

Seat No.	
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**F.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – I**

Day & Date: Friday, 06-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
4) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If $y = \log(3x + 2)$, then $y_n =$ _____.
- a) $\frac{(-1)^n n! 3^n}{(3x+2)^n}$ b) $\frac{(-1)^{n-1} (n-1)! 3^n}{(3x+2)^n}$
- c) $\frac{(-1)^{n-1} (n-1)! 3^n}{(3x+2)^{n+1}}$ d) None of these
- 2) The co-efficient of $f'''(0)$ in Maclaurin's series is _____.
- a) $\frac{x^2}{2!}$ b) $\frac{-x^2}{2!}$
- c) $\frac{-x^3}{3!}$ d) $\frac{x^3}{3!}$
- 3) If $y = x e^{2x}$, then $y_n =$ _____.
- a) $(2n)! x e^{2x}$ b) $2^n x e^{2x}$
- c) $2^n e^{2x} x + n 2^{n-1} e^{2x}$ d) $2^n e^{2x} x^2 + n 2^{n-2} e^{2x}$
- 4) Expansion of $4x^2 + 5x + 12$ in powers of $(x - 1)$ is _____.
- a) $21 + 13(x - 1) + 8(x - 1)^2$
- b) $21 + 13(x - 1) + 4(x - 1)^2$
- c) $21 - 3(x - 1) + 8(x - 1)^2$
- d) None of these
- 5) If A is a non-zero matrix of order 4×3 , then the rank of the matrix A is ____.
- a) equal to 4 b) greater than 4
- c) less than 3 or equal to 3 d) None of these
- 6) If A is a square matrix of order 'n' and $AX = 0$, where X is a $n \times 1$ matrix of unknown and $r < n$, Then the system has _____.
- a) r independent solution b) $(n - r)$ independent solutions
- c) $(2n - r)$ independent solution d) no solution
- 7) If 2,2,8 are the eigen values of a matrix $A_{3 \times 3}$ and 6,3,k are the diagonal elements, then K is equal to _____.
- a) 0 b) 1
- c) 2 d) 3

- 8) If $u = f\left(\frac{x}{y}\right)$ then _____.
- a) $x \frac{\partial u}{\partial x} - y \frac{\partial u}{\partial y} = 0$ b) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$
c) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = u$ d) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$
- 9) If $u = x - y$ and $V = xy$ then $\frac{\partial(u,V)}{\partial(x,y)} =$ _____.
- a) $x - y$ b) 0
c) $y - x$ d) $x + y$
- 10) The percentage error in area of ellipse when an error of 1% is made in measuring the major and minor axes is _____.
- a) 1% b) 2%
c) 0.5% d) 4%
- 11) The stationary points of $f(x, y) = x^2 + xy^2 + y^4$ is _____.
- a) (1,0) b) (0,1)
c) (0,0) d) (1,1)
- 12) Vector $\vec{A} = (bx^2y + yz)i + (xy^2 - xz^2)j + (2xyz - 2x^2y^2)k$ is solenoidal for b _____.
- a) -2 b) 2
c) 0.5 d) -0.5
- 13) If $\vec{r} = \vec{a} \sin ht + \vec{b} \cos ht$ then $\frac{d^2\vec{r}}{dt^2} =$ _____.
- a) \vec{r} b) $-\vec{r}$
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- 14) If \vec{a} is a constant vector then $\text{curl } \vec{a} =$ _____.
- a) \vec{a} b) a^2
c) 0 d) None of these

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Section – I

Q.2 Solve any three of the following questions. **09**

- a) Find the n^{th} derivative of $\frac{1}{6x^2-5x+1}$.
b) Expand $2x^3 + 3x^2 - 8x + 7$ in terms of $(x - 2)$.
c) Evaluate $\lim_{x \rightarrow \frac{\pi}{2}} (\sin x)^{\tan x}$
d) Find the rank of the matrix by reducing to normal form.

$$\begin{bmatrix} 6 & 4 & 7 & 3 \\ 4 & 3 & 4 & 2 \\ 2 & 1 & 5 & 6 \end{bmatrix}$$

- e) Verify the Cayley-Hamilton theorem for the matrix A where

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$$

Q.3 Solve any three of the following questions. **09**

- a) By Maclaurin's series expand $\log(1 + e^x)$ in powers of upto x^4 .
b) Evaluate $\lim_{x \rightarrow 0} \left(\frac{\sin x}{x} \right)^{\frac{1}{x^2}}$
c) Find the values of λ for which $x + y + z = 1; x + 2y + 4z = \lambda; x + 4y + 10z = \lambda^2$ has a solution. Solve it in each.
d) Are the vectors $X_1 = [1, 3, 4, 2], X_2 = [3, -5, 2, 6], X_3 = [2, -1, 3, 4]$ Linearly dependent? If so express X_2 as a Linear combination of others.
e) verify the Rolle's Theorem for the function $f(x) = x^2(1 - x)^2$ in $0 \leq x \leq 1$.

Q.4 Solve any two of the following questions. **10**

- a) Find the eigen values and the corresponding eigen vector of the matrix A. where

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 2 \\ -1 & 1 & 3 \end{bmatrix}$$

- b) If $y = [x + \sqrt{1 + x^2}]^m$, prove that $(1 + x^2)y_{n+2} + (2n + 1)xy_{n+1} + (n^2 - m^2)y_n = 0$
c) Prove that $\log(1 + \sin x) = x - \frac{x^2}{2} + \frac{x^3}{6} \dots$

Section – II

Q.5 Solve any three of the following questions. **09**

- a) If $u = ax + by, V = bx - ay$, find the value of $\left(\frac{\partial u}{\partial x}\right)_y \cdot \left(\frac{\partial x}{\partial u}\right)_v \cdot \left(\frac{\partial y}{\partial v}\right)_x \cdot \left(\frac{\partial v}{\partial y}\right)_u$
- b) if $z = f(u, v), u = \log(x^2 + y^2), v = \frac{y}{x}$, show that $x \frac{\partial z}{\partial y} - y \frac{\partial z}{\partial x} = (1 + v^2) \frac{\partial z}{\partial x}$.
- c) If $x = a \cos hu \cos v, y = a \sin hu \sin v$ find $\frac{\partial(x,y)}{\partial(u,v)}$
- d) Find the maximum value of $f = x^2 y^3 z^4$, subject to the condition $x + y + z = 5$
- e) Find the directional derivatives of $\phi = 4xz^3 - 3x^2 y^2 z$ at $(2, -1, 2)$ in the direction from this point towards the point $(4, -4, 8)$.

Q.6 Solve any three of the following questions. **09**

- a) If $u = \log(1 + x^n + y^n)$ then find the value of $\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial u}{\partial x} \frac{\partial u}{\partial y}$
- b) If $z = f(u, v), u = x^2 - y^2, v = y^2 - x^2$, prove that $x \frac{\partial z}{\partial y} + y \frac{\partial z}{\partial x} = 0$
- c) Find $[(2.92)^3 + (5.87)^3]^{1/5}$ approximately by using the theory of approximation.
- d) Find the angle between two surfaces $x^2 + y^2 + az^2 = 6$ and $z = 4 - y^2 + bxy$ at $P(1, 1, 2)$.
- e) A particle moves on the curve $x = 2t^2, y = t^2 - 4t, z = 3t - 5$. Find the velocity and acceleration at $t = 1$ in the direction of $i - 3j + 2k$.

Q.7 Solve any two of the following questions. **10**

- a) If $u = \operatorname{cosec}^{-1} \sqrt{\frac{x^{1/2} + y^{1/2}}{x^{1/3} + y^{1/3}}}$ then find the values of
- 1) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$
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- b) Find the minimum and maximum values of $x^3 y^2 (1 - x - y)$
- c) Prove that $\nabla \cdot \left(r \nabla \frac{1}{r^3} \right) = \frac{3}{r^4}$

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- 1) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$
 - 2) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$
- b) Find the minimum and maximum values of $x^3 y^2 (1 - x - y)$
- c) Prove that $\nabla \cdot \left(r \nabla \frac{1}{r^3} \right) = \frac{3}{r^4}$

- 9) Expansion of $4x^2 + 5x + 12$ in powers of $(x - 1)$ is _____.
- a) $21 + 13(x - 1) + 8(x - 1)^2$
b) $21 + 13(x - 1) + 4(x - 1)^2$
c) $21 - 3(x - 1) + 8(x - 1)^2$
d) None of these
- 10) If A is a non-zero matrix of order 4×3 , then the rank of the matrix A is ____.
- a) equal to 4
b) greater than 4
c) less than 3 or equal to 3
d) None of these
- 11) If A is a square matrix of order 'n' and $AX = 0$, where X is a $n \times 1$ matrix of unknown and $r < n$, Then the system has _____.
- a) r independent solution
b) $(n - r)$ independent solutions
c) $(2n - r)$ independent solution
d) no solution
- 12) If 2,2,8 are the eigen values of a matrix $A_{3 \times 3}$ and 6,3,k are the diagonal elements, then K is equal to _____.
- a) 0
b) 1
c) 2
d) 3
- 13) If $u = f\left(\frac{x}{y}\right)$ then _____.
- a) $x \frac{\partial u}{\partial x} - y \frac{\partial u}{\partial y} = 0$
b) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$
c) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = u$
d) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$
- 14) If $u = x - y$ and $V = xy$ then $\frac{\partial(u,V)}{\partial(x,y)} =$ _____.
- a) $x - y$
b) 0
c) $y - x$
d) $x + y$

Seat No.	
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**F.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – I**

Day & Date: Friday, 06-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
4) Use of calculator is allowed.

Section – I

Q.2 Solve any three of the following questions.

09

- a) Find the n^{th} derivative of $\frac{1}{6x^2-5x+1}$.
b) Expand $2x^3 + 3x^2 - 8x + 7$ in terms of $(x - 2)$.
c) Evaluate $\lim_{x \rightarrow \frac{\pi}{2}} (\sin x)^{\tan x}$
d) Find the rank of the matrix by reducing to normal form.

$$\begin{bmatrix} 6 & 4 & 7 & 3 \\ 4 & 3 & 4 & 2 \\ 2 & 1 & 5 & 6 \end{bmatrix}$$

- e) Verify the Cayley-Hamilton theorem for the matrix A where

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$$

Q.3 Solve any three of the following questions.

09

- a) By Maclaurin's series expand $\log(1 + e^x)$ in powers of upto x^4 .
b) Evaluate $\lim_{x \rightarrow 0} \left(\frac{\sin x}{x} \right)^{\frac{1}{x^2}}$
c) Find the values of λ for which $x + y + z = 1; x + 2y + 4z = \lambda; x + 4y + 10z = \lambda^2$ has a solution. Solve it in each.
d) Are the vectors $X_1 = [1, 3, 4, 2], X_2 = [3, -5, 2, 6], X_3 = [2, -1, 3, 4]$ Linearly dependent? If so express X_2 as a Linear combination of others.
e) verify the Rolle's Theorem for the function $f(x) = x^2(1 - x)^2$ in $0 \leq x \leq 1$.

Q.4 Solve any two of the following questions.

10

- a) Find the eigen values and the corresponding eigen vector of the matrix A. where

$$A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 2 \\ -1 & 1 & 3 \end{bmatrix}$$

- b) If $y = [x + \sqrt{1 + x^2}]^m$, prove that $(1 + x^2)y_{n+2} + (2n + 1)xy_{n+1} + (n^2 - m^2)y_n = 0$
c) Prove that $\log(1 + \sin x) = x - \frac{x^2}{2} + \frac{x^3}{6} \dots$

Section – II

Q.5 Solve any three of the following questions. **09**

- a) If $u = ax + by, V = bx - ay$, find the value of $\left(\frac{\partial u}{\partial x}\right)_y \cdot \left(\frac{\partial x}{\partial u}\right)_v \cdot \left(\frac{\partial y}{\partial v}\right)_x \cdot \left(\frac{\partial v}{\partial y}\right)_u$
- b) if $z = f(u, v), u = \log(x^2 + y^2), v = \frac{y}{x}$, show that $x \frac{\partial z}{\partial y} - y \frac{\partial z}{\partial x} = (1 + v^2) \frac{\partial z}{\partial x}$.
- c) If $x = a \cos hu \cos v, y = a \sin hu \sin v$ find $\frac{\partial(x,y)}{\partial(u,v)}$
- d) Find the maximum value of $f = x^2 y^3 z^4$, subject to the condition $x + y + z = 5$
- e) Find the directional derivatives of $\phi = 4xz^3 - 3x^2 y^2 z$ at $(2, -1, 2)$ in the direction from this point towards the point $(4, -4, 8)$.

Q.6 Solve any three of the following questions. **09**

- a) If $u = \log(1 + x^n + y^n)$ then find the value of $\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial u}{\partial x} \frac{\partial u}{\partial y}$
- b) If $z = f(u, v), u = x^2 - y^2, v = y^2 - x^2$, prove that $x \frac{\partial z}{\partial y} + y \frac{\partial z}{\partial x} = 0$
- c) Find $[(2.92)^3 + (5.87)^3]^{1/5}$ approximately by using the theory of approximation.
- d) Find the angle between two surfaces $x^2 + y^2 + az^2 = 6$ and $z = 4 - y^2 + bxy$ at $P(1, 1, 2)$.
- e) A particle moves on the curve $x = 2t^2, y = t^2 - 4t, z = 3t - 5$. Find the velocity and acceleration at $t = 1$ in the direction of $i - 3j + 2k$.

Q.7 Solve any two of the following questions. **10**

- a) If $u = \operatorname{cosec}^{-1} \sqrt{\frac{x^{1/2} + y^{1/2}}{x^{1/3} + y^{1/3}}}$ then find the values of
- 1) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$
 - 2) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$
- b) Find the minimum and maximum values of $x^3 y^2 (1 - x - y)$
- c) Prove that $\nabla \cdot \left(r \nabla \frac{1}{r^3} \right) = \frac{3}{r^4}$

Seat
No.

**S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering**

CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicates full marks
3) Assume suitable data wherever needed and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Which one doesn't come under Calcareous Rocks?
 - a) Limestone
 - b) Cement rock
 - c) Chalk
 - d) Marine shell deposits
- 2) The blended meal is sieved and fed into a rotating dish called a _____.
 - a) Clinker
 - b) Kiln
 - c) Granulator
 - d) Raw meal
- 3) Which chemical composition has highest content in OPC?
 - a) Alumina
 - b) Silica
 - c) Lime
 - d) Iron Oxide
- 4) In the soundness test a specimen of hardened cement paste is _____ for a fixed time.
 - a) Freeze
 - b) Dry
 - c) Boiled
 - d) Dipped in water
- 5) Workability of concrete is directly proportional to _____.
 - a) Grading of the aggregates
 - b) Time of transit
 - c) Aggregates cement ratio
 - d) Water cement ratio
- 6) Tensile test can be performed on _____.
 - a) Impact testing machine
 - b) Universal testing machine
 - c) Rockwell tester
 - d) Brinell tester
- 7) Which of the following option doesn't come in chemical admixtures?
 - a) Plasticizers
 - b) Pozzolanic
 - c) Super plasticizer
 - d) Accelerator
- 8) Shrinkage, which takes place before concrete has set is known as _____.
 - a) Autogenous Shrinkage
 - b) Drying shrinkage
 - c) Plastic Shrinkage
 - d) Carbonation Shrinkage
- 9) The tensile strength of concrete is about _____ of its compressive strength.
 - a) 10 to 15%
 - b) 30 to 40%
 - c) 50%
 - d) 60 to 70%

- 10) Shrinkage increases with _____.
a) Increases in water-cement ratio.
b) Increases in cement content.
c) Decreases in humidity.
d) All of above.
- 11) IS provision for concrete mix design is given by _____.
a) IS 4031-1968 b) IS 383-1970
c) IS 456-2000 d) IS 10262-2009
- 12) For the construction of the retaining structures, the type of concrete mix to be used, is _____.
a) 1:3:6 b) 1:2:4
c) 1: 1.5 : 3 d) 1: 1:2
- 13) If the average compressive strength is 4000 kg/cm^2 and standard deviation is 500, the co-efficient of variation is _____.
a) 10% b) 12.5%
c) 15% d) 20%
- 14) Permissible compressive strength of M 200 concrete grade is _____.
a) 100 kg/cm^2 b) 150 kg/cm^2
c) 200 kg/cm^2 d) 250 kg/cm^2

Seat No.	
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**S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering**

CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Figures to the right indicates full marks.
2) All questions are compulsory.
3) Assume suitable data wherever needed and mention it clearly.

Section – I

Q.2 Attempt any two of the following question.

12

- What is the chemical Composition of Cement with its Significance?
- Explain the manufacturing process of cement by Wet Process with flow chart construction.
- What is Hydration? Explain the role of “C₃S, C₂S, C₃A and C₄AF” during the hydration process?
- Find the fineness modulus of Sand and also define which type of Fine Aggregate it is with its Zone number. Below table 01 is given content of Sieve size and weight retained. (Use grading limit table 02)

Sieve Size	Weight retained
4.75	0.138
2.36	0.161
1.18	0.290
600	0.282
300	0.116
150	0.006
Pan	0.007

I.S. Sieve Designation, mm	Percentage passing by weight for			
	Grading Zone – I	Grading Zone – II	Grading Zone – III	Grading Zone – IV
10	100	100	100	100
4.75	90-100	90-100	90-100	95-100
2.36	60-95	75-100	85-100	95-100
1.18	30-70	55-90	75-100	90-100
0.6	15-34	35-59	60-79	80-100
0.3	5-20	8-30	12-40	15-50
0.15	0-10	0-10	0-10	0-15

Q.3 Attempt any four of the following question.

16

- Write a note on bulking of Sand.
- Write a brief note on Retarders and retarding admixtures and Accelerators and Accelerating Admixture.
- Write a note on Standard Grading Curve.
- Enlist types of Cement and explain in the any three of it.
- How the shape of aggregate effect on performance of Concrete?
- Write a note sulphate and chloride attack on concrete.

Section – II**Q.4 Write a note on any four of the following. 12**

- a) Shrinkage and Types of shrinkage
- b) Alkali aggregate reaction
- c) Quality control of concrete
- d) Tension test on mild steel
- e) Durability of concrete
- f) Brinell or Rockwell hardness test on metal

OR**Q.4 Write a note on any three of the following. 12**

- a) Creep of concrete and list factors affecting on creep
- b) Compression test on mild steel
- c) Types of Mixes
- d) Effect of w/c ratio on Durability of concrete

Q.5 Design M25 Concrete Mix as per IS Code 10262:2009 using following data: 16

- 1) Stipulations for proportioning

A) Grade Designation:	M25
B) Types of cement:	OPC 43 Grade conforming to IS
C) Max nominal size of aggregate:	20mm
D) Workability:	75mm(Slump)
E) Exposure Condition:	Moderate (For RCC)
F) Method of concrete placing:	Pumping
G) Degree of Supervision:	Good
H) Type of aggregate:	Crushed angular aggregate
I) Maximum cement content:	Nil
J) Chemical admixture type:	Nil
- 2) Test data for material

A) Cement Used:	OPC 43 grade
B) Specific gravity of cement:	3.15
C) Specific gravity of Course aggregate:	2.9
D) Specific gravity of Fine aggregate:	2.8
E) Water abortion:	
Course aggregate:	0.6%
Fine aggregate:	1.0%
F) Sieve analysis:	
Course aggregate:	Conforming to IS 383
Fine aggregate:	Conforming to grading zone I of IS 383

Table 1 Assumed Standard Deviation
(Clauses 3.2.1.2, A-3 and B-3)

Sl No. (1)	Grade of Concrete (2)	Assumed Standard Deviation N/mm ² (3)
i)	M 10	3.5
ii)	M 15	
iii)	M 20	4.0
iv)	M 25	
v)	M 30	5.0
vi)	M 35	
vii)	M 40	
viii)	M 45	
ix)	M 50	
x)	M 55	

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(Clauses 4.2, A-5 and B-5)

Sl No. (1)	Nominal Maximum Size of Aggregate mm (2)	Maximum Water Content ¹⁾ kg (3)
i)	10	208
ii)	20	186
iii)	40	165

NOTE — These quantities of mixing water are for use in computing cementitious material contents for trial batches.

¹⁾ Water content corresponding to saturated surface dry aggregate.

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate
(Clauses 4.4, A-7 and B-7)

Sl No.	Nominal Maximum Size of Aggregate mm	Volume of Coarse Aggregate ¹⁾ per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
		Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

¹⁾ Volumes are based on aggregates in saturated surface dry condition.

Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	-	300	0.55	M 20
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

Seat No.	
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**S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering**

CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicates full marks
3) Assume suitable data wherever needed and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Shrinkage, which takes place before concrete has set is known as _____.
a) Autogenous Shrinkage b) Drying shrinkage
c) Plastic Shrinkage d) Carbonation Shrinkage
- 2) The tensile strength of concrete is about _____ of its compressive strength.
a) 10 to 15% b) 30 to 40%
c) 50% d) 60 to 70%
- 3) Shrinkage increases with _____.
a) Increases in water-cement ratio.
b) Increases in cement content.
c) Decreases in humidity.
d) All of above.
- 4) IS provision for concrete mix design is given by _____.
a) IS 4031-1968 b) IS 383-1970
c) IS 456-2000 d) IS 10262-2009
- 5) For the construction of the retaining structures, the type of concrete mix to be used, is _____.
a) 1:3:6 b) 1:2:4
c) 1: 1.5 : 3 d) 1: 1:2
- 6) If the average compressive strength is 4000 kg/cm² and standard deviation is 500, the co-efficient of variation is _____.
a) 10% b) 12.5%
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- 7) Permissible compressive strength of M 200 concrete grade is _____.
a) 100kg/cm² b) 150kg/cm²
c) 200 kg/cm² d) 250kg/cm²
- 8) Which one doesn't comes under Calcareous Rocks?
a) Limestone b) Cement rock
c) Chalk d) Marine shell deposits

Seat No.	
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**S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering**

CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday,07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Figures to the right indicates full marks.
2) All questions are compulsory.
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Section – I

Q.2 Attempt any two of the following question.

12

- What is the chemical Composition of Cement with its Significance?
- Explain die manufacturing process of cement by Wet Process with flow chart construction.
- What is Hydration? Explain the role of “C₃S, C₂S, C₃A and C₄AF” during the hydration process?
- Find the fineness modulus of Sand and also define which type of Fine Aggregate it is with its Zone number. Below table 01 is given content of Sieve size and weight retained.(Use grading limit table 02)

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Q.3 Attempt any four of the following question.

16

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Section – II

Q.4 Write a note on any four of the following. **12**

- a) Shrinkage and Types of shrinkage
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- e) Durability of concrete
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OR

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- 1) Stipulations for proportioning

A) Grade Designation:	M25
B) Types of cement:	OPC 43 Grade conforming to IS
C) Max nominal size of aggregate:	20mm
D) Workability:	75mm(Slump)
E) Exposure Condition:	Moderate (For RCC)
F) Method of concrete placing:	Pumping
G) Degree of Supervision:	Good
H) Type of aggregate:	Crushed angular aggregate
I) Maximum cement content:	Nil
J) Chemical admixture type:	Nil
- 2) Test data for material

A) Cement Used:	OPC 43 grade
B) Specific gravity of cement:	3.15
C) Specific gravity of Course aggregate:	2.9
D) Specific gravity of Fine aggregate:	2.8
E) Water abortion:	
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vi)	M 35	
vii)	M 40	
viii)	M 45	
ix)	M 50	
x)	M 55	

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iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering

CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicates full marks
 3) Assume suitable data wherever needed and mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Workability of concrete is directly proportional to _____.
 a) Grading of the aggregates b) Time of transit
 c) Aggregates cement ratio d) Water cement ratio
- 2) Tensile test can be performed on _____.
 a) Impact testing machine b) Universal testing machine
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- 3) Which of the following option doesn't come in chemical admixtures?
 a) Plasticizers b) Pozzolanic
 c) Super plasticizer d) Accelerator
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 c) Plastic Shrinkage d) Carbonation Shrinkage
- 5) The tensile strength of concrete is about _____ of its compressive strength.
 a) 10 to 15% b) 30 to 40%
 c) 50% d) 60 to 70%
- 6) Shrinkage increases with _____.
 a) Increases in water-cement ratio.
 b) Increases in cement content.
 c) Decreases in humidity.
 d) All of above.
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 a) IS 4031-1968 b) IS 383-1970
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 a) 1:3:6 b) 1:2:4
 c) 1: 1.5 : 3 d) 1: 1:2
- 9) If the average compressive strength is 4000 kg/cm² and standard deviation is 500, the co-efficient of variation is _____.
 a) 10% b) 12.5%
 c) 15% d) 20%

Seat No.	
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**S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering**

CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Figures to the right indicates full marks.
2) All questions are compulsory.
3) Assume suitable data wherever needed and mention it clearly.

Section – I

Q.2 Attempt any two of the following question.

12

- What is the chemical Composition of Cement with its Significance?
- Explain the manufacturing process of cement by Wet Process with flow chart construction.
- What is Hydration? Explain the role of “C₃S, C₂S, C₃A and C₄AF” during the hydration process?
- Find the fineness modulus of Sand and also define which type of Fine Aggregate it is with its Zone number. Below table 01 is given content of Sieve size and weight retained. (Use grading limit table 02)

Sieve Size	Weight retained
4.75	0.138
2.36	0.161
1.18	0.290
600	0.282
300	0.116
150	0.006
Pan	0.007

I.S. Sieve Designation, mm	Percentage passing by weight for			
	Grading Zone – I	Grading Zone – II	Grading Zone – III	Grading Zone – IV
10	100	100	100	100
4.75	90-100	90-100	90-100	95-100
2.36	60-95	75-100	85-100	95-100
1.18	30-70	55-90	75-100	90-100
0.6	15-34	35-59	60-79	80-100
0.3	5-20	8-30	12-40	15-50
0.15	0-10	0-10	0-10	0-15

Q.3 Attempt any four of the following question.

16

- Write a note on bulking of Sand.
- Write a brief note on Retarders and retarding admixtures and Accelerators and Accelerating Admixture.
- Write a note on Standard Grading Curve.
- Enlist types of Cement and explain in the any three of it.
- How the shape of aggregate effect on performance of Concrete?
- Write a note sulphate and chloride attack on concrete.

Section – II

Q.4 Write a note on any four of the following. **12**

- a) Shrinkage and Types of shrinkage
- b) Alkali aggregate reaction
- c) Quality control of concrete
- d) Tension test on mild steel
- e) Durability of concrete
- f) Brinell or Rockwell hardness test on metal

OR

Q.4 Write a note on any three of the following. **12**

- a) Creep of concrete and list factors affecting on creep
- b) Compression test on mild steel
- c) Types of Mixes
- d) Effect of w/c ratio on Durability of concrete

Q.5 Design M25 Concrete Mix as per IS Code 10262:2009 using following data: **16**

- 1) Stipulations for proportioning

A) Grade Designation:	M25
B) Types of cement:	OPC 43 Grade conforming to IS
C) Max nominal size of aggregate:	20mm
D) Workability:	75mm(Slump)
E) Exposure Condition:	Moderate (For RCC)
F) Method of concrete placing:	Pumping
G) Degree of Supervision:	Good
H) Type of aggregate:	Crushed angular aggregate
I) Maximum cement content:	Nil
J) Chemical admixture type:	Nil
- 2) Test data for material

A) Cement Used:	OPC 43 grade
B) Specific gravity of cement:	3.15
C) Specific gravity of Course aggregate:	2.9
D) Specific gravity of Fine aggregate:	2.8
E) Water abortion:	
Course aggregate:	0.6%
Fine aggregate:	1.0%
F) Sieve analysis:	
Course aggregate:	Conforming to IS 383
Fine aggregate:	Conforming to grading zone I of IS 383

Table 1 Assumed Standard Deviation
(Clauses 3.2.1.2, A-3 and B-3)

Sl No. (1)	Grade of Concrete (2)	Assumed Standard Deviation N/mm ² (3)
i)	M 10	3.5
ii)	M 15	
iii)	M 20	4.0
iv)	M 25	
v)	M 30	5.0
vi)	M 35	
vii)	M 40	
viii)	M 45	
ix)	M 50	
x)	M 55	

Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate
(Clauses 4.2, A-5 and B-5)

Sl No. (1)	Nominal Maximum Size of Aggregate mm (2)	Maximum Water Content ¹⁾ kg (3)
i)	10	208
ii)	20	186
iii)	40	165

NOTE — These quantities of mixing water are for use in computing cementitious material contents for trial batches.

¹⁾ Water content corresponding to saturated surface dry aggregate.

Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate (Clauses 4.4, A-7 and B-7)

Sl No.	Nominal Maximum Size of Aggregate mm	Volume of Coarse Aggregate ¹⁾ per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
		Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

¹⁾ Volumes are based on aggregates in saturated surface dry condition.

Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m ³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	-	300	0.55	M 20
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Shrinkage increases with _____.
 - a) Increases in water-cement ratio.
 - b) Increases in cement content.
 - c) Decreases in humidity.
 - d) All of above.
- 2) IS provision for concrete mix design is given by _____.
 - a) IS 4031-1968
 - b) IS 383-1970
 - c) IS 456-2000
 - d) IS 10262-2009
- 3) For the construction of the retaining structures, the type of concrete mix to be used, is _____.
 - a) 1:3:6
 - b) 1:2:4
 - c) 1: 1.5 : 3
 - d) 1: 1:2
- 4) If the average compressive strength is 4000 kg/cm^2 and standard deviation is 500, the co-efficient of variation is _____.
 - a) 10%
 - b) 12.5%
 - c) 15%
 - d) 20%
- 5) Permissible compressive strength of M 200 concrete grade is _____.
 - a) 100 kg/cm^2
 - b) 150 kg/cm^2
 - c) 200 kg/cm^2
 - d) 250 kg/cm^2
- 6) Which one doesn't comes under Calcareous Rocks?
 - a) Limestone
 - b) Cement rock
 - c) Chalk
 - d) Marine shell deposits
- 7) The blended meal is sieved and fed into a rotating dish called a _____.
 - a) Clinker
 - b) Kiln
 - c) Granulator
 - d) Raw meal
- 8) Which chemical composition has highest content in OPC?
 - a) Alumina
 - b) Silica
 - c) Lime
 - d) Iron Oxide

- 9) In the soundness test a specimen of hardened cement paste is _____ for a fixed time.
- a) Freeze
 - b) Dry
 - c) Boiled
 - d) Dipped in water
- 10) Workability of concrete is directly proportional to _____.
- a) Grading of the aggregates
 - b) Time of transit
 - c) Aggregates cement ratio
 - d) Water cement ratio
- 11) Tensile test can be performed on _____.
- a) Impact testing machine
 - b) Universal testing machine
 - c) Rockwell tester
 - d) Brinell tester
- 12) Which of the following option doesn't come in chemical admixtures?
- a) Plasticizers
 - b) Pozzolanic
 - c) Super plasticizer
 - d) Accelerator
- 13) Shrinkage, which takes place before concrete has set is known as _____.
- a) Autogenous Shrinkage
 - b) Drying shrinkage
 - c) Plastic Shrinkage
 - d) Carbonation Shrinkage
- 14) The tensile strength of concrete is about _____ of its compressive strength.
- a) 10 to 15%
 - b) 30 to 40%
 - c) 50%
 - d) 60 to 70%

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vi)	M 35	
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viii)	M 45	
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Seat No.	
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING & GEOMATICS

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

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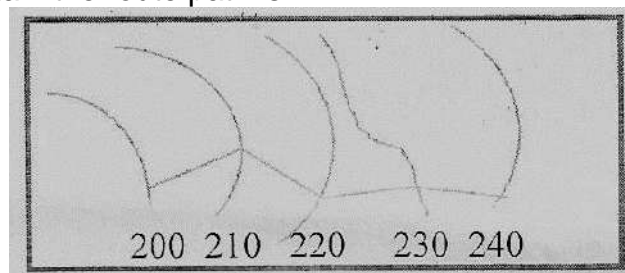
MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In tilting level the leveling of longitudinal bubble tube is done _____.
a) Using tilting screw before taking every staff reading
b) Using tilting screw after taking every staff reading
c) Using the foot screws after taking every staff reading
d) Using the foot screws before taking every staff reading
- 2) During direct method of Contouring, the staff reading observed on Bench mark of 500.000m Reduced level, is 3.000m. What should be the staff readings for locating the contour of 499.000m?
a) 1m
b) 2m
c) 3m
d) 4m
- 3) During block contouring the following staff readings are observed at four corners of a block having 5m by 5m size on ground.
It is required to locate a route from P to Q at an upward gradient of 1 in 500. The contour map of the area is available at a contour interval of 10m at a scale of 1:10000 which is shown in the fig. The radius of the arc required to obtain the route path is



- a) 0.1m
b) 0.2m
c) 0.3m
d) 0.5m
- 4) The digital level can measure _____.
a) Staff reading
b) Horizontal distance
c) Both a) and b)
d) None of these
- 5) The Transit Rule is used for applying correction to consecutive coordinates if _____.
a) Linear measurements are more precise
b) Angular measurements are more precise
c) Both linear and angular measurements are equally precise
d) None of these

- 6) The Bow Ditches rule is used for correcting the consecutive coordinates if ____.
- a) Linear measurements are more precise
 - b) Angular measurements are more precise
 - c) Both linear and angular measurements are equally precise
 - d) None of these
- 7) Resection is the process of ____.
- a) Orienting the telescope of total station towards North direction
 - b) Orienting the telescope of total station using the data of occupied station and Back sight point
 - c) Finding the coordinates of the instrument station from the coordinates of two known points
 - d) Locating the station from its known coordinates
- 8) Global positioning services (GPS) uses 24 satellite in ____.
- a) 9 Orbit
 - b) 8 Orbit
 - c) 7 Orbit
 - d) 6 Orbit
- 9) Which of the following are known as GPS positioning methods?
- a) Static
 - b) Real time kinematics
 - c) Stop and go
 - d) All of these
- 10) In a raster overlay, a point is represented by a ____.
- a) String of cells
 - b) Group of cells
 - c) Single cell
 - d) All of these
- 11) Cell like units are characteristics of ____.
- a) Raster data structures
 - b) Cellular data structures
 - c) Both (a) and (b)
 - d) Vector data structures
- 12) A passive sensor uses which of the following sources of energy?
- a) Sun
 - b) Flashlight
 - c) Its own source
 - d) Moon
- 13) Setting out is done ____.
- a) Prior to the preparation of plans
 - b) Along with the preparation of plans
 - c) After the preparation of plans
 - d) If obstructions are there
- 14) Setting out of bridge involves determination of ____.
- a) Length of Central Line and height of piers
 - b) Direction of Central Line and height of piers
 - c) Length of Central Line and position of piers
 - d) None of these

Seat No.	
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Set **P**

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SURVEYING & GEOMATICS

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Section I

- Q.2** a) Explain the construction and working principle of Tilting Level with suitable sketches. **04**
 b) During block contouring the following staff readings are observed at four corners of a block having 5m by 5m size on ground.

Station and Cartesian coordinate (m)	Staff reading (m)			Rise	Fall	R.L	Remark
	B.S.	I.S.	F.S.				
	4.000					500.000	Bench mark
0,0		3.000					
0,5		0.000					
5,5		1.000					
5,0			2.000				

- 1) Calculate the R.L. of stations at four corners using rise and fall method. Take usual arithmetic check. **02**
 2) Draw the block at 1:50 scale on the answer sheet and show the Reduced Levels as per conditions. **02**
 3) Draw contours at 1m contour interval. Use arithmetic method of interpolation. **04**

Q.3 Explain

- a) Explain the uses of contour map with suitable example for checking the inter-visibility from opposite ends of a line. **04**
 b) Explain the construction and working of digital level. **04**

- Q.4** a) Compare the Bow Ditches rule and transit rule. **04**
 b) Calculate the independent coordinates for the following traverse using Transit rule. **04**

Station	Line	Length	Consecutive coordinates				Independent Coordinates	
			Latitude		Departure		L	D
			Northing	Southing	Easting	Westing	N	E
P	SP	85	13.29		83.95		500	600
Q	PQ	100	99.98		1.74			
R	QR	80	8.36			79.56		
S	RS	95		94.98		1.66		

Q.5 Explain

- a) Use of Total station for stake out. **04**
 b) Use of total station for Remote elevation measurement. **04**

Section II

- Q.6 a)** Construction & use of Mirror stereoscope. **04**
b) Two points A and B having elevations of 500 m and 300 m respectively above datum appear on a vertical photograph having focal length of 20 cm & flying altitude of 2500m above datum. Their corrected photographic coordinates are as follow: **06**

Point	x co-ordinate	y co-ordinate
a	+ 265 mm	+ 136 mm
b	- 192 mm	- 365 mm

Determine the length of ground line AB.

- Q.7 a)** What are the segments of GPS? Describe them briefly. **05**
b) Describe GPS receivers & its type. **04**
- Q.8 a)** Write a note on Spatial data & non spatial data. **05**
b) Explain setting out of Tunnel. **04**
- Q.9 a)** What are the different Application of GPS? **04**
b) What are the different Application of GIS? **05**

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Set **Q**

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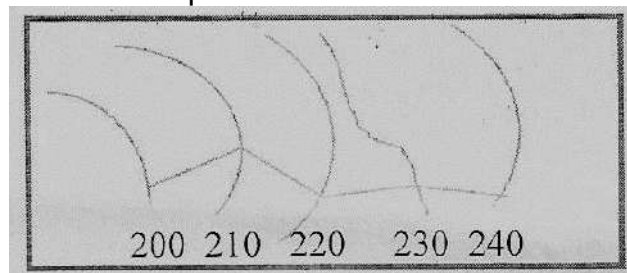
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Set	Q
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5,0			2.000				

- 1) Calculate the R.L. of stations at four corners using rise and fall method. Take usual arithmetic check. **02**
2) Draw the block at 1:50 scale on the answer sheet and show the Reduced Levels as per conditions. **02**
3) Draw contours at 1m contour interval. Use arithmetic method of interpolation. **04**

Q.3 Explain

- a) Explain the uses of contour map with suitable example for checking the inter-visibility from opposite ends of a line. **04**
b) Explain the construction and working of digital level. **04**

- Q.4** a) Compare the Bow Ditches rule and transit rule. **04**
b) Calculate the independent coordinates for the following traverse using Transit rule. **04**

Station	Line	Length	Consecutive coordinates				Independent Coordinates	
			Latitude		Departure		L	D
			Northing	Southing	Easting	Westing	N	E
P	SP	85	13.29		83.95		500	600
Q	PQ	100	99.98		1.74			
R	QR	80	8.36			79.56		
S	RS	95		94.98		1.66		

- Q.5 Explain**
- a) Use of Total station for stake out. **04**
 - b) Use of total station for Remote elevation measurement. **04**

Section II

- Q.6**
- a) Construction & use of Mirror stereoscope. **04**
 - b) Two points A and B having elevations of 500 m and 300 m respectively above datum appear on a vertical photograph having focal length of 20 cm & flying altitude of 2500m above datum. Their corrected photographic coordinates are as follow: **06**

Point	x co-ordinate	y co-ordinate
a	+ 265 mm	+ 136 mm
b	- 192 mm	- 365 mm

Determine the length of ground line AB.

- Q.7**
 - a) What are the segments of GPS? Describe them briefly. **05**
 - b) Describe GPS receivers & its type. **04**
- Q.8**
 - a) Write a note on Spatial data & non spatial data. **05**
 - b) Explain setting out of Tunnel. **04**
- Q.9**
 - a) What are the different Application of GPS? **04**
 - b) What are the different Application of GIS? **05**

Seat No.	
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING & GEOMATICS

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The Transit Rule is used for applying correction to consecutive coordinates if _____.
 - a) Linear measurements are more precise
 - b) Angular measurements are more precise
 - c) Both linear and angular measurements are equally precise
 - d) None of these
- 2) The Bow Ditches rule is used for correcting the consecutive coordinates if _____.
 - a) Linear measurements are more precise
 - b) Angular measurements are more precise
 - c) Both linear and angular measurements are equally precise
 - d) None of these
- 3) Resection is the process of _____.
 - a) Orienting the telescope of total station towards North direction
 - b) Orienting the telescope of total station using the data of occupied station and Back sight point
 - c) Finding the coordinates of the instrument station from the coordinates of two known points
 - d) Locating the station from its known coordinates
- 4) Global positioning services (GPS) uses 24 satellite in _____.

a) 9 Orbit	b) 8 Orbit
c) 7 Orbit	d) 6 Orbit
- 5) Which of the following are known as GPS positioning methods?

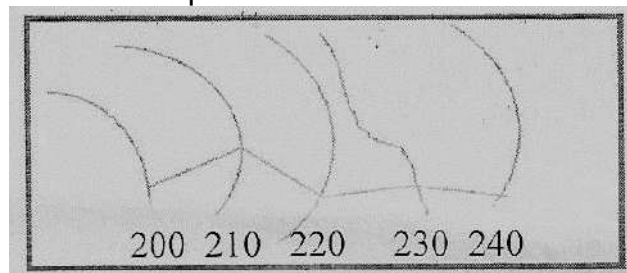
a) Static	b) Real time kinematics
c) Stop and go	d) All of these
- 6) In a raster overlay, a point is represented by a _____.

a) String of cells	b) Group of cells
c) Single cell	d) All of these
- 7) Cell like units are characteristics of _____.

a) Raster data structures	b) Cellular data structures
c) Both (a) and (b)	d) Vector data structures
- 8) A passive sensor uses which of the following sources of energy?

a) Sun	b) Flashlight
c) Its own source	d) Moon

- 9) Setting out is done _____.
- Prior to the preparation of plans
 - Along with the preparation of plans
 - After the preparation of plans
 - If obstructions are there
- 10) Setting out of bridge involves determination of _____.
- Length of Central Line and height of piers
 - Direction of Central Line and height of piers
 - Length of Central Line and position of piers
 - None of these
- 11) In tilting level the leveling of longitudinal bubble tube is done _____.
- Using tilting screw before taking every staff reading
 - Using tilting screw after taking every staff reading
 - Using the foot screws after taking every staff reading
 - Using the foot screws before taking every staff reading
- 12) During direct method of Contouring, the staff reading observed on Bench mark of 500.000m Reduced level, is 3.000m. What should be the staff readings for locating the contour of 499.000m?
- 1m
 - 2m
 - 3m
 - 4m
- 13) During block contouring the following staff readings are observed at four corners of a block having 5m by 5m size on ground. It is required to locate a route from P to Q at an upward gradient of 1 in 500. The contour map of the area is available at a contour interval of 10m at a scale of 1:10000 which is shown in the fig. The radius of the arc required to obtain the route path is



- 0.1m
 - 0.2m
 - 0.3m
 - 0.5m
- 14) The digital level can measure _____.
- Staff reading
 - Horizontal distance
 - Both a) and b)
 - None of these

Seat No.	
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**S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING & GEOMATICS**

Day & Date: Tuesday, 10-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Q. No. 2 & Q. No. 6 is compulsory.
2) Attempt any two questions from each section.
3) Figures to the right indicate fill marks.

Section I

- Q.2** a) Explain the construction and working principle of Tilting Level with suitable sketches. **04**
b) During block contouring the following staff readings are observed at four corners of a block having 5m by 5m size on ground.

Station and Cartesian coordinate (m)	Staff reading (m)			Rise	Fall	R.L	Remark
	B.S.	I.S.	F.S.				
	4.000					500.000	Bench mark
0,0		3.000					
0,5		0.000					
5,5		1.000					
5,0			2.000				

- 1) Calculate the R.L. of stations at four corners using rise and fall method. Take usual arithmetic check. **02**
2) Draw the block at 1:50 scale on the answer sheet and show the Reduced Levels as per conditions. **02**
3) Draw contours at 1m contour interval. Use arithmetic method of interpolation. **04**

Q.3 Explain

- a) Explain the uses of contour map with suitable example for checking the inter-visibility from opposite ends of a line. **04**
b) Explain the construction and working of digital level. **04**

- Q.4** a) Compare the Bow Ditches rule and transit rule. **04**
b) Calculate the independent coordinates for the following traverse using Transit rule. **04**

Station	Line	Length	Consecutive coordinates				Independent Coordinates	
			Latitude		Departure		L	D
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P	SP	85	13.29		83.95		500	600
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Q.5 Explain

- a) Use of Total station for stake out. **04**
 b) Use of total station for Remote elevation measurement. **04**

Section II

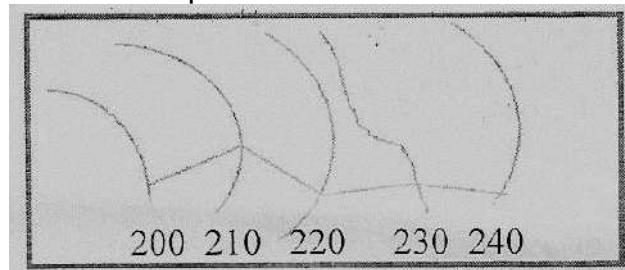
- Q.6 a)** Construction & use of Mirror stereoscope. **04**
b) Two points A and B having elevations of 500 m and 300 m respectively above datum appear on a vertical photograph having focal length of 20 cm & flying altitude of 2500m above datum. Their corrected photographic coordinates are as follow: **06**

Point	x co-ordinate	y co-ordinate
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Determine the length of ground line AB.

- Q.7 a)** What are the segments of GPS? Describe them briefly. **05**
b) Describe GPS receivers & its type. **04**
- Q.8 a)** Write a note on Spatial data & non spatial data. **05**
b) Explain setting out of Tunnel. **04**
- Q.9 a)** What are the different Application of GPS? **04**
b) What are the different Application of GIS? **05**

- 8) During block contouring the following staff readings are observed at four corners of a block having 5m by 5m size on ground. It is required to locate a route from P to Q at an upward gradient of 1 in 500. The contour map of the area is available at a contour interval of 10m at a scale of 1:10000 which is shown in the fig. The radius of the arc required to obtain the route path is



- a) 0.1m b) 0.2m
 c) 0.3m d) 0.5m
- 9) The digital level can measure _____.
 a) Staff reading b) Horizontal distance
 c) Both a)and b) d) None of these
- 10) The Transit Rule is used for applying correction to consecutive coordinates if _____.
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Seat No.	
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**S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
SURVEYING & GEOMATICS**

Day & Date: Tuesday, 10-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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	4.000					500.000	Bench mark
0,0		3.000					
0,5		0.000					
5,5		1.000					
5,0			2.000				

- 1) Calculate the R.L. of stations at four corners using rise and fall method. Take usual arithmetic check. **02**
2) Draw the block at 1:50 scale on the answer sheet and show the Reduced Levels as per conditions. **02**
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Q.3 Explain

- a) Explain the uses of contour map with suitable example for checking the inter-visibility from opposite ends of a line. **04**
b) Explain the construction and working of digital level. **04**

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b) Calculate the independent coordinates for the following traverse using Transit rule. **04**

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Q.5 Explain

- a) Use of Total station for stake out. **04**
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Section II

- Q.6 a)** Construction & use of Mirror stereoscope. **04**
b) Two points A and B having elevations of 500 m and 300 m respectively above datum appear on a vertical photograph having focal length of 20 cm & flying altitude of 2500m above datum. Their corrected photographic coordinates are as follow: **06**

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- Q.9 a)** What are the different Application of GPS? **04**
b) What are the different Application of GIS? **05**

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 02:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 A) State whether following statement is true or false. 07

- 1) If depth of footing is less than or equal width of footing then it is called as shallow foundation.
- 2) Style is part of door frame.
- 3) Landing width is equal to flight width of staircase.
- 4) In case of roofs, water flows from valley to ridge.
- 5) Lintel is provided to carry load of wall above opening provided in wall.
- 6) Varnish is applied on wood surfaces.
- 7) Plastering is the process of covering rough surfaces of wall, column and ceiling etc.

B) Choose the correct alternatives from the options and rewrite the sentence. 07

- 1) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area _____.
 a) 1/8th b) 1/20th
 c) 1/5th d) 1/10th
- 2) System of air conditioning is _____.
 a) Central system b) Self-contained system
 c) Combined system d) All above
- 3) _____ ventilation involves placement of windows in both windward and leeward walls.
 a) Lateral b) Diagonal
 c) Cross d) Indirect
- 4) Going and Nosing makes one _____.
 a) Arcade b) Tread
 c) Arch d) Shutter
- 5) The weight of Queen closure is 200 gms then the weight of the full brick shall be _____ gms.
 a) 600 b) 800
 c) 400 d) 200

- 6) IS brick size is _____ in mm.
- | | |
|------------------|--------------------|
| a) 90 x 90 x 200 | b) 100 x 90 x 210 |
| c) 90 x 90 x 190 | d) 100 x 100 x 190 |
- 7) The lowest part of a structure which transmits the load to the soil is known as _____.
- | | |
|--------------------|-------------|
| a) super structure | b) plinth |
| c) foundation | d) basement |

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 02:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary and state it clearly.

Section – I

Q.2 Answer any seven of the following: **28**

- a) Write note on Functional requirements of a building as a whole.
- b) What is thermal insulation? Explain any one method of thermal insulation?
- c) Write a note on UCR masonry and coursed rubble masonry and explain importance of through stone.
- d) Define Foundation. Draw plan and section of any two types of foundation.
- e) Explain step by step procedure of providing Brick Bat coba roof water proofing.
- f) Write requirement of staircase with specifications of landing width, flight width, riser, tread.
- g) Enlist the type of stone masonry. Explain any one in detail.
- h) Enlist various basic forms of pitched roof. Explain brief with sketch about any one type.
- i) Describe in brief about:
 - 1) Wind effect
 - 2) Stack effect

Section – II

Q.3 Draw to a scale 1:10 Plan for odd courses & even courses and Elevation for 12 courses for a L shaped portion of brick wall with English bond. The wall is one and half brick thick throughout. Take brick size as 100 x 100 x 200 mm including mortar joints. Height wall portion is 1000 mm. **10**

OR

Draw to scale 1:5 'Horizontal Section' and 'Front Elevation' for two leaf, fully glazed wooden window of overall size of 1000 mm x 1200 mm use Following:

- a) Frame – Wooden section 60 mm x 100 mm
 - b) Shutter – Wooden shutter frame – section 30 mm x 100mm
 - c) Glass thickness 05 mm
- (Select and assume other suitable data is required)

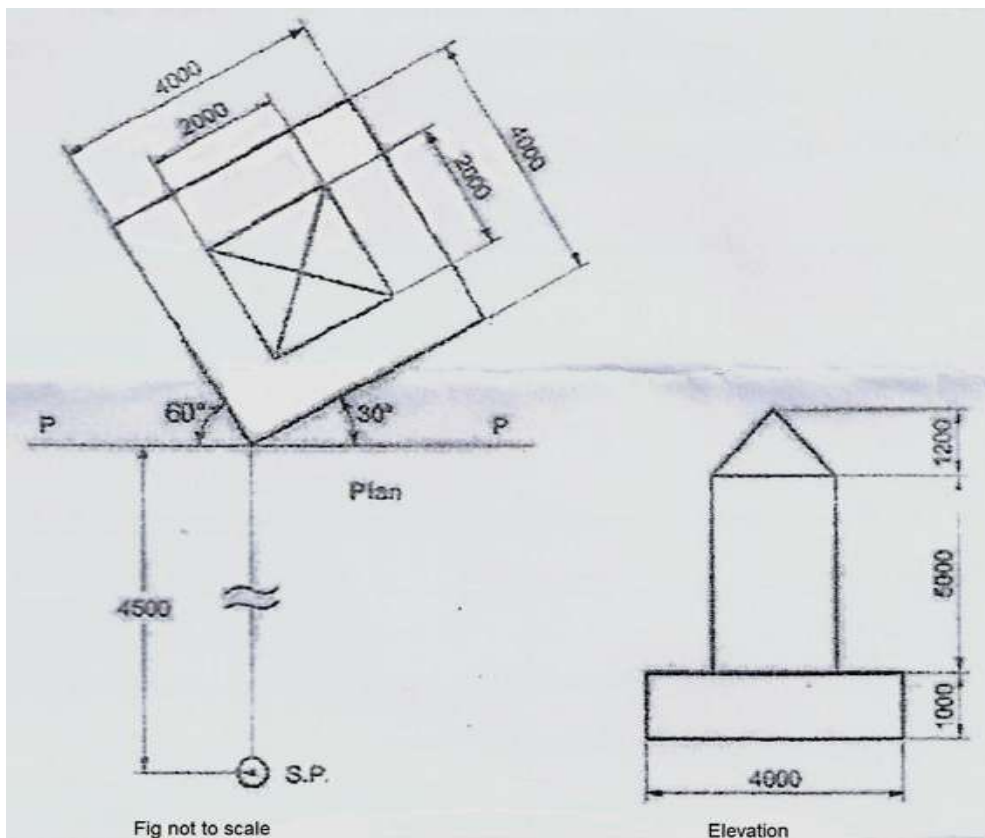
- Q.4** Design a suitable Staircase for residential building using the following data: **12**
- a) Size of stair hall 5.20 m x 2.50 m
 - b) Floor to floor height 3.10 m
 - c) Wall thickness 230 mm
 - d) Thickness of slab 120 mm
- Assume suitable data if necessary.
- 1) Draw detailed plan
 - 2) Sectional elevation
- (write step by step calculation on sheet with pencil only)

OR

Design and draw to scale 1:20

- a) Plan
 - b) Sectional elevation
- Dog legged RCC staircase. Use following data:
- 1) Height to be climbed = 3000 mm
 - 2) Tread = 270 to 300 mm
 - 3) Riser = 150 to 180 mm
 - 4) Width of stair flights = 1200 mm
 - 5) Waist slab thickness = 125 mm
- Reinforcement details not expected.
(Write step by step calculation on sheet with pencil only)

- Q.5** Draw perspective for given sketch taking eye level 2.0 m above the G.L. Use **06**
scale 1:100. Symbols have usual meaning.



- 7) _____ ventilation involves placement of windows in both windward and leeward walls.
- a) Lateral
 - b) Diagonal
 - c) Cross
 - d) Indirect

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

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Section – II

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OR

Design and draw to scale 1:20

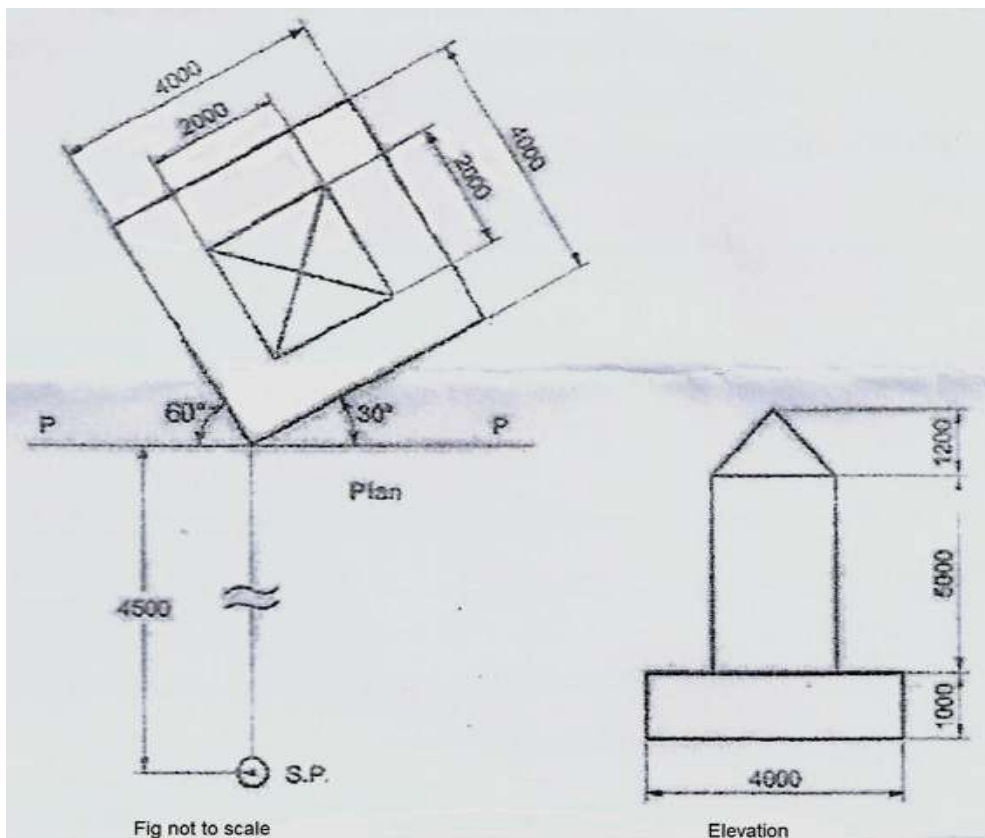
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Dog legged RCC staircase. Use following data:

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 - 4) Width of stair flights = 1200 mm
 - 5) Waist slab thickness = 125 mm
- Reinforcement details not expected.

(Write step by step calculation on sheet with pencil only)

Q.5 Draw perspective for given sketch taking eye level 2.0 m above the G.L. Use scale 1:100. Symbols have usual meaning. 06



Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
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Duration: 30 Minutes

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B) Choose the correct alternatives from the options and rewrite the sentence.

07

- 1) IS brick size is _____ in mm.

a) 90 x 90 x 200	b) 100 x 90 x 210
c) 90 x 90 x 190	d) 100 x 100 x 190
- 2) The lowest part of a structure which transmits the load to the soil is known as _____.

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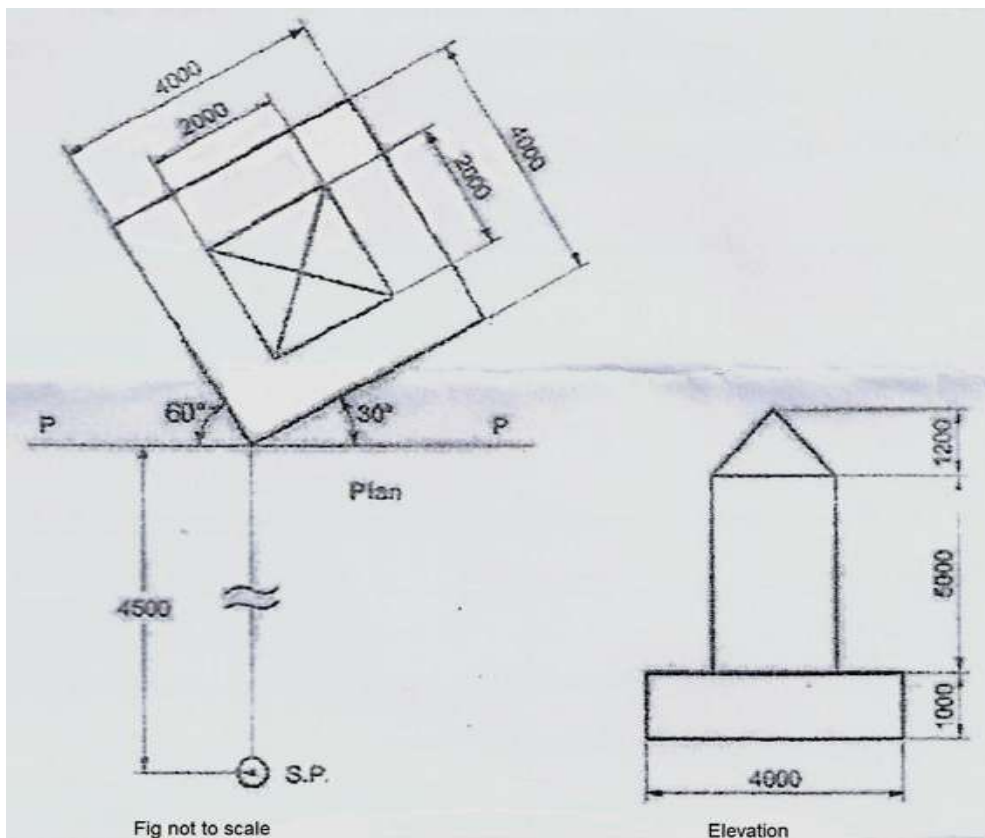
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- 2) Landing width is equal to flight width of staircase.
- 3) In case of roofs, water flows from valley to ridge.
- 4) Lintel is provided to carry load of wall above opening provided in wall.
- 5) Varnish is applied on wood surfaces.
- 6) Plastering is the process of covering rough surfaces of wall, column and ceiling etc.
- 7) If depth of footing is less than or equal width of footing then it is called as shallow foundation.

B) Choose the correct alternatives from the options and rewrite the sentence.

07

- 1) System of air conditioning is _____.
 a) Central system b) Self-contained system
 c) Combined system d) All above
- 2) _____ ventilation involves placement of windows in both windward and leeward walls.
 a) Lateral b) Diagonal
 c) Cross d) Indirect
- 3) Going and Nosing makes one _____.
 a) Arcade b) Tread
 c) Arch d) Shutter
- 4) The weight of Queen closure is 200 gms then the weight of the full brick shall be _____ gms.
 a) 600 b) 800
 c) 400 d) 200
- 5) IS brick size is _____ in mm.
 a) 90 x 90 x 200 b) 100 x 90 x 210
 c) 90 x 90 x 190 d) 100 x 100 x 190
- 6) The lowest part of a structure which transmits the load to the soil is known as _____.
 a) super structure b) plinth
 c) foundation d) basement

- 7) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area _____.
- | | |
|----------|-----------------------|
| a) 1/8th | b) 1/20th |
| c) 1/5th | d) 1/10 th |

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
BUILDING CONSTRUCTION & DRAWING

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 02:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary and state it clearly.

Section – I

Q.2 Answer any seven of the following: **28**

- a) Write note on Functional requirements of a building as a whole.
- b) What is thermal insulation? Explain any one method of thermal insulation?
- c) Write a note on UCR masonry and coursed rubble masonry and explain importance of through stone.
- d) Define Foundation. Draw plan and section of any two types of foundation.
- e) Explain step by step procedure of providing Brick Bat coba roof water proofing.
- f) Write requirement of staircase with specifications of landing width, flight width, riser, tread.
- g) Enlist the type of stone masonry. Explain any one in detail.
- h) Enlist various basic forms of pitched roof. Explain brief with sketch about any one type.
- i) Describe in brief about:
 - 1) Wind effect
 - 2) Stack effect

Section – II

Q.3 Draw to a scale 1:10 Plan for odd courses & even courses and Elevation for 12 courses for a L shaped portion of brick wall with English bond. The wall is one and half brick thick throughout. Take brick size as 100 x 100 x 200 mm including mortar joints. Height wall portion is 1000 mm. **10**

OR

Draw to scale 1:5 'Horizontal Section' and 'Front Elevation' for two leaf, fully glazed wooden window of overall size of 1000 mm x 1200 mm use Following:

- a) Frame – Wooden section 60 mm x 100 mm
 - b) Shutter – Wooden shutter frame – section 30 mm x 100mm
 - c) Glass thickness 05 mm
- (Select and assume other suitable data is required)

Q.4 Design a suitable Staircase for residential building using the following data: **12**

- a) Size of stair hall 5.20 m x 2.50 m
- b) Floor to floor height 3.10 m
- c) Wall thickness 230 mm
- d) Thickness of slab 120 mm

Assume suitable data if necessary.

- 1) Draw detailed plan
- 2) Sectional elevation

(write step by step calculation on sheet with pencil only)

OR

Design and draw to scale 1:20

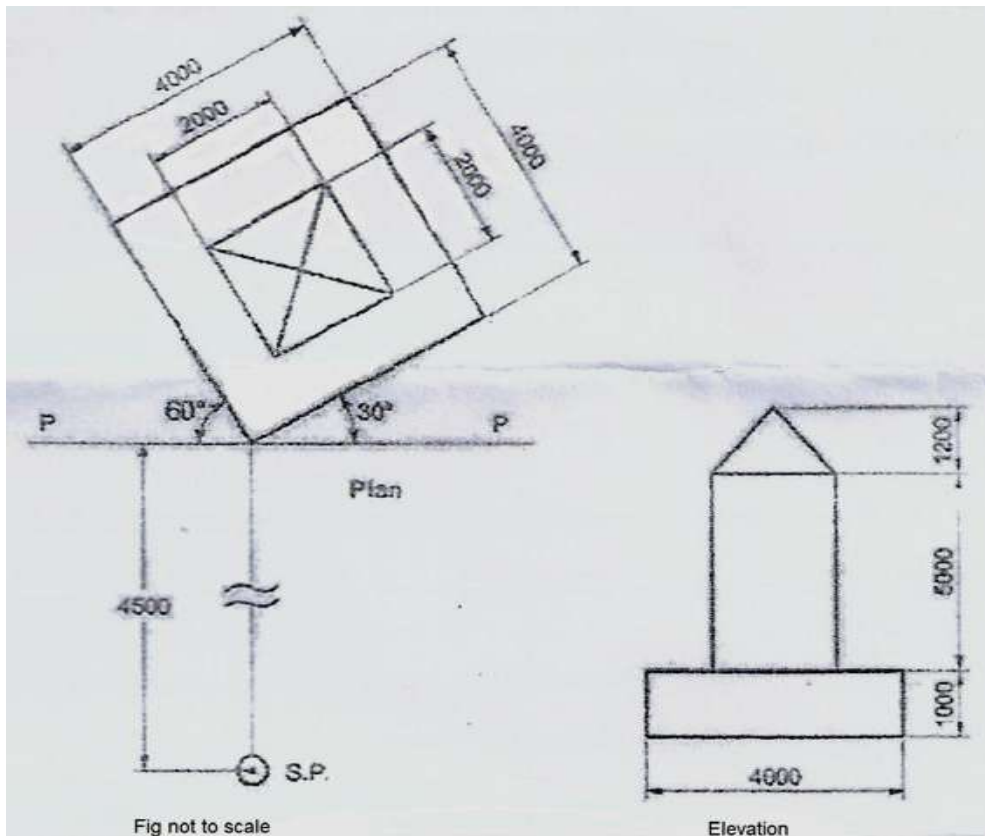
- a) Plan
- b) Sectional elevation

Dog legged RCC staircase. Use following data:

- 1) Height to be climbed = 3000 mm
 - 2) Tread = 270 to 300 mm
 - 3) Riser = 150 to 180 mm
 - 4) Width of stair flights = 1200 mm
 - 5) Waist slab thickness = 125 mm
- Reinforcement details not expected.

(Write step by step calculation on sheet with pencil only)

Q.5 Draw perspective for given sketch taking eye level 2.0 m above the G.L. Use scale 1:100. Symbols have usual meaning. **06**



Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO FLUID MECHANICS

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14**
- 1) Liquids having predominating cohesive force shows _____. **01**
 - a) Capillary rise
 - b) Capillary fall
 - c) Both a and b
 - d) None of these

 - 2) The bulk modulus of elasticity _____. **01**
 - a) Increases with the pressure
 - b) Is independent of pressure and viscosity
 - c) Is larger when the fluid is more compressible
 - d) has a dimension of (1/P)

 - 3) A small plastic boat loaded with material is floating in bath tub. If the cargo is dumped into a water, allowing the boat to float empty, then the water level in the tub will _____. **01**
 - a) Fall
 - b) Rise
 - c) Both will happen simultaneously
 - d) Not change

 - 4) The Bouyant force is _____. **01**
 - a) The resultant force acting on a body due to the fluid surrounding it
 - b) The resultant force acting on body
 - c) Equal to the volume of liquid displaced
 - d) The force necessary to maintain equilibrium of a submerged body

 - 5) When a liquid rotates at constant angular velocity about a vertical axis as a rigid body, the pressure intensity _____. **01**
 - a) Decrease as the square of the radial distance
 - b) Increase linearly as the radial distance
 - c) Varies inversely as the elevation along any vertical line
 - d) Varies as square of the radial distance

 - 6) In irrotational flow of an ideal fluid _____. **01**
 - a) A velocity potential exists
 - b) All particles must move in straight lines
 - c) The motion must be uniform
 - d) The velocity must be zero at boundary

- 7) A flow net cannot be applied for the viscous fluids as it _____. **01**
a) Gives zero velocity at boundaries
b) Gives some velocity at boundaries
c) Fails to represent actual flow pattern
d) Fails to represent formation of wake
- 8) Darcy-Weisbach equation is used to find loss of head due to _____. **01**
a) Sudden enlargement b) Friction
c) Sudden contraction d) None of the above
- 9) Loss of head due to entrance in pipe is given as _____. **01**
a) $v^2/2g$ b) v/g
c) $0.5v^2/2g$ d) $v^3/2g$
- 10) Due to which phenomenon water hammer is caused? **01**
a) Incompressibility
b) Sudden opening of valve
c) The material of pipe being elastic
d) Sudden closure of valve
- 11) In which of the devices, Bernoulli's equation is used? **01**
a) Venturimeter b) Orificemeter
c) Pitot tube d) All the above
- 12) The co-efficient of discharge (C_d) of venturimeter lies within the limit _____.
a) 0.95 to 0.99 b) 0.7 to 0.8
c) 0.8 to 0.85 d) 0.6 to 0.7
- 13) In a pipe of 90 mm diameter water is flowing with mean velocity of 2 m/s **02**
and at a gauge pressure of 350 kN/m^2 , what will be its total head if the pipe
is 10 m above the datum lines
a) 40.88 m b) 45.88 m
c) 43.88 m d) 47.88 m

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO FLUID MECHANICS

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Q.2 is compulsory. Solve any two questions from Q No.3 to Q. No. 5
 Section - I.

- 2) Q.6 is compulsory. Solve any one question from Q.7 and 8 in section - II.
 3) Assume suitable data if necessary and state it clearly.
 4) Figures to the right indicate full marks.

Section- I

- Q.2** a) Enlist different methods of finding meta centre and explain any one with neat sketch. **04**
 b) What is effect of pressure and temperature on weight density, specific weight and specific gravity of a liquid? **03**
 c) Explain the concept of stream tube and streak line with neat sketches. **03**
- Q.3** a) State Newton's law of Viscosity and explain the advantages of mechanical gauges over manometers. **04**
 b) A log of wood having a square section of 0.36 m x 0.36 m and specific gravity 0.8 floats in water, One edge is depressed and released causing the log to roll. Estimate the period of roll. **05**
- Q.4** a) For a three dimension flow filled described by $V = (y^2 + z^2)i + (x^2 + z^2)j + (x^2 + y^2)k$ find at (1, 2, 3) **04**
 1) The components of acceleration and
 2) The component of rotation
 b) In finding, the metacentre of a ship of 98.1 MN displaces a weight of 490.5 kN at a distance of 6 m from the longitudinal centre plane causes the ship to heel through an angle of 3° . What is the metacentric height? Hence find the angle of heel and its direction when the ship is going ahead and power transmitted 2.8336 MW is being transmitted to a single propeller shaft which is rotated at a speed of 3π rad/ sec. **05**
- Q.5** a) Briefly, explain the principle employed in the measurement of pressure by manometers and explain with neat sketch single column manometer. **04**
 b) At a depth of 2 km in the ocean, the pressure is 840 kg (f)/cm². Assume the specific weight at surface as 1025 kg(f)/m³, and that the average bulk modulus of elasticity is 24×10^3 kg(f)/cm² for that pressure range. **05**
 1) What will be the change in specific volume between that at the surface and at that depth?
 2) What will be the specific volume at that depth? and,
 3) What will be the specific weight at that depth?

- Q.6** a) The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is $0.05 \text{ m}^3/\text{s}$. The intensity of pressure at 150 mm pipe is 110 kN/m^2 . Calculate Loss of head due to Sudden enlargement. **05**
- b) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation. **06**
- c) Explain the phenomenon of drag and lift. **03**
- Q.7** a) Derive Darcy-Weisbach equation for calculating loss of head due to friction. **05**
- b) The difference in water surface level in two tanks which are connected by three pipes in series having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18mts. Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, Considering Minor Losses. **06**
- c) Using Hazen Poissulle's equation obtain the expression for friction factor in terms of Reynold's number. **03**
- Q.8** a) Explain the Hardy Cross Method of solving pipe network. **05**
- b) Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$, where u is the velocity at a distance y from the plate and $u = U$ at $y = \delta$ and $\delta =$ boundary layer thickness. Also, Calculate $\frac{\delta^*}{\theta}$ **06**
- c) Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch). **03**

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO FLUID MECHANICS

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q. Choose the correct alternatives from the options and rewrite the sentence. **14**
1

- 1) Darcy-Weisbach equation is used to find loss of head due to _____. **01**
 a) Sudden enlargement b) Friction
 c) Sudden contraction d) None of the above
- 2) Loss of head due to entrance in pipe is given as _____. **01**
 a) $v^2/2g$ b) v/g
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- 3) Due to which phenomenon water hammer is caused? **01**
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 a) 0.95 to 0.99 b) 0.7 to 0.8
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- 7) The bulk modulus of elasticity _____. **01**
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 c) Is larger when the fluid is more compressible
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- 8) A small plastic boat loaded with material is floating in bath tub. If the cargo is dumped into a water, allowing the boat to float empty, then the water level in the tub will _____. **01**
- a) Fall
 - b) Rise
 - c) Both will happen simultaneously
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- 9) The Bouyant force is _____. **01**
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 - b) The resultant force acting on body
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- 10) When a liquid rotates at constant angular velocity about a vertical axis as a rigid body, the pressure intensity _____. **01**
- a) Decrease as the square of the radial distance
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- 12) A flow net cannot be applied for the viscous fluids as it _____. **01**
- a) Gives zero velocity at boundaries
 - b) Gives some velocity at boundaries
 - c) Fails to represent actual flow pattern
 - d) Fails to represent formation of wake
- 13) In a pipe of 90 mm diameter water is flowing with mean velocity of 2 m/s and at a guage pressure of 350 kN/m^2 , what will be its total head if the pipe is 10 m above the datum lines **02**
- a) 40.88 m
 - b) 45.88 m
 - c) 43.88 m
 - d) 47.88 m

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO FLUID MECHANICS

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Q.2 is compulsory. Solve any two questions from Q No.3 to Q. No. 5
 Section - I.

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 b) At a depth of 2 km in the ocean, the pressure is 840 kg (f)/cm². Assume the specific weight at surface as 1025 kg(f)/m³, and that the average bulk modulus of elasticity is 24×10^3 kg(f)/cm² for that pressure range. **05**
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- c) Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch). **03**

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO FLUID MECHANICS

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

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- 1) In which of the devices, Bernoulli's equation is used? **01**
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Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO FLUID MECHANICS

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Q.2 is compulsory. Solve any two questions from Q No.3 to Q. No. 5
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Section- I

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- c) Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch). **03**

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO FLUID MECHANICS

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14**
- 1) In irrotational flow of an ideal fluid _____. **01**
 - a) A velocity potential exists
 - b) All particles must move in straight lines
 - c) The motion must be uniform
 - d) The velocity must be zero at boundary

 - 2) A flow net cannot be applied for the viscous fluids as it _____. **01**
 - a) Gives zero velocity at boundaries
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 - c) Fails to represent actual flow pattern
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 - 3) Darcy-Weisbach equation is used to find loss of head due to _____. **01**
 - a) Sudden enlargement
 - b) Friction
 - c) Sudden contraction
 - d) None of the above

 - 4) Loss of head due to entrance in pipe is given as _____. **01**
 - a) $\frac{v^2}{2g}$
 - b) $\frac{v}{g}$
 - c) $0.5\frac{v^2}{2g}$
 - d) $\frac{v^3}{2g}$

 - 5) Due to which phenomenon water hammer is caused? **01**
 - a) Incompressibility
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 - d) All the above

 - 7) The co-efficient of discharge (C_d) of venturimeter lies within the limit _____.
 - a) 0.95 to 0.99
 - b) 0.7 to 0.8
 - c) 0.8 to 0.85
 - d) 0.6 to 0.7

 - 8) Liquids having predominating cohesive force shows _____. **01**
 - a) Capillary rise
 - b) Capillary fall
 - c) Both a and b
 - d) None of these

- 9) The bulk modulus of elasticity _____. **01**
- a) Increases with the pressure
 - b) Is independent of pressure and viscosity
 - c) Is larger when the fluid is more compressible
 - d) has a dimension of $(1/P)$
- 10) A small plastic boat loaded with material is floating in bath tub. If the cargo is dumped into a water, allowing the boat to float empty, then the water level in the tub will _____. **01**
- a) Fall
 - b) Rise
 - c) Both will happen simultaneously
 - d) Not change
- 11) The Bouyant force is _____. **01**
- a) The resultant force acting on a body due to the fluid surrounding it
 - b) The resultant force acting on body
 - c) Equal to the volume of liquid displaced
 - d) The force necessary to maintain equilibrium of a submerged body
- 12) When a liquid rotates at constant angular velocity about a vertical axis as a rigid body, the pressure intensity _____. **01**
- a) Decrease as the square of the radial distance
 - b) Increase linearly as the radial distance
 - c) Varies inversely as the elevation along any vertical line
 - d) Varies as square of the radial distance
- 13) In a pipe of 90 mm diameter water is flowing with mean velocity of 2 m/s and at a guage pressure of 350 kN/m^2 , what will be its total head if the pipe is 10 m above the datum lines **02**
- a) 40.88 m
 - b) 45.88 m
 - c) 43.88 m
 - d) 47.88 m

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO FLUID MECHANICS

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Q.2 is compulsory. Solve any two questions from Q No.3 to Q. No. 5
 Section - I.

2) Q.6 is compulsory. Solve any one question from Q.7 and 8 in section - II.

3) Assume suitable data if necessary and state it clearly.

4) Figures to the right indicate full marks.

Section- I

- Q.2** a) Enlist different methods of finding meta centre and explain any one with neat sketch. **04**
 b) What is effect of pressure and temperature on weight density, specific weight and specific gravity of a liquid? **03**
 c) Explain the concept of stream tube and streak line with neat sketches. **03**
- Q.3** a) State Newton's law of Viscosity and explain the advantages of mechanical gauges over manometers. **04**
 b) A log of wood having a square section of 0.36 m x 0.36 m and specific gravity 0.8 floats in water, One edge is depressed and released causing the log to roll. Estimate the period of roll. **05**
- Q.4** a) For a three dimension flow filled described by $V = (y^2 + z^2)i + (x^2 + z^2)j + (x^2 + y^2)k$ find at (1, 2, 3) **04**
 1) The components of acceleration and
 2) The component of rotation
 b) In finding, the metacentre of a ship of 98.1 MN displaces a weight of 490.5 kN at a distance of 6 m from the longitudinal centre plane causes the ship to heel through an angle of 3° . What is the metacentric height? Hence find the angle of heel and its direction when the ship is going ahead and power transmitted 2.8336 MW is being transmitted to a single propeller shaft which is rotated at a speed of 3π rad/ sec. **05**
- Q.5** a) Briefly, explain the principle employed in the measurement of pressure by manometers and explain with neat sketch single column manometer. **04**
 b) At a depth of 2 km in the ocean, the pressure is 840 kg (f)/cm². Assume the specific weight at surface as 1025 kg(f)/m³, and that the average bulk modulus of elasticity is 24×10^3 kg(f)/cm² for that pressure range. **05**
 1) What will be the change in specific volume between that at the surface and at that depth?
 2) What will be the specific volume at that depth? and,
 3) What will be the specific weight at that depth?

- Q.6** a) The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is $0.05 \text{ m}^3/\text{s}$. The intensity of pressure at 150 mm pipe is 110 kN/m^2 . Calculate Loss of head due to Sudden enlargement. **05**
- b) Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation. **06**
- c) Explain the phenomenon of drag and lift. **03**
- Q.7** a) Derive Darcy-Weisbach equation for calculating loss of head due to friction. **05**
- b) The difference in water surface level in two tanks which are connected by three pipes in series having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18 mts. Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, Considering Minor Losses. **06**
- c) Using Hazen Poissulle's equation obtain the expression for friction factor in terms of Reynold's number. **03**
- Q.8** a) Explain the Hardy Cross Method of solving pipe network. **05**
- b) Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$, where u is the velocity at a distance y from the plate and $u = U$ at $y = \delta$ and $\delta =$ boundary layer thickness. Also, Calculate $\frac{\delta^*}{\theta}$ **06**
- c) Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch). **03**

Seat No.	
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**S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY**

Day & Date: Tuesday, 17-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) The bun shaped igneous intrusion in unfolded region is called _____.

a) Lopolith	b) Phaccolith
c) Laccolith	d) Sill
- 2) The _____ rocks are insoluble products of rock weathering.

a) Rudaceous	b) Arenaceous
c) Argillaceous	d) Residual
- 3) The rapid cooling of lava forms _____ texture.

a) Porphyritic	b) Coarse grain
c) Glassy	d) Ophitic
- 4) The gaseous and vapors entrapped during the solidification of lava form _____ structure.

a) Flow	b) Ropy
c) Pillow	d) Vesicular
- 5) Arenaceous sedimentary rock composed entirely of _____ grains.

a) Sand	b) Clay
c) Boulder	d) Pebble
- 6) _____ mineral is in mica group.

a) Quartz	b) Orthoclase
c) Plagioclase	d) Biotite
- 7) The horizontal displacement of a fault is called as _____.

a) Throw	b) Hade
c) Have	d) Net slip
- 8) Sloping surface of valley upon which dam rests is known as _____.

a) Heel	b) Abutment
c) Toe	d) Pier
- 9) _____ is the ornamented stone.

a) Shale	b) Phyllite
c) Sandstone	d) Marble
- 10) Which of the following is oldest type of drilling _____?

a) Rotary	b) Calyx
c) Diamond	d) Auger

- 11) _____ rock having low porosity.
- a) Sandstone
 - b) Limestone
 - c) Granite
 - d) Shale
- 12) Majority of landslides due to _____.
- a) Heavy rain
 - b) Earthquake
 - c) Volcanic eruption
 - d) Terrain cutting
- 13) For the safe and stable construction of dam the correct geological condition would be _____.
- a) At crest of fold limbs dipping upstream
 - b) At trough of fold
 - c) At limb of fold
 - d) None of these
- 14) The main geological problems connected with the reservoir are _____.
- a) Groundwater conditions
 - b) Permeable rocks
 - c) Silting
 - d) All of these

Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Draw neat and labeled diagram wherever necessary.

Section – I

- Q.2** a) Define fold and explain any four types of fold. **06**
 b) Define igneous rock and explain any three igneous structures. **06**
 OR
- Q.3** a) Define sedimentary rock and explain formation process of sedimentary rock. **06**
 b) Define volcano and explain in detail products of volcano. **06**
- Q.4** What is concordant igneous intrusion? Explain any three concordant intrusions. **07**
 OR
- Q.5** Define metamorphic rock? Explain in detail agents of metamorphism. **07**
- Q.6** **Write short note. (Any Three)** **09**
 a) Angular unconformity
 b) Cross bedding structure
 c) Mohs scale of hardness
 d) Mica group of minerals
 e) Gneissose structure

Section – II

- Q.7** a) Define landslide and explain types of landslide. **06**
 b) Explain in detail geophysical investigation for dam site. **06**
 OR
- Q.8** a) Define earthquake and explain causes and effect of earthquake. **06**
 b) What is building stone? Describe properties of good building stone. **06**
- Q.9** Define aquifer and explain types of aquifer. **07**
 OR
- Q.10** Explain the parameters for good reservoir site. **07**
- Q.11** **Write note. (Any Three)** **09**
 a) Focus and epicenter
 b) Siltation of reservoir
 c) RQD
 d) Porosity and permeability
 e) A typical core log

Seat No.	
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**S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY**

Day & Date: Tuesday, 17-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Sloping surface of valley upon which dam rests is known as _____.
a) Heel b) Abutment
c) Toe d) Pier

- 2) _____ is the ornamented stone.
a) Shale b) Phyllite
c) Sandstone d) Marble

- 3) Which of the following is oldest type of drilling _____?
a) Rotary b) Calyx
c) Diamond d) Auger

- 4) _____ rock having low porosity.
a) Sandstone b) Limestone
c) Granite d) Shale

- 5) Majority of landslides due to _____.
a) Heavy rain b) Earthquake
c) Volcanic eruption d) Terrain cutting

- 6) For the safe and stable construction of dam the correct geological condition would be _____.
a) At crest of fold limbs dipping upstream
b) At trough of fold
c) At limb of fold
d) None of these

- 7) The main geological problems connected with the reservoir are _____.
a) Groundwater conditions b) Permeable rocks
c) Silting d) All of these

- 8) The bun shaped igneous intrusion in unfolded region is called _____.
a) Lopolith b) Phaccolith
c) Laccolith d) Sill

- 9) The _____ rocks are insoluble products of rock weathering.
a) Rudaceous b) Arenaceous
c) Argillaceous d) Residual

- 10) The rapid cooling of lava forms _____ texture.
- a) Porphyritic
 - b) Coarse grain
 - c) Glassy
 - d) Ophitic
- 11) The gaseous and vapors entrapped during the solidification of lava form _____ structure.
- a) Flow
 - b) Ropy
 - c) Pillow
 - d) Vesicular
- 12) Arenaceous sedimentary rock composed entirely of _____ grains.
- a) Sand
 - b) Clay
 - c) Boulder
 - d) Pebble
- 13) _____ mineral is in mica group.
- a) Quartz
 - b) Orthoclase
 - c) Plagioclase
 - d) Biotite
- 14) The horizontal displacement of a fault is called as _____.
- a) Throw
 - b) Hade
 - c) Have
 - d) Net slip

Seat No.	
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Q

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Draw neat and labeled diagram wherever necessary.

Section – I

- Q.2** a) Define fold and explain any four types of fold. **06**
 b) Define igneous rock and explain any three igneous structures. **06**
 style="text-align: center;">**OR**
- Q.3** a) Define sedimentary rock and explain formation process of sedimentary rock. **06**
 b) Define volcano and explain in detail products of volcano. **06**
- Q.4** What is concordant igneous intrusion? Explain any three concordant intrusions. **07**
 style="text-align: center;">**OR**
- Q.5** Define metamorphic rock? Explain in detail agents of metamorphism. **07**
- Q.6** **Write short note. (Any Three)** **09**
 a) Angular unconformity
 b) Cross bedding structure
 c) Mohs scale of hardness
 d) Mica group of minerals
 e) Gneissose structure

Section – II

- Q.7** a) Define landslide and explain types of landslide. **06**
 b) Explain in detail geophysical investigation for dam site. **06**
 style="text-align: center;">**OR**
- Q.8** a) Define earthquake and explain causes and effect of earthquake. **06**
 b) What is building stone? Describe properties of good building stone. **06**
- Q.9** Define aquifer and explain types of aquifer. **07**
 style="text-align: center;">**OR**
- Q.10** Explain the parameters for good reservoir site. **07**
- Q.11** **Write note. (Any Three)** **09**
 a) Focus and epicenter
 b) Siltation of reservoir
 c) RQD
 d) Porosity and permeability
 e) A typical core log

Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Draw neat and labeled diagram wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Arenaceous sedimentary rock composed entirely of _____ grains.

a) Sand	b) Clay
c) Boulder	d) Pebble
- 2) _____ mineral is in mica group.

a) Quartz	b) Orthoclase
c) Plagioclase	d) Biotite
- 3) The horizontal displacement of a fault is called as _____.

a) Throw	b) Hade
c) Have	d) Net slip
- 4) Sloping surface of valley upon which dam rests is known as _____.

a) Heel	b) Abutment
c) Toe	d) Pier
- 5) _____ is the ornamented stone.

a) Shale	b) Phyllite
c) Sandstone	d) Marble
- 6) Which of the following is oldest type of drilling _____?

a) Rotary	b) Calyx
c) Diamond	d) Auger
- 7) _____ rock having low porosity.

a) Sandstone	b) Limestone
c) Granite	d) Shale
- 8) Majority of landslides due to _____.

a) Heavy rain	b) Earthquake
c) Volcanic eruption	d) Terrain cutting
- 9) For the safe and stable construction of dam the correct geological condition would be _____.

a) At crest of fold limbs dipping upstream
b) At trough of fold
c) At limb of fold
d) None of these

- 10) The main geological problems connected with the reservoir are ____.
- a) Groundwater conditions
 - b) Permeable rocks
 - c) Silting
 - d) All of these
- 11) The bun shaped igneous intrusion in unfolded region is called ____.
- a) Lopolith
 - b) Phaccolith
 - c) Laccolith
 - d) Sill
- 12) The ____ rocks are insoluble products of rock weathering.
- a) Rudaceous
 - b) Arenaceous
 - c) Argillaceous
 - d) Residual
- 13) The rapid cooling of lava forms ____ texture.
- a) Porphyritic
 - b) Coarse grain
 - c) Glassy
 - d) Ophitic
- 14) The gaseous and vapors entrapped during the solidification of lava form ____ structure.
- a) Flow
 - b) Ropy
 - c) Pillow
 - d) Vesicular

Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Draw neat and labeled diagram wherever necessary.

Section – I

- Q.2** a) Define fold and explain any four types of fold. **06**
 b) Define igneous rock and explain any three igneous structures. **06**
OR
- Q.3** a) Define sedimentary rock and explain formation process of sedimentary rock. **06**
 b) Define volcano and explain in detail products of volcano. **06**
- Q.4** What is concordant igneous intrusion? Explain any three concordant intrusions. **07**
OR
- Q.5** Define metamorphic rock? Explain in detail agents of metamorphism. **07**
- Q.6** **Write short note. (Any Three)** **09**
 a) Angular unconformity
 b) Cross bedding structure
 c) Mohs scale of hardness
 d) Mica group of minerals
 e) Gneissose structure

Section – II

- Q.7** a) Define landslide and explain types of landslide. **06**
 b) Explain in detail geophysical investigation for dam site. **06**
OR
- Q.8** a) Define earthquake and explain causes and effect of earthquake. **06**
 b) What is building stone? Describe properties of good building stone. **06**
- Q.9** Define aquifer and explain types of aquifer. **07**
OR
- Q.10** Explain the parameters for good reservoir site. **07**
- Q.11** **Write note. (Any Three)** **09**
 a) Focus and epicenter
 b) Siltation of reservoir
 c) RQD
 d) Porosity and permeability
 e) A typical core log

Seat No.	
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Set	S
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:**
- 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.
 - 2) Figures to the right indicate full marks.
 - 3) Draw neat and labeled diagram wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Which of the following is oldest type of drilling _____?

a) Rotary	b) Calyx
c) Diamond	d) Auger
- 2) _____ rock having low porosity.

a) Sandstone	b) Limestone
c) Granite	d) Shale
- 3) Majority of landslides due to _____.

a) Heavy rain	b) Earthquake
c) Volcanic eruption	d) Terrain cutting
- 4) For the safe and stable construction of dam the correct geological condition would be _____.

a) At crest of fold limbs dipping upstream	
b) At trough of fold	
c) At limb of fold	
d) None of these	
- 5) The main geological problems connected with the reservoir are _____.

a) Groundwater conditions	b) Permeable rocks
c) Silting	d) All of these
- 6) The bun shaped igneous intrusion in unfolded region is called _____.

a) Lopolith	b) Phaccolith
c) Laccolith	d) Sill
- 7) The _____ rocks are insoluble products of rock weathering.

a) Rudaceous	b) Arenaceous
c) Argillaceous	d) Residual
- 8) The rapid cooling of lava forms _____ texture.

a) Porphyritic	b) Coarse grain
c) Glassy	d) Ophitic
- 9) The gaseous and vapors entrapped during the solidification of lava form _____ structure.

a) Flow	b) Ropy
c) Pillow	d) Vesicular

- 10) Arenaceous sedimentary rock composed entirely of _____ grains.
- | | |
|------------|-----------|
| a) Sand | b) Clay |
| c) Boulder | d) Pebble |
- 11) _____ mineral is in mica group.
- | | |
|----------------|---------------|
| a) Quartz | b) Orthoclase |
| c) Plagioclase | d) Biotite |
- 12) The horizontal displacement of a fault is called as _____.
- | | |
|----------|-------------|
| a) Throw | b) Hade |
| c) Have | d) Net slip |
- 13) Sloping surface of valley upon which dam rests is known as _____.
- | | |
|---------|-------------|
| a) Heel | b) Abutment |
| c) Toe | d) Pier |
- 14) _____ is the ornamented stone.
- | | |
|--------------|-------------|
| a) Shale | b) Phyllite |
| c) Sandstone | d) Marble |

Seat No.	
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Set **S**

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
ENGINEERING GEOLOGY

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Draw neat and labeled diagram wherever necessary.

Section – I

- Q.2** a) Define fold and explain any four types of fold. **06**
 b) Define igneous rock and explain any three igneous structures. **06**
OR
- Q.3** a) Define sedimentary rock and explain formation process of sedimentary rock. **06**
 b) Define volcano and explain in detail products of volcano. **06**
- Q.4** What is concordant igneous intrusion? Explain any three concordant intrusions. **07**
OR
- Q.5** Define metamorphic rock? Explain in detail agents of metamorphism. **07**
- Q.6** **Write short note. (Any Three)** **09**
 a) Angular unconformity
 b) Cross bedding structure
 c) Mohs scale of hardness
 d) Mica group of minerals
 e) Gneissose structure

Section – II

- Q.7** a) Define landslide and explain types of landslide. **06**
 b) Explain in detail geophysical investigation for dam site. **06**
OR
- Q.8** a) Define earthquake and explain causes and effect of earthquake. **06**
 b) What is building stone? Describe properties of good building stone. **06**
- Q.9** Define aquifer and explain types of aquifer. **07**
OR
- Q.10** Explain the parameters for good reservoir site. **07**
- Q.11** **Write note. (Any Three)** **09**
 a) Focus and epicenter
 b) Siltation of reservoir
 c) RQD
 d) Porosity and permeability
 e) A typical core log

Seat
No.

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Assume suitable data, if necessary & mention it clearly.
 3) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) The ratio of linear stress to linear strain is known as _____.
 - a) Poisson's ratio
 - b) Bulk modulus
 - c) Modulus of rigidity
 - d) Modulus of elasticity
- 2) Factor of safety is equal to _____.
 - a) Ultimate stress – yield stress
 - b) Yield stress – permissible stress
 - c) Yield stress/permissible stress
 - d) All of the above
- 3) The normal stress on oblique plane is minimum when α is equal to _____.
 - a) 0°
 - b) 45°
 - c) 30°
 - d) 90°
- 4) Principle planes are the planes of _____.
 - a) maximum shear stress
 - b) minimum shear stress
 - c) zero shear stress
 - d) none of the above
- 5) The equivalent Torque under combined action of bending moment (M) & Torque (T) is _____.
 - a) $T_e = (M^2 + T^2)$
 - b) $T_e = (M^2 + T^2)^{1/2}$
 - c) $T_e = (M^2 + T^2)^{3/2}$
 - d) $T_e = (M^2 + T^2)^2$
- 6) The equivalent bending moment under combined action of bending moment (M) & Torque (T) is _____.
 - a) $\sqrt{M^2 + T^2}$
 - b) $\frac{1}{2}\sqrt{M^2 + T^2}$
 - c) $\frac{1}{2}M\sqrt{M^2 + T^2}$
 - d) $\frac{1}{2}(M + \sqrt{M^2 + T^2})$
- 7) _____ is a Saint Venant theory.
 - a) Maximum shear stress theory
 - b) Maximum strain energy theory
 - c) Maximum principle strain theory
 - d) Distortion energy theory

Seat No.	
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Set	P
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**S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO SOLID MECHANICS**

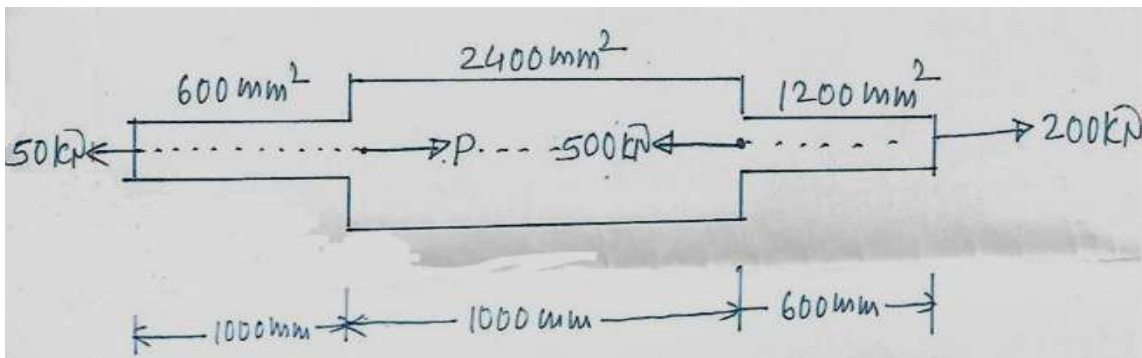
Day & Date: Thursday, 19-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:**
- 1) Q. No.2 is compulsory and Solve any two questions from remaining Question from section I.
 - 2) Q. No. 6 is compulsory and Solve any two questions from remaining Question from section II.
 - 3) Assume suitable data, if necessary & mention it clearly.
 - 4) Figures to the right indicates full marks.

Section – I

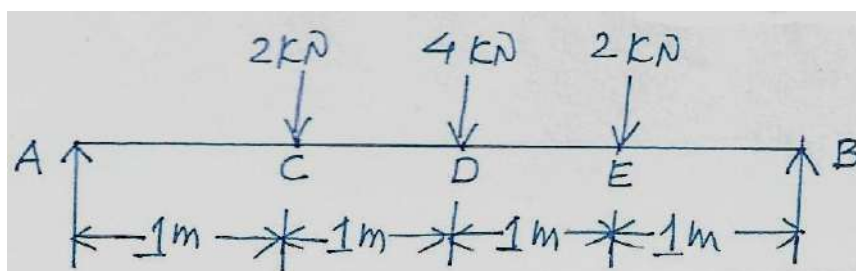
- Q.2** a) Write detailed note on any three elastic failure theories giving details of it's suitability. **06**
 b) Draw stress strain curve & explain in detail for mild steel material. **04**
- Q.3** Find the value of unknown force 'P' and total elongation for the compound bar shown bellow take $E = 210 \text{ GN/m}^2$ **09**



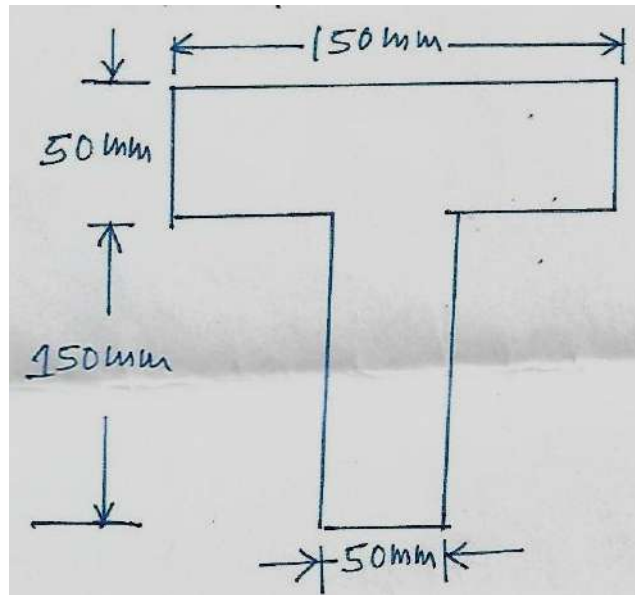
- Q.4** Find normal & tangential stresses and the resultant stresses and it's obliquity on a plane at 20° with major Principle Plane. Take major principle stress as 120 MN/m^2 (Tensile) & minor principle stress as 60 MN/m^2 (Tensile) **09**
- Q.5** Find Principle stresses & principle planes of a shaft section of 100 mm diameter subjected to bending moment of 4000 Nm & Torque of 6000 Nm. **09**

Section – II

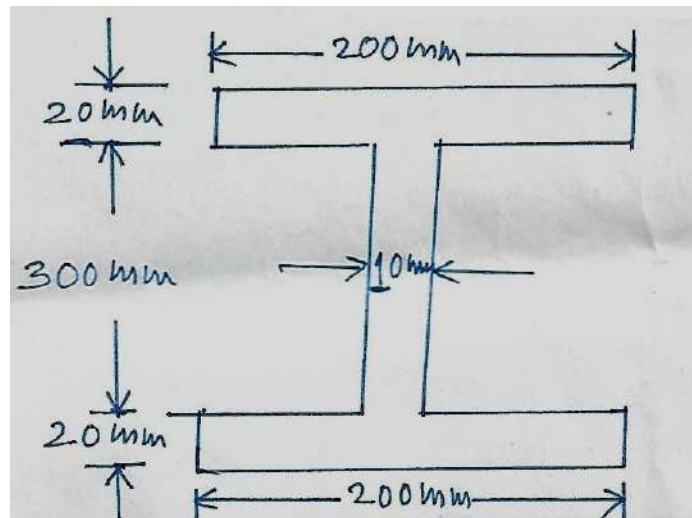
- Q.6** Draw SFD & BMD for beam as shown below: **10**



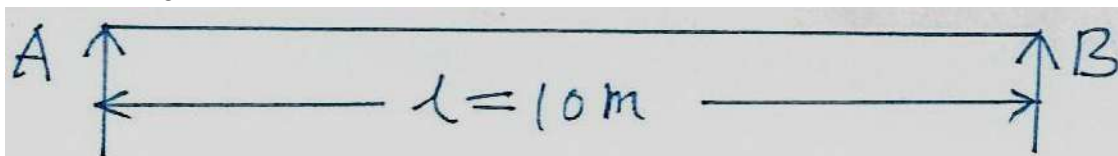
- Q.7** Find extreme stresses at top & bottom of 'T' section shown below, it section is subjected to bending moment of 3.4 KNm. **09**



- Q.8** Draw the shear stress distribution across the section. If section is subjected to shear force of 100 KN. **09**



- Q.9** Draw ILD for reactions at 'A' & 'B'. also draw ILD for shear force & bending moment at 3 meter from 'A'. **09**



Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Assume suitable data, if necessary & mention it clearly.
 3) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.**14**

- Maximum shear stress theory is also called as _____.
 - Beltrami theory
 - Haigh theory
 - Guest theory
 - Saint Venant theory
- The point of zero bending moment, where the bending moment diagram changes its sign is called _____.
 - The point of contraflexure
 - The point of inflection
 - The point of virtual hinge
 - All of the above
- Bending moment on a section is maximum where shearing force is _____.
 - minimum
 - maximum
 - equal
 - zero
- If a member is subjected to a uniform bending moment (M), the radius of curvature of the deflected form of the member is given by _____.
 - $\frac{M}{I} = \frac{E}{R}$
 - $\frac{M}{R} = \frac{E}{I}$
 - $\frac{M}{I} = \frac{R}{E}$
 - $\frac{M}{E} = RI$
- Section modulus of rectangular section of width b & depth d is _____.
 - $\frac{db^2}{4}$
 - $\frac{db^2}{6}$
 - $\frac{bd^2}{4}$
 - $\frac{bd^2}{6}$
- For a rectangular beam, the ratio of Z_{max}/I_{ave} is _____.
 - 2
 - 1
 - 1.5
 - None of the above
- Strength of the beam is more if its section modulus is _____.
 - decreased
 - zero
 - increased
 - none
- The ratio of linear stress to linear strain is known as _____.
 - Poisson's ratio
 - Bulk modulus
 - Modulus of rigidity
 - Modulus of elasticity

- 9) Factor of safety is equal to _____.
 a) Ultimate stress – yield stress
 b) Yield stress – permissible stress
 c) Yield stress/permissible stress
 d) All of the above
- 10) The normal stress on oblique plane is minimum when α is equal to _____.
 a) 0°
 b) 45°
 c) 30°
 d) 90°
- 11) Principle planes are the planes of _____.
 a) maximum shear stress
 b) minimum shear stress
 c) zero shear stress
 d) none of the above
- 12) The equivalent Torque under combined action of bending moment (M) & Torque (T) is _____.
 a) $T_e = (M^2 + T^2)$
 b) $T_e = (M^2 + T^2)^{1/2}$
 c) $T_e = (M^2 + T^2)^{3/2}$
 d) $T_e = (M^2 + T^2)^2$
- 13) The equivalent bending moment under combined action of bending moment (M) & Torque (T) is _____.
 a) $\sqrt{M^2 + T^2}$
 b) $\frac{1}{2}\sqrt{M^2 + T^2}$
 c) $\frac{1}{2}M\sqrt{M^2 + T^2}$
 d) $\frac{1}{2}(M + \sqrt{M^2 + T^2})$
- 14) _____ is a Saint Venant theory.
 a) Maximum shear stress theory
 b) Maximum strain energy theory
 c) Maximum principle strain theory
 d) Distortion energy theory

Seat No.	
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Set **Q**

**S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO SOLID MECHANICS**

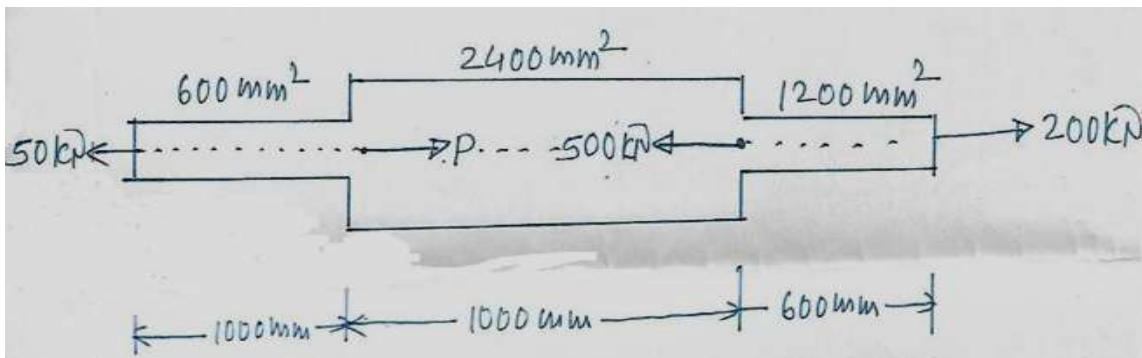
Day & Date: Thursday, 19-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:**
- 1) Q. No.2 is compulsory and Solve any two questions from remaining Question from section I.
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Section – I

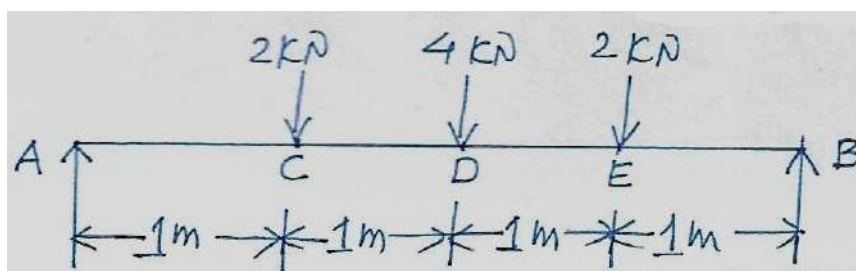
- Q.2** a) Write detailed note on any three elastic failure theories giving details of it's suitability. **06**
 b) Draw stress strain curve & explain in detail for mild steel material. **04**
- Q.3** Find the value of unknown force 'P' and total elongation for the compound bar shown bellow take $E = 210 \text{ GN/m}^2$ **09**



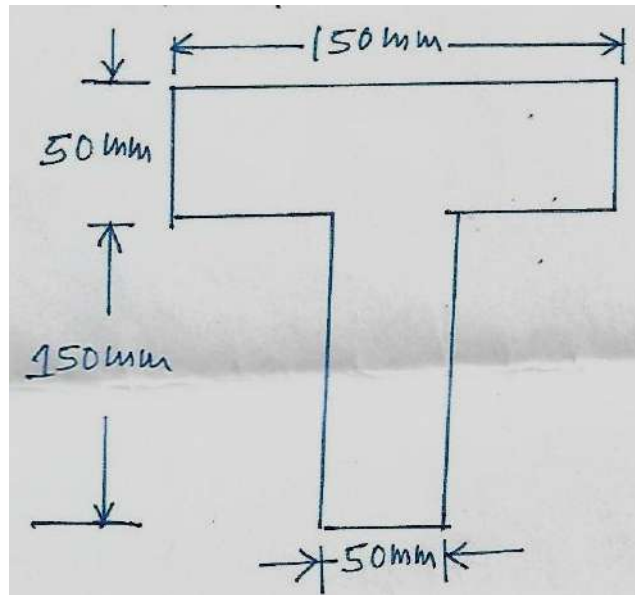
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- Q.5** Find Principle stresses & principle planes of a shaft section of 100 mm diameter subjected to bending moment of 4000 Nm & Torque of 6000 Nm. **09**

Section – II

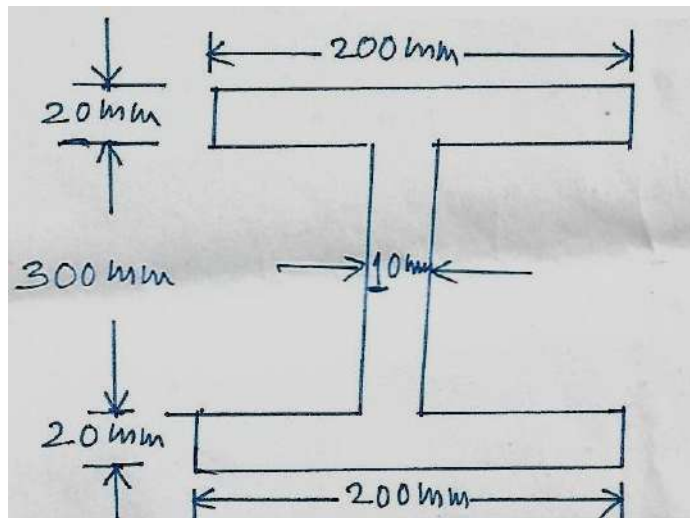
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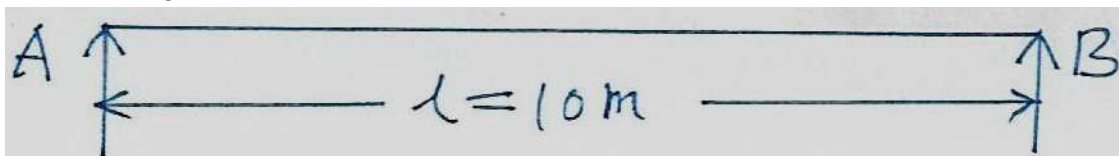
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Q.8 Draw the shear stress distribution across the section. If section is subjected to shear force of 100 KN. **09**



Q.9 Draw ILD for reactions at 'A' & 'B'. also draw ILD for shear force & bending moment at 3 meter from 'A'. **09**



Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- The equivalent Torque under combined action of bending moment (M) & Torque (T) is _____.
 - $T_e = (M^2 + T^2)$
 - $T_e = (M^2 + T^2)^{1/2}$
 - $T_e = (M^2 + T^2)^{3/2}$
 - $T_e = (M^2 + T^2)^2$
- The equivalent bending moment under combined action of bending moment (M) & Torque (T) is _____.
 - $\sqrt{M^2 + T^2}$
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 - $\frac{1}{2}(M + \sqrt{M^2 + T^2})$
- _____ is a Saint Venant theory.
 - Maximum shear stress theory
 - Maximum strain energy theory
 - Maximum principle strain theory
 - Distortion energy theory
- Maximum shear stress theory is also called as _____.
 - Beltrami theory
 - Haigh theory
 - Guest theory
 - Saint Venant theory
- The point of zero bending moment, where the bending moment diagram changes its sign is called _____.
 - The point of contraflexure
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 - All of the above
- Bending moment on a section is maximum where shearing force is _____.
 - minimum
 - maximum
 - equal
 - zero
- If a member is subjected to a uniform bending moment (M), the radius of curvature of the deflected form of the member is given by _____.
 - $\frac{M}{I} = \frac{E}{R}$
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- 8) Section modulus of rectangular section of width b & depth d is _____.
a) $\frac{db^2}{4}$ b) $\frac{db^2}{6}$
c) $\frac{bd^2}{4}$ d) $\frac{bd^2}{6}$
- 9) For a rectangular beam, the ratio of Z_{\max}/I_{ave} is _____.
a) 2 b) 1
c) 1.5 d) None of the above
- 10) Strength of the beam is more if its section modulus is _____.
a) decreased b) zero
c) increased d) none
- 11) The ratio of linear stress to linear strain is known as _____.
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- 12) Factor of safety is equal to _____.
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c) Yield stress/permissible stress
d) All of the above
- 13) The normal stress on oblique plane is minimum when α is equal to _____.
a) 0° b) 45°
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- 14) Principle planes are the planes of _____.
a) maximum shear stress b) minimum shear stress
c) zero shear stress d) none of the above

Seat No.	
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**S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO SOLID MECHANICS**

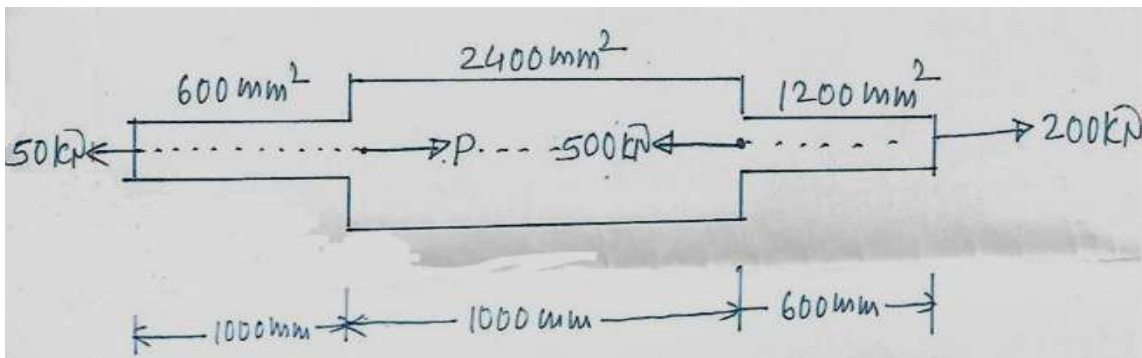
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Max. Marks: 56

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Section – I

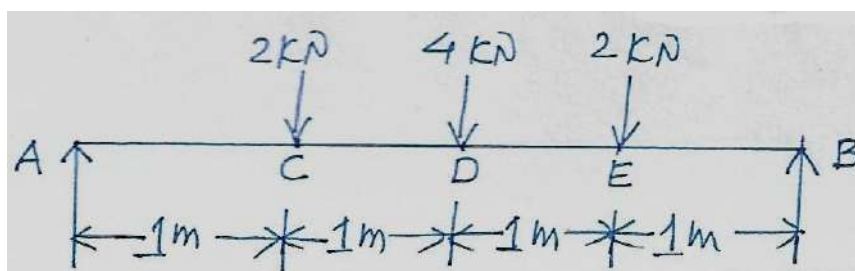
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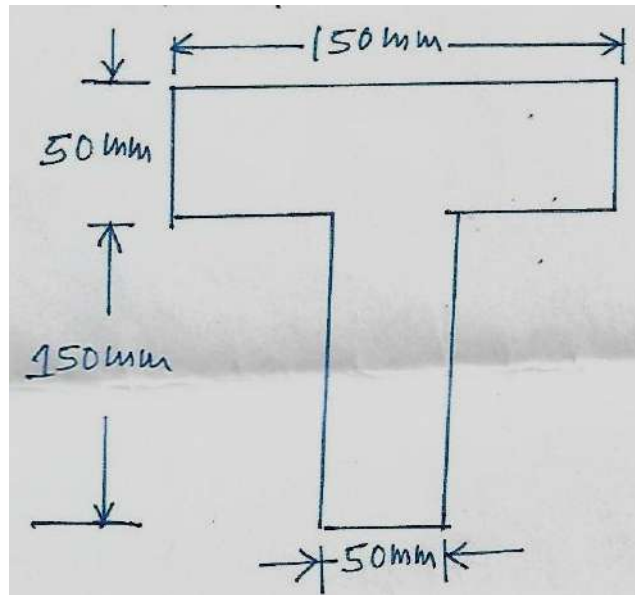
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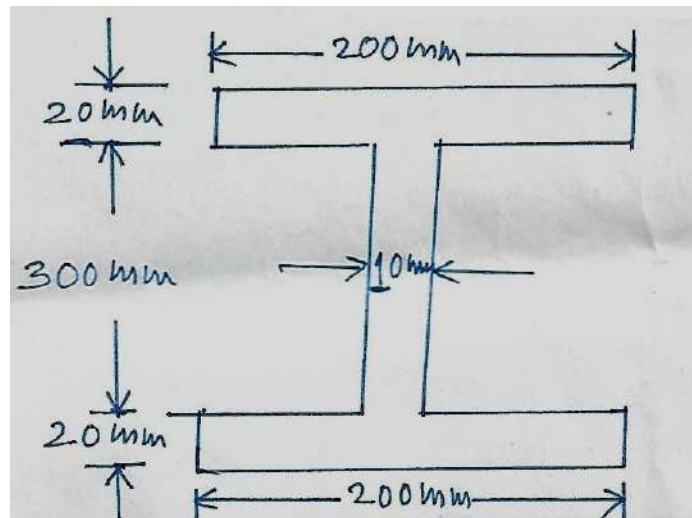
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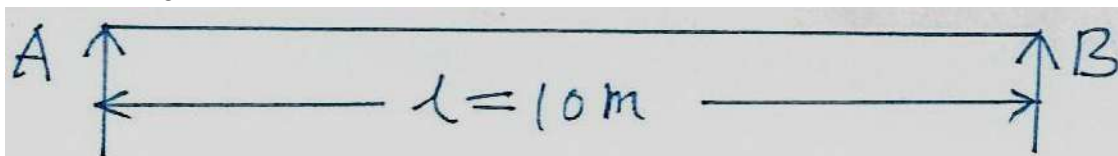
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Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019
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Max. Marks: 70

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

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- 14) The point of zero bending moment, where the bending moment diagram changes its sign is called _____.
a) The point of contraflexure
b) The point of inflation
c) The point of virtual hinge
d) All of the above

Seat No.	
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**S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Civil Engineering
INTRODUCTION TO SOLID MECHANICS**

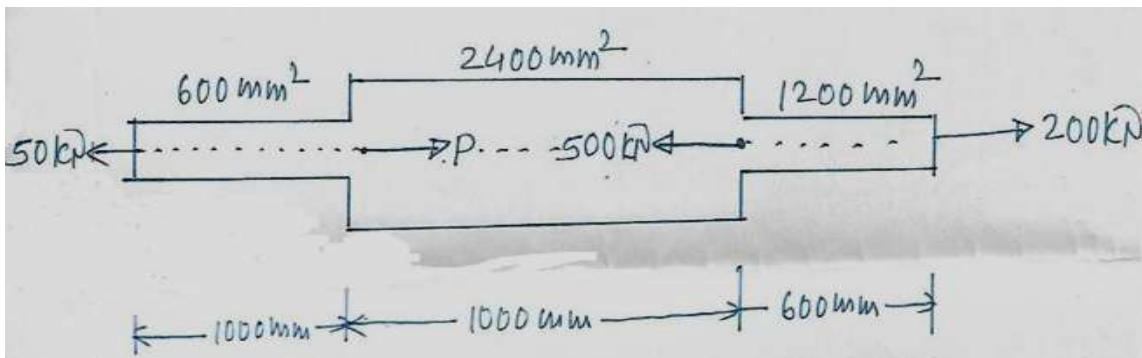
Day & Date: Thursday, 19-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:**
- 1) Q. No.2 is compulsory and Solve any two questions from remaining Question from section I.
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Section – I

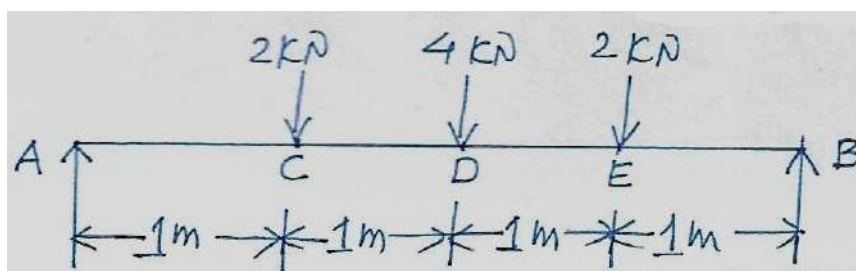
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- Q.3** Find the value of unknown force 'P' and total elongation for the compound bar shown below take $E = 210 \text{ GN/m}^2$ **09**



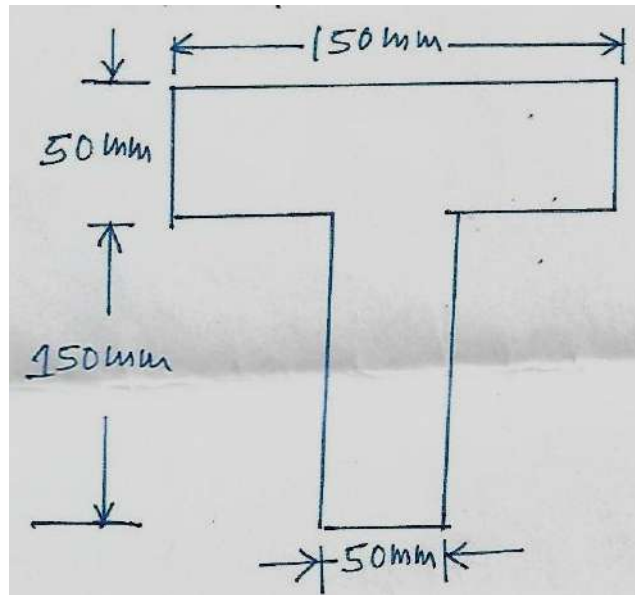
- Q.4** Find normal & tangential stresses and the resultant stresses and its obliquity on a plane at 20° with major Principle Plane. Take major principle stress as 120 MN/m^2 (Tensile) & minor principle stress as 60 MN/m^2 (Tensile) **09**
- Q.5** Find Principle stresses & principle planes of a shaft section of 100 mm diameter subjected to bending moment of 4000 Nm & Torque of 6000 Nm. **09**

Section – II

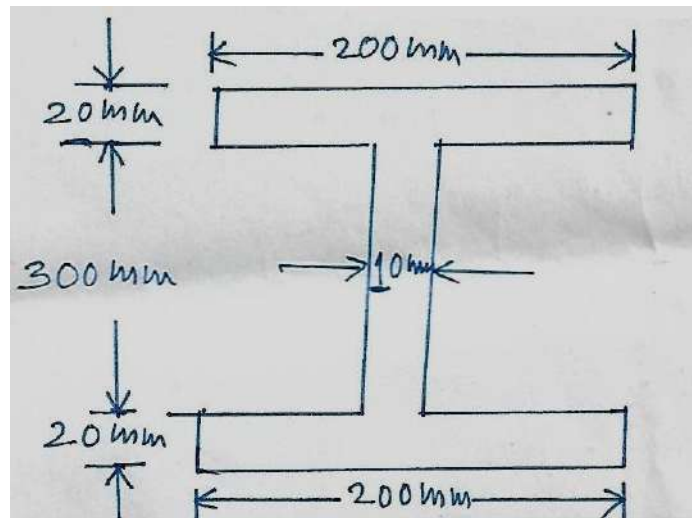
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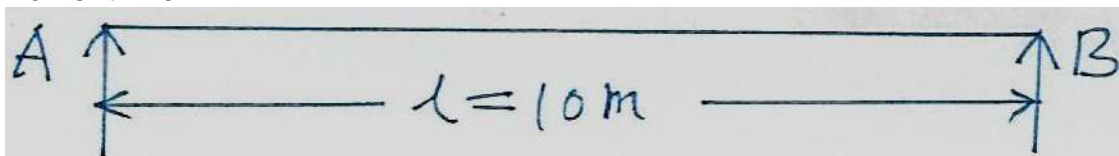
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Q.8 Draw the shear stress distribution across the section. If section is subjected to shear force of 100 KN. **09**



Q.9 Draw ILD for reactions at 'A' & 'B'. also draw ILD for shear force & bending moment at 3 meter from 'A'. **09**



Seat No.	
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S.Y (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

- 2) Use of Steam tables and Mollier diagram is allowed.
- 3) Use of Scientific calculator is allowed.
- 4) Assume suitable data if required and state it clearly.
- 5) Neat diagrams must be drawn wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The term coefficient of performance is related with _____.

a) Heat pump	b) Heat Engine
c) Steam Engine	d) Gas Turbine

- 2) Reversible adiabatic process has _____.

a) $ds = 0$	b) $ds \leq 0$
c) $ds \geq 0$	d) $ds = dh$

- 3) A liquid, whose temperature is less than the saturation temperature at the given pressure, is called as _____.

a) Saturated liquid	b) Sub cooled liquid
c) Both a and b	d) none of the above

- 4) The state, at which saturated liquid line with respect to vaporisation and saturated vapour line on p-v diagram of pure substance, meet is called as _____.

a) Saturation state	b) Critical state
c) Vaporisation state	d) Superheated Vapour State

- 5) The ratio of heat actually used in producing the steam to the heat liberated in the furnace is called as _____.

a) Equivalent evaporation	b) Evaporative capacity
c) Boiler efficiency	d) Factor of evaporation

- 6) The major heat loss in boiler is due to _____.

a) Moisture in fuel	b) Dry fuel gases
c) steam formation	d) Unburnt fuel

- 7) Rankine cycle efficiency of good steam power plant may be in the range of _____.

a) 15 to 20%	b) 35 to 45%
c) 70 to 80%	d) 90 to 95%

- 8) Rankine cycle comprises of _____.
a) Two isentropic processes and two const. volume processes
b) Two isentropic processes and two const. pressure processes
c) Two isothermal processes and two const. pressure processes
d) None of the above
- 9) Effect of friction in nozzle _____ dryness fraction of steam.
a) Increases
b) Decreases
c) No change
d) None of the above
- 10) Critical pressure ration for Supeheated steam is _____.
a) 0.528
b) 0.582
c) 0.577
d) 0.546
- 11) Thermal efficiency of engine with condenser as compared to without condenser, for a given pressure and temperature of steam is _____.
a) Higher
b) Lower
c) Same as long as initial press. and temp are unchanged
d) None of the above
- 12) The Compounding of turbine is done in order to _____.
a) Increase tangential force
b) Improve efficiency
c) Reduce exit losses
d) reduce rotational Speed
- 13) In single stage single acting reciprocating compressor without clearance volume, the work done is minimum during _____.
a) Isothermal compression
b) Isentropic compression
c) Polytropic compression
d) None of the above
- 14) Due to intercooling, the required work done for compression _____.
a) Remains constant
b) Increases
c) Decreases
d) None of the above

Seat No.	
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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
APPLIED THERMODYNAMICS**

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) out of remaining questions solve any two questions from each Section.
2) Use of Steam tables and Mollier diagram is allowed.
3) Use of Scientific calculator is allowed.
4) Assume suitable data if required and state it clearly.
5) Neat diagrams must be drawn wherever necessary.

Section – I

- Q.2** a) State Kelvin-Planck and Clausius statements of second law of thermodynamics and how they are equivalent to each other. **05**
b) A Carnot engine works between temperature limit of 825°C and 125°C . the engine receives 3600 kJ of heat per minute. Determine power of engine and amount of heat rejected to sink per second. **05**
c) Ice melts at 0°C with latent heat of fusion of 334.92 kJ/kg. At atm.press. water boils at 100°C with latent heat of vaporization 2254 kJ/kg. Calculate the entropy change fusion and vaporization processes. **04**
- Q.3** a) Explain with the help of sketch Property diagram for Phase-change process. **05**
b) A boiler produces wet steam having dryness fraction 0.90. The working pressure of boiler is 12 bar absolute It generates steam at the rate of 640 kg/hr and consumes coal at the rate of 80 kg/hr, if the calorific value of coal is 31,400 kJ/kg and water is fed at temp, of 20°C , calculate
1) equivalent evaporation/kg of coal
2) factor of evaporation
3) boiler efficiency. **05**
c) With the help of formulas explain the different heat losses occurs in the boiler plant **04**
- Q.4** a) Derive an expression for entropy change of an ideal gas undergoing change of state, in terms of initial and final temperatures and volumes. **05**
b) In a Rankine cycle, dry saturated steam enters turbine at a pressure of 15 bar and the exhaust pressure is 0.074 bar. determine
1) Rankine cycle efficiency
2) Specific steam consumption
3) Work ratio **05**
c) Explain the effect of different operating conditions on Rankine cycle efficiency **04**

Section – II

- Q.5** a) Steam enters a nozzle with a velocity of 250 m/s, pressure of 3 bar and dryness fraction 0.95. If the isentropic expansion in nozzle proceeds till the pressure at exit is 2 bar, calculate the exit velocity and area at exit from nozzle for flow of 0.75 kg/sec. Also show process on Mollier Diagram. **05**
b) Define condenser, & explain with Sketch the elements of steam condensing plant. **05**

- c) Explain the advantages of Steam turbine. **04**
- Q.6** a) Derive an expression for maximum discharge through the nozzle. **05**
- b) Show that maximum blade efficiency in a single stage impulse turbine is given by $\eta_{bmax} = \cos^2 \alpha_1$ with usual notations. **05**
- c) Draw a Combined Velocity diagram of a Impulse turbine and mention the different notations used for it. **04**
- Q.7** a) Derive the expression for a polytropic work input required in a single stage reciprocating air compressor with a suitable P-V diagram. **05**
- b) A single stage reciprocating compressor has a bore of 200 mm and stroke of 300 mm. It runs at speed of 480 rpm. The clearance volume is 6% of the swept volume and law for compression, expansion is $PV^{1.32}=C$. Intake pressure is 98 kPa and temp. is 27°C and compressor delivery} pressure is 500 kPa. Determine **05**
- 1) Volumetric efficiency
 - 2) Power required to run compressor
 - 3) Isothermal power
 - 4) Isothermal efficiency
- c) What is necessity of multistage compression? Discuss advantages of multistage compression with intercooling. **04**

Seat No.	
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Set **Q**

S.Y (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Use of Steam tables and Mollier diagram is allowed.
 3) Use of Scientific calculator is allowed.
 4) Assume suitable data if required and state it clearly.
 5) Neat diagrams must be drawn wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Rankine cycle comprises of _____.
 - a) Two isentropic processes and two const. volume processes
 - b) Two isentropic processes and two const. pressure processes
 - c) Two isothermal processes and two const. pressure processes
 - d) None of the above
- 2) Effect of friction in nozzle _____ dryness fraction of steam.
 - a) Increases
 - b) Decreases
 - c) No change
 - d) None of the above
- 3) Critical pressure ration for Supeheated steam is _____.
 - a) 0.528
 - b) 0.582
 - c) 0.577
 - d) 0.546
- 4) Thermal efficiency of engine with condenser as compared to without condenser, for a given pressure and temperature of steam is _____.
 - a) Higher
 - b) Lower
 - c) Same as long as initial press. and temp are unchanged
 - d) None of the above
- 5) The Compounding of turbine is done in order to _____.
 - a) Increase tangential force
 - b) Improve efficiency
 - c) Reduce exit losses
 - d) reduce rotational Speed
- 6) In single stage single acting reciprocating compressor without clearance volume, the work done is minimum during _____.
 - a) Isothermal compression
 - b) Isentropic compression
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 - d) None of the above
- 7) Due to intercooling, the required work done for compression _____.
 - a) Remains constant
 - b) Increases
 - c) Decreases
 - d) None of the above

- 8) The term coefficient of performance is related with _____.
- | | |
|-----------------|----------------|
| a) Heat pump | b) Heat Engine |
| c) Steam Engine | d) Gas Turbine |
- 9) Reversible adiabatic process has _____.
- | | |
|----------------|----------------|
| a) $ds = 0$ | b) $ds \leq 0$ |
| c) $ds \geq 0$ | d) $ds = dh$ |
- 10) A liquid, whose temperature is less than the saturation temperature at the given pressure, is called as _____.
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| a) Saturated liquid | b) Sub cooled liquid |
| c) Both a and b | d) none of the above |
- 11) The state, at which saturated liquid line with respect to vaporisation and saturated vapour line on p-v diagram of pure substance, meet is called as _____.
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|-----------------------|-----------------------------|
| a) Saturation state | b) Critical state |
| c) Vaporisation state | d) Superheated Vapour State |
- 12) The ratio of heat actually used in producing the steam to the heat liberated in the furnace is called as _____.
- | | |
|---------------------------|--------------------------|
| a) Equivalent evaporation | b) Evaporative capacity |
| c) Boiler efficiency | d) Factor of evaporation |
- 13) The major heat loss in boiler is due to _____.
- | | |
|---------------------|-------------------|
| a) Moisture in fuel | b) Dry fuel gases |
| c) steam formation | d) Unburnt fuel |
- 14) Rankine cycle efficiency of good steam power plant may be in the range of _____.
- | | |
|--------------|--------------|
| a) 15 to 20% | b) 35 to 45% |
| c) 70 to 80% | d) 90 to 95% |

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) out of remaining questions solve any two questions from each Section.
 2) Use of Steam tables and Mollier diagram is allowed.
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 5) Neat diagrams must be drawn wherever necessary.

Section – I

- Q.2** a) State Kelvin-Planck and Clausius statements of second law of thermodynamics and how they are equivalent to each other. **05**
 b) A Carnot engine works between temperature limit of 825°C and 125°C . the engine receives 3600 kJ of heat per minute. Determine power of engine and amount of heat rejected to sink per second. **05**
 c) Ice melts at 0°C with latent heat of fusion of 334.92 kJ/kg. At atm.press. water boils at 100°C with latent heat of vaporization 2254 kJ/kg. Calculate the entropy change fusion and vaporization processes. **04**
- Q.3** a) Explain with the help of sketch Property diagram for Phase-change process. **05**
 b) A boiler produces wet steam having dryness fraction 0.90. The working pressure of boiler is 12 bar absolute It generates steam at the rate of 640 kg/hr and consumes coal at the rate of 80 kg/hr, if the calorific value of coal is 31,400 kJ/kg and water is fed at temp, of 20°C , calculate
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 2) factor of evaporation
 3) boiler efficiency. **05**
 c) With the help of formulas explain the different heat losses occurs in the boiler plant **04**
- Q.4** a) Derive an expression for entropy change of an ideal gas undergoing change of state, in terms of initial and final temperatures and volumes. **05**
 b) In a Rankine cycle, dry saturated steam enters turbine at a pressure of 15 bar and the exhaust pressure is 0.074 bar. determine
 1) Rankine cycle efficiency
 2) Specific steam consumption
 3) Work ratio **05**
 c) Explain the effect of different operating conditions on Rankine cycle efficiency **04**

Section – II

- Q.5** a) Steam enters a nozzle with a velocity of 250 m/s, pressure of 3 bar and dryness fraction 0.95. If the isentropic expansion in nozzle proceeds till the pressure at exit is 2 bar, calculate the exit velocity and area at exit from nozzle for flow of 0.75 kg/sec. Also show process on Mollier Diagram. **05**
 b) Define condenser, & explain with Sketch the elements of steam condensing plant. **05**

- | | | | |
|------------|-----------|--|-----------|
| | c) | Explain the advantages of Steam turbine. | 04 |
| Q.6 | a) | Derive an expression for maximum discharge through the nozzle. | 05 |
| | b) | Show that maximum blade efficiency in a single stage impulse turbine is given by $\eta_{bmax} = \cos^2 \alpha_1$ with usual notations. | 05 |
| | c) | Draw a Combined Velocity diagram of a Impulse turbine and mention the different notations used for it. | 04 |
| Q.7 | a) | Derive the expression for a polytropic work input required in a single stage reciprocating air compressor with a suitable P-V diagram. | 05 |
| | b) | A single stage reciprocating compressor has a bore of 200 mm and stroke of 300 mm. It runs at speed of 480 rpm. The clearance volume is 6% of the swept volume and law for compression, expansion is $PV^{1.32}=C$. Intake pressure is 98 kPa and temp. is 27°C and compressor delivery} pressure is 500 kPa. Determine | 05 |
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S.Y (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The ratio of heat actually used in producing the steam to the heat liberated in the furnace is called as _____.
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 c) Boiler efficiency d) Factor of evaporation
- 2) The major heat loss in boiler is due to _____.
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- 3) Rankine cycle efficiency of good steam power plant may be in the range of _____.
 a) 15 to 20% b) 35 to 45%
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- 10) Due to intercooling, the required work done for compression _____.
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- 11) The term coefficient of performance is related with _____.
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a) Saturated liquid b) Sub cooled liquid
c) Both a and b d) none of the above
- 14) The state, at which saturated liquid line with respect to vaporisation and saturated vapour line on p-v diagram of pure substance, meet is called as _____.
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c) Vaporisation state d) Superheated Vapour State

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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**S.Y (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
APPLIED THERMODYNAMICS**

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

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MCQ/Objective Type Questions

Duration: 30 Minutes

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- 14) Effect of friction in nozzle _____ dryness fraction of steam.
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| a) Increases | b) Decreases |
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

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Seat
No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MECHANICS OF MATERIALS

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The stress due to suddenly applied load is _____ times the gradually applied load.

a) Two	b) Three
c) Four	d) Five
- 2) Angle between the principal planes and plane of maximum shear stress is _____.

a) 90°	b) 45°
c) 120°	d) None of the above
- 3) The property of material same in all direction is known as _____.

a) Homogeneous	b) Isotropic
c) Elasticity	d) None of these
- 4) A simply supported beam of span (l) carries a point load (w) at the center of the beam. The shear force diagram will be _____.

a) a rectangle
b) a triangle
c) two equal and opposite rectangles
d) two equal and opposite triangles
- 5) For a cantilever loaded with one-point load applied not at the free end, the maximum deflection occurs at the _____.

a) free end	b) load point
c) fixed end	d) both a and b
- 6) The torque transmitted by hollow shaft of external diameter (D) and internal diameter (d) is equal to _____.

a) $\frac{\pi}{32} \tau(D^3 - d^3)$	b) $\frac{\pi}{16} \tau(D^3 - d^3)$
c) $\frac{\pi}{16} \tau(D^4 - d^4)$	d) $\frac{\pi}{32} \tau\left(\frac{D^4 - d^4}{D}\right)$
- 7) For an I – section.

a) Bending stress is maximum at the neutral axis
b) Shear stress is zero at the neutral axis
c) Bending stress is zero at the edges
d) Shear stress is maximum at the neutral axis

- 8) For a simply supported beam of length (L) carrying a U.D.L. of w/m on its entire span, maximum slope is given by _____.
- a) $5wl^4/384 EI$ b) $wl^3/48EI$
c) $wl^3/6EI$ d) $wl^3/24EI$
- 9) The radius of Mohr's circle always represents _____.
- a) minimum principal stress
b) difference between the principal stresses
c) maximum principal stress
d) maximum shear stress
- 10) The bending moment on a section is maximum where shearing force is ____.
- a) Minimum b) Maximum
c) Average d) Changing sign
- 11) Variation of shear stress across the depth of a section of a beam is _____.
- a) Linear b) Parabolic
c) Cubic d) Exponential
- 12) In case of circular section the section modulus is given as _____.
- a) $\frac{\pi}{16} d^2$ b) $\frac{\pi}{16} d^3$
c) $\frac{\pi}{32} d^3$ d) $\frac{\pi}{16} d^4$
- 13) Total strain energy stored in a body is called as _____.
- a) Impact load b) Modulus of resilience
c) resilience d) proof resilience
- 14) If E = Young's Modulus, K = Bulk Modulus and G = Shear Modulus, then _____.
- a) $E = 9KG/(3K + G)$ b) $E = 3KG/(9K + G)$
c) $E = 3KG/(6K + G)$ d) $E = 6KG/(3K + G)$

Seat No.	
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MECHANICS OF MATERIALS

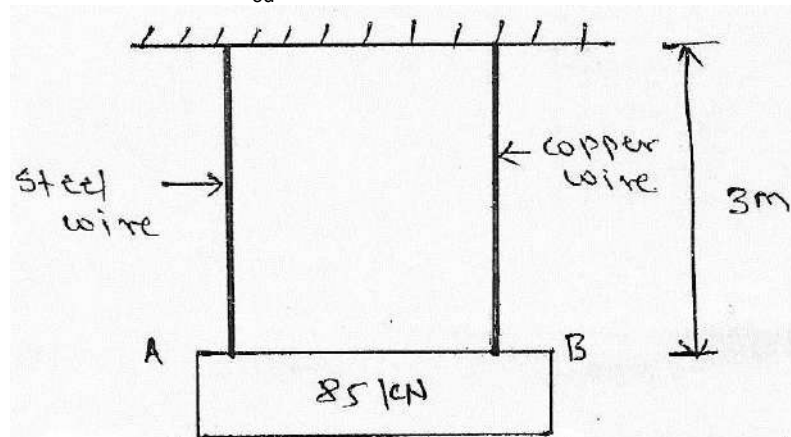
Day & Date: Tuesday, 10-12-2019
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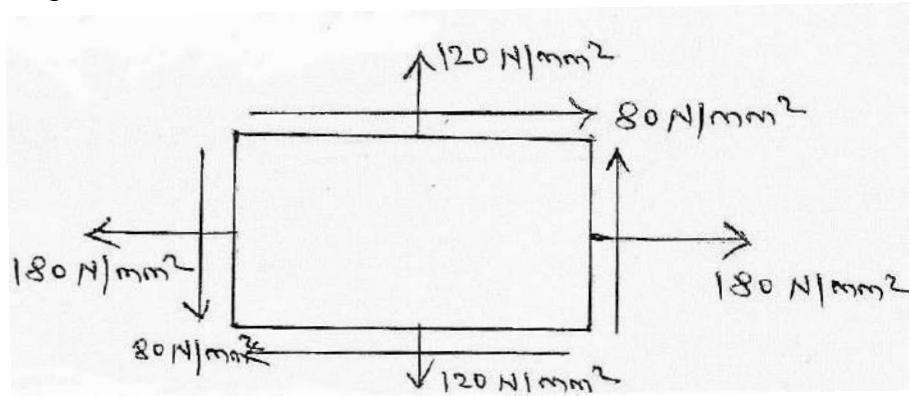
Section I

- Q.2 a)** Two wires of equal length supports a rigid body AB of 85 kN as shown in figure below. If cross-section area of each wire is 400 mm^2 , calculate load and stress shared by each wire, If length of each wire is 3 m. **08**
 Take $E_{st} = 200 \text{ GPa}$ and $E_{cu} = 110 \text{ GPa}$.



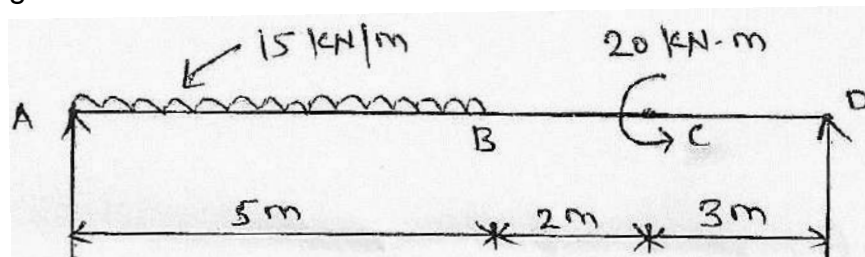
- b)** A Wagon weighing 45 kN is attached to a wire rope and moving down an incline at a speed of 3.6 km/hr when the rope jams and the wagon is suddenly brought to rest. If the length of the rope is 65 m at the time of sudden stoppage. Calculate the maximum instantaneous stress and maximum instantaneous elongation produced. **06**
 Diameter of rope = 50 mm, $E = 200 \text{ GN/m}^2$.
- Q.3 a)** At a point in a strained material, the principal stresses are 130 MPa and 50 MPa respectively. Both stresses are tensile in nature. The plane inclined at 30° with major principal plane. Find normal, tangential and resultant stress on this plane along with angle of obliquity by using Mohr's circle method only. **06**
- b)** A hollow of diameter ratio $3/8$ is required to transmit 375 kW at 110 r.p.m **08**
 The maximum torque = 1.25 mean torque. The shear stress is not to exceed 65 N/mm^2 , and twist in a length of 4 m not to exceed 2° . Calculate the external and internal diameter of the shaft, which will satisfy these conditions.
 Take $G = 0.85 \times 10^5 \text{ N/mm}^2$.

- Q.4**
- a) Prove that: $E = 3K(1 - 2\mu)$. **05**
 - b) A 15 mm diameter M.S. bar of 1.2 m is stressed by a weight of 135 N dropping freely through a distance 25 mm before commencing to stretch the bar. Find the maximum instantaneous stress and strain energy stored in the bar. **04**
Take $E = 2 \times 10^5 \text{ N/mm}^2$.
 - c) A point in a strained material is subjected to stresses as shown in figure. **05**
Find
 - 1) Magnitude of principal stresses and direction of principal plane.
 - 2) Magnitude of maximum shear stress.



Section II

- Q.5** a) Draw the shear force and bending moment diagram for the following loaded beam. Indicate important points and calculate the maximum bending moment. **08**



- b) A beam is of 'T' section having top flange 120 mm x 20 mm and web 20 mm x 100 mm is simply supported over a span 5 m and carries U.D.L. of 3 kN/m over the entire span. Determine maximum tensile and compressive stresses developed. Also draw bending stress distribution diagram. **06**

- Q.6**
- a) A beam of I-section is simply supported on span 7 m carries u.d.l. of 'w' kN/m. Both flanges of I-section are 150 mm wide and 20 mm thick and web 300 mm deep and 10 mm thick. Find the U.D.L. on the beam, if the tensile stress shall not exceed 35 N/mm². **06**
 - b) An Inverted T section has the flange 150 mm x 50 mm and the web 150 mm X 50 mm. A vertical shear force of 50 kN acts on it when web is held vertically. Determine the shear stress induced at important points and plot the shear stress distribution across the section. **08**

- Q.7**
- a) A cantilever beam of length 4 m carries a point load of 30 kN at free end and another point load of 25 kN at distance 2 m from fixed end. If $E = 110$ GPa and $I = 2 \times 10^8$ N/mm². For the cantilever, find the slope and deflection at free end by moment area method. **08**
 - b) Define the terms Slope and Deflection. **02**
 - c) Draw S.F.D. and B.M.D. for a cantilever beam having length (L) and subjected point load 'w' at free end. **04**

Seat No.	
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MECHANICS OF MATERIALS

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) For a simply supported beam of length (L) carrying a U.D.L. of w/m on its entire span, maximum slope is given by _____.
 - a) $5wl^4/384 EI$
 - b) $wl^3/48EI$
 - c) $wl^3/6EI$
 - d) $wl^3/24EI$
- 2) The radius of Mohr's circle always represents _____.
 - a) minimum principal stress
 - b) difference between the principal stresses
 - c) maximum principal stress
 - d) maximum shear stress
- 3) The bending moment on a section is maximum where shearing force is _____.
 - a) Minimum
 - b) Maximum
 - c) Average
 - d) Changing sign
- 4) Variation of shear stress across the depth of a section of a beam is _____.
 - a) Linear
 - b) Parabolic
 - c) Cubic
 - d) Exponential
- 5) In case of circular section the section modulus is given as _____.
 - a) $\frac{\pi}{16} d^2$
 - b) $\frac{\pi}{16} d^3$
 - c) $\frac{\pi}{32} d^3$
 - d) $\frac{\pi}{16} d^4$
- 6) Total strain energy stored in a body is called as _____.
 - a) Impact load
 - b) Modulus of resilience
 - c) resilience
 - d) proof resilience
- 7) If E = Young's Modulus, K = Bulk Modulus and G = Shear Modulus, then _____.
 - a) $E = 9KG/(3K + G)$
 - b) $E = 3KG/(9K + G)$
 - c) $E = 3KG/(6K + G)$
 - d) $E = 6KG/(3K + G)$
- 8) The stress due to suddenly applied load is _____ times the gradually applied load.
 - a) Two
 - b) Three
 - c) Four
 - d) Five
- 9) Angle between the principal planes and plane of maximum shear stress is _____.
 - a) 90°
 - b) 45°
 - c) 120°
 - d) None of the above

- 10) The property of material same in all direction is known as _____.
- | | |
|----------------|------------------|
| a) Homogeneous | b) Isotropic |
| c) Elasticity | d) None of these |
- 11) A simply supported beam of span (l) carries a point load (w) at the center of the beam. The shear force diagram will be _____.
- | |
|--------------------------------------|
| a) a rectangle |
| b) a triangle |
| c) two equal and opposite rectangles |
| d) two equal and opposite triangles |
- 12) For a cantilever loaded with one-point load applied not at the free end, the maximum deflection occurs at the _____.
- | | |
|--------------|-----------------|
| a) free end | b) load point |
| c) fixed end | d) both a and b |
- 13) The torque transmitted by hollow shaft of external diameter (D) and internal diameter (d) is equal to _____.
- | | |
|------------------------------------|---|
| a) $\frac{\pi}{32}\tau(D^3 - d^3)$ | b) $\frac{\pi}{16}\tau(D^3 - d^3)$ |
| c) $\frac{\pi}{16}\tau(D^4 - d^4)$ | d) $\frac{\pi}{32}\tau\left(\frac{D^4 - d^4}{D}\right)$ |
- 14) For an I – section.
- | |
|--|
| a) Bending stress is maximum at the neutral axis |
| b) Shear stress is zero at the neutral axis |
| c) Bending stress is zero at the edges |
| d) Shear stress is maximum at the neutral axis |

Seat
No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MECHANICS OF MATERIALS

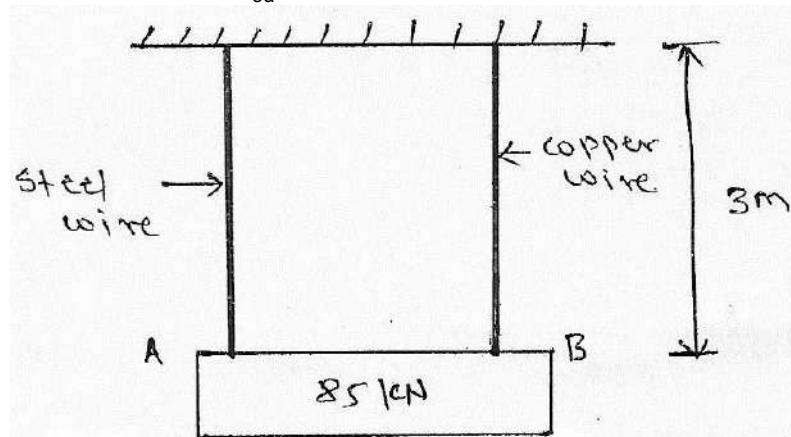
Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Solve any two questions from each section.
 2) Figures to the right indicate fill marks.
 3) Use of calculator is allowed.
 4) Assume additional suitable data, if necessary and mention it clearly.

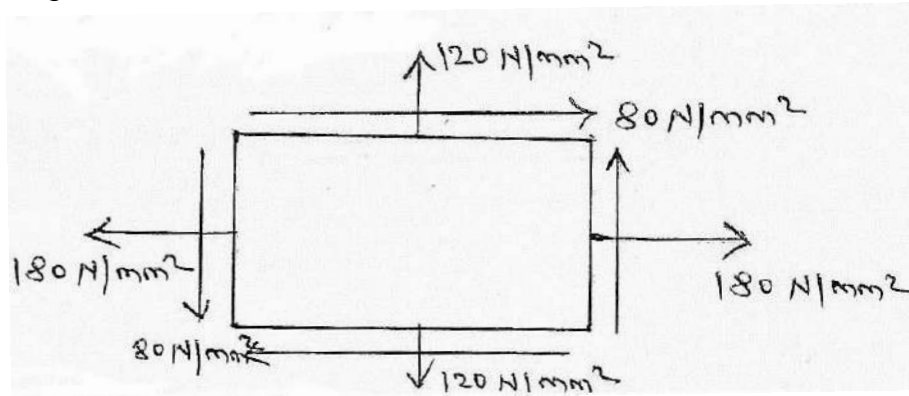
Section I

- Q.2 a)** Two wires of equal length supports a rigid body AB of 85 kN as shown in figure below. If cross-section area of each wire is 400 mm^2 , calculate load and stress shared by each wire, If length of each wire is 3 m. **08**
 Take $E_{\text{st}} = 200 \text{ GPa}$ and $E_{\text{cu}} = 110 \text{ GPa}$.



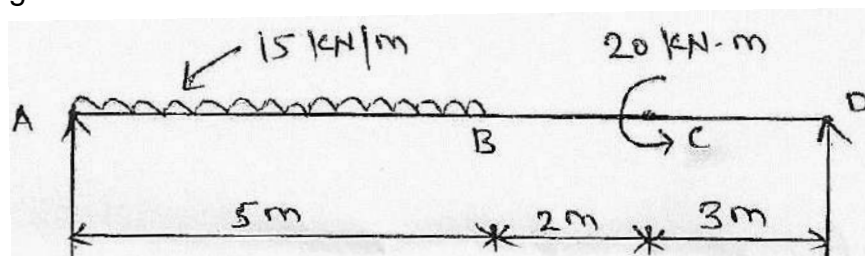
- b)** A Wagon weighing 45 kN is attached to a wire rope and moving down an incline at a speed of 3.6 km/hr when the rope jams and the wagon is suddenly brought to rest. If the length of the rope is 65 m at the time of sudden stoppage. Calculate the maximum instantaneous stress and maximum instantaneous elongation produced. **06**
 Diameter of rope = 50 mm, $E = 200 \text{ GN/m}^2$.
- Q.3 a)** At a point in a strained material, the principal stresses are 130 MPa and 50 MPa respectively. Both stresses are tensile in nature. The plane inclined at 30° with major principal plane. Find normal, tangential and resultant stress on this plane along with angle of obliquity by using Mohr's circle method only. **06**
- b)** A hollow of diameter ratio $3/8$ is required to transmit 375 kW at 110 r.p.m **08**
 The maximum torque = 1.25 mean torque. The shear stress is not to exceed 65 N/mm^2 , and twist in a length of 4 m not to exceed 2° . Calculate the external and internal diameter of the shaft, which will satisfy these conditions.
 Take $G = 0.85 \times 10^5 \text{ N/mm}^2$.

- Q.4**
- a) Prove that: $E = 3K(1 - 2\mu)$. **05**
 - b) A 15 mm diameter M.S. bar of 1.2 m is stressed by a weight of 135 N dropping freely through a distance 25 mm before commencing to stretch the bar. Find the maximum instantaneous stress and strain energy stored in the bar. **04**
Take $E = 2 \times 10^5 \text{ N/mm}^2$.
 - c) A point in a strained material is subjected to stresses as shown in figure. **05**
Find
 - 1) Magnitude of principal stresses and direction of principal plane.
 - 2) Magnitude of maximum shear stress.



Section II

- Q.5** a) Draw the shear force and bending moment diagram for the following loaded beam. Indicate important points and calculate the maximum bending moment. **08**



- b) A beam is of 'T' section having top flange 120 mm x 20 mm and web 20 mm x 100 mm is simply supported over a span 5 m and carries U.D.L. of 3 kN/m over the entire span. Determine maximum tensile and compressive stresses developed. Also draw bending stress distribution diagram. **06**

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Seat
No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MECHANICS OF MATERIALS

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) For a cantilever loaded with one-point load applied not at the free end, the maximum deflection occurs at the _____.
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- 3) For an I – section.
 - a) Bending stress is maximum at the neutral axis
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MECHANICS OF MATERIALS

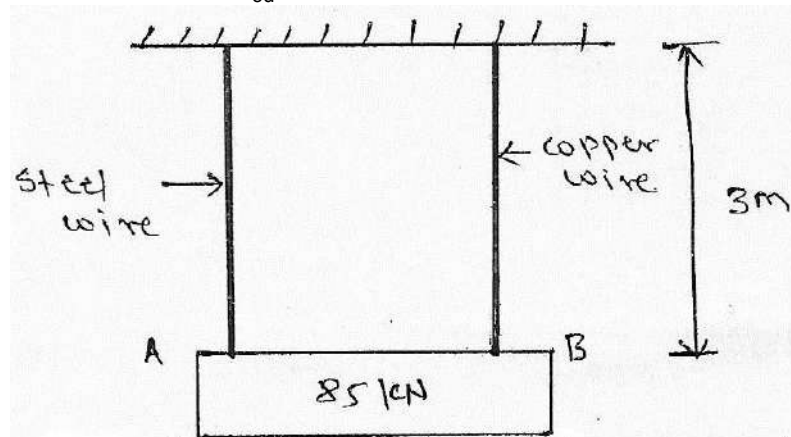
Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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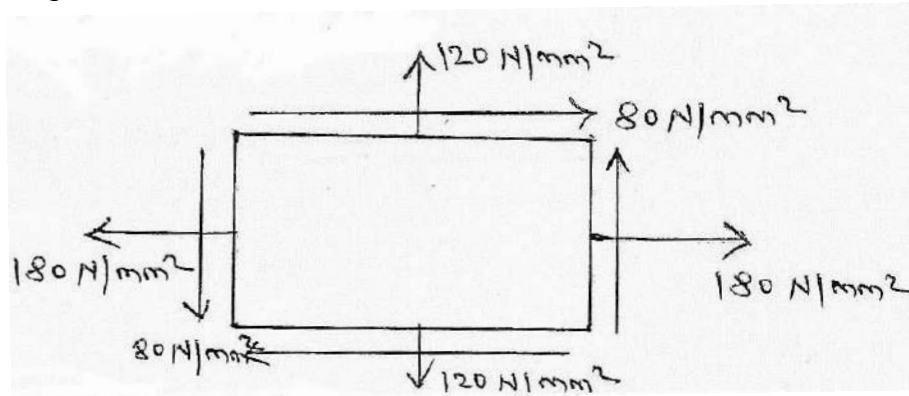
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- Q.2 a)** Two wires of equal length supports a rigid body AB of 85 kN as shown in figure below. If cross-section area of each wire is 400 mm^2 , calculate load and stress shared by each wire, If length of each wire is 3 m. **08**
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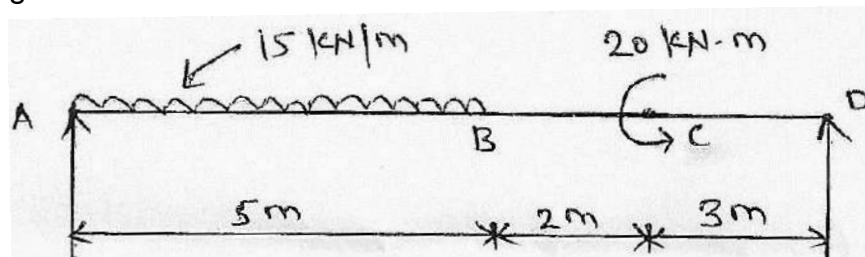
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Section II

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 - b) Define the terms Slope and Deflection. **02**
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Seat No.	
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MECHANICS OF MATERIALS

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MECHANICS OF MATERIALS

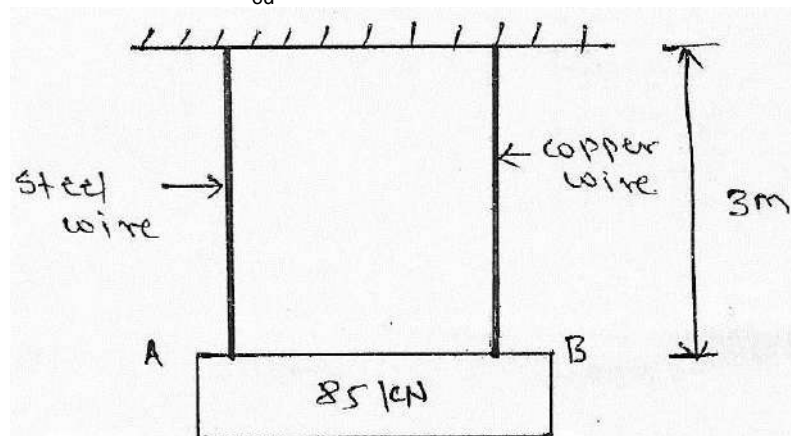
Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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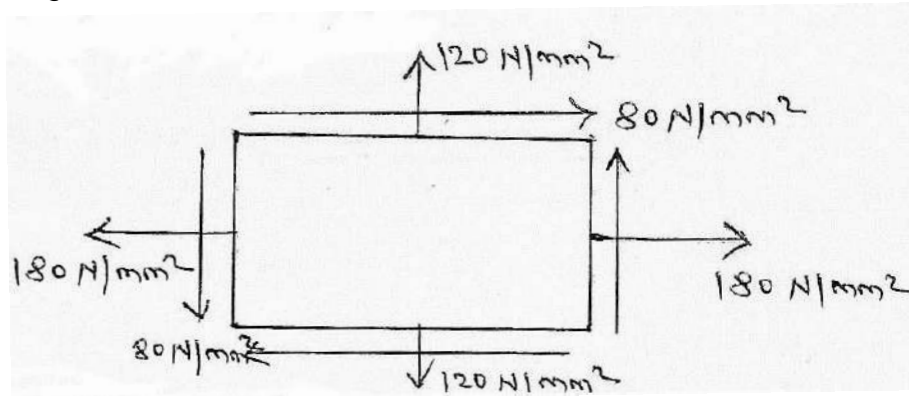
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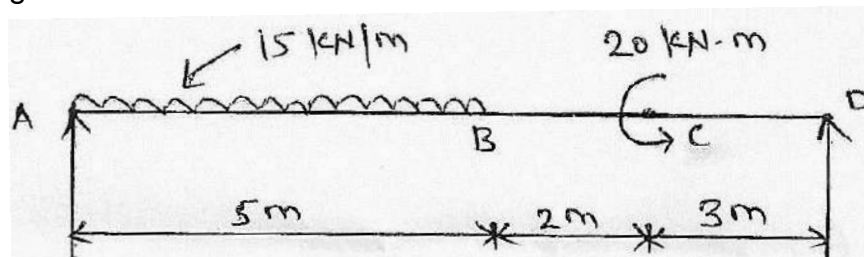
- b)** A Wagon weighing 45 kN is attached to a wire rope and moving down an incline at a speed of 3.6 km/hr when the rope jams and the wagon is suddenly brought to rest. If the length of the rope is 65 m at the time of sudden stoppage. Calculate the maximum instantaneous stress and maximum instantaneous elongation produced. **06**
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 Find
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Section II

- Q.5** a) Draw the shear force and bending moment diagram for the following loaded beam. Indicate important points and calculate the maximum bending moment. **08**



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- a) A cantilever beam of length 4 m carries a point load of 30 kN at free end and another point load of 25 kN at distance 2 m from fixed end. If $E = 110$ GPa and $I = 2 \times 10^8$ N/mm². For the cantilever, find the slope and deflection at free end by moment area method. **08**
 - b) Define the terms Slope and Deflection. **02**
 - c) Draw S.F.D. and B.M.D. for a cantilever beam having length (L) and subjected point load 'w' at free end. **04**

Q.1 B) Choose the correct alternatives from the options and rewrite the sentence. (2 marks each)

- 1) For joining of two parts without use of extra filler metal, following processes are used _____.
 - a) Brazing
 - b) TIG welding
 - c) MIG welding
 - d) Resistance welding

- 2) Investment Casting process _____.
 - a) uses Metal Pattern
 - b) is suitable for Mass Production
 - c) uses wax pattern
 - d) is used for manufacturing of Lathe Bed

- 3) Cam shaft for automotive is manufactured by _____.
 - a) Casting
 - b) Forging
 - c) Extrusion
 - d) Rolling

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MANUFACTURING PROCESSES

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Attempt any two questions from each section.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 4) Neat sketches must be drawn wherever necessary.

Section – I

- Q.2** a) Explain the following with neat sketch: **06**
 1) Follow board pattern
 2) Horizontal core
 b) Explain the various allowances provided on pattern. **05**
 c) What are the advantages of casting process? **03**
- Q.3** a) Enlist requisite properties of green molding sand. **04**
 b) Explain the advantages and limitations of Investment casting process. **04**
 c) Explain various elements of gating system with neat sketch. What is gating ratio? **06**
- Q.4** a) Explain with neat sketch construction and steps in operation of cupola. **06**
 b) Explain any five common important defects in castings with neat sketch. **05**
 c) Explain the advantages of mechanization in a foundry. **03**

Section – II

- Q.5** a) Compare between Hot working and cold working processes. **04**
 b) Explain with neat sketch the process of closed die forging. **05**
 c) Explain classification of Rolling mills on the basis of no of stands in rolling mill. **05**
- Q.6** a) Explain with neat sketch, process of Direct extrusion, with its advantages and limitations. **05**
 b) Explain the process of Rod drawing with neat sketch. **04**
 c) Enlist the processes of tube drawing and explain the process of tube drawing with floating mandrel. **05**
- Q.7** a) Explain various types of flames in gas welding with neat sketch. **06**
 b) Compare between TIG welding and MIG welding. **04**
 c) Compare between welding and brazing. **04**

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MANUFACTURING PROCESSES

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 A) Choose the correct alternatives from the options and rewrite the sentence. (1 marks each) 08

- 1) _____ is one of filler metal used in the soldering.

a) Fe	b) Ar
c) Ag	d) Au
- 2) Which of the following additives in sand is reducing agent?

a) Saw dust	b) Coal dust
c) iron oxide	d) Bentonite
- 3) Mild Steel bar used for workshop practical is manufactured by _____.

a) rolling	b) Casting
c) forging	d) Extrusion
- 4) The billet is uniformly confined from all sides in case of _____ Extrusion

a) Direct	b) Indirect
c) Hydrostatic	d) Impact
- 5) Which of the following material is not used for charging in cupola?

a) MS scrap	b) Pig iron
c) Returns	d) CI borings
- 6) The furnace commonly used in non ferrous foundries is _____.

a) Direct arc furnaces	b) Cupola
c) Induction furnace	d) any of above
- 7) Higher ramming density gives _____ to mould.

a) Good Collapsibility	b) Low permeability
c) Low strength	d) High permeability
- 8) Following is the product of Thermosetting Plastics _____.

a) Oil bottle	b) Plastic dishes
c) Bucket	d) Electrical components

Q.1 B) Choose the correct alternatives from the options and rewrite the sentence. (2 marks each)

- 1) Investment Casting process _____.
 - a) uses Metal Pattern
 - b) is suitable for Mass Production
 - c) uses wax pattern
 - d) is used for manufacturing of Lathe Bed

- 2) Cam shaft for automotive is manufactured by _____.
 - a) Casting
 - b) Forging
 - c) Extrusion
 - d) Rolling

- 3) For joining of two parts without use of extra filler metal, following processes are used _____.
 - a) Brazing
 - b) TIG welding
 - c) MIG welding
 - d) Resistance welding

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MANUFACTURING PROCESSES

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Attempt any two questions from each section.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 4) Neat sketches must be drawn wherever necessary.

Section – I

- | | | | |
|------------|-----------|---|-----------|
| Q.2 | a) | Explain the following with neat sketch: | 06 |
| | | 1) Follow board pattern | |
| | | 2) Horizontal core | |
| | b) | Explain the various allowances provided on pattern. | 05 |
| | c) | What are the advantages of casting process? | 03 |
| Q.3 | a) | Enlist requisite properties of green molding sand. | 04 |
| | b) | Explain the advantages and limitations of Investment casting process. | 04 |
| | c) | Explain various elements of gating system with neat sketch. What is gating ratio? | 06 |
| Q.4 | a) | Explain with neat sketch construction and steps in operation of cupola. | 06 |
| | b) | Explain any five common important defects in castings with neat sketch. | 05 |
| | c) | Explain the advantages of mechanization in a foundry. | 03 |

Section – II

- | | | | |
|------------|-----------|---|-----------|
| Q.5 | a) | Compare between Hot working and cold working processes. | 04 |
| | b) | Explain with neat sketch the process of closed die forging. | 05 |
| | c) | Explain classification of Rolling mills on the basis of no of stands in rolling mill. | 05 |
| Q.6 | a) | Explain with neat sketch, process of Direct extrusion, with its advantages and limitations. | 05 |
| | b) | Explain the process of Rod drawing with neat sketch. | 04 |
| | c) | Enlist the processes of tube drawing and explain the process of tube drawing with floating mandrel. | 05 |
| Q.7 | a) | Explain various types of flames in gas welding with neat sketch. | 06 |
| | b) | Compare between TIG welding and MIG welding. | 04 |
| | c) | Compare between welding and brazing. | 04 |

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MANUFACTURING PROCESSES

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 A) Choose the correct alternatives from the options and rewrite the sentence. (1 marks each) 08

- 1) Higher ramming density gives _____ to mould.

a) Good Collapsibility	b) Low permeability
c) Low strength	d) High permeability
- 2) Following is the product of Thermosetting Plastics _____.

a) Oil bottle	b) Plastic dishes
c) Bucket	d) Electrical components
- 3) _____ is one of filler metal used in the soldering.

a) Fe	b) Ar
c) Ag	d) Au
- 4) Which of the following additives in sand is reducing agent?

a) Saw dust	b) Coal dust
c) iron oxide	d) Bentonite
- 5) Mild Steel bar used for workshop practical is manufactured by _____.

a) rolling	b) Casting
c) forging	d) Extrusion
- 6) The billet is uniformly confined from all sides in case of _____ Extrusion

a) Direct	b) Indirect
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- 7) Which of the following material is not used for charging in cupola?

a) MS scrap	b) Pig iron
c) Returns	d) CI borings
- 8) The furnace commonly used in non ferrous foundries is _____.

a) Direct arc furnaces	b) Cupola
c) Induction furnace	d) any of above

Q.1 B) Choose the correct alternatives from the options and rewrite the sentence. (2 marks each)

- 1) Cam shaft for automotive is manufactured by _____.
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 - b) Forging
 - c) Extrusion
 - d) Rolling

- 2) For joining of two parts without use of extra filler metal, following processes are used _____.
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 - b) TIG welding
 - c) MIG welding
 - d) Resistance welding

- 3) Investment Casting process _____.
 - a) uses Metal Pattern
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 - c) uses wax pattern
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MANUFACTURING PROCESSES

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Max. Marks: 56

- Instructions:** 1) Attempt any two questions from each section.
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Section – I

- Q.2** a) Explain the following with neat sketch: **06**
 1) Follow board pattern
 2) Horizontal core
 b) Explain the various allowances provided on pattern. **05**
 c) What are the advantages of casting process? **03**
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Section – II

- Q.5** a) Compare between Hot working and cold working processes. **04**
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 c) Enlist the processes of tube drawing and explain the process of tube drawing with floating mandrel. **05**
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 c) Compare between welding and brazing. **04**

Seat
No.**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019**
Mechanical Engineering
MANUFACTURING PROCESSESDay & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 A) Choose the correct alternatives from the options and rewrite the sentence. (1 marks each) 08

- 1) Mild Steel bar used for workshop practical is manufactured by _____.
 - a) rolling
 - b) Casting
 - c) forging
 - d) Extrusion
- 2) The billet is uniformly confined from all sides in case of _____ Extrusion.
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 - b) Indirect
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 - b) Cupola
 - c) Induction furnace
 - d) any of above
- 5) Higher ramming density gives _____ to mould.
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- 6) Following is the product of Thermosetting Plastics _____.
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- 7) _____ is one of filler metal used in the soldering.
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 - c) Ag
 - d) Au
- 8) Which of the following additives in sand is reducing agent?
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 - b) Coal dust
 - c) iron oxide
 - d) Bentonite

Q.1 B) Choose the correct alternatives from the options and rewrite the sentence. (2 marks each)

- 1) For joining of two parts without use of extra filler metal, following processes are used _____.
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 - b) TIG welding
 - c) MIG welding
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- 3) Cam shaft for automotive is manufactured by _____.
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 - b) Forging
 - c) Extrusion
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MANUFACTURING PROCESSES

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Attempt any two questions from each section.
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Section – II

- | | | | |
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| Q.5 | a) | Compare between Hot working and cold working processes. | 04 |
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| | c) | Enlist the processes of tube drawing and explain the process of tube drawing with floating mandrel. | 05 |
| Q.7 | a) | Explain various types of flames in gas welding with neat sketch. | 06 |
| | b) | Compare between TIG welding and MIG welding. | 04 |
| | c) | Compare between welding and brazing. | 04 |

Seat
No.

**F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MECHANICS**

Day & Date: Monday, 09-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Q. No 1 is compulsory. It should be solved in first 30 minutes in Answer.
Book Page.

2) Figures to the right indicate full marks.

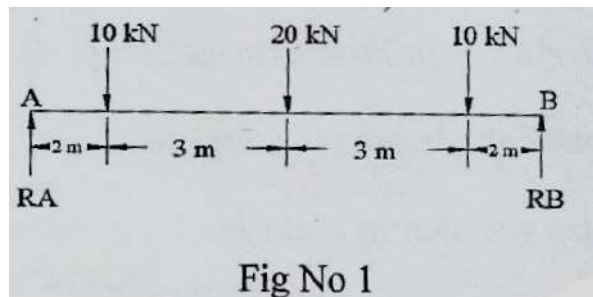
MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternative from the options and rewrite the sentence. 14

- 1) The resultant of two forces P and Q acting at an angle θ is _____.
- a) $P^2 + Q^2 + 2P \sin \theta$ b) $P^2 + Q^2 + 2PQ \cos \theta$
c) $P^2 + Q^2 + 2PQ$ d) $\sqrt{P^2 + Q^2 + 2PQ \cos \theta}$
- 2) The beam a shown in the Figure no 1. A hinge support at A and a roller support at B. The reaction R_A of the hinged support A of the beam is _____.



- a) 10.8 kN b) 20 kN
c) 30 kN d) 40 kN
- 3) A body which can retain its original shape and size even if it subjected to external forces, is known as _____.
- a) Plastic body b) Elastic body
c) Rigid body d) None of these
- 4) On a ladder resting on a rough floor and leaning against a smooth vertical wall, the force of friction acts _____.
- a) Downwards at its upper end
b) Upwards at its upper end
c) Perpendicular to the wall at its upper end
d) Zero at its upper end
- 5) If number of joints in a perfect truss is J, then number of member in the frame m is _____.
- a) $2J$ b) $2J - 3$
c) $2J + 3$ d) $2J - 4$
- 6) A couple can produces _____.
- a) translatory motion b) rotational motion
c) combined (a) and (b) d) None of these

- 7) The ratio of static friction to dynamic friction is always _____.
- | | |
|-------|------------------|
| a) =1 | b) <1 |
| c) >1 | d) None of these |
- 8) A particle is dropped from a height 'h' above the ground. Assuming negligible air resistance. The velocity with which it will strike the ground is _____.
- | | |
|------------------|-------------------|
| a) 2gh | b) $(2gh)^{1/2}$ |
| c) $(2gh)^{3/2}$ | d) $2 (gh)^{1/2}$ |
- 9) The principle which converts a dynamic problem into static problem is known as _____.
- D' Alembert's Principle
 - Principle of conservation of energy
 - Principle of transmissibility
 - Principle of conservation
- 10) During elastic impact, the relative velocity of two bodies after impacts is _____ the relative velocity of the two bodies before impact.
- | | |
|-----------------|------------------|
| a) Equal to | b) Less than |
| c) Greater than | d) None of these |
- 11) The work done on a body is zero when, _____.
- There is no displacement of the body
 - Resultant of forces acting on it is zero
 - The displacement is perpendicular to the direction of force
 - All of the above
- 12) The unit for impulse is _____.
- | | |
|----------------------|---------|
| a) N-sec | b) N-mm |
| c) N-cm ² | d) N/mm |
- 13) The rate of change of displacement of a body with respect to time, is known as _____.
- | | |
|-------------|------------------|
| a) Velocity | b) Acceleration |
| c) Speed | d) None of these |
- 14) If the periodic motion takes place without any external force, the vibration is called as _____.
- | | |
|-------------------|---------------------|
| a) Free Vibration | b) Forced Vibration |
| c) both a and b | d) None of these |

Seat No.	
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**F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MECHANICS**

Day & Date: Monday, 09-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Use of non programmable scientific calculator is allowed.
3) Figures to the right indicate full marks.

Section I

Q.2 Attempt any four of the following questions.

12

- a) Draw the free body diagram of ball of weight W , supported by string AB and resting against a smooth vertical wall at C and also resting against a smooth horizontal floor at D as shown in Fig No 2.

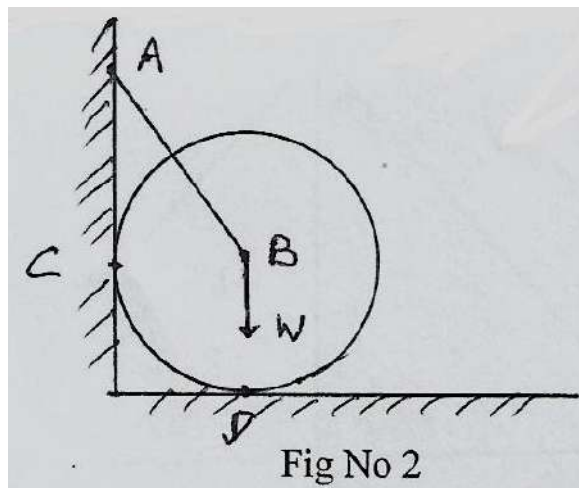


Fig No 2

- b) Enlist different types of supports and also draw its sketch.
c) Define and explain characteristics of couple.
d) State and Explain Lami's Theorem.
e) Find Center of Gravity of T-section as shown in Fig No 3.

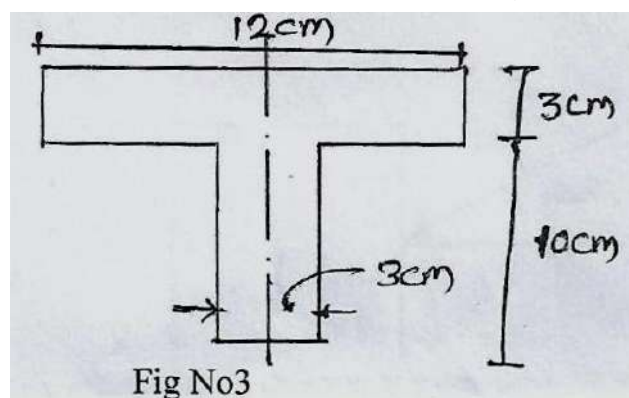
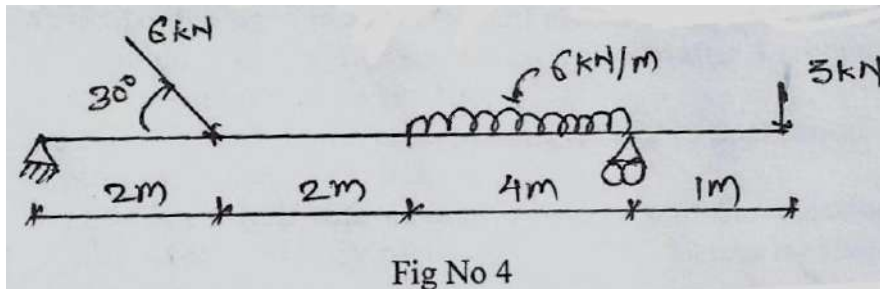


Fig No3

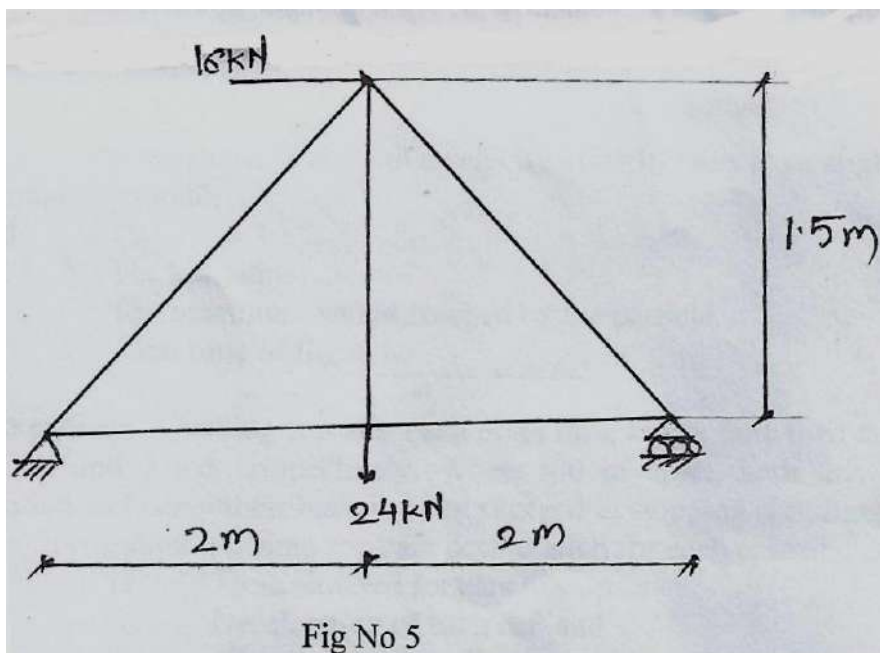
- f) State assumptions made in the analysis of perfect frame.

Q.3 Attempt any two of the following questions.

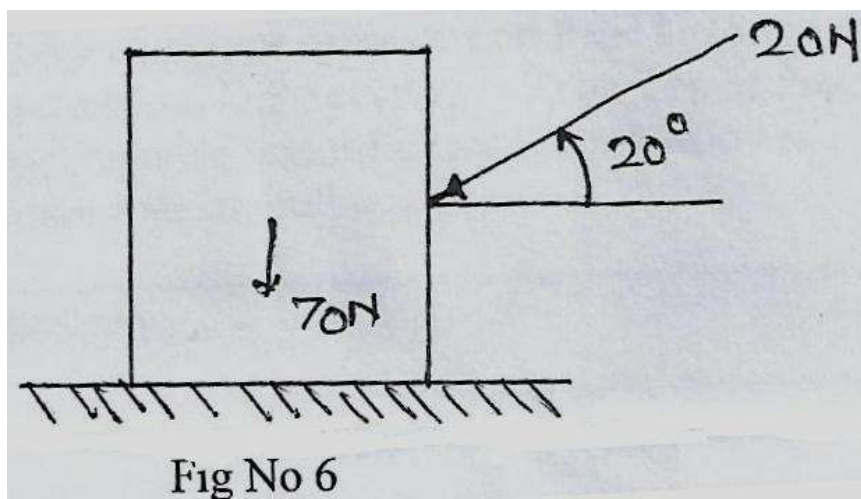
- a) A beam is loaded as shown in Fig No 4. Determine the reactions at supports.



- b) Determine the forces in the truss shown in Fig No.5 which carries horizontal load of 12kN and vertical load of 18kN.



- c) A body of weight 70N is placed on a rough horizontal plane. To just move the body on the horizontal plane, a push of 20N inclined at 20° to the horizontal plane is required. Find the co-efficient of friction.



Q.4 Attempt any four of the following questions.

- a) Distinguish between angular motion and linear motion.
- b) Explain the term free vibration.
- c) A circular disc has a mass moment of inertia of 12 kg-m^2 about its axis of rotation. If it is initially at rest, find its angular velocity after 3 seconds, if it is acted upon by a torque of magnitude 800 Nm.
- d) State principle of conservation of energy. Give its application.
- e) Explain coefficient of restitution.
- f) A body is rotating with an angular velocity of 5 radians/sec. After 4 sec, the angular velocity of body becomes 13 rad/sec. Determine the angular acceleration of the body.

Q.5 Attempt any two of the following questions.

- a) An elevator cage of a mine shaft weighing 8 kN, when empty is lifted or lowered by means of a wire rope. Once a man weighing 600N, entered it and lowered with uniform acceleration such that when a distance of 187.5 m was covered, the velocity of the cage was 25 m/s. Determine the tension in the rope and the force exerted by the man on the floor of the cage.
- b) A particle is projected in air with a velocity of $u=100 \text{ m/s}$ at an angle of $\alpha = 30^\circ$ with the horizontal.
Find.
 - 1) The horizontal range
 - 2) The maximum height reached by the particle
 - 3) Total time of flight
- c) Two cars are travelling towards each other on a single lane road at the velocities 12 m/s and 9 m/s . respectively. When 100 m apart, both drivers realize the situation and apply their brakes. They succeed in stopping simultaneously and just short of colliding. Assume constant deceleration for each case and determine.
 - 1) Time required for cars to stop
 - 2) Deceleration of each car and
 - 3) The distance travelled by each car while slowing down

**Seat
No.****F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MECHANICS**Day & Date: Monday, 09-12-2019
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Max. Marks: 70

- Instructions:** 1) Q. No 1 is compulsory. It should be solved in first 30 minutes in Answer.
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MCQ/Objective Type Questions

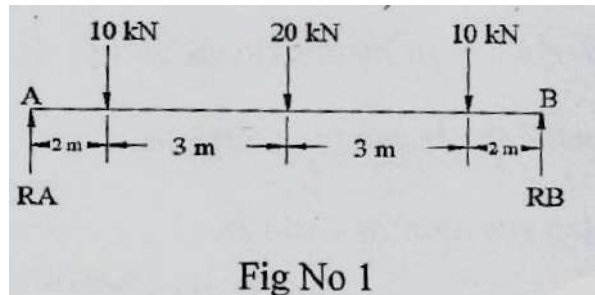
Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternative from the options and rewrite the sentence. 14

- 1) A particle is dropped from a height 'h' above the ground. Assuming negligible air resistance. The velocity with which it will strikes the ground is _____.
a) $2gh$
b) $(2gh)^{1/2}$
c) $(2gh)^{3/2}$
d) $2(gh)^{1/2}$
- 2) The principle which converts a dynamic problem into static problem is known as _____.
a) D' Alembert's Principle
b) Principle of conservation of energy
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- 3) During elastic impact, the relative velocity of two bodies after impacts is _____ the relative velocity of the two bodies before impact.
a) Equal to
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- 4) The work done on a body is zero when, _____.
a) There is no displacement of the body
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d) All of the above
- 5) The unit for impulse is _____.
a) N-sec
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c) N-cm²
d) N/mm
- 6) The rate of change of displacement of a body with respect to time, is known as _____.
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- 7) If the periodic motion takes place without any external force, the vibration is called as _____.
a) Free Vibration
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- 8) The resultant of two forces P and Q acting at an angle θ is _____.
a) $P^2 + Q^2 + 2P \sin \theta$
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c) $P^2 + Q^2 + 2PQ$
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- 9) The beam shown in the Figure no 1. A hinge support at A and a roller support at B. The reaction R_A of the hinged support A of the beam is _____.



- | | |
|------------|----------|
| a) 10.8 kN | b) 20 kN |
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- 10) A body which can retain its original shape and size even if it subjected to external forces, is known as _____.
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|---|-----------------------------|
| a) Downwards at its upper end | b) Upwards at its upper end |
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- 12) If number of joints in a perfect truss is J, then number of member in the frame m is _____.
- | | |
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| a) $2J$ | b) $2J - 3$ |
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Seat No.	
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**F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MECHANICS**

Day & Date: Monday, 09-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

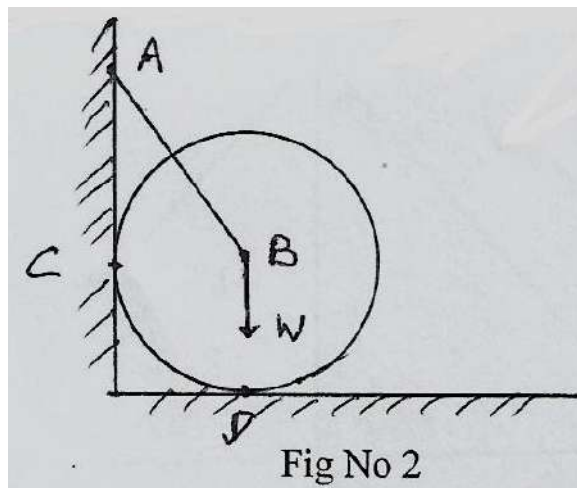
- Instructions:** 1) All questions are compulsory.
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Section I

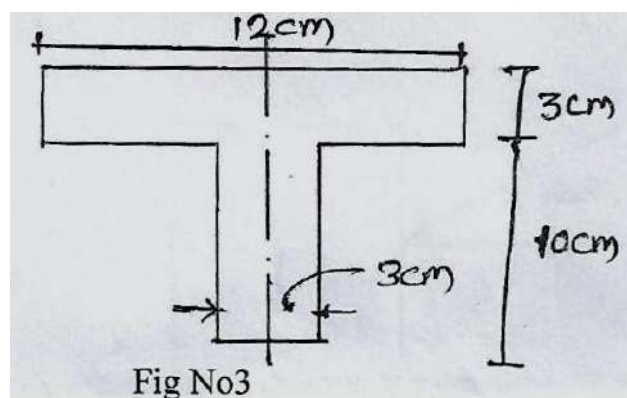
Q.2 Attempt any four of the following questions.

12

- a) Draw the free body diagram of ball of weight W , supported by string AB and resting against a smooth vertical wall at C and also resting against a smooth horizontal floor at D as shown in Fig No 2.



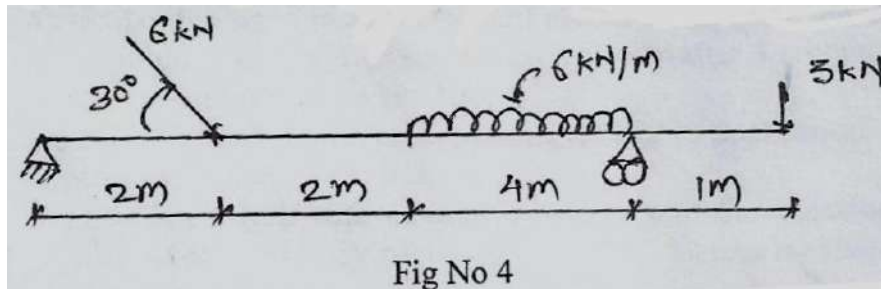
- b) Enlist different types of supports and also draw its sketch.
c) Define and explain characteristics of couple.
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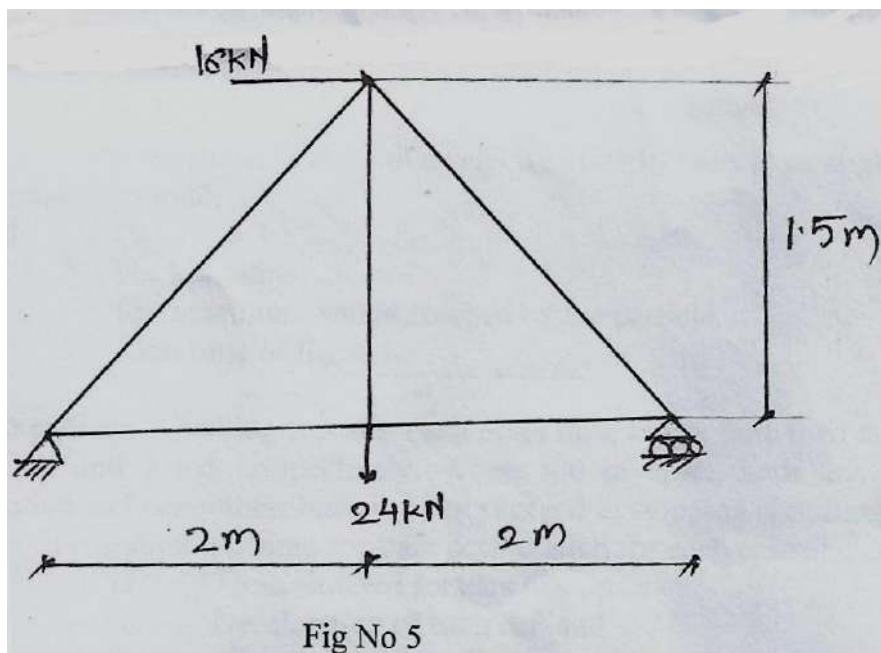
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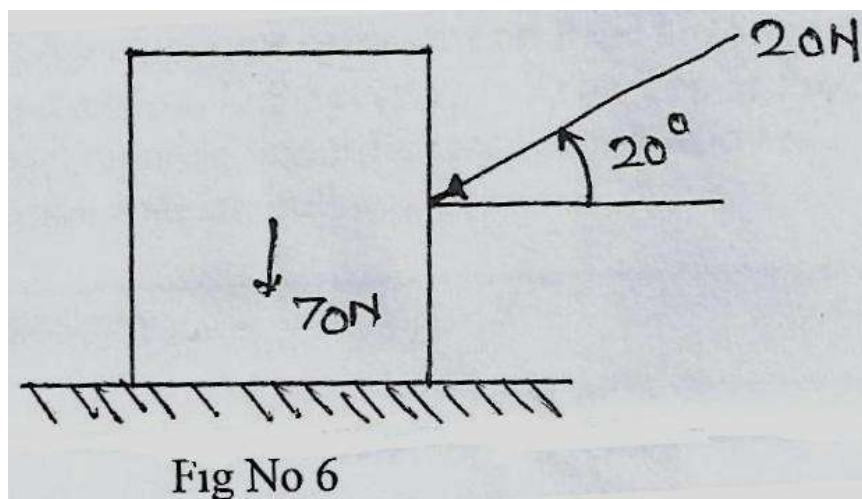
- a) A beam is loaded as shown in Fig No 4. Determine the reactions at supports.



- b) Determine the forces in the truss shown in Fig No.5 which carries horizontal load of 12kN and vertical load of 18kN.



- c) A body of weight 70N is placed on a rough horizontal plane. To just move the body on the horizontal plane, a push of 20N inclined at 20° to the horizontal plane is required. Find the co-efficient of friction.



Q.4 Attempt any four of the following questions.

- a) Distinguish between angular motion and linear motion.
- b) Explain the term free vibration.
- c) A circular disc has a mass moment of inertia of 12 kg-m^2 about its axis of rotation. If it is initially at rest, find its angular velocity after 3 seconds, if it is acted upon by a torque of magnitude 800 Nm.
- d) State principle of conservation of energy. Give its application.
- e) Explain coefficient of restitution.
- f) A body is rotating with an angular velocity of 5 radians/sec. After 4 sec, the angular velocity of body becomes 13 rad/sec. Determine the angular acceleration of the body.

Q.5 Attempt any two of the following questions.

- a) An elevator cage of a mine shaft weighing 8 kN, when empty is lifted or lowered by means of a wire rope. Once a man weighing 600N, entered it and lowered with uniform acceleration such that when a distance of 187.5 m was covered, the velocity of the cage was 25 m/s. Determine the tension in the rope and the force exerted by the man on the floor of the cage.
- b) A particle is projected in air with a velocity of $u=100 \text{ m/s}$ at an angle of $\alpha = 30^\circ$ with the horizontal.
Find.
 - 1) The horizontal range
 - 2) The maximum height reached by the particle
 - 3) Total time of flight
- c) Two cars are travelling towards each other on a single lane road at the velocities 12 m/s and 9 m/s . respectively. When 100 m apart, both drivers realize the situation and apply their brakes. They succeed in stopping simultaneously and just short of colliding. Assume constant deceleration for each case and determine.
 - 1) Time required for cars to stop
 - 2) Deceleration of each car and
 - 3) The distance travelled by each car while slowing down

Seat
No.

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MECHANICS

Day & Date: Monday, 09-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No 1 is compulsory. It should be solved in first 30 minutes in Answer. Book Page.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

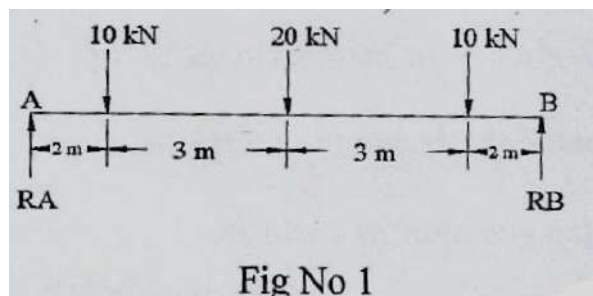
Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternative from the options and rewrite the sentence. 14

- 1) If number of joints in a perfect truss is J , then number of member in the frame m is _____.
 - a) $2J$
 - b) $2J - 3$
 - c) $2J + 3$
 - d) $2J - 4$
- 2) A couple can produces _____.
 - a) translatory motion
 - b) rotational motion
 - c) combined (a) and (b)
 - d) None of these
- 3) The ratio of static friction to dynamic friction is always _____.
 - a) $=1$
 - b) <1
 - c) >1
 - d) None of these
- 4) A particle is dropped from a height 'h' above the ground. Assuming negligible air resistance. The velocity with which it will strikes the ground is _____.
 - a) $2gh$
 - b) $(2gh)^{1/2}$
 - c) $(2gh)^{3/2}$
 - d) $2(g h)^{1/2}$
- 5) The principle which converts a dynamic problem into static problem is known as _____.
 - a) D' Alembert's Principle
 - b) Principle of conservation of energy
 - c) Principle of transmissibility
 - d) Principle of conservation
- 6) During elastic impact, the relative velocity of two bodies after impacts is _____ the relative velocity of the two bodies before impact.
 - a) Equal to
 - b) Less than
 - c) Greater than
 - d) None of these
- 7) The work done on a body is zero when, _____.
 - a) There is no displacement of the body
 - b) Resultant of forces acting on it is zero
 - c) The displacement is perpendicular to the direction of force
 - d) All of the above
- 8) The unit for impulse is _____.
 - a) N-sec
 - b) N-mm
 - c) $N\text{-cm}^2$
 - d) N/mm

- 9) The rate of change of displacement of a body with respect to time, is known as _____.
- a) Velocity b) Acceleration
c) Speed d) None of these
- 10) If the periodic motion takes place without any external force, the vibration is called as _____.
- a) Free Vibration b) Forced Vibration
c) both a and b d) None of these
- 11) The resultant of two forces P and Q acting at an angle θ is _____.
- a) $P^2 + Q^2 + 2P \sin \theta$ b) $P^2 + Q^2 + 2PQ \cos \theta$
c) $P^2 + Q^2 + 2PQ$ d) $\sqrt{P^2 + Q^2 + 2PQ \cos \theta}$
- 12) The beam as shown in the Figure no 1. A hinge support at A and a roller support at B. The reaction R_A of the hinged support A of the beam is _____.

**Fig No 1**

- a) 10.8 kN b) 20 kN
c) 30 kN d) 40 kN
- 13) A body which can retain its original shape and size even if it is subjected to external forces, is known as _____.
- a) Plastic body b) Elastic body
c) Rigid body d) None of these
- 14) On a ladder resting on a rough floor and leaning against a smooth vertical wall, the force of friction acts _____.
- a) Downwards at its upper end
b) Upwards at its upper end
c) Perpendicular to the wall at its upper end
d) Zero at its upper end

Seat No.	
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**F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MECHANICS**

Day & Date: Monday, 09-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Use of non programmable scientific calculator is allowed.
3) Figures to the right indicate full marks.

Section I

Q.2 Attempt any four of the following questions.

12

- a) Draw the free body diagram of ball of weight W , supported by string AB and resting against a smooth vertical wall at C and also resting against a smooth horizontal floor at D as shown in Fig No 2.

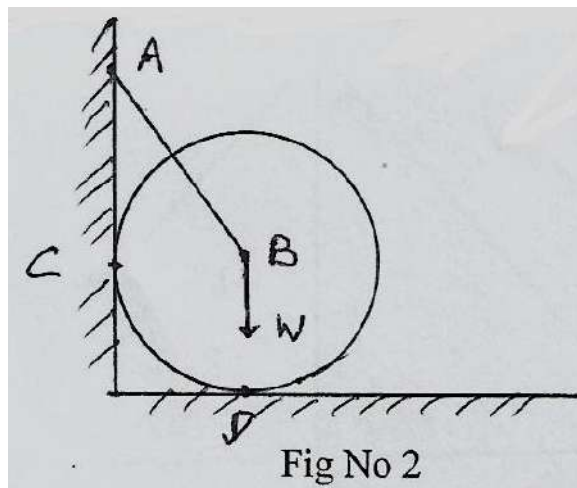


Fig No 2

- b) Enlist different types of supports and also draw its sketch.
c) Define and explain characteristics of couple.
d) State and Explain Lami's Theorem.
e) Find Center of Gravity of T-section as shown in Fig No 3.

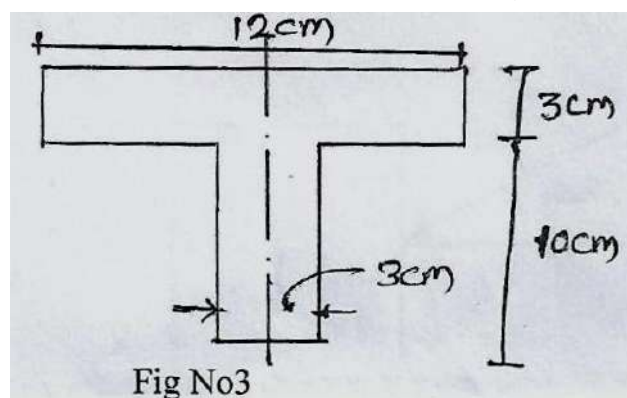
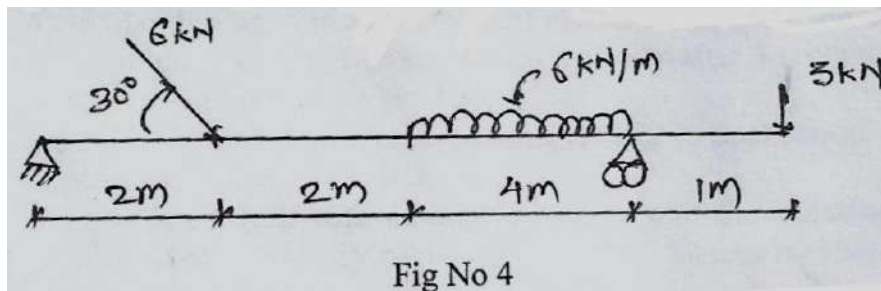


Fig No3

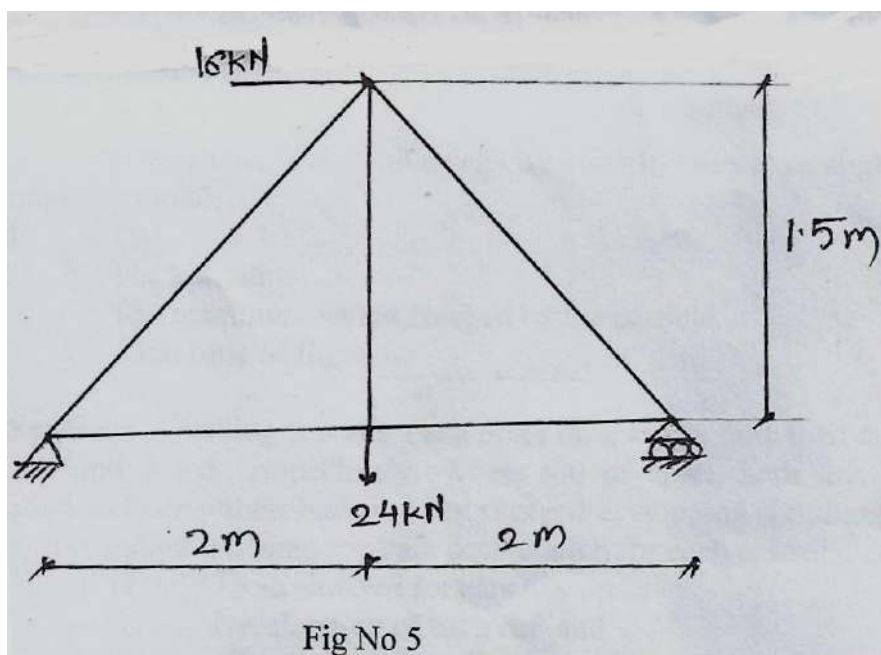
- f) State assumptions made in the analysis of perfect frame.

Q.3 Attempt any two of the following questions.

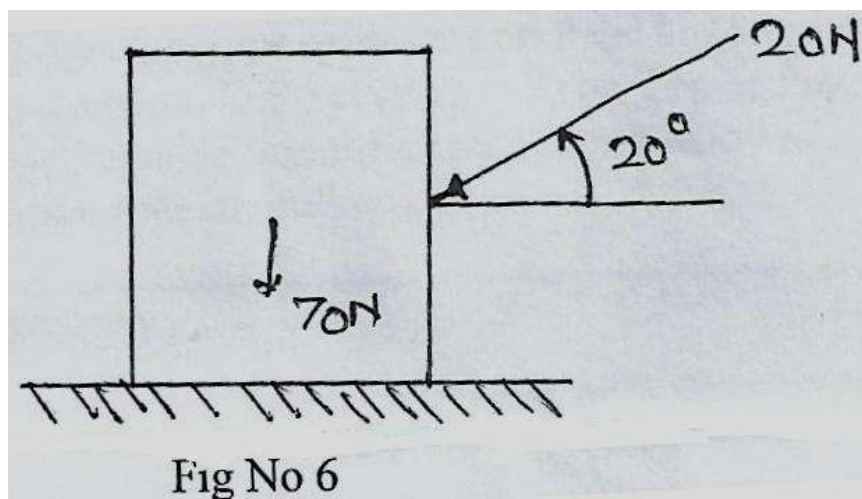
- a) A beam is loaded as shown in Fig No 4. Determine the reactions at supports.



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- c) A body of weight 70N is placed on a rough horizontal plane. To just move the body on the horizontal plane, a push of 20N inclined at 20° to the horizontal plane is required. Find the co-efficient of friction.



Q.4 Attempt any four of the following questions.

- a) Distinguish between angular motion and linear motion.
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- c) A circular disc has a mass moment of inertia of 12 kg-m^2 about its axis of rotation. If it is initially at rest, find its angular velocity after 3 seconds, if it is acted upon by a torque of magnitude 800 Nm.
- d) State principle of conservation of energy. Give its application.
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Seat
No.

**F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MECHANICS**

Day & Date: Monday, 09-12-2019
Time: 10:00 AM To 01:00 PM

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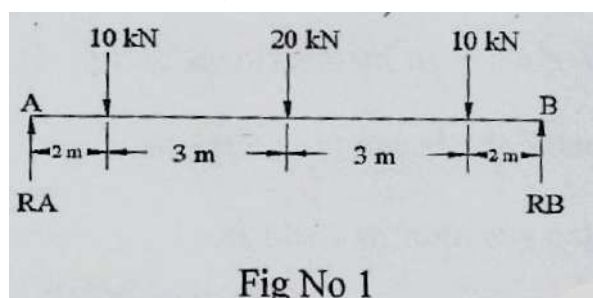
MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

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 - b) N-mm
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Seat No.	
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**F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MECHANICS**

Day & Date: Monday, 09-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
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Section I

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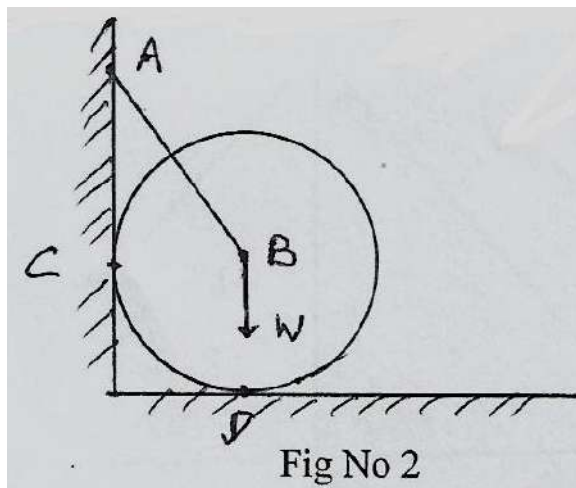


Fig No 2

- b) Enlist different types of supports and also draw its sketch.
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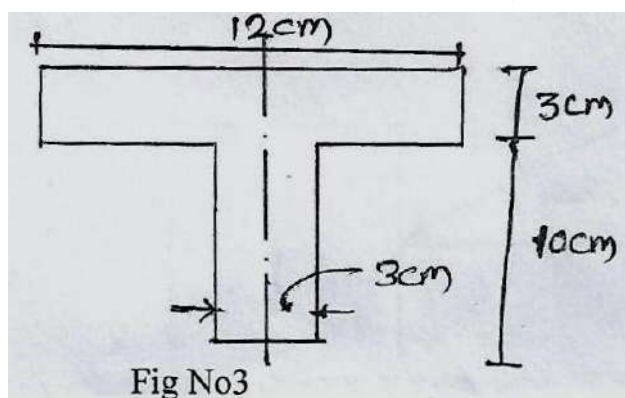
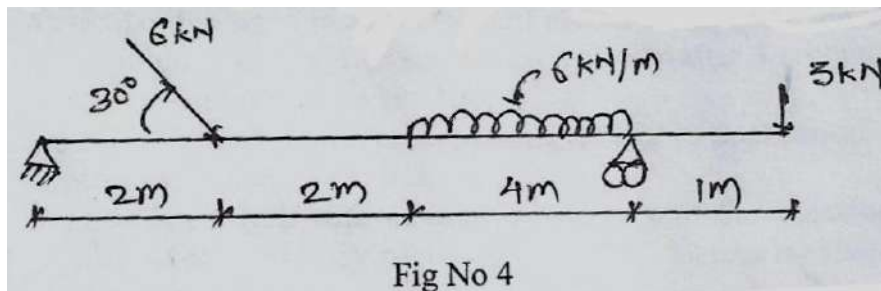


Fig No3

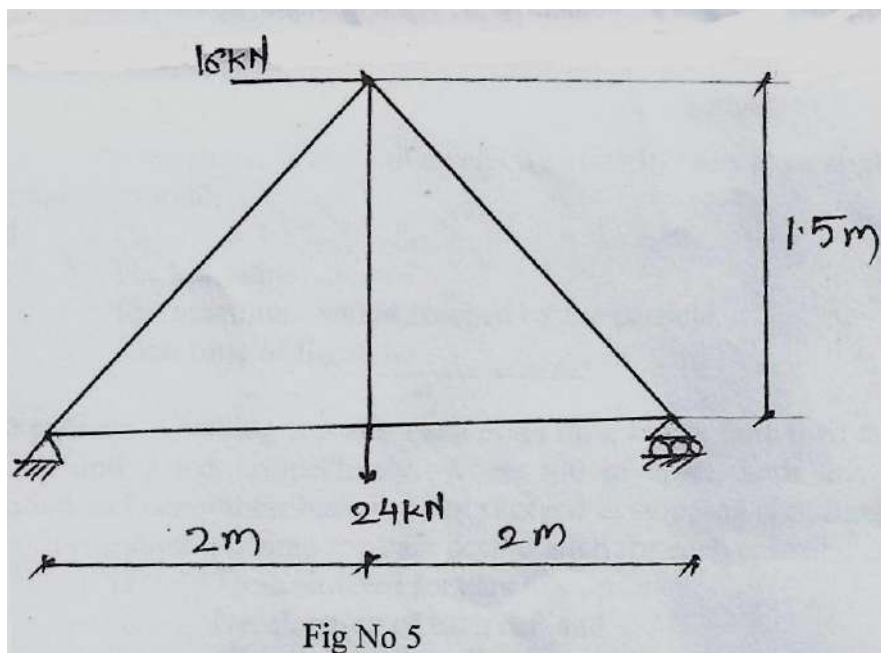
- f) State assumptions made in the analysis of perfect frame.

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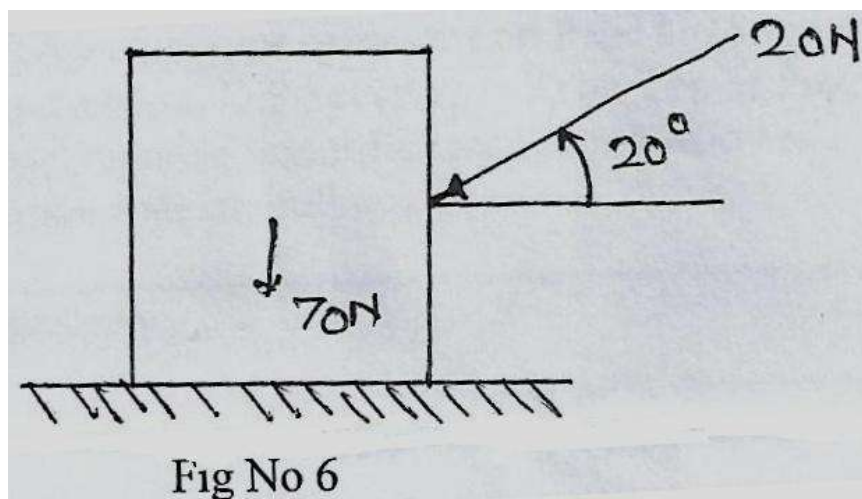
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 - 1) Time required for cars to stop
 - 2) Deceleration of each car and
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Seat No.	
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S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 4) Retain all the constructional details.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14




Q.1 Type:1 Match the pairs

03

Column- I


- 1) Profile of Surface
- 2) Concentricity
- 3) Runout


Column- II

- a) 
- b) 
- c) 

Type: 2 Correct or Incorrect

02

4)  is the symbol for external threads.

5)  is the material convention used for steel and alloys.

Type: 3 Multiple Correct Answers (2 marks each)

04

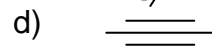
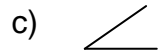
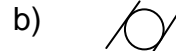
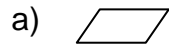
- 6) Which of the following represents interference fit?
 - a) $\Phi 80H_7s_6$
 - b) $\Phi 80H_7r_6$
 - c) $\Phi 80H_7e_8$
 - d) $\Phi 80H_7f_7$
- 7) Which of the following is transition fit?
 - a) $\Phi 35H_7f_7$
 - b) $\Phi 35H_7j_6$
 - c) $\Phi 35H_7k_6$
 - d) $\Phi 35H_7g_6$

Type: 4 Straight objective questions (1 mark each)

05

- 8) As per BIS, the standard size for A-3 sheet is _____.
 - a) 420 X 594
 - b) 420 X 297
 - c) 841 X 1189
 - d) 210 X 297
- 9) Footstep bearing is used for _____ shafts.
 - a) vorizontal
 - b) vertical
 - c) Inclined
 - d) none of above
- 10) Included angle for Buttress threads is _____.
 - a) 55°
 - b) 29°
 - c) 45°
 - d) 60°
- 11) The thickness of the washer to be used with M10 nut & bolt is _____.
 - a) 0.1 mm
 - b) 1.5 mm
 - c) 1.75 mm
 - d) 0.15 mm

12) Which of following symbol represents symmetry tolerance?



Seat No.	
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S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Q. No. 2 is compulsory.
 2) Attempt any two questions out of Q.3, Q.4. & Q.5.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 5) Retain all the constructional details.

- Q.2** Figure 1 shows details of swivel bearing containing. Draw assembly drawing containing front view and top view. Prepare bill of material. **26**
 Given details include following parts
- 1) Body - CI - qty 1
 - 2) Bearing - CI- qty 1
 - 3) Fork - MS - qty 1
 - 4) Spindle - MS - qty 1
 - 5) Lock nut - MS - qty 1
 - 6) Set screw - MS - qty 1
 - 7) Set screw - MS - qty 1
 - 8) Set screw - MS - qty 2
 - 9) Disc - brass - qty 1
 - 10) Disc - brass – qty 1
 - 11) Nut, M9 - MS – qty 2
 - 12) Bush - GM – qty 1
- Q.3** a) Draw BIS conventions of diamond knurling and spur gear. **04**
 b) Draw free hand sketch of knuckle joint. **05**
 c) Represent various fits as per hole basis and shaft basis with reference to zero line. **06**
- Q.4** a) Draw BIS conventions of splined shaft and torsion spring. **04**
 b) Draw free hand sketches of wing nut and hexagonal nut. **05**
 c) Calculate working dimensions of hole and shaft and state type of fit for **06**
- 1) $\Phi 100H_7g_6$
 - 2) $\Phi 100H_7S_6$
- Q.5** a) Represent revolved section and removed section with an example. **04**
 b) Draw free hand sketch of double riveted double strap chain butt joint. **05**
 c) Figure 2 shows views of a machine component. Redraw the given views and represent the following: **06**
- 1) $\Phi 40$ is circular within 0.02 mm.
 - 2) Surface A is parallel to surface B within 0.01 mm
 - 3) Dimension 35 mm has a unilateral tolerance of + 0.02 mm.
 - 4) Surface B is milled to get Ra value of 50 microns.

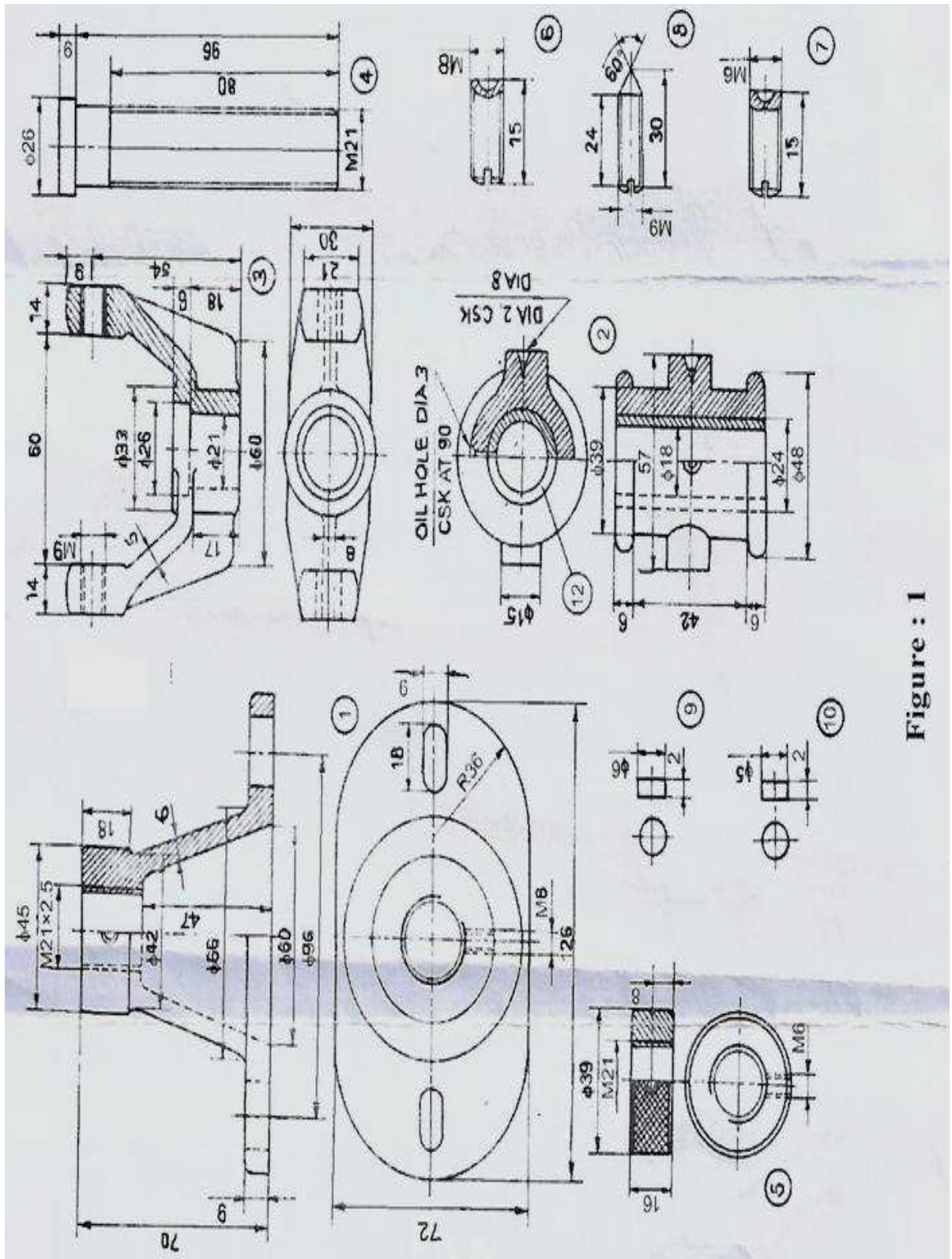


Figure : 1

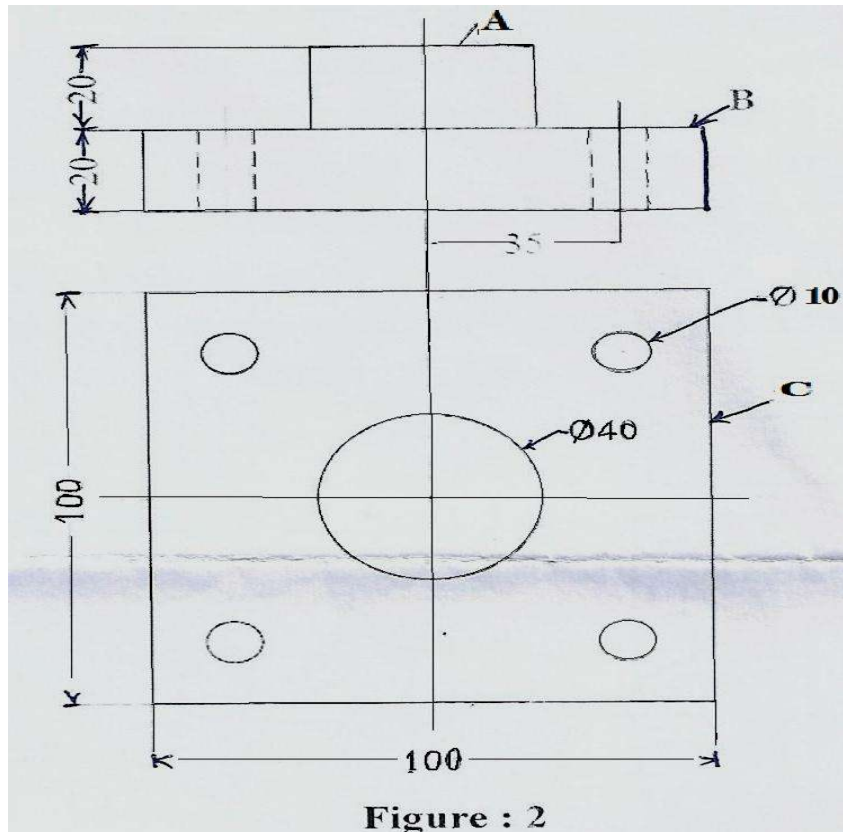


Figure : 2

Tolerance Charts

Nominal sizes	Tolerances of holes					Tolerances of shafts				
	C11	N7	P7	R7	S7	r6	s6	t6	u6	U6
From 1	+120	-4	-6	-10	-1	+16	+20	-	+24	+28
Upto 3	+60	-14	-16	-20	-24	+10	+14	-	+10	+18
Over 3	+145	-4	-8	-11	-15	+23	+27	-	+31	+35
Upto 6	+70	-16	-20	-23	-27	+15	+19	-	+23	+23
Over 6	+170	-4	-9	-13	-17	+28	+32	-	+37	+33
Upto 10	+80	-19	-24	-28	-32	+19	+28	-	+28	+28
Over 10	+205	-5	-11	-16	-27	+34	+39	-	+44	+51
Upto 18	+95	-23	-29	-34	-39	+23	+28	-	+33	+33
Over 18	+240	-7	-14	-20	-27	+41	+48	+54	+61	+62
Upto 30	+110	-28	-35	-41	-48	+28	+35	+41	+41	+41
Over 30	+280	-8	-17	-25	-34	+50	+59	+64	+76	+85
Upto 40	+120	-33	-42	-50	-59	+48	+59	+64	+60	+60
Over 40	+290	-9	-21	-30	-42	+34	+43	+70	+86	+95
Upto 50	+130	-39	-51	-60	-72	+54	+63	+54	+70	+70
Over 50	+330	-9	-21	-30	-42	+60	+72	+85	+106	+117
Upto 65	+140	-45	-59	-60	-72	+41	+53	+66	+87	+87
Over 65	+340	-10	-24	-32	-48	+62	+78	+94	+121	+132
Upto 80	+150	-39	-51	-62	-78	+43	+59	+75	+102	+102
Over 80	+390	-10	-24	-38	-58	+73	+93	+113	+146	+159
Upto 100	+170	-45	-59	-73	-93	+51	+71	+91	+124	+124
Over 100	+400	-12	-28	-41	-66	+76	+101	+126	+166	+175
Upto 120	+180	-52	-68	-76	-101	+54	+79	+104	+144	+144
Over 120	+450	-12	-28	-48	-77	+88	+117	+147	+195	+230
Upto 140	+200	-52	-68	-88	-117	+63	+92	+122	+170	+170
Over 140	+480	-14	-33	-50	-85	+93	+133	+171	+235	+250
Upto 180	+210	-60	-79	-93	-133	+65	+100	+134	+190	+190
Over 180	+570	-14	-33	-60	-105	+113	+169	+225	+330	+330
Upto 250	+240	-60	-79	-113	-169	+77	+122	+166	+236	+236
Over 250	+650	-14	-36	-74	-138	+130	+202	+272	+382	+402
Upto 315	+300	-66	-88	-130	-202	+94	+158	+218	+350	+315
Over 315	+760	-16	-41	-87	-169	+150	+244	+330	+471	+492
Upto 400	+360	-73	-98	-150	-224	+108	+190	+268	+390	+390
Over 400	+880	-17	-45	-103	-209	+172	+292	+400	+580	+603
Upto 500	+440	-80	-108	-172	-292	+126	+232	+330	+490	+490

Nominal sizes	Tolerances of holes						Tolerances of shafts			
	D10	E9	F8	G7	JS7	K7	j6	k6	n6	p6
From 1	+ 60	+ 39	+ 20	+12	+ 5	0	+ 3	+ 6	+10	+ 12
Upto 3	+ 20	+ 14	+ 6	+ 2	- 5	-10	- 3	0	+ 4	+ 6
Over 3	+ 78	+ 50	+ 28	+16	+ 6	+ 3	+ 4	+ 9	+16	+ 20
Upto 6	+ 30	+ 20	+ 10	+ 4	- 6	- 9	- 4	+ 1	+ 8	+ 12
Over 6	+ 98	+ 61	+ 35	+20	+ 7.5	+ 5	+ 4.5	+10	+19	+ 24
Upto 10	+ 40	+ 25	+ 13	+ 5	- 7.5	-10	- 4.5	+ 1	+10	+ 15
Over 10	+120	+ 75	+ 43	+24	+ 9	+ 6	+ 5.5	+12	+23	+ 29
Upto 18	+ 50	+ 32	+ 16	+ 6	- 9	-12	- 5.5	+ 1	+12	+ 18
Over 18	+149	+ 92	+ 53	+28	+10.5	+6	+ 6.5	+15	+28	+ 35
Upto 30	+ 65	+ 40	+ 20	+ 7	-10.5	-15	- 6.5	+ 2	+15	+ 22
Over 30	+180	+112	+ 64	+34	+12.5	+ 7	+ 8	+18	+33	+ 42
Upto 50	+ 80	+ 50	+ 25	+ 9	-12.5	-18	- 8	+ 2	+17	+ 26
Over 50	+220	+134	+ 76	+40	+15	+ 9	+ 9.5	+21	+39	+ 51
Upto 80	+100	+ 60	+ 30	+10	-15	-21	- 9.5	+ 2	+20	+ 32
Over 80	+260	+159	+ 90	+47	+17.5	+10	+11	+25	+45	+ 59
Upto 120	+120	+ 72	+ 36	+12	-17.5	-25	-11	+ 3	+23	+ 37
Over 120	+305	+185	+106	+54	+20	+12	+12.5	+28	+52	+ 68
Upto 180	+145	+ 85	+ 43	+14	-20	-28	-12.5	+ 3	+27	+ 43
Over 180	+355	+215	+122	+61	+23	+13	+14.5	+33	+60	+ 79
Upto 250	+170	+100	+ 50	+15	-23	+33	-14.5	+ 4	+31	+ 50
Over 250	+400	+240	+135	+69	+26	+16	+16	+36	+66	+ 88
Upto 315	+190	+110	+ 55	+17	-26	-36	-16	+ 4	+34	+ 56
Over 315	+440	+265	+151	+75	+28.5	+17	+18	+40	+73	+ 98
Upto 400	+210	+125	+ 69	+18	-28.5	-40	-18	+ 4	+37	+ 62
Over 400	+480	+290	+165	+83	+31.5	+18	+20	+45	+80	+108
Upto 500	+230	+135	+ 68	+20	-31.5	-45	-20	+ 5	+40	+ 68

Nominal sizes	Tolerances of holes					Tolerances of shafts				
	H7	H8	H9	H10	H11	d9	e8	f7	g6	h6
From 1	+10	+14	+ 25	+ 40	+ 60	- 20	- 14	- 6	- 2	0
Upto 3	0	0	0	0	0	- 45	- 28	- 16	- 8	- 6
Over 3	+12	+18	+ 30	+ 45	+ 75	- 30	- 20	- 10	- 4	0
Upto 6	0	0	0	0	0	- 60	- 38	- 22	-12	- 8
Over 6	+15	+22	+ 36	+ 58	+ 90	- 40	- 25	- 15	- 5	0
Upto 10	0	0	0	0	0	- 75	- 47	- 28	-14	- 9
Over 10	+18	+27	+ 43	+ 70	+110	- 50	- 32	- 16	- 6	0
Upto 18	0	0	0	0	0	- 93	- 59	- 34	-17	-11
Over 18	+21	+33	+ 52	+ 84	+130	- 65	- 40	- 20	- 7	0
Upto 30	0	0	0	0	0	-117	- 73	- 41	-20	-13
Over 30	+25	+39	+ 62	+100	+160	-80	- 50	- 25	- 9	0
Upto 50	0	0	0	0	0	-142	- 89	- 50	-25	-16
Over 50	+30	+46	+ 76	+120	+190	-100	- 60	- 30	-10	0
Upto 80	0	0	0	0	0	-174	-105	- 60	-29	-19
Over 80	+35	+54	+ 87	+140	+220	-120	- 72	- 36	-12	0
Upto 120	0	0	0	0	0	-207	-126	- 71	-34	-22
Over 120	+40	+63	+100	+160	+250	-145	-85	- 43	-14	0
Upto 180	0	0	0	0	0	-245	-148	- 83	-39	-25
Over 180	+45	+72	+115	+185	+290	-170	-100	- 50	-15	0
Upto 250	0	0	0	0	0	-285	-172	- 96	-44	-29

Seat No.	
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**S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MACHINE DRAWING & CAD**

Day & Date: Saturday, 14-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Retain all the constructional details.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Type:1 Match the pairs

03

Column- I

Column- II

- | | |
|-----------------------|----|
| 1) Profile of Surface | a) |
| 2) Concentricity | b) |
| 3) Runout | c) |
| | d) |

Type: 2 Correct or Incorrect

02

- 4) is the symbol for external threads.

- 5) is the material convention used for steel and alloys.

Type: 3 Multiple Correct Answers (2 marks each)

04

- 6) Which of the following represents interference fit?
- | | |
|--------------------|--------------------|
| a) $\Phi 80H_7s_6$ | b) $\Phi 80H_7r_6$ |
| c) $\Phi 80H_7e_8$ | d) $\Phi 80H_7f_7$ |
- 7) Which of the following is transition fit?
- | | |
|--------------------|--------------------|
| a) $\Phi 35H_7f_7$ | b) $\Phi 35H_7j_6$ |
| c) $\Phi 35H_7k_6$ | d) $\Phi 35H_7g_6$ |

Type: 4 Straight objective questions (1 mark each)

05

- 8) The thickness of the washer to be used with M10 nut & bolt is ____.
- | | |
|------------|------------|
| a) 0.1 mm | b) 1.5 mm |
| c) 1.75 mm | d) 0.15 mm |
- 9) Which of following symbol represents symmetry tolerance?
- | | |
|----|----|
| a) | b) |
| c) | d) |
- 10) As per BIS, the standard size for A-3 sheet is ____.
- | | |
|---------------|--------------|
| a) 420 X 594 | b) 420 X 297 |
| c) 841 X 1189 | d) 210 X 297 |
- 11) Footstep bearing is used for ____ shafts.
- | | |
|---------------|------------------|
| a) vorizontal | b) vertical |
| c) Inclined | d) none of above |

- 12) Included angle for Buttress threads is _____.
- | | |
|--------|--------|
| a) 55° | b) 29° |
| c) 45° | d) 60° |

Seat No.	
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S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Q. No. 2 is compulsory.
 2) Attempt any two questions out of Q.3, Q.4. & Q.5.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 5) Retain all the constructional details.

- Q.2** Figure 1 shows details of swivel bearing containing. Draw assembly drawing containing front view and top view. Prepare bill of material. **26**
 Given details include following parts
- 1) Body - CI - qty 1
 - 2) Bearing - CI- qty 1
 - 3) Fork - MS - qty 1
 - 4) Spindle - MS - qty 1
 - 5) Lock nut - MS - qty 1
 - 6) Set screw - MS - qty 1
 - 7) Set screw - MS - qty 1
 - 8) Set screw - MS - qty 2
 - 9) Disc - brass - qty 1
 - 10) Disc - brass – qty 1
 - 11) Nut, M9 - MS – qty 2
 - 12) Bush - GM – qty 1
- Q.3**
- a) Draw BIS conventions of diamond knurling and spur gear. **04**
 - b) Draw free hand sketch of knuckle joint. **05**
 - c) Represent various fits as per hole basis and shaft basis with reference to zero line. **06**
- Q.4**
- a) Draw BIS conventions of splined shaft and torsion spring. **04**
 - b) Draw free hand sketches of wing nut and hexagonal nut. **05**
 - c) Calculate working dimensions of hole and shaft and state type of fit for **06**
 - 1) $\Phi 100H_7g_6$
 - 2) $\Phi 100H_7S_6$
- Q.5**
- a) Represent revolved section and removed section with an example. **04**
 - b) Draw free hand sketch of double riveted double strap chain butt joint. **05**
 - c) Figure 2 shows views of a machine component. Redraw the given views and represent the following: **06**
 - 1) $\Phi 40$ is circular within 0.02 mm.
 - 2) Surface A is parallel to surface B within 0.01 mm
 - 3) Dimension 35 mm has a unilateral tolerance of + 0.02 mm.
 - 4) Surface B is milled to get Ra value of 50 microns.

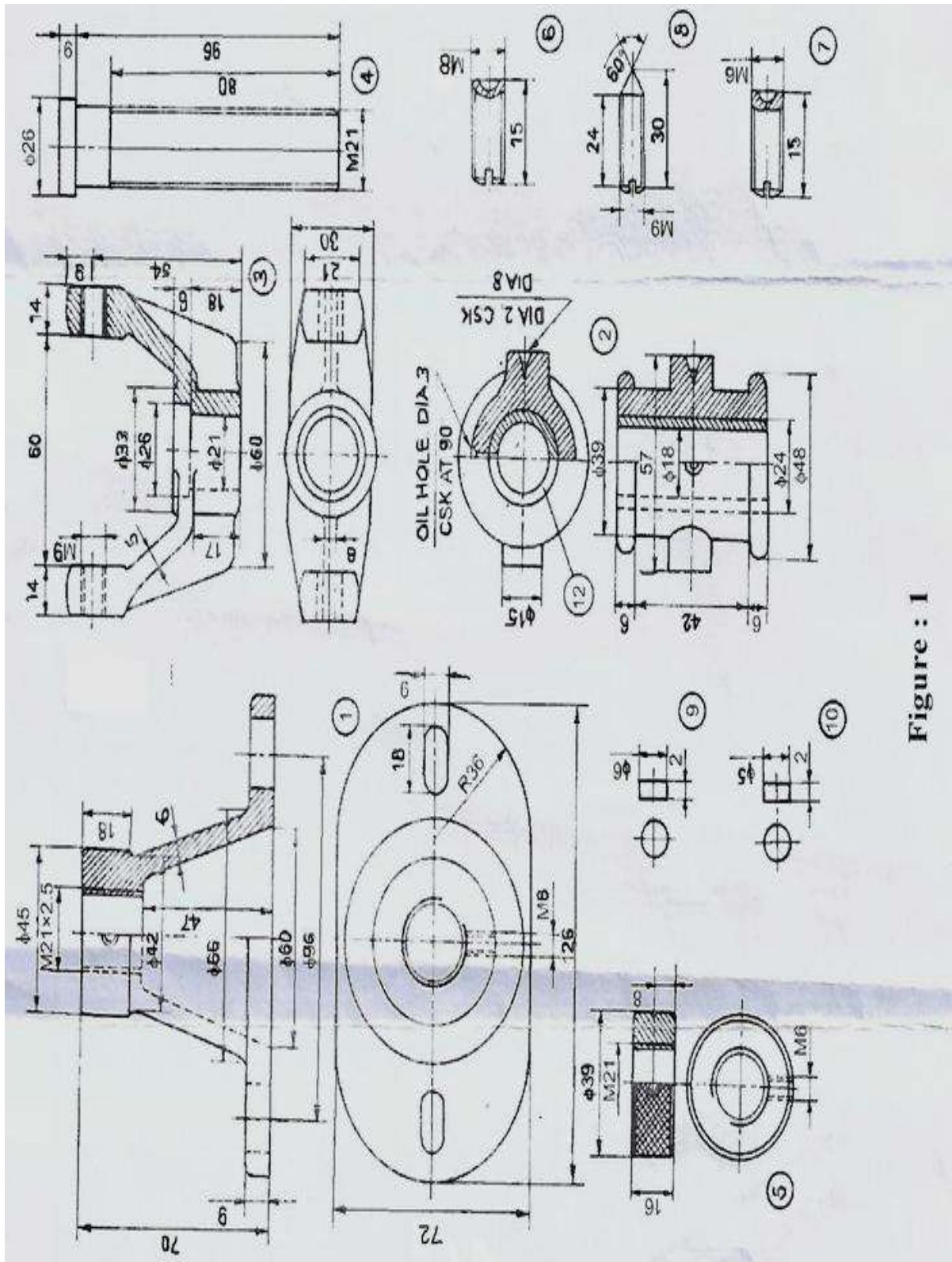


Figure : 1

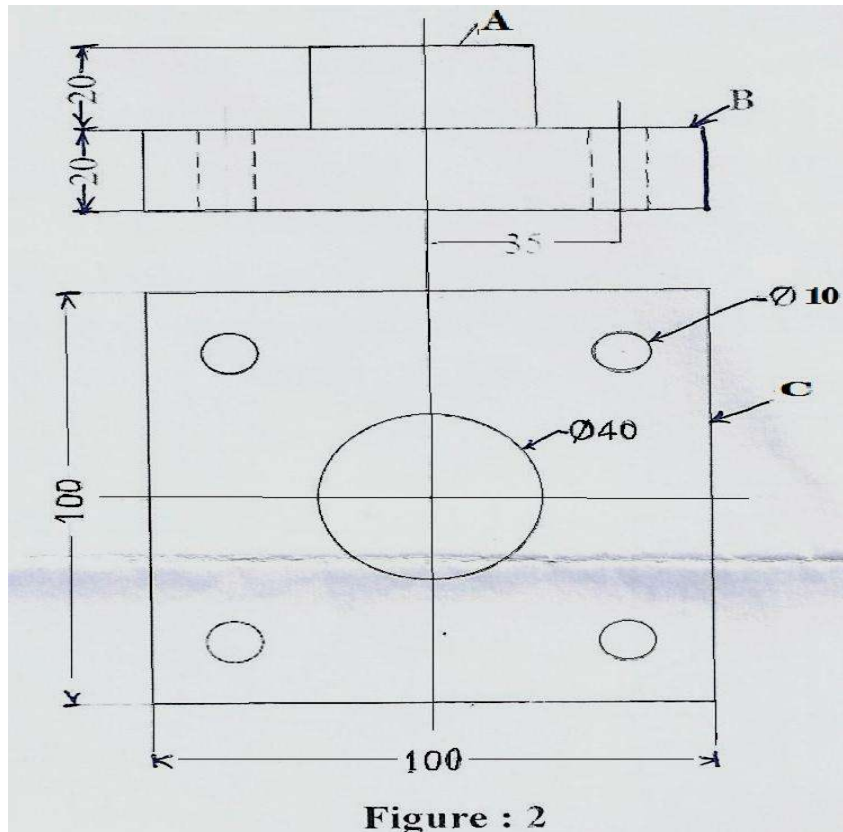


Figure : 2

Tolerance Charts

Nominal sizes	Tolerances of holes					Tolerances of shafts				
	C11	N7	P7	R7	S7	r6	s6	t6	u6	U6
From 1	+120	-4	-6	-10	-1	+16	+20	-	+24	+28
Upto 3	+60	-14	-16	-20	-24	+10	+14	-	+10	+18
Over 3	+145	-4	-8	-11	-15	+23	+27	-	+31	+35
Upto 6	+70	-16	-20	-23	-27	+15	+19	-	+23	+23
Over 6	+170	-4	-9	-13	-17	+28	+32	-	+37	+33
Upto 10	+80	-19	-24	-28	-32	+19	+28	-	+28	+28
Over 10	+205	-5	-11	-16	-27	+34	+39	-	+44	+51
Upto 18	+95	-23	-29	-34	-39	+23	+28	-	+33	+33
Over 18	+240	-7	-14	-20	-27	+41	+48	+54	+61	+62
Upto 30	+110	-28	-35	-41	-48	+28	+35	+41	+41	+41
Over 30	+280	-8	-17	-25	-34	+50	+59	+64	+76	+85
Upto 40	+120	-33	-42	-50	-59	+34	+43	+48	+60	+60
Over 40	+290	-9	-21	-30	-42	+60	+72	+70	+86	+95
Upto 50	+130	-39	-51	-60	-72	+41	+53	+54	+70	+70
Over 50	+330	-9	-21	-30	-42	+60	+72	+85	+106	+117
Upto 65	+140	-39	-51	-60	-72	+41	+53	+66	+87	+87
Over 65	+340	-10	-24	-32	-48	+62	+78	+94	+121	+132
Upto 80	+150	-45	-59	-62	-78	+43	+59	+75	+102	+102
Over 80	+390	-10	-24	-38	-58	+73	+93	+113	+146	+159
Upto 100	+170	-52	-68	-73	-93	+51	+71	+91	+124	+124
Over 100	+400	-12	-28	-41	-66	+76	+101	+126	+166	+175
Upto 120	+180	-52	-68	-76	-101	+54	+79	+104	+144	+144
Over 120	+450	-12	-28	-48	-77	+88	+117	+147	+195	+230
Upto 140	+200	-52	-68	-88	-117	+63	+92	+122	+170	+170
Over 140	+480	-14	-33	-50	-85	+93	+133	+171	+235	+250
Upto 180	+210	-52	-68	-93	-133	+65	+100	+134	+190	+190
Over 180	+570	-14	-33	-60	-105	+113	+169	+225	+330	+330
Upto 250	+240	-60	-79	-113	-169	+77	+122	+166	+236	+236
Over 250	+650	-14	-36	-74	-138	+130	+202	+272	+382	+402
Upto 315	+300	-66	-88	-130	-202	+94	+158	+218	+350	+315
Over 315	+760	-16	-41	-87	-169	+150	+244	+330	+471	+492
Upto 400	+360	-73	-98	-150	-224	+108	+190	+268	+390	+390
Over 400	+880	-17	-45	-103	-209	+172	+292	+400	+580	+603
Upto 500	+440	-80	-108	-172	-292	+126	+232	+330	+490	+490

Tolerances of holes						Tolerances of shafts				
Nominal sizes	D10	E9	F8	G7	JS7	K7	j6	k6	n6	p6
From 1	+ 60	+ 39	+ 20	+12	+ 5	0	+ 3	+ 6	+10	+ 12
Upto 3	+ 20	+ 14	+ 6	+ 2	- 5	-10	- 3	0	+ 4	+ 6
Over 3	+ 78	+ 50	+ 28	+16	+ 6	+ 3	+ 4	+ 9	+16	+ 20
Upto 6	+ 30	+ 20	+ 10	+ 4	- 6	- 9	- 4	+ 1	+ 8	+ 12
Over 6	+ 98	+ 61	+ 35	+20	+ 7.5	+ 5	+ 4.5	+10	+19	+ 24
Upto 10	+ 40	+ 25	+ 13	+ 5	- 7.5	-10	- 4.5	+ 1	+10	+ 15
Over 10	+120	+ 75	+ 43	+24	+ 9	+ 6	+ 5.5	+12	+23	+ 29
Upto 18	+ 50	+ 32	+ 16	+ 6	- 9	-12	- 5.5	+ 1	+12	+ 18
Over 18	+149	+ 92	+ 53	+28	+10.5	+6	+ 6.5	+15	+28	+ 35
Upto 30	+ 65	+ 40	+ 20	+ 7	-10.5	-15	- 6.5	+ 2	+15	+ 22
Over 30	+180	+112	+ 64	+34	+12.5	+ 7	+ 8	+18	+33	+ 42
Upto 50	+ 80	+ 50	+ 25	+ 9	-12.5	-18	- 8	+ 2	+17	+ 26
Over 50	+220	+134	+ 76	+40	+15	+ 9	+ 9.5	+21	+39	+ 51
Upto 80	+100	+ 60	+ 30	+10	-15	-21	- 9.5	+ 2	+20	+ 32
Over 80	+260	+159	+ 90	+47	+17.5	+10	+11	+25	+45	+ 59
Upto 120	+120	+ 72	+ 36	+12	-17.5	-25	-11	+ 3	+23	+ 37
Over 120	+305	+185	+106	+54	+20	+12	+12.5	+28	+52	+ 68
Upto 180	+145	+ 85	+ 43	+14	-20	-28	-12.5	+ 3	+27	+ 43
Over 180	+355	+215	+122	+61	+23	+13	+14.5	+33	+60	+ 79
Upto 250	+170	+100	+ 50	+15	-23	+33	-14.5	+ 4	+31	+ 50
Over 250	+400	+240	+135	+69	+26	+16	+16	+36	+66	+ 88
Upto 315	+190	+110	+ 55	+17	-26	-36	-16	+ 4	+34	+ 56
Over 315	+440	+265	+151	+75	+28.5	+17	+18	+40	+73	+ 98
Upto 400	+210	+125	+ 69	+18	-28.5	-40	-18	+ 4	+37	+ 62
Over 400	+480	+290	+165	+83	+31.5	+18	+20	+45	+80	+108
Upto 500	+230	+135	+ 68	+20	-31.5	-45	-20	+ 5	+40	+ 68

Tolerances of holes					Tolerances of shafts					
Nominal sizes	H7	H8	H9	H10	H11	d9	e8	f7	g6	h6
From 1	+10	+14	+ 25	+ 40	+ 60	- 20	- 14	- 6	- 2	0
Upto 3	0	0	0	0	0	- 45	- 28	- 16	- 8	- 6
Over 3	+12	+18	+ 30	+ 45	+ 75	- 30	- 20	- 10	- 4	0
Upto 6	0	0	0	0	0	- 60	- 38	- 22	-12	- 8
Over 6	+15	+22	+ 36	+ 58	+ 90	- 40	- 25	- 15	- 5	0
Upto 10	0	0	0	0	0	- 75	- 47	- 28	-14	- 9
Over 10	+18	+27	+ 43	+ 70	+110	- 50	- 32	- 16	- 6	0
Upto 18	0	0	0	0	0	- 93	- 59	- 34	-17	-11
Over 18	+21	+33	+ 52	+ 84	+130	- 65	- 40	- 20	- 7	0
Upto 30	0	0	0	0	0	-117	- 73	- 41	-20	-13
Over 30	+25	+39	+ 62	+100	+160	-80	- 50	- 25	- 9	0
Upto 50	0	0	0	0	0	-142	- 89	- 50	-25	-16
Over 50	+30	+46	+ 76	+120	+190	-100	- 60	- 30	-10	0
Upto 80	0	0	0	0	0	-174	-105	- 60	-29	-19
Over 80	+35	+54	+ 87	+140	+220	-120	- 72	- 36	-12	0
Upto 120	0	0	0	0	0	-207	-126	- 71	-34	-22
Over 120	+40	+63	+100	+160	+250	-145	-85	- 43	-14	0
Upto 180	0	0	0	0	0	-245	-148	- 83	-39	-25
Over 180	+45	+72	+115	+185	+290	-170	-100	- 50	-15	0
Upto 250	0	0	0	0	0	-285	-172	- 96	-44	-29

Seat No.	
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S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:**
- 1) Q. No. 1 is compulsory and should be solved in first 30 minutes.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary.
 - 4) Retain all the constructional details.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Type:1 Match the pairs

03

- | Column- I | Column- II |
|-----------------------|-------------------|
| 1) Profile of Surface | a) |
| 2) Concentricity | b) |
| 3) Runout | c) |
| | d) |

Type: 2 Correct or Incorrect

02

- 4) is the symbol for external threads.
- 5) is the material convention used for steel and alloys.

Type: 3 Multiple Correct Answers (2 marks each)

04

- 6) Which of the following represents interference fit?
- | | |
|--------------------|--------------------|
| a) $\Phi 80H_7s_6$ | b) $\Phi 80H_7r_6$ |
| c) $\Phi 80H_7e_8$ | d) $\Phi 80H_7f_7$ |
- 7) Which of the following is transition fit?
- | | |
|--------------------|--------------------|
| a) $\Phi 35H_7f_7$ | b) $\Phi 35H_7j_6$ |
| c) $\Phi 35H_7k_6$ | d) $\Phi 35H_7g_6$ |

Type: 4 Straight objective questions (1 mark each)

05

- 8) Footstep bearing is used for _____ shafts.
- | | |
|---------------|------------------|
| a) vorizontal | b) vertical |
| c) Inclined | d) none of above |
- 9) Included angle for Buttress threads is _____.
- | | |
|--------|--------|
| a) 55° | b) 29° |
| c) 45° | d) 60° |
- 10) The thickness of the washer to be used with M10 nut & bolt is _____.
- | | |
|------------|------------|
| a) 0.1 mm | b) 1.5 mm |
| c) 1.75 mm | d) 0.15 mm |
- 11) Which of following symbol represents symmetry tolerance?
- | | |
|----|----|
| a) | b) |
| c) | d) |

- 12) As per BIS, the standard size for A-3 sheet is _____.
- | | |
|---------------|--------------|
| a) 420 X 594 | b) 420 X 297 |
| c) 841 X 1189 | d) 210 X 297 |

Seat No.	
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S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Q. No. 2 is compulsory.
 2) Attempt any two questions out of Q.3, Q.4. & Q.5.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 5) Retain all the constructional details.

- Q.2** Figure 1 shows details of swivel bearing containing. Draw assembly drawing containing front view and top view. Prepare bill of material. **26**
 Given details include following parts
- 1) Body - CI - qty 1
 - 2) Bearing - CI- qty 1
 - 3) Fork - MS - qty 1
 - 4) Spindle - MS - qty 1
 - 5) Lock nut - MS - qty 1
 - 6) Set screw - MS - qty 1
 - 7) Set screw - MS - qty 1
 - 8) Set screw - MS - qty 2
 - 9) Disc - brass - qty 1
 - 10) Disc - brass – qty 1
 - 11) Nut, M9 - MS – qty 2
 - 12) Bush - GM – qty 1
- Q.3**
- a) Draw BIS conventions of diamond knurling and spur gear. **04**
 - b) Draw free hand sketch of knuckle joint. **05**
 - c) Represent various fits as per hole basis and shaft basis with reference to zero line. **06**
- Q.4**
- a) Draw BIS conventions of splined shaft and torsion spring. **04**
 - b) Draw free hand sketches of wing nut and hexagonal nut. **05**
 - c) Calculate working dimensions of hole and shaft and state type of fit for **06**
 - 1) $\Phi 100H_7g_6$
 - 2) $\Phi 100H_7S_6$
- Q.5**
- a) Represent revolved section and removed section with an example. **04**
 - b) Draw free hand sketch of double riveted double strap chain butt joint. **05**
 - c) Figure 2 shows views of a machine component. Redraw the given views and represent the following: **06**
 - 1) $\Phi 40$ is circular within 0.02 mm.
 - 2) Surface A is parallel to surface B within 0.01 mm
 - 3) Dimension 35 mm has a unilateral tolerance of + 0.02 mm.
 - 4) Surface B is milled to get Ra value of 50 microns.

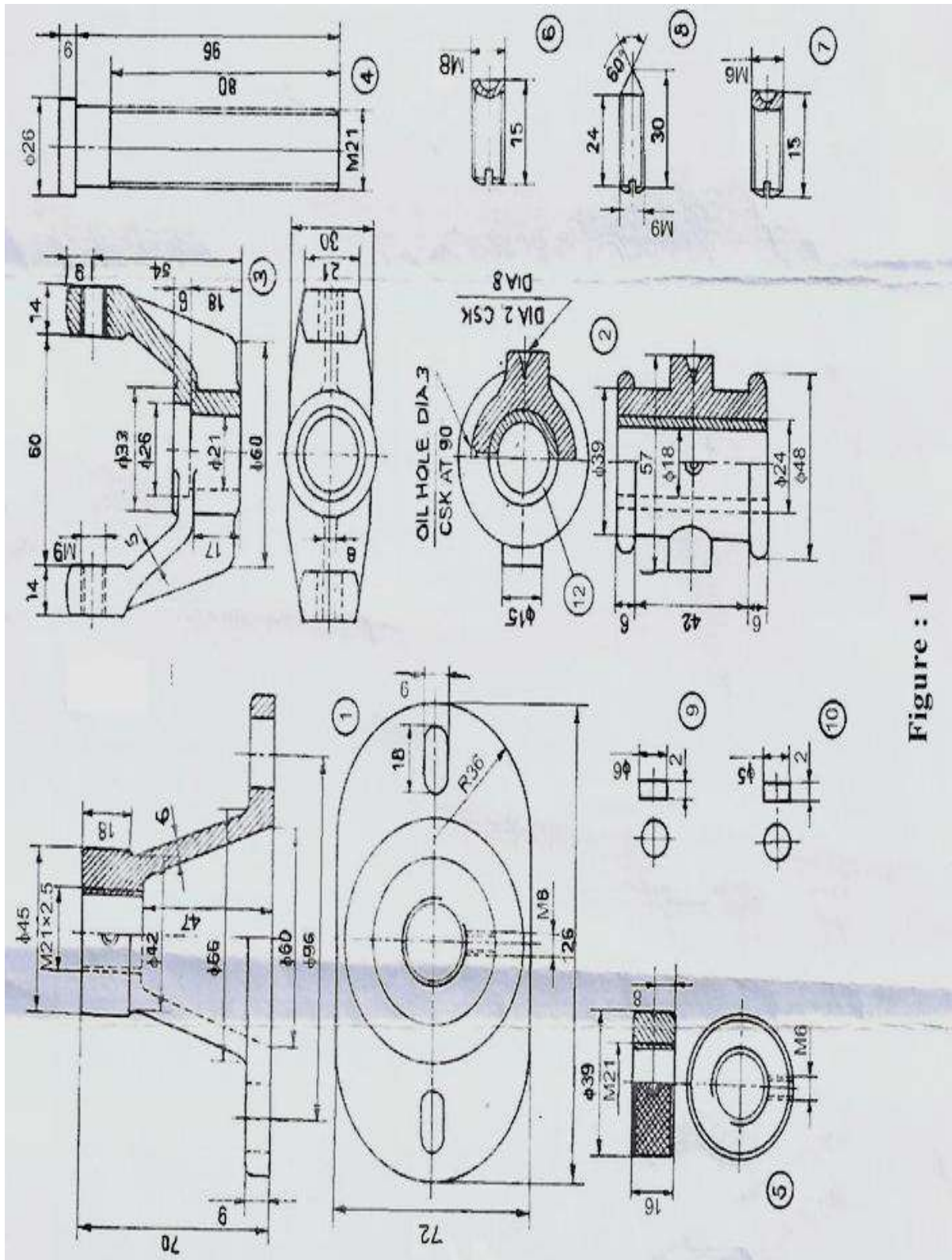


Figure : 1

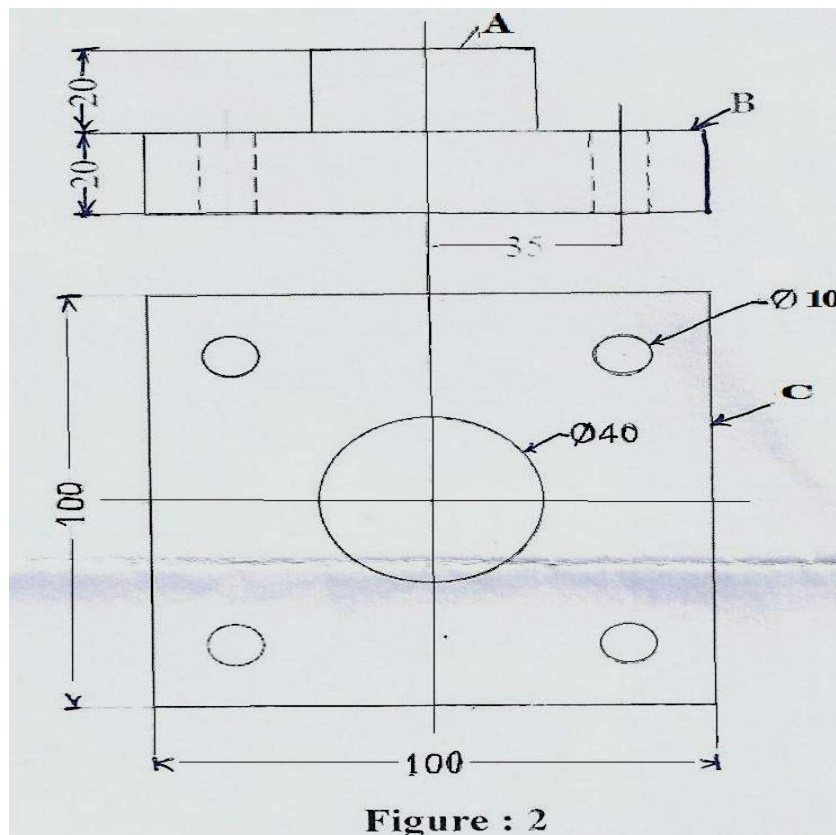


Figure : 2

Tolerance Charts

Nominal sizes	Tolerances of holes					Tolerances of shafts				
	C11	N7	P7	R7	S7	r6	s6	t6	u6	U6
From 1	+120	-4	-6	-10	-1	+16	+20	-	+24	+28
Upto 3	+60	-14	-16	-20	-24	+10	+14	-	+10	+18
Over 3	+145	-4	-8	-11	-15	+23	+27	-	+31	+35
Upto 6	+70	-16	-20	-23	-27	+15	+19	-	+23	+23
Over 6	+170	-4	-9	-13	-17	+28	+32	-	+37	+33
Upto 10	+80	-19	-24	-28	-32	+19	+28	-	+28	+28
Over 10	+205	-5	-11	-16	-27	+34	+39	-	+44	+51
Upto 18	+95	-23	-29	-34	-39	+23	+28	-	+33	+33
Over 18	+240	-7	-14	-20	-27	+41	+48	+54	+61	+62
Upto 30	+110	-28	-35	-41	-48	+28	+35	+41	+41	+41
Over 30	+280	-8	-17	-25	-34	+50	+59	+64	+76	+85
Upto 40	+120	-33	-42	-50	-59	+48	+58	+64	+60	+60
Over 40	+290	-9	-21	-30	-42	+34	+43	+70	+86	+95
Upto 50	+130	-39	-51	-60	-72	+54	+63	+54	+70	+70
Over 50	+330	-9	-21	-30	-42	+60	+72	+85	+106	+117
Upto 65	+140	-45	-59	-60	-72	+41	+53	+66	+87	+87
Over 65	+340	-10	-24	-32	-48	+62	+78	+94	+121	+132
Upto 80	+150	-39	-51	-62	-78	+43	+59	+75	+102	+102
Over 80	+390	-10	-24	-38	-58	+73	+93	+113	+146	+159
Upto 100	+170	-45	-59	-73	-93	+51	+71	+91	+124	+124
Over 100	+400	-12	-28	-41	-66	+76	+101	+126	+166	+175
Upto 120	+180	-52	-68	-76	-101	+54	+79	+104	+144	+144
Over 120	+450	-12	-28	-48	-77	+88	+117	+147	+195	+230
Upto 140	+200	-52	-68	-88	-117	+63	+92	+122	+170	+170
Over 140	+480	-14	-33	-50	-85	+93	+133	+171	+235	+250
Upto 180	+210	-60	-79	-93	-133	+65	+100	+134	+190	+190
Over 180	+570	-14	-33	-60	-105	+113	+169	+225	+330	+330
Upto 250	+240	-60	-79	-113	-169	+77	+122	+166	+236	+236
Over 250	+650	-14	-36	-74	-138	+130	+202	+272	+382	+402
Upto 315	+300	-66	-88	-130	-202	+94	+158	+218	+350	+315
Over 315	+760	-16	-41	-87	-169	+150	+244	+330	+471	+492
Upto 400	+360	-73	-98	-150	-224	+108	+190	+268	+390	+390
Over 400	+880	-17	-45	-103	-209	+172	+292	+400	+580	+603
Upto 500	+440	-80	-108	-172	-292	+126	+232	+330	+490	+490

Tolerances of holes						Tolerances of shafts				
Nominal sizes	D10	E9	F8	G7	JS7	K7	j6	k6	n6	p6
From 1	+ 60	+ 39	+ 20	+12	+ 5	0	+ 3	+ 6	+10	+ 12
Upto 3	+ 20	+ 14	+ 6	+ 2	- 5	-10	- 3	0	+ 4	+ 6
Over 3	+ 78	+ 50	+ 28	+16	+ 6	+ 3	+ 4	+ 9	+16	+ 20
Upto 6	+ 30	+ 20	+ 10	+ 4	- 6	- 9	- 4	+ 1	+ 8	+ 12
Over 6	+ 98	+ 61	+ 35	+20	+ 7.5	+ 5	+ 4.5	+10	+19	+ 24
Upto 10	+ 40	+ 25	+ 13	+ 5	- 7.5	-10	- 4.5	+ 1	+10	+ 15
Over 10	+120	+ 75	+ 43	+24	+ 9	+ 6	+ 5.5	+12	+23	+ 29
Upto 18	+ 50	+ 32	+ 16	+ 6	- 9	-12	- 5.5	+ 1	+12	+ 18
Over 18	+149	+ 92	+ 53	+28	+10.5	+6	+ 6.5	+15	+28	+ 35
Upto 30	+ 65	+ 40	+ 20	+ 7	-10.5	-15	- 6.5	+ 2	+15	+ 22
Over 30	+180	+112	+ 64	+34	+12.5	+ 7	+ 8	+18	+33	+ 42
Upto 50	+ 80	+ 50	+ 25	+ 9	-12.5	-18	- 8	+ 2	+17	+ 26
Over 50	+220	+134	+ 76	+40	+15	+ 9	+ 9.5	+21	+39	+ 51
Upto 80	+100	+ 60	+ 30	+10	-15	-21	- 9.5	+ 2	+20	+ 32
Over 80	+260	+159	+ 90	+47	+17.5	+10	+11	+25	+45	+ 59
Upto 120	+120	+ 72	+ 36	+12	-17.5	-25	-11	+ 3	+23	+ 37
Over 120	+305	+185	+106	+54	+20	+12	+12.5	+28	+52	+ 68
Upto 180	+145	+ 85	+ 43	+14	-20	-28	-12.5	+ 3	+27	+ 43
Over 180	+355	+215	+122	+61	+23	+13	+14.5	+33	+60	+ 79
Upto 250	+170	+100	+ 50	+15	-23	+33	-14.5	+ 4	+31	+ 50
Over 250	+400	+240	+135	+69	+26	+16	+16	+36	+66	+ 88
Upto 315	+190	+110	+ 55	+17	-26	-36	-16	+ 4	+34	+ 56
Over 315	+440	+265	+151	+75	+28.5	+17	+18	+40	+73	+ 98
Upto 400	+210	+125	+ 69	+18	-28.5	-40	-18	+ 4	+37	+ 62
Over 400	+480	+290	+165	+83	+31.5	+18	+20	+45	+80	+108
Upto 500	+230	+135	+ 68	+20	-31.5	-45	-20	+ 5	+40	+ 68

Tolerances of holes					Tolerances of shafts					
Nominal sizes	H7	H8	H9	H10	H11	d9	e8	f7	g6	h6
From 1	+10	+14	+ 25	+ 40	+ 60	- 20	- 14	- 6	- 2	0
Upto 3	0	0	0	0	0	- 45	- 28	- 16	- 8	- 6
Over 3	+12	+18	+ 30	+ 45	+ 75	- 30	- 20	- 10	- 4	0
Upto 6	0	0	0	0	0	- 60	- 38	- 22	-12	- 8
Over 6	+15	+22	+ 36	+ 58	+ 90	- 40	- 25	- 15	- 5	0
Upto 10	0	0	0	0	0	- 75	- 47	- 28	-14	- 9
Over 10	+18	+27	+ 43	+ 70	+110	- 50	- 32	- 16	- 6	0
Upto 18	0	0	0	0	0	- 93	- 59	- 34	-17	-11
Over 18	+21	+33	+ 52	+ 84	+130	- 65	- 40	- 20	- 7	0
Upto 30	0	0	0	0	0	-117	- 73	- 41	-20	-13
Over 30	+25	+39	+ 62	+100	+160	-80	- 50	- 25	- 9	0
Upto 50	0	0	0	0	0	-142	- 89	- 50	-25	-16
Over 50	+30	+46	+ 76	+120	+190	-100	- 60	- 30	-10	0
Upto 80	0	0	0	0	0	-174	-105	- 60	-29	-19
Over 80	+35	+54	+ 87	+140	+220	-120	- 72	- 36	-12	0
Upto 120	0	0	0	0	0	-207	-126	- 71	-34	-22
Over 120	+40	+63	+100	+160	+250	-145	-85	- 43	-14	0
Upto 180	0	0	0	0	0	-245	-148	- 83	-39	-25
Over 180	+45	+72	+115	+185	+290	-170	-100	- 50	-15	0
Upto 250	0	0	0	0	0	-285	-172	- 96	-44	-29

Seat No.	
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S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Retain all the constructional details.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14





Q.1 Type:1 Match the pairs

03

Column- I


- 1) Profile of Surface
- 2) Concentricity
- 3) Runout


Column- II

- a) 
- b) 
- c) 
- d) 

Type: 2 Correct or Incorrect

02

4)  is the symbol for external threads.

5)  is the material convention used for steel and alloys.





Type: 3 Multiple Correct Answers (2 marks each)

04

- 6) Which of the following represents interference fit?
 - a) $\Phi 80H_7s_6$
 - b) $\Phi 80H_7r_6$
 - c) $\Phi 80H_7e_8$
 - d) $\Phi 80H_7f_7$
- 7) Which of the following is transition fit?
 - a) $\Phi 35H_7f_7$
 - b) $\Phi 35H_7j_6$
 - c) $\Phi 35H_7k_6$
 - d) $\Phi 35H_7g_6$

Type: 4 Straight objective questions (1 mark each)

05

- 8) Which of following symbol represents symmetry tolerance?
 - a) 
 - b) 
 - c) 
 - d) 
- 9) As per BIS, the standard size for A-3 sheet is _____.
 - a) 420 X 594
 - b) 420 X 297
 - c) 841 X 1189
 - d) 210 X 297
- 10) Footstep bearing is used for _____ shafts.
 - a) vorizontal
 - b) vertical
 - c) Inclined
 - d) none of above
- 11) Included angle for Buttress threads is _____.
 - a) 55°
 - b) 29°
 - c) 45°
 - d) 60°

- 12) The thickness of the washer to be used with M10 nut & bolt is _____.
- | | |
|------------|------------|
| a) 0.1 mm | b) 1.5 mm |
| c) 1.75 mm | d) 0.15 mm |

Seat No.	
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S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Q. No. 2 is compulsory.
 2) Attempt any two questions out of Q.3, Q.4. & Q.5.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 5) Retain all the constructional details.

- Q.2** Figure 1 shows details of swivel bearing containing. Draw assembly drawing containing front view and top view. Prepare bill of material. **26**
 Given details include following parts
- 1) Body - CI - qty 1
 - 2) Bearing - CI- qty 1
 - 3) Fork - MS - qty 1
 - 4) Spindle - MS - qty 1
 - 5) Lock nut - MS - qty 1
 - 6) Set screw - MS - qty 1
 - 7) Set screw - MS - qty 1
 - 8) Set screw - MS - qty 2
 - 9) Disc - brass - qty 1
 - 10) Disc - brass – qty 1
 - 11) Nut, M9 - MS – qty 2
 - 12) Bush - GM – qty 1
- Q.3**
- a) Draw BIS conventions of diamond knurling and spur gear. **04**
 - b) Draw free hand sketch of knuckle joint. **05**
 - c) Represent various fits as per hole basis and shaft basis with reference to zero line. **06**
- Q.4**
- a) Draw BIS conventions of splined shaft and torsion spring. **04**
 - b) Draw free hand sketches of wing nut and hexagonal nut. **05**
 - c) Calculate working dimensions of hole and shaft and state type of fit for **06**
 - 1) $\Phi 100H_7g_6$
 - 2) $\Phi 100H_7S_6$
- Q.5**
- a) Represent revolved section and removed section with an example. **04**
 - b) Draw free hand sketch of double riveted double strap chain butt joint. **05**
 - c) Figure 2 shows views of a machine component. Redraw the given views and represent the following: **06**
 - 1) $\Phi 40$ is circular within 0.02 mm.
 - 2) Surface A is parallel to surface B within 0.01 mm
 - 3) Dimension 35 mm has a unilateral tolerance of + 0.02 mm.
 - 4) Surface B is milled to get Ra value of 50 microns.

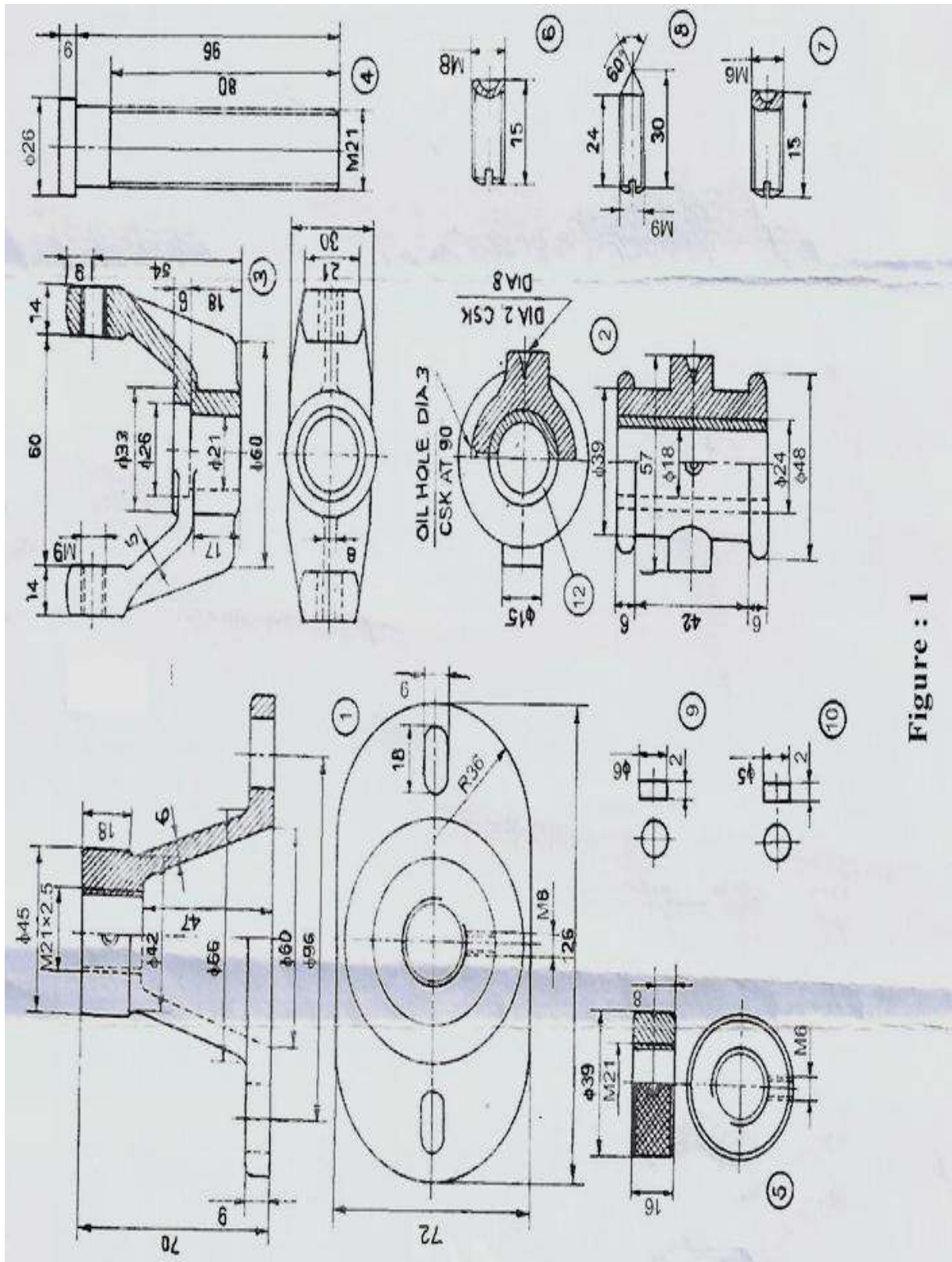


Figure : 1

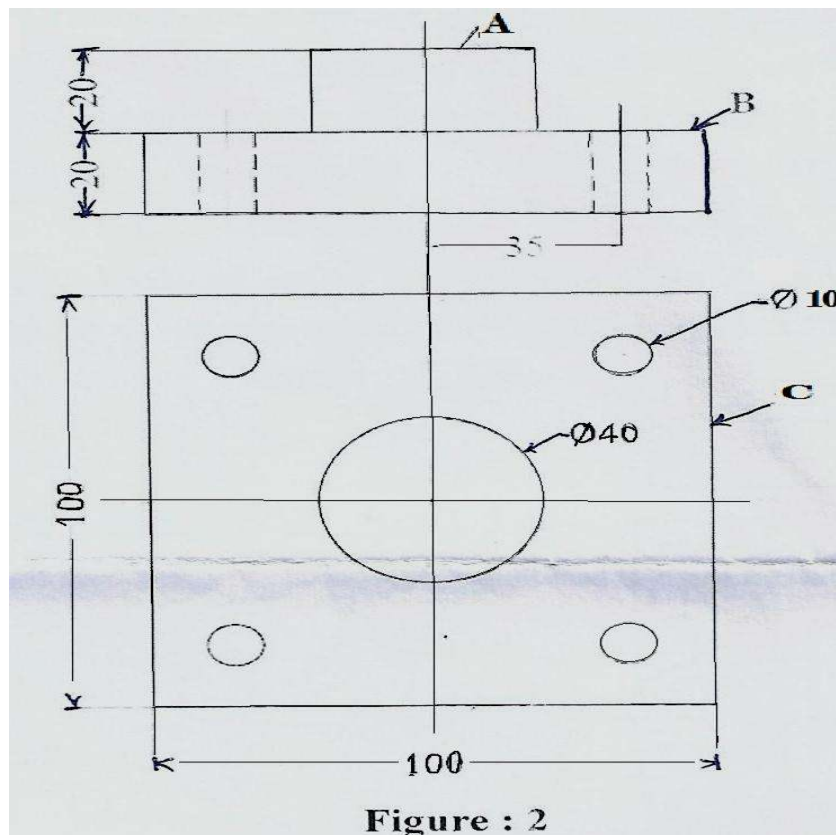


Figure : 2

Tolerance Charts

Nominal sizes	Tolerances of holes					Tolerances of shafts				
	C11	N7	P7	R7	S7	r6	s6	t6	u6	U6
From 1	+120	-4	-6	-10	-1	+16	+20	-	+24	+28
Upto 3	+60	-14	-16	-20	-24	+10	+14	-	+10	+18
Over 3	+145	-4	-8	-11	-15	+23	+27	-	+31	+35
Upto 6	+70	-16	-20	-23	-27	+15	+19	-	+23	+23
Over 6	+170	-4	-9	-13	-17	+28	+32	-	+37	+33
Upto 10	+80	-19	-24	-28	-32	+19	+28	-	+28	+28
Over 10	+205	-5	-11	-16	-27	+34	+39	-	+44	+51
Upto 18	+95	-23	-29	-34	-39	+23	+28	-	+33	+33
Over 18	+240	-7	-14	-20	-27	+41	+48	+54	+61	+62
Upto 30	+110	-28	-35	-41	-48	+28	+35	+41	+41	+41
Over 30	+280	-8	-17	-25	-34	+50	+59	+64	+76	+85
Upto 40	+120	-33	-42	-50	-59	+34	+43	+48	+60	+60
Over 40	+290	-9	-21	-30	-42	+60	+72	+85	+106	+117
Upto 50	+130	-39	-51	-60	-72	+41	+53	+66	+87	+87
Over 50	+330	-9	-21	-30	-42	+60	+72	+85	+106	+117
Upto 65	+140	-39	-51	-60	-72	+41	+53	+66	+87	+87
Over 65	+340	-10	-24	-38	-58	+73	+93	+113	+146	+159
Upto 80	+150	-45	-59	-76	-101	+54	+79	+104	+144	+144
Over 80	+390	-10	-24	-38	-58	+73	+93	+113	+146	+159
Upto 100	+170	-45	-59	-76	-101	+54	+79	+104	+144	+144
Over 100	+400	-12	-28	-48	-77	+88	+117	+147	+195	+230
Upto 120	+180	-52	-68	-93	-133	+65	+100	+134	+190	+190
Over 120	+450	-12	-28	-48	-77	+88	+117	+147	+195	+230
Upto 140	+200	-52	-68	-93	-133	+65	+100	+134	+190	+190
Over 140	+480	-14	-33	-60	-109	+113	+169	+225	+330	+330
Upto 180	+210	-60	-79	-113	-169	+77	+122	+166	+236	+236
Over 180	+570	-14	-33	-60	-109	+113	+169	+225	+330	+330
Upto 250	+240	-66	-88	-130	-202	+94	+158	+218	+350	+315
Over 250	+650	-16	-41	-87	-169	+150	+244	+330	+471	+492
Upto 315	+300	-73	-98	-150	-224	+108	+190	+268	+390	+390
Over 315	+760	-17	-45	-103	-209	+172	+292	+400	+580	+603
Upto 400	+360	-80	-108	-172	-292	+126	+232	+330	+490	+490

Tolerances of holes						Tolerances of shafts				
Nominal sizes	D10	E9	F8	G7	JS7	K7	j6	k6	n6	p6
From 1	+ 60	+ 39	+ 20	+12	+ 5	0	+ 3	+ 6	+10	+ 12
Upto 3	+ 20	+ 14	+ 6	+ 2	- 5	-10	- 3	0	+ 4	+ 6
Over 3	+ 78	+ 50	+ 28	+16	+ 6	+ 3	+ 4	+ 9	+16	+ 20
Upto 6	+ 30	+ 20	+ 10	+ 4	- 6	- 9	- 4	+ 1	+ 8	+ 12
Over 6	+ 98	+ 61	+ 35	+20	+ 7.5	+ 5	+ 4.5	+10	+19	+ 24
Upto 10	+ 40	+ 25	+ 13	+ 5	- 7.5	-10	- 4.5	+ 1	+10	+ 15
Over 10	+120	+ 75	+ 43	+24	+ 9	+ 6	+ 5.5	+12	+23	+ 29
Upto 18	+ 50	+ 32	+ 16	+ 6	- 9	-12	- 5.5	+ 1	+12	+ 18
Over 18	+149	+ 92	+ 53	+28	+10.5	+6	+ 6.5	+15	+28	+ 35
Upto 30	+ 65	+ 40	+ 20	+ 7	-10.5	-15	- 6.5	+ 2	+15	+ 22
Over 30	+180	+112	+ 64	+34	+12.5	+ 7	+ 8	+18	+33	+ 42
Upto 50	+ 80	+ 50	+ 25	+ 9	-12.5	-18	- 8	+ 2	+17	+ 26
Over 50	+220	+134	+ 76	+40	+15	+ 9	+ 9.5	+21	+39	+ 51
Upto 80	+100	+ 60	+ 30	+10	-15	-21	- 9.5	+ 2	+20	+ 32
Over 80	+260	+159	+ 90	+47	+17.5	+10	+11	+25	+45	+ 59
Upto 120	+120	+ 72	+ 36	+12	-17.5	-25	-11	+ 3	+23	+ 37
Over 120	+305	+185	+106	+54	+20	+12	+12.5	+28	+52	+ 68
Upto 180	+145	+ 85	+ 43	+14	-20	-28	-12.5	+ 3	+27	+ 43
Over 180	+355	+215	+122	+61	+23	+13	+14.5	+33	+60	+ 79
Upto 250	+170	+100	+ 50	+15	-23	+33	-14.5	+ 4	+31	+ 50
Over 250	+400	+240	+135	+69	+26	+16	+16	+36	+66	+ 88
Upto 315	+190	+110	+ 55	+17	-26	-36	-16	+ 4	+34	+ 56
Over 315	+440	+265	+151	+75	+28.5	+17	+18	+40	+73	+ 98
Upto 400	+210	+125	+ 69	+18	-28.5	-40	-18	+ 4	+37	+ 62
Over 400	+480	+290	+165	+83	+31.5	+18	+20	+45	+80	+108
Upto 500	+230	+135	+ 68	+20	-31.5	-45	-20	+ 5	+40	+ 68

Tolerances of holes					Tolerances of shafts					
Nominal sizes	H7	H8	H9	H10	H11	d9	e8	f7	g6	h6
From 1	+10	+14	+ 25	+ 40	+ 60	- 20	- 14	- 6	- 2	0
Upto 3	0	0	0	0	0	- 45	- 28	- 16	- 8	- 6
Over 3	+12	+18	+ 30	+ 45	+ 75	- 30	- 20	- 10	- 4	0
Upto 6	0	0	0	0	0	- 60	- 38	- 22	-12	- 8
Over 6	+15	+22	+ 36	+ 58	+ 90	- 40	- 25	- 15	- 5	0
Upto 10	0	0	0	0	0	- 75	- 47	- 28	-14	- 9
Over 10	+18	+27	+ 43	+ 70	+110	- 50	- 32	- 16	- 6	0
Upto 18	0	0	0	0	0	- 93	- 59	- 34	-17	-11
Over 18	+21	+33	+ 52	+ 84	+130	- 65	- 40	- 20	- 7	0
Upto 30	0	0	0	0	0	-117	- 73	- 41	-20	-13
Over 30	+25	+39	+ 62	+100	+160	- 80	- 50	- 25	- 9	0
Upto 50	0	0	0	0	0	-142	- 89	- 50	-25	-16
Over 50	+30	+46	+ 76	+120	+190	-100	- 60	- 30	-10	0
Upto 80	0	0	0	0	0	-174	-105	- 60	-29	-19
Over 80	+35	+54	+ 87	+140	+220	-120	- 72	- 36	-12	0
Upto 120	0	0	0	0	0	-207	-126	- 71	-34	-22
Over 120	+40	+63	+100	+160	+250	-145	-85	- 43	-14	0
Upto 180	0	0	0	0	0	-245	-148	- 83	-39	-25
Over 180	+45	+72	+115	+185	+290	-170	-100	- 50	-15	0
Upto 250	0	0	0	0	0	-285	-172	- 96	-44	-29

Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:**
- 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 - 2) Figures to the right indicate full marks.
 - 3) Make suitable assumption if necessary and state them clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) In which of the following engine, supercharging is essential _____.

a) petrol	b) Diesel
c) aircraft	d) Marine
- 2) On which of the following cycles are most high speed engines operated?

a) petrol engine	b) diesel engine
c) carnot engine	d) dual engine
- 3) Which of the following compression ratio range is used in CI engine?

a) 0-5	b) 5-10
c) 10-15	d) 16-22
- 4) Which of the following is the highest and most volatile liquid fuel?

a) kerosene	b) Gasoline
c) diesel	d) fuel oil
- 5) Lean air-fuel mixture is required for _____.

a) idling	b) Acceleration
c) starting	d) Cruising
- 6) In which of the following engine CRDI is used?

a) SI engine	b) CI engine
c) Steam engine	d) None of above
- 7) The compression ratio range for SI engine is _____.

a) 2-3	b) 7-10
c) 16-20	d) 20-25
- 8) Carburettor is designed for operation during cruising range, at air-fuel ratio of _____.

a) 16:1	b) 1:16
c) 1:10	d) 5:1
- 9) The engine of two wheelers of 100 CC are cooled by using _____.

a) air	b) Water
c) oil	d) Petrol

- 10) The process of increasing density of air before it enters the engine cylinder is known as _____.
- | | |
|---------------|------------------|
| a) scavenging | b) Supercharging |
| c) knocking | d) pre-heating |
- 11) In a CI engine squish is created _____.
- | |
|--|
| a) towards the end of compression stroke |
| b) at the end of suction stroke |
| c) at the beginning of suction stroke |
| d) during combustion |
- 12) An IC engine develops 20 kW output power. If the efficiency of the engine is 80 percentage, the heat supplied to the engine will be _____.
- | | |
|----------|---------|
| a) 15kW | b) 20kW |
| c) 25 kW | d) 30kW |
- 13) Generally, the initiation of knocking in CI engine considering pressure-crank angle diagram in combustion phase occurs _____.
- | | |
|---------------|------------------|
| a) before TDC | b) after TDC |
| c) at BDC | d) none of above |
- 14) Which of the following is the Internal combustion engine?
- | | |
|--------------------|------------------|
| a) Airplane engine | b) Boiler |
| c) Steam engine | d) None of above |

Seat No.	
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Set	P
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Solve any two questions from each section.
 2) Figures to the right indicate full marks.
 3) Use of calculator is allowed.

Section – I

- Q.2** a) Explain the classification of Internal combustion (I. C.) engines. **05**
 b) List down different compensating devices used in complete carburetor. And explain any one in detail. **05**
 c) With neat sketch, explain Unit Injector of CI engine. **04**
- Q.3** a) Explain the difference between supercharger and turbocharger with diagram. **05**
 b) Write the difference between SI and CI engines. **05**
 c) Derive mass of air relation of the simple carburettor considering compressibility of air. **04**
- Q.4** a) A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m³. The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66 **05**
 b) Explain factors which limit the use of supercharger in SI engine. **05**
 c) Write a note on CRDI in CI engines. **04**

Section – II

- Q.5** a) A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.00115 m³. The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed. **05**
 b) Explain stages of combustion in CI engines with the help of pressure-crank angle diagram. **05**
 c) Write the requirements of a good combustion chamber of a SI engine. **04**
- Q.6** a) Explain abnormal combustion in SI engines. **05**
 b) Write a note on 'cetane number'. **05**
 c) List down the methods to measure Brake power of IC Engine. Explain any one. **04**
- Q.7** a) Explain alternative fuels of SI engines. **05**
 b) Explain 'heat balance sheet' of IC Engines. **05**
 c) Explain highest useful compression ratio (HUCR). **04**

Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Make suitable assumption if necessary and state them clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Carburettor is designed for operation during cruising range, at air-fuel ratio of _____.

a) 16:1	b) 1:16
c) 1:10	d) 5:1
- 2) The engine of two wheelers of 100 CC are cooled by using _____.

a) air	b) Water
c) oil	d) Petrol
- 3) The process of increasing density of air before it enters the engine cylinder is known as _____.

a) scavenging	b) Supercharging
c) knocking	d) pre-heating
- 4) In a CI engine squish is created _____.

a) towards the end of compression stroke
b) at the end of suction stroke
c) at the beginning of suction stroke
d) during combustion
- 5) An IC engine develops 20 kW output power. If the efficiency of the engine is 80 percentage, the heat supplied to the engine will be _____.

a) 15kW	b) 20kW
c) 25 kW	d) 30kW
- 6) Generally, the initiation of knocking in CI engine considering pressure -crank angle diagram in combustion phase occurs _____.

a) before TDC	b) after TDC
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- 7) Which of the following is the Internal combustion engine?

a) Airplane engine	b) Boiler
c) Steam engine	d) None of above
- 8) In which of the following engine, supercharging is essential _____.

a) petrol	b) Diesel
c) aircraft	d) Marine

- 9) On which of the following cycles are most high speed engines operated?
- a) petrol engine
 - b) diesel engine
 - c) carnot engine
 - d) dual engine
- 10) Which of the following compression ratio range is used in CI engine?
- a) 0-5
 - b) 5-10
 - c) 10-15
 - d) 16-22
- 11) Which of the following is the highest and most volatile liquid fuel?
- a) kerosene
 - b) Gasoline
 - c) diesel
 - d) fuel oil
- 12) Lean air-fuel mixture is required for _____.
- a) idling
 - b) Acceleration
 - c) starting
 - d) Cruising
- 13) In which of the following engine CRDI is used?
- a) SI engine
 - b) CI engine
 - c) Steam engine
 - d) None of above
- 14) The compression ratio range for SI engine is _____.
- a) 2-3
 - b) 7-10
 - c) 16-20
 - d) 20-25

Seat No.	
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Set

Q

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Solve any two questions from each section.
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Section – I

- Q.2** a) Explain the classification of Internal combustion (I. C.) engines. **05**
 b) List down different compensating devices used in complete carburetor. And explain any one in detail. **05**
 c) With neat sketch, explain Unit Injector of CI engine. **04**
- Q.3** a) Explain the difference between supercharger and turbocharger with diagram. **05**
 b) Write the difference between SI and CI engines. **05**
 c) Derive mass of air relation of the simple carburettor considering compressibility of air. **04**
- Q.4** a) A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m³. The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66 **05**
 b) Explain factors which limit the use of supercharger in SI engine. **05**
 c) Write a note on CRDI in CI engines. **04**

Section – II

- Q.5** a) A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.00115 m³. The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed. **05**
 b) Explain stages of combustion in CI engines with the help of pressure-crank angle diagram. **05**
 c) Write the requirements of a good combustion chamber of a SI engine. **04**
- Q.6** a) Explain abnormal combustion in SI engines. **05**
 b) Write a note on 'cetane number'. **05**
 c) List down the methods to measure Brake power of IC Engine. Explain any one. **04**
- Q.7** a) Explain alternative fuels of SI engines. **05**
 b) Explain 'heat balance sheet' of IC Engines. **05**
 c) Explain highest useful compression ratio (HUCR). **04**

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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Make suitable assumption if necessary and state them clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Lean air-fuel mixture is required for _____.

a) idling	b) Acceleration
c) starting	d) Cruising
- 2) In which of the following engine CRDI is used?

a) SI engine	b) CI engine
c) Steam engine	d) None of above
- 3) The compression ratio range for SI engine is _____.

a) 2-3	b) 7-10
c) 16-20	d) 20-25
- 4) Carburettor is designed for operation during cruising range, at air-fuel ratio of _____.

a) 16:1	b) 1:16
c) 1:10	d) 5:1
- 5) The engine of two wheelers of 100 CC are cooled by using _____.

a) air	b) Water
c) oil	d) Petrol
- 6) The process of increasing density of air before it enters the engine cylinder is known as _____.

a) scavenging	b) Supercharging
c) knocking	d) pre-heating
- 7) In a CI engine squish is created _____.

a) towards the end of compression stroke
b) at the end of suction stroke
c) at the beginning of suction stroke
d) during combustion
- 8) An IC engine develops 20 kW output power. If the efficiency of the engine is 80 percentage, the heat supplied to the engine will be _____.

a) 15kW	b) 20kW
c) 25 kW	d) 30kW

- 9) Generally, the initiation of knocking in CI engine considering pressure-crank angle diagram in combustion phase occurs _____.
a) before TDC b) after TDC
c) at BDC d) none of above
- 10) Which of the following is the Internal combustion engine?
a) Airplane engine b) Boiler
c) Steam engine d) None of above
- 11) In which of the following engine, supercharging is essential _____.
a) petrol b) Diesel
c) aircraft d) Marine
- 12) On which of the following cycles are most high speed engines operated?
a) petrol engine b) diesel engine
c) carnot engine d) dual engine
- 13) Which of the following compression ratio range is used in CI engine?
a) 0-5 b) 5-10
c) 10-15 d) 16-22
- 14) Which of the following is the highest and most volatile liquid fuel?
a) kerosene b) Gasoline
c) diesel d) fuel oil

Seat No.	
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Set **R**

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Solve any two questions from each section.
 2) Figures to the right indicate full marks.
 3) Use of calculator is allowed.

Section – I

- Q.2** a) Explain the classification of Internal combustion (I. C.) engines. **05**
 b) List down different compensating devices used in complete carburetor. And explain any one in detail. **05**
 c) With neat sketch, explain Unit Injector of CI engine. **04**
- Q.3** a) Explain the difference between supercharger and turbocharger with diagram. **05**
 b) Write the difference between SI and CI engines. **05**
 c) Derive mass of air relation of the simple carburettor considering compressibility of air. **04**
- Q.4** a) A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m³. The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66 **05**
 b) Explain factors which limit the use of supercharger in SI engine. **05**
 c) Write a note on CRDI in CI engines. **04**

Section – II

- Q.5** a) A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.00115 m³. The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed. **05**
 b) Explain stages of combustion in CI engines with the help of pressure-crank angle diagram. **05**
 c) Write the requirements of a good combustion chamber of a SI engine. **04**
- Q.6** a) Explain abnormal combustion in SI engines. **05**
 b) Write a note on 'cetane number'. **05**
 c) List down the methods to measure Brake power of IC Engine. Explain any one. **04**
- Q.7** a) Explain alternative fuels of SI engines. **05**
 b) Explain 'heat balance sheet' of IC Engines. **05**
 c) Explain highest useful compression ratio (HUCR). **04**

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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday,17-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Make suitable assumption if necessary and state them clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) The process of increasing density of air before it enters the engine cylinder is known as _____.
 - a) scavenging
 - b) Supercharging
 - c) knocking
 - d) pre-heating
- 2) In a CI engine squish is created _____.
 - a) towards the end of compression stroke
 - b) at the end of suction stroke
 - c) at the beginning of suction stroke
 - d) during combustion
- 3) An IC engine develops 20 kW output power. If the efficiency of the engine is 80 percentage, the heat supplied to the engine will be _____.
 - a) 15kW
 - b) 20kW
 - c) 25 kW
 - d) 30kW
- 4) Generally, the initiation of knocking in CI engine considering pressure-crank angle diagram in combustion phase occurs _____.
 - a) before TDC
 - b) after TDC
 - c) at BDC
 - d) none of above
- 5) Which of the following is the Internal combustion engine?
 - a) Airplane engine
 - b) Boiler
 - c) Steam engine
 - d) None of above
- 6) In which of the following engine, supercharging is essential _____.
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 - b) Diesel
 - c) aircraft
 - d) Marine
- 7) On which of the following cycles are most high speed engines operated?
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 - b) diesel engine
 - c) carnot engine
 - d) dual engine
- 8) Which of the following compression ratio range is used in CI engine?
 - a) 0-5
 - b) 5-10
 - c) 10-15
 - d) 16-22
- 9) Which of the following is the highest and most volatile liquid fuel?
 - a) kerosene
 - b) Gasoline
 - c) diesel
 - d) fuel oil

- 10) Lean air-fuel mixture is required for _____.
- | | |
|-------------|-----------------|
| a) idling | b) Acceleration |
| c) starting | d) Cruising |
- 11) In which of the following engine CRDI is used?
- | | |
|-----------------|------------------|
| a) SI engine | b) CI engine |
| c) Steam engine | d) None of above |
- 12) The compression ratio range for SI engine is _____.
- | | |
|----------|----------|
| a) 2-3 | b) 7-10 |
| c) 16-20 | d) 20-25 |
- 13) Carburettor is designed for operation during cruising range, at air-fuel ratio of _____.
- | | |
|---------|---------|
| a) 16:1 | b) 1:16 |
| c) 1:10 | d) 5:1 |
- 14) The engine of two wheelers of 100 CC are cooled by using _____.
- | | |
|--------|-----------|
| a) air | b) Water |
| c) oil | d) Petrol |

Seat No.	
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Set **S**

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Solve any two questions from each section.
 2) Figures to the right indicate full marks.
 3) Use of calculator is allowed.

Section – I

- Q.2** a) Explain the classification of Internal combustion (I. C.) engines. **05**
 b) List down different compensating devices used in complete carburetor. And explain any one in detail. **05**
 c) With neat sketch, explain Unit Injector of CI engine. **04**
- Q.3** a) Explain the difference between supercharger and turbocharger with diagram. **05**
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- Q.4** a) A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m³. The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66 **05**
 b) Explain factors which limit the use of supercharger in SI engine. **05**
 c) Write a note on CRDI in CI engines. **04**

Section – II

- Q.5** a) A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.00115 m³. The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed. **05**
 b) Explain stages of combustion in CI engines with the help of pressure-crank angle diagram. **05**
 c) Write the requirements of a good combustion chamber of a SI engine. **04**
- Q.6** a) Explain abnormal combustion in SI engines. **05**
 b) Write a note on 'cetane number'. **05**
 c) List down the methods to measure Brake power of IC Engine. Explain any one. **04**
- Q.7** a) Explain alternative fuels of SI engines. **05**
 b) Explain 'heat balance sheet' of IC Engines. **05**
 c) Explain highest useful compression ratio (HUCR). **04**

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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
COMPOSITE MATERIALS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate fill marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options. 14

- 1) A1-alloys for engine/automobile parts are reinforced to increase their _____.
 - a) Strength
 - b) Elastic modulus
 - c) Wear resistance
 - d) Density
- 2) _____ is not an example for laminar composite.
 - a) Wood
 - b) Coatings/Paints
 - c) Bimetallic
 - d) Claddings
- 3) Which of the following is used as reinforcement in advanced polymer matrix composite?
 - a) Carbon-fiber reinforced
 - b) Glass-fiber reinforced
 - c) Wood-fiber reinforced
 - d) Unidirectional-fiber reinforced
- 4) Aspect ratio is _____.
 - a) Diameter to length ratio
 - b) Length to depth ratio
 - c) Depth to length ratio
 - d) Length to diameter ratio
- 5) _____ can not be used as matrix to combine with fiber to give composites.
 - a) Metals
 - b) Ceramics
 - c) Non-metals
 - d) Polymers
- 6) One of the most popular types of core material used is _____.
 - a) Metal foam
 - b) Honeycomb
 - c) Glass
 - d) Plastic
- 7) The flexural stiffness of the sandwich panel is proportional to the _____ of core thickness.
 - a) Square
 - b) Square root
 - c) Inverse
 - d) Cube
- 8) Which of the following is not an application of sandwich panel?
 - a) Fabrication of wings of aircrafts
 - b) Design of ships, boat hulls
 - c) Conveyor belts
 - d) Fabrication of roofs, floors and walls of buildings

- 9) Which of the following is an application of glass-fiber reinforced composites?
- | | |
|--------------------|---------------------|
| a) Adhesives | b) Conveyor belts |
| c) Design of ships | d) Automotive parts |
- 10) _____ is not an example of thermoplastic polymer.
- | | |
|-----------------------|-----------|
| a) Polyethylene | b) Epoxy |
| c) Polyvinyl chloride | d) Nylons |
- 11) In Fiber reinforced composites, fiber act as _____.
- | | |
|------------------|------------------|
| a) Matrix | b) Base Material |
| c) Reinforcement | d) None of these |
- 12) _____ is not desirable property of matrix in case of composites.
- | |
|--|
| a) Low Moisture absorption |
| b) High Strength at elevated temperature |
| c) Low temperature capability |
| d) High shrinkage |
- 13) _____ is not example of natural fiber.
- | | |
|-----------|------------|
| a) Jute | b) Coconut |
| c) Carbon | d) Sisal |
- 14) Size range of dispersoids used in dispersion strengthened composites _____.
- | | |
|---------------------------|------------------|
| a) 0.01-0.1 μm | b) 0.01-0.1 nm |
| c) 0.01-0.1 mm | d) none of these |

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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
COMPOSITE MATERIALS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Attempt any two questions from each section.
 2) Figures to the right indicate full marks.

Section – I

- | | | | |
|------------|-----------|---|-----------|
| Q.2 | a) | Define Composite material and explain how composites are classified? | 07 |
| | b) | What are various theories of failure? Explain maximum stress theory. | 07 |
| Q.3 | a) | Explain Tsai-Hill Failure Theory. | 07 |
| | b) | How polymer composites are classified explain in detail. | 07 |
| Q.4 | a) | What are the different applications of Composite materials? | 07 |
| | b) | Explain characteristics and selection criteria for fiber reinforced composites. | 07 |

Section – II

- | | | | |
|------------|-----------|--|-----------|
| Q.5 | a) | Explain Hand lay-up techniques with neat sketch | 07 |
| | b) | What are the different steps involved in structural design process? | 07 |
| Q.6 | a) | What are the different elements in structural design? | 07 |
| | b) | Write a short note on filament winding process. | 07 |
| Q.7 | a) | How concept of fracture mechanics can be applied to composite material? | 07 |
| | b) | Elaborate the importance of material selection in design of composite structure. | 07 |

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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
COMPOSITE MATERIALS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Which of the following is not an application of sandwich panel?
 - a) Fabrication of wings of aircrafts
 - b) Design of ships, boat hulls
 - c) Conveyor belts
 - d) Fabrication of roofs, floors and walls of buildings
- 2) Which of the following is an application of glass-fiber reinforced composites?
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 - b) Conveyor belts
 - c) Design of ships
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- 3) _____ is not an example of thermoplastic polymer.
 - a) Polyethylene
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- 4) In Fiber reinforced composites, fiber act as _____.
 - a) Matrix
 - b) Base Material
 - c) Reinforcement
 - d) None of these
- 5) _____ is not desirable property of matrix in case of composites.
 - a) Low Moisture absorption
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- 7) Size range of dispersoids used in dispersion strengthened composites _____.
 - a) 0.01-0.1 μm
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 - c) 0.01-0.1 mm
 - d) none of these
- 8) A1-alloys for engine/automobile parts are reinforced to increase their _____.
 - a) Strength
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 - d) Density
- 9) _____ is not an example for laminar composite.
 - a) Wood
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- 10) Which of the following is used as reinforcement in advanced polymer matrix composite?
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|----------------------------|------------------------------------|
| a) Carbon-fiber reinforced | b) Glass-fiber reinforced |
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- 11) Aspect ratio is _____.
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|-----------------------------|-----------------------------|
| a) Diameter to length ratio | b) Length to depth ratio |
| c) Depth to length ratio | d) Length to diameter ratio |
- 12) _____ can not be used as matrix to combine with fiber to give composites.
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|---------------|-------------|
| a) Metals | b) Ceramics |
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- 13) One of the most popular types of core material used is _____.
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|---------------|--------------|
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| c) Glass | d) Plastic |
- 14) The flexural stiffness of the sandwich panel is proportional to the _____ of core thickness.
- | | |
|------------|----------------|
| a) Square | b) Square root |
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Seat No.	
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**S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
COMPOSITE MATERIALS**

Day & Date: Tuesday, 17-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Attempt any two questions from each section.
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Section – I

- Q.2** a) Define Composite material and explain how composites are classified? **07**
b) What are various theories of failure? Explain maximum stress theory. **07**
- Q.3** a) Explain Tsai-Hill Failure Theory. **07**
b) How polymer composites are classified explain in detail. **07**
- Q.4** a) What are the different applications of Composite materials? **07**
b) Explain characteristics and selection criteria for fiber reinforced composites. **07**

Section – II

- Q.5** a) Explain Hand lay-up techniques with neat sketch **07**
b) What are the different steps involved in structural design process? **07**
- Q.6** a) What are the different elements in structural design? **07**
b) Write a short note on filament winding process. **07**
- Q.7** a) How concept of fracture mechanics can be applied to composite material? **07**
b) Elaborate the importance of material selection in design of composite structure. **07**

Seat
No.

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
COMPOSITE MATERIALS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate fill marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.**14**

- 1) _____ can not be used as matrix to combine with fiber to give composites.
 - a) Metals
 - b) Ceramics
 - c) Non-metals
 - d) Polymers
- 2) One of the most popular types of core material used is _____.
 - a) Metal foam
 - b) Honeycomb
 - c) Glass
 - d) Plastic
- 3) The flexural stiffness of the sandwich panel is proportional to the _____ of core thickness.
 - a) Square
 - b) Square root
 - c) Inverse
 - d) Cube
- 4) Which of the following is not an application of sandwich panel?
 - a) Fabrication of wings of aircrafts
 - b) Design of ships, boat hulls
 - c) Conveyor belts
 - d) Fabrication of roofs, floors and walls of buildings
- 5) Which of the following is an application of glass-fiber reinforced composites?
 - a) Adhesives
 - b) Conveyor belts
 - c) Design of ships
 - d) Automotive parts
- 6) _____ is not an example of thermoplastic polymer.
 - a) Polyethylene
 - b) Epoxy
 - c) Polyvinyl chloride
 - d) Nylons
- 7) In Fiber reinforced composites, fiber act as _____.
 - a) Matrix
 - b) Base Material
 - c) Reinforcement
 - d) None of these
- 8) _____ is not desirable property of matrix in case of composites.
 - a) Low Moisture absorption
 - b) High Strength at elevated temperature
 - c) Low temperature capability
 - d) High shrinkage
- 9) _____ is not example of natural fiber.
 - a) Jute
 - b) Coconut
 - c) Carbon
 - d) Sisal

- 10) Size range of dispersoids used in dispersion strengthened composites _____.
- | | |
|---------------------------|------------------|
| a) 0.01-0.1 μm | b) 0.01-0.1 nm |
| c) 0.01-0.1 mm | d) none of these |
- 11) Al-alloys for engine/automobile parts are reinforced to increase their _____.
- | | |
|--------------------|--------------------|
| a) Strength | b) Elastic modulus |
| c) Wear resistance | d) Density |
- 12) _____ is not an example for laminar composite.
- | | |
|---------------|--------------------|
| a) Wood | b) Coatings/Paints |
| c) Bimetallic | d) Claddings |
- 13) Which of the following is used as reinforcement in advanced polymer matrix composite?
- | | |
|----------------------------|------------------------------------|
| a) Carbon-fiber reinforced | b) Glass-fiber reinforced |
| c) Wood-fiber reinforced | d) Unidirectional-fiber reinforced |
- 14) Aspect ratio is _____.
- | | |
|-----------------------------|-----------------------------|
| a) Diameter to length ratio | b) Length to depth ratio |
| c) Depth to length ratio | d) Length to diameter ratio |

Seat No.	
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**S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
COMPOSITE MATERIALS**

Day & Date: Tuesday, 17-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Attempt any two questions from each section.
2) Figures to the right indicate full marks.

Section – I

- Q.2** a) Define Composite material and explain how composites are classified? **07**
b) What are various theories of failure? Explain maximum stress theory. **07**
- Q.3** a) Explain Tsai-Hill Failure Theory. **07**
b) How polymer composites are classified explain in detail. **07**
- Q.4** a) What are the different applications of Composite materials? **07**
b) Explain characteristics and selection criteria for fiber reinforced composites. **07**

Section – II

- Q.5** a) Explain Hand lay-up techniques with neat sketch **07**
b) What are the different steps involved in structural design process? **07**
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No.**S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019****Mechanical Engineering
COMPOSITE MATERIALS**

Day & Date: Tuesday, 17-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

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Duration: 30 Minutes

Marks: 14

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 - c) Carbon
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 - a) 0.01-0.1 μm
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 - c) 0.01-0.1 mm
 - d) none of these
- 6) A1-alloys for engine/automobile parts are reinforced to increase their _____.
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- 7) _____ is not an example for laminar composite.
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 - c) Depth to length ratio
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 - c) Design of ships
 - d) Automotive parts

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**S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Mechanical Engineering
COMPOSITE MATERIALS**

Day & Date: Tuesday, 17-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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Section – II

- Q.5** a) Explain Hand lay-up techniques with neat sketch **07**
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Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The general solution of $(D^3 - 2D^2 + D)y = 0$ is _____.
 a) $y = C_1 + (C_2 + C_3x)e^{-x}$ b) $y = (C_1 + C_2x)e^{-x}$
 c) $y = c_1 + c_2e^x + c_3e^x$ d) $y = c_1 + (c_2 + c_3x)e^x$
- The Particular Integral of $(D^2 + 9)y = \cos 3x$ is _____.
 a) $\frac{1}{18} \cos 3x$ b) $\frac{x}{6} \sin 3x$
 c) $\frac{1}{6} \sin 3x$ d) $\frac{x}{6} \cos 3x$
- $\frac{1}{D+M} X =$ _____.
 a) $e^{mx} \int e^{-mx} X dx$ b) $e^{-mx} \int e^{mx} X dx$
 c) $\int X e^{mx} dx$ d) $\int X e^{-mx} dx$
- The value of the Fourier coefficient a_0 of the function $f(x) = x^2$ in $(-\pi, \pi)$ is _____.
 a) $\frac{\pi^2}{3}$ b) $\frac{\pi^3}{3}$
 c) $\frac{\pi^2}{2}$ d) 0
- Which of the following functions cannot be expanded as fourier series in the interval $(-\pi, \pi)$
 a) x^3 b) $|x|$
 c) $\operatorname{cosec} x$ d) e^{-x}
- If $z\{f(k)\} = F(z)$, then $z\{k f(k)\} =$ _____.
 a) $\frac{dF(z)}{dz}$ b) $\frac{-dF(z)}{dz}$
 c) $-\frac{dF(z)}{z dz}$ d) $\frac{dF(z)}{z dz}$
- $Z\{1\} =$ _____.
 a) $\frac{1}{z-1}$ b) $\frac{1}{z}$
 c) $\frac{z}{z+1}$ d) $\frac{z+1}{z-1}$

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 4) Use of calculator is allowed.

Section – I

Q.2 Solve any three of the following questions. 09

- a) Solve $(D^2 + 4D + 4)y = e^{3x} + \cos 5x$
 b) Solve $(D^2 + 1)y = \sin x \sin 2x$
 c) Find the Fourier series of $f(x) = 1 - x^2$ in the interval $(-1, 1)$.
 d) Find the half – range sine service of

$$f(x) = \frac{2x}{3}, 0 \leq x \leq \frac{\pi}{3}$$

$$= \frac{\pi-x}{3}, \frac{\pi}{3} \leq x \leq \pi$$

- e) Find $Z\{K 5^k\}, k \geq 0$

Q.3 Solve any three of the following questions. 09

- a) Solve $(D^3 + 3D)y = \cosh 2x$.
 b) Solve $(D^2 + 4)y = x \sin x$.
 c) Find the Fourier series of

$$f(x) = -1, \quad 0 < x < \pi$$

$$= 2, \quad \pi < x < 2\pi$$

- d) Find $z\{\sinh \alpha k\}, k \geq 0$.
 e) Find $Z^{-1}\left\{\frac{1}{(z-3)^2}\right\}, |z| > 3$.

Q.4 Solve any two of the following questions. 10

- a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f $E = E_o \cos wt$, so that the charge Q satisfies the diff. equation

$$\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L} \cos wt.$$

If $W^2 = \frac{1}{CL}$ and initially $Q = Q_o$ at $t = 0$ and the current $i = i_0$ at $t = 0$

Find the charge Q at time t

- b) Find the Fourier series of

$$f(x) = x, \quad -1 < x < 0$$

$$= x + 2, \quad 0 < x < 1$$

- c) Find $Z^{-1}\left\{\frac{z}{(z-2)(z-3)}\right\}, |z| > 3$

Section – II

Q.5 Solve any three of the following questions.

09

a) Find $L[e^{-2t}\sqrt{1+\sin 4t}]$

b) Solve the system of equation by using Gauss- Elimination method

$$x + 4y - z = -5, \quad x + y - 6z = -12, \quad -3x - y - z = 4$$

c) Given x series y series

Mean $\quad 18 \quad 100$

S.D. $\quad 14 \quad 20$

Coefficient of correlation between x and y is 0.8. Find the equation of line of regression of x on y . Also find out the most probable value of x if y is 90.d) A random variable x has the following probability distribution.

x	1	2	3	4	6	6	7
$P(x)$	k	$2k$	$3k$	k^2	$k^2 + k$	$2k^2$	$4k^2$

e) Find the coefficient of correlation (Karl Pearson's) from the following data.

x	28	45	40	38	35	33	40	32	36	33
y	23	34	33	34	30	26	28	31	36	35

Q.6 Solve any three of the following questions.

09

a) A firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a poisson variate with mean 1.5.

Calculate the probable number of days in a year on which

1) neither car is in demand

2) a demand is refused

b) Find by Newton's method, the real root of the equation $3x = \cos x + 1$ correct to the four decimal places.

c) Solve the following system of linear equations by Gauss Seidal method.

$$28x + 4y - z = 32$$

$$x + 3y + 10z = 24$$

$$2x + 17y + 4z = 35 \text{ (perform 3 iterations)}$$

d) Find $L^{-1} \left[\frac{2s+3}{s^2+2s+2} \right]$

e) Find Laplace transform of $\frac{d}{dt} \left(\frac{\sin t}{t} \right)$

Q.7 Solve any two of the following questions.

10

a) Find the Laplace transform of

$$f(t) = \frac{t}{a} \quad 0 < t \leq a$$

$$= \frac{1}{a}(2a - t) \quad a \leq t < 2a \text{ and } f(t) = f(t + 2a)$$

b) Seven coins are tossed at a time 256 times. Number of heads obtained in each toss are recorded below. Fit a binomial distribution under the hypothesis that the coins are unbiased.

No of heads	0	1	2	3	4	5	6	7
Frequency	14	12	38	70	60	46	14	2

c) Solve the following system of equations by Gauss- Jacobi's method. (Perform 4 iterations)

$$8x - 3y + 2z = 20$$

$$4x + 11y - z = 33$$

$$6x + 3y + 12z = 35$$

Seat
No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) $L^{-1} \left[\frac{1}{(s-3)^2+16} \right]$ _____.
 - a) $\frac{e^{3t}}{4} \sin 4t$
 - b) $\frac{e^{-3t}}{4} \sin 4t$
 - c) $e^{3t} \cos 4t$
 - d) $e^{-3t} \cos 4t$
- 2) $L\{\delta(t-3)\} =$ _____.
 - a) e^{3s}
 - b) $\frac{e^{-3s}}{s}$
 - c) $\frac{e^{3s}}{s}$
 - d) e^{-3s}
- 3) For a binomial distribution the mean is 12 and the variance is 4 the n, p, q are _____.
 - a) $18, \frac{2}{3}, \frac{1}{3}$
 - b) $16, \frac{1}{3}, \frac{2}{3}$
 - c) $18, \frac{1}{3}, \frac{2}{3}$
 - d) None
- 4) If $byx = \frac{5}{18}$, $bxxy = \frac{8}{5}$ then $r =$ _____.
 - a) $2/5$
 - b) $1/2$
 - c) $2/3$
 - d) $3/2$
- 5) Gauss Seidal method converges only if the coefficient matrix A of the system of simultaneous equation $AX = B$ is _____.
 - a) Diagonally dominant
 - b) Upper triangular
 - c) Singular
 - d) Non Singular matrix
- 6) The positive real root of the equation $x^3 - x - 11 = 0$ lies between _____.
 - a) 0 and 1
 - b) 2 and 3
 - c) 1 and 2
 - d) 3 and 4
- 7) If $L\{y(t)\} = \bar{y}(s)$ then $L \left[\frac{d^2y}{dt^2} \right] =$ _____.
 - a) $s \bar{y}(s) - y(0)$
 - b) $s^2 \bar{y}(s) + sy(0) + y'(0)$
 - c) $s^2 \bar{y}(s) - sy'(0) - y''(0)$
 - d) $s^2 \bar{y}(s) - sy(0) - y'(0)$
- 8) The general solution of $(D^3 - 2D^2 + D)y = 0$ is _____.
 - a) $y = C_1 + (C_2 + C_3x)e^{-x}$
 - b) $y = (C_1 + C_2x)e^{-x}$
 - c) $y = c_1 + c_2e^x + c_3e^x$
 - d) $y = c_1 + (c_2 + c_3x)e^x$

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
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Section – II

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- b) Solve the system of equation by using Gauss- Elimination method
 $x + 4y - z = -5, \quad x + y - 6z = -12, \quad -3x - y - z = 4$
- c) Given

x series	y series
Mean	18 100
S.D.	14 20

Coefficient of correlation between x and y is 0.8. Find the equation of line of regression of x on y . Also find out the most probable value of x if y is 90.

- d) A random variable x has the following probability distribution.

x	1	2	3	4	6	6	7
$P(x)$	k	$2k$	$3k$	k^2	$k^2 + k$	$2k^2$	$4k^2$

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- neither car is in demand
 - a demand is refused
- b) Find by Newton's method, the real root of the equation $3x = \cos x + 1$ correct to the four decimal places.
- c) Solve the following system of linear equations by Gauss Seidal method.
 $28x + 4y - z = 32$
 $x + 3y + 10z = 24$
 $2x + 17y + 4z = 35$ (perform 3 iterations)
- d) Find $L^{-1} \left[\frac{2s+3}{s^2+2s+2} \right]$
- e) Find Laplace transform of $\frac{d}{dt} \left(\frac{\sin t}{t} \right)$

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10

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 $= \frac{1}{a}(2a - t) \quad a \leq t < 2a$ and $f(t) = f(t + 2a)$
- b) Seven coins are tossed at a time 256 times. Number of heads obtained in each toss are recorded below. Fit a binomial distribution under the hypothesis that the coins are unbiased.
- | | | | | | | | | |
|-------------|----|----|----|----|----|----|----|---|
| No of heads | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Frequency | 14 | 12 | 38 | 70 | 60 | 46 | 14 | 2 |
- c) Solve the following system of equations by Gauss- Jacobi's method. (Perform 4 iterations)
- $$8x - 3y + 2z = 20$$
- $$4x + 11y - z = 33$$
- $$6x + 3y + 12z = 35$$

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Which of the following functions cannot be expanded as fourier series in the interval $(-\pi, \pi)$
 - x^3
 - $|x|$
 - $\operatorname{cosec} x$
 - e^{-x}
- If $z\{f(k)\} = F(z)$, then $z\{k f(k)\} = \underline{\hspace{2cm}}$.
 - $\frac{dF(z)}{dz}$
 - $\frac{-dF(z)}{dz}$
 - $-z \frac{dF(z)}{dz}$
 - $z \frac{dF(z)}{dz}$
- $Z\{1\} = \underline{\hspace{2cm}}$.
 - $\frac{1}{z}$
 - $\frac{1}{z+1}$
 - $\frac{z}{z+1}$
 - $\frac{z}{z-1}$
- $L^{-1} \left[\frac{1}{(s-3)^2+16} \right] = \underline{\hspace{2cm}}$.
 - $\frac{e^{3t}}{4} \sin 4t$
 - $\frac{e^{-3t}}{4} \sin 4t$
 - $e^{3t} \cos 4t$
 - $e^{-3t} \cos 4t$
- $L\{\delta(t-3)\} = \underline{\hspace{2cm}}$.
 - e^{3s}
 - $\frac{e^{-3s}}{s}$
 - $\frac{e^{3s}}{s}$
 - e^{-3s}
- For a binomial distribution the mean is 12 and the variance is 4 the n, p, q are $\underline{\hspace{2cm}}$.
 - $18, \frac{2}{3}, \frac{1}{3}$
 - $16, \frac{1}{3}, \frac{2}{3}$
 - $18, \frac{1}{3}, \frac{2}{3}$
 - None
- If $byx = \frac{5}{18}$, $bxxy = \frac{8}{5}$ then $r = \underline{\hspace{2cm}}$.
 - $2/5$
 - $1/2$
 - $2/3$
 - $3/2$

- 8) Gauss Seidal method converges only if the coefficient matrix A of the system of simultaneous equation $AX = B$ is _____.
- a) Diagonally dominant b) Upper triangular
c) Singular d) Non Singular matrix
- 9) The positive real root of the equation $x^3 - x - 11 = 0$ lies between _____.
- a) 0 and 1 b) 2 and 3
c) 1 and 2 d) 3 and 4
- 10) If $L\{y(t)\} = \bar{y}(s)$ then $L\left[\frac{d^2y}{dt^2}\right] =$ _____.
- a) $s\bar{y}(s) - y(o)$ b) $s^2\bar{y}(s) + sy(o) + y'(o)$
c) $s^2\bar{y}(s) - sy'(o) - y''(o)$ d) $s^2\bar{y}(s) - sy(o) - y'(o)$
- 11) The general solution of $(D^3 - 2D^2 + D)y = 0$ is _____.
- a) $y = C_1 + (C_2 + C_3x)e^{-x}$ b) $y = (C_1 + C_2x)e^{-x}$
c) $y = c_1 + c_2e^x + c_3e^x$ d) $y = c_1 + (c_2 + c_3x)e^x$
- 12) The Particular Integral of $(D^2 + 9)y = \cos 3x$ is _____.
- a) $\frac{1}{18} \cos 3x$ b) $\frac{x}{6} \sin 3x$
c) $\frac{1}{6} \sin 3x$ d) $\frac{x}{6} \cos 3x$
- 13) $\frac{1}{D+M} X =$ _____.
- a) $e^{mx} \int e^{-mx} X dx$ b) $e^{-mx} \int e^{mx} X dx$
c) $\int X e^{mx} dx$ d) $\int X e^{-mx} dx$
- 14) The value of the Fourier coefficient a_0 of the function $f(x) = x^2$ in $(-\pi, \pi)$ is _____.
- a) $\frac{\pi^2}{3}$ b) $\frac{\pi^3}{3}$
c) $\frac{\pi^2}{2}$ d) 0

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 4) Use of calculator is allowed.

Section – I

Q.2 Solve any three of the following questions. 09

- a) Solve $(D^2 + 4D + 4)y = e^{3x} + \cos 5x$
 b) Solve $(D^2 + 1)y = \sin x \sin 2x$
 c) Find the Fourier series of $f(x) = 1 - x^2$ in the interval $(-1, 1)$.
 d) Find the half – range sine service of

$$f(x) = \frac{2x}{3}, 0 \leq x \leq \frac{\pi}{3}$$

$$= \frac{\pi-x}{3}, \frac{\pi}{3} \leq x \leq \pi$$

- e) Find $Z\{K 5^k\}, k \geq 0$

Q.3 Solve any three of the following questions. 09

- a) Solve $(D^3 + 3D)y = \cosh 2x$.
 b) Solve $(D^2 + 4)y = x \sin x$.
 c) Find the Fourier series of

$$f(x) = -1, \quad 0 < x < \pi$$

$$= 2, \quad \pi < x < 2\pi$$

- d) Find $z\{\sinh \alpha k\}, k \geq 0$.
 e) Find $Z^{-1}\left\{\frac{1}{(z-3)^2}\right\}, |z| > 3$.

Q.4 Solve any two of the following questions. 10

- a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f $E = E_0 \cos wt$, so that the charge Q satisfies the diff. equation

$$\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_0}{L} \cos wt.$$

If $W^2 = \frac{1}{CL}$ and initially $Q = Q_0$ at $t = 0$ and the current $i = i_0$ at $t = 0$

Find the charge Q at time t

- b) Find the Fourier series of

$$f(x) = x, \quad -1 < x < 0$$

$$= x + 2, \quad 0 < x < 1$$

- c) Find $Z^{-1}\left\{\frac{z}{(z-2)(z-3)}\right\}, |z| > 3$

Section – II

Q.5 Solve any three of the following questions.

09

a) Find $L[e^{-2t}\sqrt{1+\sin 4t}]$

b) Solve the system of equation by using Gauss- Elimination method

$$x + 4y - z = -5, \quad x + y - 6z = -12, \quad -3x - y - z = 4$$

c) Given x series y series

Mean 18 100

S.D. 14 20

Coefficient of correlation between x and y is 0.8. Find the equation of line of regression of x on y . Also find out the most probable value of x if y is 90.d) A random variable x has the following probability distribution.

x	1	2	3	4	6	6	7
$P(x)$	k	$2k$	$3k$	k^2	$k^2 + k$	$2k^2$	$4k^2$

e) Find the coefficient of correlation (Karl Pearson's) from the following data.

x	28	45	40	38	35	33	40	32	36	33
y	23	34	33	34	30	26	28	31	36	35

Q.6 Solve any three of the following questions.

09

a) A firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a poisson variate with mean 1.5.

Calculate the probable number of days in a year on which

1) neither car is in demand

2) a demand is refused

b) Find by Newton's method, the real root of the equation $3x = \cos x + 1$ correct to the four decimal places.

c) Solve the following system of linear equations by Gauss Seidal method.

$$28x + 4y - z = 32$$

$$x + 3y + 10z = 24$$

$$2x + 17y + 4z = 35 \text{ (perform 3 iterations)}$$

d) Find $L^{-1} \left[\frac{2s+3}{s^2+2s+2} \right]$

e) Find Laplace transform of $\frac{d}{dt} \left(\frac{\sin t}{t} \right)$

Q.7 Solve any two of the following questions.

10

a) Find the Laplace transform of

$$f(t) = \frac{t}{a} \quad 0 < t \leq a$$

$$= \frac{1}{a}(2a - t) \quad a \leq t < 2a \text{ and } f(t) = f(t + 2a)$$

b) Seven coins are tossed at a time 256 times. Number of heads obtained in each toss are recorded below. Fit a binomial distribution under the hypothesis that the coins are unbiased.

No of heads	0	1	2	3	4	5	6	7
Frequency	14	12	38	70	60	46	14	2

c) Solve the following system of equations by Gauss- Jacobi's method. (Perform 4 iterations)

$$8x - 3y + 2z = 20$$

$$4x + 11y - z = 33$$

$$6x + 3y + 12z = 35$$

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 4) Use of non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- For a binomial distribution the mean is 12 and the variance is 4 the n, p, q are _____.
 a) $18, \frac{2}{3}, \frac{1}{3}$
 b) $16, \frac{1}{3}, \frac{2}{3}$
 c) $18, \frac{1}{3}, \frac{2}{3}$
 d) None
- If $byx = \frac{5}{18}$, $bxxy = \frac{8}{5}$ then $r =$ _____.
 a) $2/5$
 b) $1/2$
 c) $2/3$
 d) $3/2$
- Gauss Seidal method converges only if the coefficient matrix A of the system of simultaneous equation $AX = B$ is _____.
 a) Diagonally dominant
 b) Upper triangular
 c) Singular
 d) Non Singular matrix
- The positive real root of the equation $x^3 - x - 11 = 0$ lies between _____.
 a) 0 and 1
 b) 2 and 3
 c) 1 and 2
 d) 3 and 4
- If $L\{y(t)\} = \bar{y}(s)$ then $L\left[\frac{d^2y}{dt^2}\right] =$ _____.
 a) $s \bar{y}(s) - y(0)$
 b) $s^2 \bar{y}(s) + sy(0) + y'(0)$
 c) $s^2 \bar{y}(s) - sy'(0) - y''(0)$
 d) $s^2 \bar{y}(s) - sy(0) - y'(0)$
- The general solution of $(D^3 - 2D^2 + D)y = 0$ is _____.
 a) $y = C_1 + (C_2 + C_3x)e^{-x}$
 b) $y = (C_1 + C_2x)e^{-x}$
 c) $y = c_1 + c_2e^x + c_3e^x$
 d) $y = c_1 + (c_2 + c_3x)e^x$
- The Particular Integral of $(D^2 + 9)y = \cos 3x$ is _____.
 a) $\frac{1}{18} \cos 3x$
 b) $\frac{x}{6} \sin 3x$
 c) $\frac{1}{6} \sin 3x$
 d) $\frac{x}{6} \cos 3x$
- $\frac{1}{D+M} X =$ _____.
 a) $e^{mx} \int e^{-mx} X dx$
 b) $e^{-mx} \int e^{mx} X dx$
 c) $\int X e^{mx} dx$
 d) $\int X e^{-mx} dx$

- 9) The value of the Fourier coefficient a_0 of the function $f(x) = x^2$ in $(-\pi, \pi)$ is _____.
- | | |
|----------------------|----------------------|
| a) $\frac{\pi^2}{3}$ | b) $\frac{\pi^3}{3}$ |
| c) $\frac{\pi^2}{2}$ | d) 0 |
- 10) Which of the following functions cannot be expanded as fourier series in the interval $(-\pi, \pi)$
- | | |
|-----------------------------|-------------|
| a) x^3 | b) $ x $ |
| c) $\operatorname{cosec} x$ | d) e^{-x} |
- 11) If $z\{f(k)\} = F(z)$, then $z\{k f(k)\} =$ _____.
- | | |
|--------------------------|-------------------------|
| a) $\frac{dF(z)}{dz}$ | b) $\frac{-dF(z)}{dz}$ |
| c) $-\frac{z dF(z)}{dz}$ | d) $\frac{z dF(z)}{dz}$ |
- 12) $Z\{1\} =$ _____.
- | | |
|--------------------|--------------------|
| a) $\frac{1}{z-1}$ | b) $\frac{1}{z+1}$ |
| c) $\frac{z}{z+1}$ | d) $\frac{z}{z-1}$ |
- 13) $L^{-1}\left[\frac{1}{(s-3)^2+16}\right] =$ _____.
- | | |
|-------------------------------|--------------------------------|
| a) $\frac{e^{3t}}{4} \sin 4t$ | b) $\frac{e^{-3t}}{4} \sin 4t$ |
| c) $e^{3t} \cos 4t$ | d) $e^{-3t} \cos 4t$ |
- 14) $L\{\delta(t-3)\} =$ _____.
- | | |
|-----------------------|------------------------|
| a) e^{3s} | b) $\frac{e^{-3s}}{s}$ |
| c) $\frac{e^{3s}}{s}$ | d) e^{-3s} |

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 4) Use of calculator is allowed.

Section – I

Q.2 Solve any three of the following questions. 09

- a) Solve $(D^2 + 4D + 4)y = e^{3x} + \cos 5x$
 b) Solve $(D^2 + 1)y = \sin x \sin 2x$
 c) Find the Fourier series of $f(x) = 1 - x^2$ in the interval $(-1, 1)$.
 d) Find the half – range sine service of

$$f(x) = \frac{2x}{3}, 0 \leq x \leq \frac{\pi}{3}$$

$$= \frac{\pi-x}{3}, \frac{\pi}{3} \leq x \leq \pi$$

 e) Find $Z\{K 5^k\}, k \geq 0$

Q.3 Solve any three of the following questions. 09

- a) Solve $(D^3 + 3D)y = \cosh 2x$.
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Q.4 Solve any two of the following questions. 10

- a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f $E = E_o \cos wt$, so that the charge Q satisfies the diff. equation

$$\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L} \cos wt.$$

 If $W^2 = \frac{1}{CL}$ and initially $Q = Q_o$ at $t = 0$ and the current $i = i_o$ at $t = 0$
 Find the charge Q at time t
 b) Find the Fourier series of

$$f(x) = x, \quad -1 < x < 0$$

$$= x + 2, \quad 0 < x < 1$$

 c) Find $Z^{-1}\left\{\frac{z}{(z-2)(z-3)}\right\}, |z| > 3$

Section – II

Q.5 Solve any three of the following questions.

09

a) Find $L[e^{-2t}\sqrt{1+\sin 4t}]$

b) Solve the system of equation by using Gauss- Elimination method

$$x + 4y - z = -5, \quad x + y - 6z = -12, \quad -3x - y - z = 4$$

c) Given x series y series

Mean 18 100

S.D. 14 20

Coefficient of correlation between x and y is 0.8. Find the equation of line of regression of x on y . Also find out the most probable value of x if y is 90.d) A random variable x has the following probability distribution.

x	1	2	3	4	6	6	7
$P(x)$	k	$2k$	$3k$	k^2	$k^2 + k$	$2k^2$	$4k^2$

e) Find the coefficient of correlation (Karl Pearson's) from the following data.

x	28	45	40	38	35	33	40	32	36	33
y	23	34	33	34	30	26	28	31	36	35

Q.6 Solve any three of the following questions.

09

a) A firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a poisson variate with mean 1.5.

Calculate the probable number of days in a year on which

1) neither car is in demand

2) a demand is refused

b) Find by Newton's method, the real root of the equation $3x = \cos x + 1$ correct to the four decimal places.

c) Solve the following system of linear equations by Gauss Seidal method.

$$28x + 4y - z = 32$$

$$x + 3y + 10z = 24$$

$$2x + 17y + 4z = 35 \text{ (perform 3 iterations)}$$

d) Find $L^{-1} \left[\frac{2s+3}{s^2+2s+2} \right]$

e) Find Laplace transform of $\frac{d}{dt} \left(\frac{\sin t}{t} \right)$

Q.7 Solve any two of the following questions.

10

a) Find the Laplace transform of

$$f(t) = \frac{t}{a} \quad 0 < t \leq a$$

$$= \frac{1}{a}(2a - t) \quad a \leq t < 2a \text{ and } f(t) = f(t + 2a)$$

b) Seven coins are tossed at a time 256 times. Number of heads obtained in each toss are recorded below. Fit a binomial distribution under the hypothesis that the coins are unbiased.

No of heads	0	1	2	3	4	5	6	7
Frequency	14	12	38	70	60	46	14	2

c) Solve the following system of equations by Gauss- Jacobi's method. (Perform 4 iterations)

$$8x - 3y + 2z = 20$$

$$4x + 11y - z = 33$$

$$6x + 3y + 12z = 35$$

- 7) The CE amplifier circuit are preferred over CB amplifier circuit because they have _____.
a) lower amplification factor
b) larger amplification factor
c) high input resistance and low output resistance
d) none of these
- 8) Input impedance of JFET amplifier is _____.
a) Very low
b) Same as transistor
c) Very High
d) Both a & b
- 9) The region in which JFET works as an amplifier is called as _____.
a) pinchoff region
b) ohmic region
c) cutoff region
d) both b & c
- 10) The FET configuration used in the unity gain buffers is _____.
a) Common Gate
b) Common Drain
c) Common Source
d) All above
- 11) The negative feedback in amplifier _____.
a) increases voltage gain
b) decreases voltage gain
c) stabilizes the voltage gain
d) both b & c
- 12) An emitter follower is widely used circuit because _____.
a) its voltage gain in very high
b) its voltage gain is "1"
c) its input impedance is high and output impedance is low
d) it employs no bypass capacitor
- 13) A feedback circuit usually employs _____ network.
a) Resistive
b) Capacitive
c) Inductive
d) None of the above
- 14) The frequency response of transistor coupling is _____.
a) Good
b) very good
c) Excellent
d) Bad

Seat
No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019

Electronics Engineering

ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019

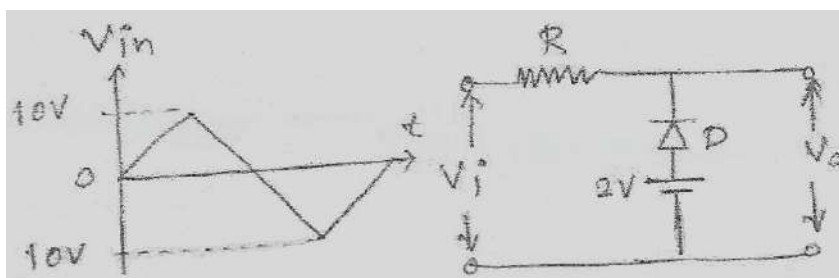
Max. Marks: 56

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) All questions are compulsory.
 2) Assume suitable data if required
 3) Figures to the right indicate full marks.

Section – I**Q.2 Attempt any four of the following question.****16**

- List different applications of diode. Draw circuit diagram of full wave voltage doubler and example its working in detail.
- Draw circuit diagram of LC filter with FWR and example its functioning in detail.
- Determine output of following clipper circuit and draw output waveform. Assume ideal diode in circuit.



- Describe Early effect in case of BJT in detail.
- What is necessity of biasing in transistor? Example different working regions of transistor.

Q.3 Attempt any two of the following question.**12**

- Draw diagram of FWR capacitor filter and derive an expression of ripple factor for the same.
- Why clampers are necessary? Describe working of positive and negative clampers with suitable example in detail.
- Define h-parameters for 2 port network. Draw equivalent hybrid circuit for CB, CE, and CC configuration. Define h-parameters for each configuration.

Section – II**Q.4 Attempt any four of the following question.****16**

- Describe BJT application as a switch.
- What is the need of multistage amplifiers? List different type of amplifier coupling. Describe any one in brief.
- Draw block diagram of amplifier with negative feedback network and derive generalized expression of its voltage gain with feedback. List few benefits of negative feedback.
- Define the terms drain resistance, trans-conductance, amplification factor related to JFET. What is the relation between them?
- Compare between FET and BJT.

Q.5 Attempt any two of the following questions.

- a)** A potential divider biasing circuit uses Ge transistor. The Q-point is $I_{CQ} = 2\text{mA}$, $V_{ECQ} = 4\text{V}$. If $R_c = 2\text{K}$, $V_{CC} = 10\text{V}$, $\beta = 50$, determine values of R_1 , R_2 and R_E . Assume current in R_1 is 10 times the current in base ($I_1 = 10I_B$)
- b)** Draw circuit diagram of emitter follower, What kind of feedback is used in the emitter follower? Find expression of feedback factor, current gain, input impedance with feedback voltage gain for the same.
- c)** Explain construction and working of depletion type MOSFET.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Input impedance of JFET amplifier is _____.
 - a) Very low
 - b) Same as transistor
 - c) Very High
 - d) Both a & b
- 2) The region in which JFET works as an amplifier is called as _____.
 - a) pinchoff region
 - b) ohmic region
 - c) cutoff region
 - d) both b & c
- 3) The FET configuration used in the unity gain buffers is _____.
 - a) Common Gate
 - b) Common Drain
 - c) Common Source
 - d) All above
- 4) The negative feedback in amplifier _____.
 - a) increases voltage gain
 - b) decreases voltage gain
 - c) stabilizes the voltage gain
 - d) both b & c
- 5) An emitter follower is widely used circuit because _____.
 - a) its voltage gain is very high
 - b) its voltage gain is "1"
 - c) its input impedance is high and output impedance is low
 - d) it employs no bypass capacitor
- 6) A feedback circuit usually employs _____ network.
 - a) Resistive
 - b) Capacitive
 - c) Inductive
 - d) None of the above
- 7) The frequency response of transistor coupling is _____.
 - a) Good
 - b) very good
 - c) Excellent
 - d) Bad
- 8) If the line frequency is 50 Hz, the output frequency of bridge rectifier is _____.
 - a) 25 Hz
 - b) 50 Hz
 - c) 100 Hz
 - d) 200 Hz

- 9) The basic purpose of filter is to _____.
- a) minimize variations in ac input signal
 - b) suppress harmonics in rectified output
 - c) remove ripples from the rectified output
 - d) stabilize dc output voltage
- 10) A half wave rectifier is equivalent to _____.
- a) clamper circuit
 - b) a clipper circuit
 - c) a clamper circuit with negative bias
 - d) a clamper circuit with positive bias
- 11) In a LC filter, the ripple factor _____.
- a) increases with the load current
 - b) increases with the load resistance
 - c) remains constant with the load current
 - d) has the lowest value
- 12) Early effect in BJT refers to _____.
- a) avalanche breakdown
 - b) thermal breakdown
 - c) base narrowing
 - d) zener breakdown
- 13) In CE configuration the output V-I characteristics are drawn by taking _____.
- a) VCE vs. IC for constant value of IE
 - b) VCE vs. IC for constant value of IB
 - c) VCE vs. IC for constant value of VCB
 - d) None of these
- 14) The CE amplifier circuit are preferred over CB amplifier circuit because they have _____.
- a) lower amplification factor
 - b) larger amplification factor
 - c) high input resistance and low output resistance
 - d) none of these

Seat
No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

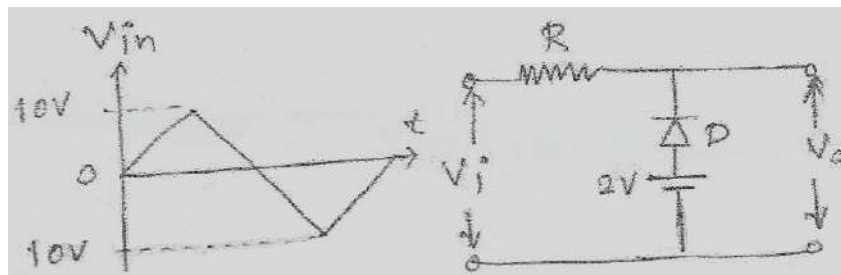
Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
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Section – I

Q.2 Attempt any four of the following question. 16

- List different applications of diode. Draw circuit diagram of full wave voltage doubler and example its working in detail.
- Draw circuit diagram of LC filter with FWR and example its functioning in detail.
- Determine output of following clipper circuit and draw output waveform. Assume ideal diode in circuit.



- Describe Early effect in case of BJT in detail.
- What is necessity of biasing in transistor? Example different working regions of transistor.

Q.3 Attempt any two of the following question. 12

- Draw diagram of FWR capacitor filter and derive an expression of ripple factor for the same.
- Why clampers are necessary? Describe working of positive and negative clampers with suitable example in detail.
- Define h-parameters for 2 port network. Draw equivalent hybrid circuit for CB, CE, and CC configuration. Define h-parameters for each configuration.

Section – II

Q.4 Attempt any four of the following question. 16

- Describe BJT application as a switch.
- What is the need of multistage amplifiers? List different type of amplifier coupling. Describe any one in brief.
- Draw block diagram of amplifier with negative feedback network and derive generalized expression of its voltage gain with feedback. List few benefits of negative feedback.
- Define the terms drain resistance, trans-conductance, amplification factor related to JFET. What is the relation between them?
- Compare between FET and BJT.

Q.5 Attempt any two of the following questions.

- a) A potential divider biasing circuit uses Ge transistor. The Q-point is $I_{CQ} = 2\text{mA}$, $V_{ECQ} = 4\text{V}$. If $R_c = 2\text{K}$, $V_{CC} = 10\text{V}$, $\beta = 50$, determine values of R_1 , R_2 and R_E . Assume current in R_1 is 10 times the current in base ($I_1 = 10I_B$)
- b) Draw circuit diagram of emitter follower, What kind of feedback is used in the emitter follower? Find expression of feedback factor, current gain, input impedance with feedback voltage gain for the same.
- c) Explain construction and working of depletion type MOSFET.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Early effect in BJT refers to _____.
 - a) avalanche breakdown
 - b) thermal breakdown
 - c) base narrowing
 - d) zener breakdown
- 2) In CE configuration the output V-I characteristics are drawn by taking _____.
 - a) VCE vs. IC for constant value of IE
 - b) VCE vs. IC for constant value of IB
 - c) VCE vs. IC for constant value of VCB
 - d) None of these
- 3) The CE amplifier circuit are preferred over CB amplifier circuit because they have _____.
 - a) lower amplification factor
 - b) larger amplification factor
 - c) high input resistance and low output resistance
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- 4) Input impedance of JFET amplifier is _____.
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 - a) pinchoff region
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 - d) both b & c
- 6) The FET configuration used in the unity gain buffers is _____.
 - a) Common Gate
 - b) Common Drain
 - c) Common Source
 - d) All above
- 7) The negative feedback in amplifier _____.
 - a) increases voltage gain
 - b) decreases voltage gain
 - c) stabilizes the voltage gain
 - d) both b & c
- 8) An emitter follower is widely used circuit because _____.
 - a) its voltage gain is very high
 - b) its voltage gain is "1"
 - c) its input impedance is high and output impedance is low
 - d) it employs no bypass capacitor

- 9) A feedback circuit usually employs _____ network.
- a) Resistive
 - b) Capacitive
 - c) Inductive
 - d) None of the above
- 10) The frequency response of transistor coupling is _____
- a) Good
 - b) very good
 - c) Excellent
 - d) Bad
- 11) If the line frequency is 50 Hz, the output frequency of bridge rectifier is _____.
- a) 25 Hz
 - b) 50 Hz
 - c) 100 Hz
 - d) 200 Hz
- 12) The basic purpose of filter is to _____.
- a) minimize variations in ac input signal
 - b) suppress harmonics in rectified output
 - c) remove ripples from the rectified output
 - d) stabilize dc output voltage
- 13) A half wave rectifier is equivalent to _____.
- a) clamper circuit
 - b) a clipper circuit
 - c) a clamper circuit with negative bias
 - d) a clamper circuit with positive bias
- 14) In a LC filter, the ripple factor _____.
- a) increases with the load current
 - b) increases with the load resistance
 - c) remains constant with the load current
 - d) has the lowest value

Seat
No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019

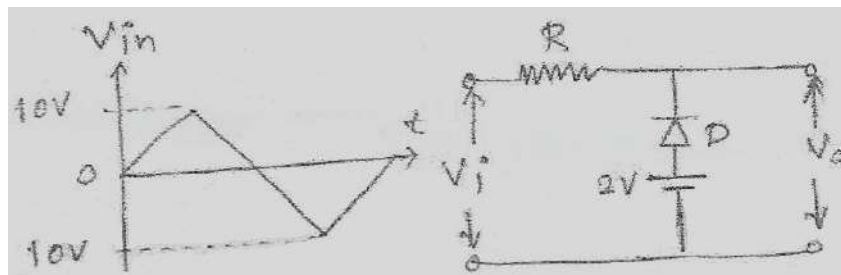
Max. Marks: 56

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) All questions are compulsory.
 2) Assume suitable data if required
 3) Figures to the right indicate full marks.

Section – I**Q.2 Attempt any four of the following question.****16**

- List different applications of diode. Draw circuit diagram of full wave voltage doubler and example its working in detail.
- Draw circuit diagram of LC filter with FWR and example its functioning in detail.
- Determine output of following clipper circuit and draw output waveform. Assume ideal diode in circuit.



- Describe Early effect in case of BJT in detail.
- What is necessity of biasing in transistor? Example different working regions of transistor.

Q.3 Attempt any two of the following question.**12**

- Draw diagram of FWR capacitor filter and derive an expression of ripple factor for the same.
- Why clampers are necessary? Describe working of positive and negative clampers with suitable example in detail.
- Define h-parameters for 2 port network. Draw equivalent hybrid circuit for CB, CE, and CC configuration. Define h-parameters for each configuration.

Section – II**Q.4 Attempt any four of the following question.****16**

- Describe BJT application as a switch.
- What is the need of multistage amplifiers? List different type of amplifier coupling. Describe any one in brief.
- Draw block diagram of amplifier with negative feedback network and derive generalized expression of its voltage gain with feedback. List few benefits of negative feedback.
- Define the terms drain resistance, trans-conductance, amplification factor related to JFET. What is the relation between them?
- Compare between FET and BJT.

Q.5 Attempt any two of the following questions.

- a)** A potential divider biasing circuit uses Ge transistor. The Q-point is $I_{CQ} = 2\text{mA}$, $V_{ECQ} = 4\text{V}$. If $R_c = 2\text{K}$, $V_{CC} = 10\text{V}$, $\beta = 50$, determine values of R_1 , R_2 and R_E . Assume current in R_1 is 10 times the current in base ($I_1 = 10I_B$)
- b)** Draw circuit diagram of emitter follower, What kind of feedback is used in the emitter follower? Find expression of feedback factor, current gain, input impedance with feedback voltage gain for the same.
- c)** Explain construction and working of depletion type MOSFET.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday,10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary and state it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The FET configuration used in the unity gain buffers is _____.
 - a) Common Gate
 - b) Common Drain
 - c) Common Source
 - d) All above
- 2) The negative feedback in amplifier _____.
 - a) increases voltage gain
 - b) decreases voltage gain
 - c) stabilizes the voltage gain
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- 3) An emitter follower is widely used circuit because _____.
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- 4) A feedback circuit usually employs _____ network.
 - a) Resistive
 - b) Capacitive
 - c) Inductive
 - d) None of the above
- 5) The frequency response of transistor coupling is _____.
 - a) Good
 - b) very good
 - c) Excellent
 - d) Bad
- 6) If the line frequency is 50 Hz, the output frequency of bridge rectifier is _____.
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 - a) clamper circuit
 - b) a clipper circuit
 - c) a clamper circuit with negative bias
 - d) a clamper circuit with positive bias

- 9) In a LC filter, the ripple factor _____.
- a) increases with the load current
 - b) increases with the load resistance
 - c) remains constant with the load current
 - d) has the lowest value
- 10) Early effect in BJT refers to _____.
- a) avalanche breakdown
 - b) thermal breakdown
 - c) base narrowing
 - d) zener breakdown
- 11) In CE configuration the output V-I characteristics are drawn by taking _____.
- a) VCE vs. IC for constant value of IE
 - b) VCE vs. IC for constant value of IB
 - c) VCE vs. IC for constant value of VCB
 - d) None of these
- 12) The CE amplifier circuit are preferred over CB amplifier circuit because they have _____.
- a) lower amplification factor
 - b) larger amplification factor
 - c) high input resistance and low output resistance
 - d) none of these
- 13) Input impedance of JFET amplifier is _____.
- a) Very low
 - b) Same as transistor
 - c) Very High
 - d) Both a & b
- 14) The region in which JFET works as an amplifier is called as _____.
- a) pinchoff region
 - b) ohmic region
 - c) cutoff region
 - d) both b & c

Seat
No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

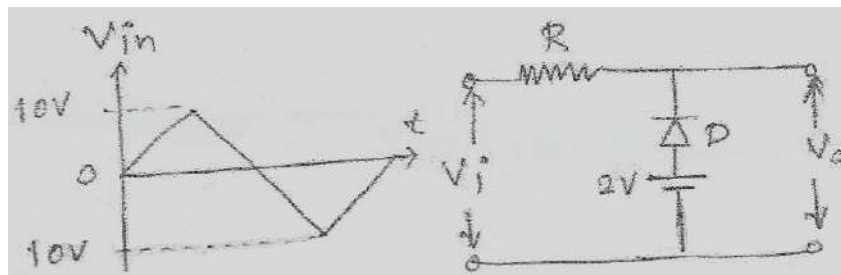
Max. Marks: 56

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Section – I

Q.2 Attempt any four of the following question. 16

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- Draw circuit diagram of LC filter with FWR and example its functioning in detail.
- Determine output of following clipper circuit and draw output waveform. Assume ideal diode in circuit.



- Describe Early effect in case of BJT in detail.
- What is necessity of biasing in transistor? Example different working regions of transistor.

Q.3 Attempt any two of the following question. 12

- Draw diagram of FWR capacitor filter and derive an expression of ripple factor for the same.
- Why clampers are necessary? Describe working of positive and negative clampers with suitable example in detail.
- Define h-parameters for 2 port network. Draw equivalent hybrid circuit for CB, CE, and CC configuration. Define h-parameters for each configuration.

Section – II

Q.4 Attempt any four of the following question. 16

- Describe BJT application as a switch.
- What is the need of multistage amplifiers? List different type of amplifier coupling. Describe any one in brief.
- Draw block diagram of amplifier with negative feedback network and derive generalized expression of its voltage gain with feedback. List few benefits of negative feedback.
- Define the terms drain resistance, trans-conductance, amplification factor related to JFET. What is the relation between them?
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- a)** A potential divider biasing circuit uses Ge transistor. The Q-point is $I_{CQ} = 2\text{mA}$, $V_{ECQ} = 4\text{V}$. If $R_c = 2\text{K}$, $V_{CC} = 10\text{V}$, $\beta = 50$, determine values of R_1 , R_2 and R_E . Assume current in R_1 is 10 times the current in base ($I_1 = 10I_B$)
- b)** Draw circuit diagram of emitter follower, What kind of feedback is used in the emitter follower? Find expression of feedback factor, current gain, input impedance with feedback voltage gain for the same.
- c)** Explain construction and working of depletion type MOSFET.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if required.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Mesh Analysis is based on _____.
 a) Kirchhoff's Voltage Law b) Kirchhoff's Current Law
 c) Circuit condition d) None
- 2) If $Z_{11}=2$ ohm, $Z_{12}=1$ ohm and $Z_{21} = 1$ ohm and $Z_{22}=3$ ohm, what is the determinant of matrix?
 a) 1 b) 1/5
 c) 5 d) 2
- 3) When two port networks are connected in series the resultant ____?
 a) Z parameters are a sum of individual parameters
 b) Y parameters are a sum of individual parameters
 c) h parameters are a sum of individual parameters
 d) ABCD parameters are a sum of individual parameters
- 4) Example of a two port network is _____.
 a) Transformer
 b) transmission line
 c) bridge circuit and transistor circuit
 d) all of the above
- 5) If a series circuit RLC circuit, the quality factor is defined as _____.
 a) C b) ωRC
 c) ωC d) $1/\omega RC$
- 6) In the parallel RLC circuit the impedance at resonance is _____.
 a) Maximum b) Minimum
 c) Zero d) Infinity
- 7) Norton's equivalent circuit consists of _____.
 a) Voltage Source in parallel with resistance
 b) Voltage Source in series with resistance
 c) Current Source in parallel with resistance
 d) Current Source in series with resistance
- 8) The system is said to be stable if and only if _____.
 a) All the poles lie on right half of the s-plane
 b) Some of the poles lie on right half of the s-plane
 c) All the poles lie on the left half of the s-plane
 d) None

- 9) For driving point function $N(s)=P(s)/Q(s)$, coefficients of $P(s)$ and $Q(s)$ must be _____.
- a) real and positive b) Complex
c) real and negative d) none of these
- 10) In the M derived low pass filter the resonant frequency is to be chosen so that it is _____.
- a) Below cut off frequency b) Above cut off frequency
c) Equal to cut off frequency d) None of these
- 11) A Low pass filter is one which _____.
- a) Passes all low frequencies
b) Attenuates all high frequencies
c) Passes all low frequencies up to cut-off frequencies and attenuates all other frequencies
d) None
- 12) Transient behavior occurs in any circuit when _____.
- a) there is sudden change in applied voltage
b) the voltage source is suddenly shorted
c) the circuit is connected or disconnected from supply
d) all of the above
- 13) When a series RC circuit is connected to a constant voltage at $t=0$, the current passing through the circuit is at $t=0^+$ is _____.
- a) Infinite b) Zero
c) $\frac{V}{R}$ d) $\frac{V}{\omega C}$
- 14) The function is said to be having simple poles and zeros only if _____.
- a) The poles are not repeated
b) The zeros are not repeated
c) The poles and zeros are not repeated
d) None of the above

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

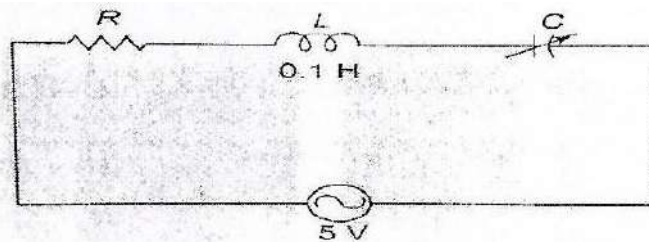
Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 4) Assume suitable data if required.

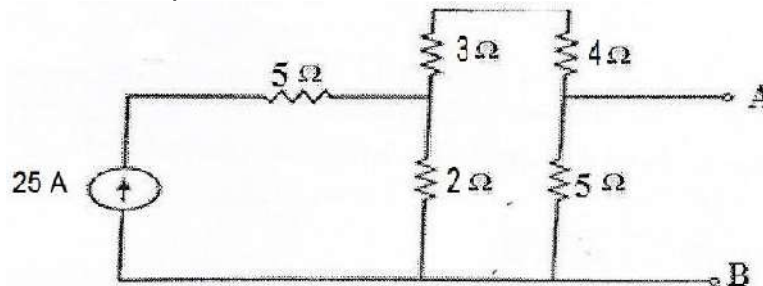
Section – I

Q.2 Attempt any four.

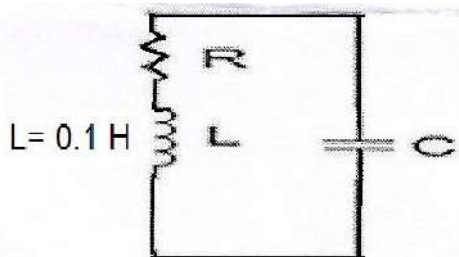
- a) In the circuit shown above a maximum current of 0.1 A flows through the circuit when capacitor is at $5\mu\text{F}$ with fixed frequency and voltage of 5V. Determine frequency at which the circuit resonates, bandwidth, quality factor and resistance R. **16**



- b) State and prove Maximum power transfer theorem.
 c) Determine Norton's equivalent circuit for above circuit.



- d) Express Z parameters in terms of Y parameter.
 e) For above circuit an inductance of 0.1H having quality factor of 5 is in parallel with capacitor. Determine value of C and coil resistance at resonant frequency 500 rad/sec.

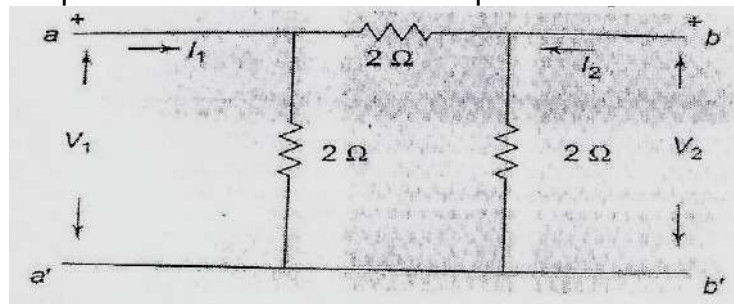


Q.3 Attempt any two.

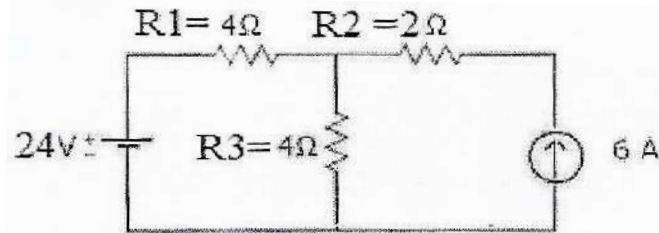
- a) Prove that bandwidth of series RLC circuit is $BW = \frac{R}{2\pi L}$ and $Q = \frac{f_r}{BW}$.

12

- b) Find the ABCD parameters of the above two port network.



- c) Find current in various branches using superposition theorem

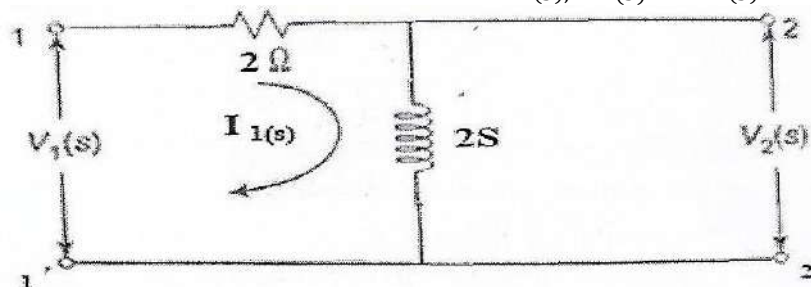


Section – II

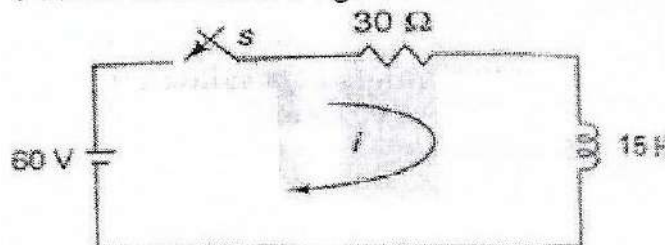
Q.4 Attempt any four.

16

- Prove that cut off frequency for constant K low pass filter is $F_c = \frac{1}{\pi\sqrt{LC}}$
- Design a T pad attenuator to give an attenuation of 60dB & to work in line of 500Ω impedance.
- Check stability of following polynomial by applying Routh criteria
 $Q(S) = S^3 + S^2 + 3S + 8$
- For above network obtain transfer function $G_{21}(s), Z_{21}(s)$ & $Z_{11}(s)$



- e) A series RL circuit with $R = 30 \Omega$ & $L = 15H$ has constant voltage of $V=60V$ applied at $t=0$ as shown in above figure. Find Current I & Voltage across R & L .



Q.5 Attempt any two.

12

- Derive an expression of current, V_R & V_C for dc response of series RC circuit.
- Draw the pole-zero plot for the given network function and hence obtain $V(t)$.

$$V(s) = \frac{4s(s+2)}{(s+1)(s+3)}$$

- Design an M derived T section & π section high pass filter having cutoff frequency of 5KHz with design impedance of 600Ω and $m= 0.35$. Find also frequency of infinite attenuation.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The system is said to be stable if and only if _____.
 - a) All the poles lie on right half of the s -plane
 - b) Some of the poles lie on right half of the s -plane
 - c) All the poles lie on the left half of the s -plane
 - d) None
- 2) For driving point function $N(s)=P(s)/Q(s)$, coefficients of $P(s)$ and $Q(s)$ must be _____.
 - a) real and positive
 - b) Complex
 - c) real and negative
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- 3) In the M derived low pass filter the resonant frequency is to be chosen so that it is _____.
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 - b) Above cut off frequency
 - c) Equal to cut off frequency
 - d) None of these
- 4) A Low pass filter is one which _____.
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 - b) Attenuates all high frequencies
 - c) Passes all low frequencies up to cut-off frequencies and attenuates all other frequencies
 - d) None
- 5) Transient behavior occurs in any circuit when _____.
 - a) there is sudden change in applied voltage
 - b) the voltage source is suddenly shorted
 - c) the circuit is connected or disconnected from supply
 - d) all of the above
- 6) When a series RC circuit is connected to a constant voltage at $t=0$, the current passing through the circuit is at $t=0^+$ is _____.
 - a) Infinite
 - b) Zero
 - c) $\frac{V}{R}$
 - d) $\frac{V}{\omega C}$

- 7) The function is said to be having simple poles and zeros only if _____.
a) The poles are not repeated
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c) The poles and zeros are not repeated
d) None of the above
- 8) Mesh Analysis is based on _____.
a) Kirchhoff's Voltage Law b) Kirchhoff's Current Law
c) Circuit condition d) None
- 9) If $Z_{11}=2$ ohm, $Z_{12}=1$ ohm and $Z_{21} = 1$ ohm and $Z_{22}=3$ ohm, what is the determinant of matrix?
a) 1 b) 1/5
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- 10) When two port networks are connected in series the resultant _____?
a) Z parameters are a sum of individual parameters
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- 11) Example of a two port network is _____.
a) Transformer
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- 14) Norton's equivalent circuit consists of _____.
a) Voltage Source in parallel with resistance
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c) Current Source in parallel with resistance
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Seat No.	
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Set	Q
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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
NETWORK THEORY AND ANALYSIS**

Day & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

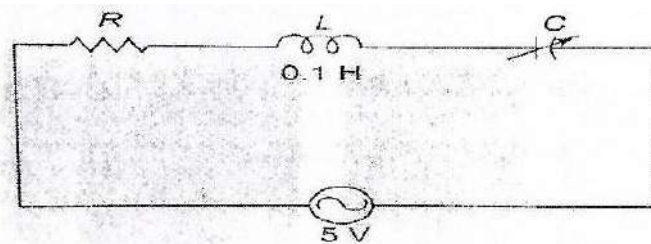
Max. Marks: 56

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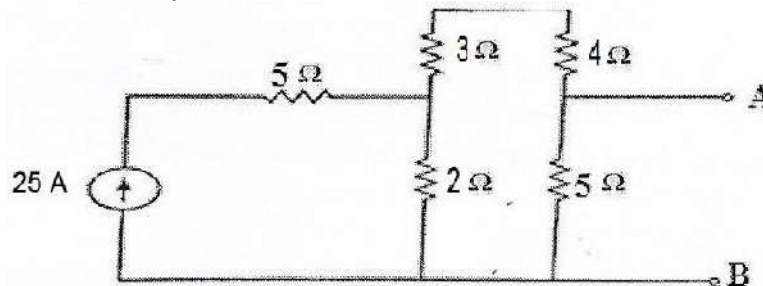
Section – I

Q.2 Attempt any four.

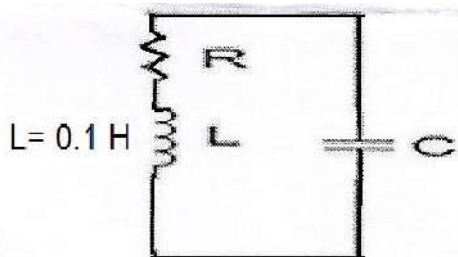
- a) In the circuit shown above a maximum current of 0.1 A flows through the circuit when capacitor is at $5\mu\text{F}$ with fixed frequency and voltage of 5V. Determine frequency at which the circuit resonates, bandwidth, quality factor and resistance R. **16**



- b) State and prove Maximum power transfer theorem.
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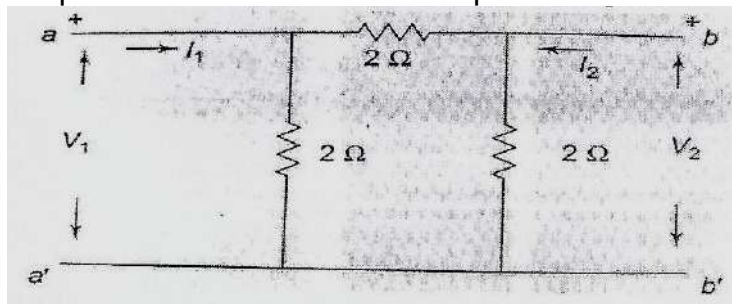


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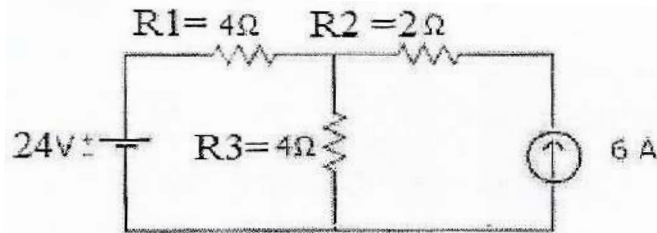
- a) Prove that bandwidth of series RLC circuit is $BW = \frac{R}{2\pi L}$ and $Q = \frac{f_r}{BW}$.

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- b) Find the ABCD parameters of the above two port network.



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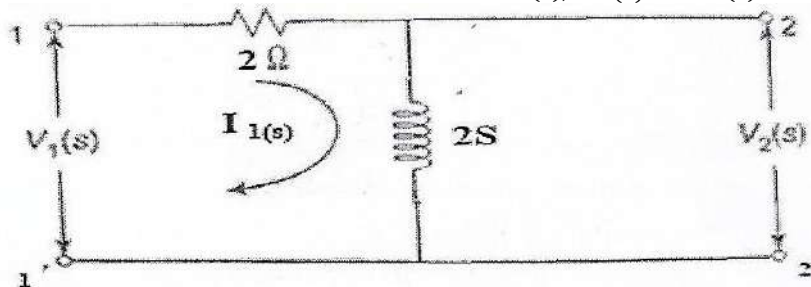


Section – II

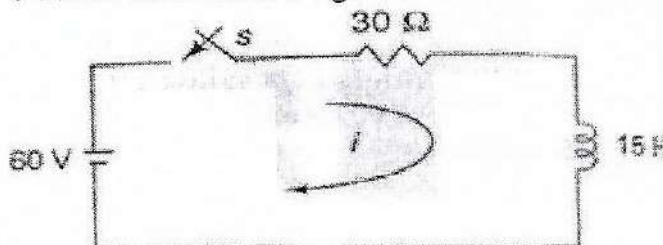
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c) 5
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c) bridge circuit and transistor circuit
d) all of the above

Seat No.	
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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
 Electronics Engineering
 NETWORK THEORY AND ANALYSIS**

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

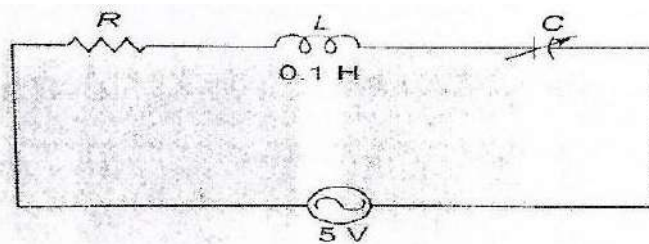
Max. Marks: 56

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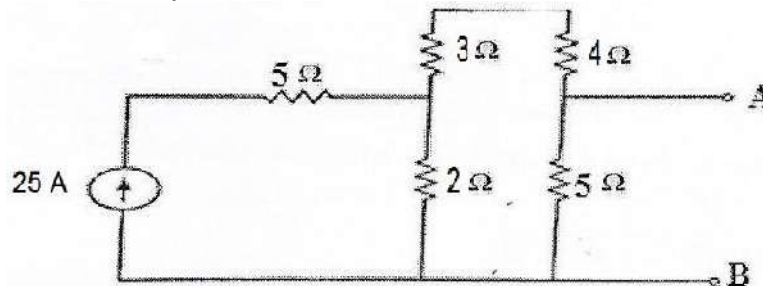
Section – I

Q.2 Attempt any four.

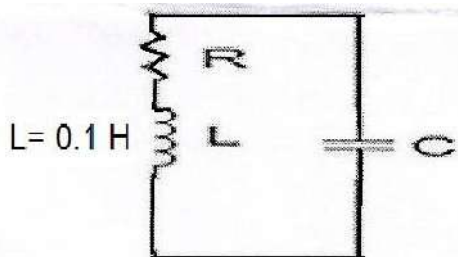
- a) In the circuit shown above a maximum current of 0.1 A flows through the circuit when capacitor is at $5\mu\text{F}$ with fixed frequency and voltage of 5V. Determine frequency at which the circuit resonates, bandwidth, quality factor and resistance R. **16**



- b) State and prove Maximum power transfer theorem.
 c) Determine Norton's equivalent circuit for above circuit.



- d) Express Z parameters in terms of Y parameter.
 e) For above circuit an inductance of 0.1H having quality factor of 5 is in parallel with capacitor. Determine value of C and coil resistance at resonant frequency 500 rad/sec.

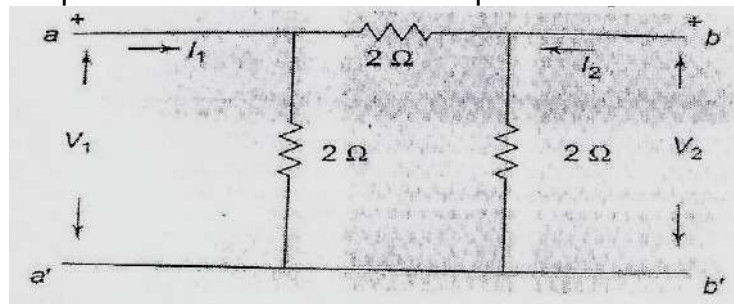


Q.3 Attempt any two.

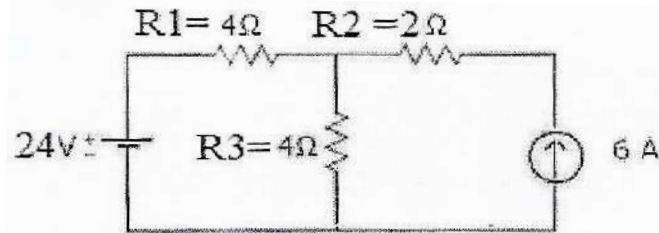
- a) Prove that bandwidth of series RLC circuit is $BW = \frac{R}{2\pi L}$ and $Q = \frac{f_r}{BW}$.

12

- b) Find the ABCD parameters of the above two port network.



- c) Find current in various branches using superposition theorem

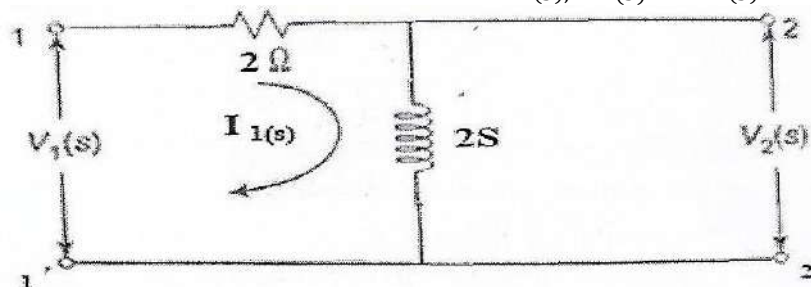


Section – II

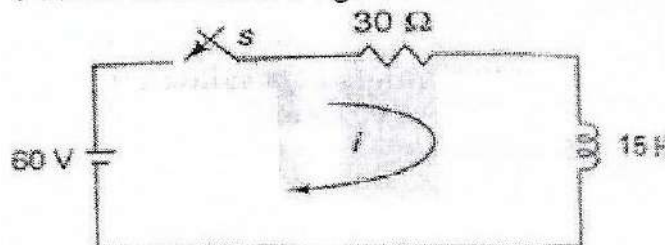
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- Prove that cut off frequency for constant K low pass filter is $F_c = \frac{1}{\pi\sqrt{LC}}$
- Design a T pad attenuator to give an attenuation of 60dB & to work in line of 500Ω impedance.
- Check stability of following polynomial by applying Routh criteria
 $Q(S) = S^3 + S^2 + 3S + 8$
- For above network obtain transfer function $G_{21}(s), Z_{21}(s)$ & $Z_{11}(s)$



- e) A series RL circuit with $R = 30 \Omega$ & $L = 15H$ has constant voltage of $V=60V$ applied at $t=0$ as shown in above figure. Find Current I & Voltage across R & L .



Q.5 Attempt any two.

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- Derive an expression of current, V_R & V_C for dc response of series RC circuit.
- Draw the pole-zero plot for the given network function and hence obtain $V(t)$.

$$V(s) = \frac{4s(s+2)}{(s+1)(s+3)}$$

- Design an M derived T section & π section high pass filter having cutoff frequency of 5KHz with design impedance of 600Ω and $m= 0.35$. Find also frequency of infinite attenuation.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if required.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In the M derived low pass filter the resonant frequency is to be chosen so that it is _____.
 - a) Below cut off frequency
 - b) Above cut off frequency
 - c) Equal to cut off frequency
 - d) None of these
- 2) A Low pass filter is one which _____.
 - a) Passes all low frequencies
 - b) Attenuates all high frequencies
 - c) Passes all low frequencies up to cut-off frequencies and attenuates all other frequencies
 - d) None
- 3) Transient behavior occurs in any circuit when _____.
 - a) there is sudden change in applied voltage
 - b) the voltage source is suddenly shorted
 - c) the circuit is connected or disconnected from supply
 - d) all of the above
- 4) When a series RC circuit is connected to a constant voltage at $t=0$, the current passing through the circuit is at $t=0^+$ is _____.
 - a) Infinite
 - b) Zero
 - c) $\frac{V}{R}$
 - d) $\frac{V}{\omega C}$
- 5) The function is said to be having simple poles and zeros only if _____.
 - a) The poles are not repeated
 - b) The zeros are not repeated
 - c) The poles and zeros are not repeated
 - d) None of the above
- 6) Mesh Analysis is based on _____.
 - a) Kirchhoff's Voltage Law
 - b) Kirchhoff's Current Law
 - c) Circuit condition
 - d) None
- 7) If $Z_{11}=2$ ohm, $Z_{12}=1$ ohm and $Z_{21} = 1$ ohm and $Z_{22}=3$ ohm, what is the determinant of matrix?
 - a) 1
 - b) 1/5
 - c) 5
 - d) 2

- 8) When two port networks are connected in series the resultant _____?
- a) Z parameters are a sum of individual parameters
 - b) Y parameters are a sum of individual parameters
 - c) h parameters are a sum of individual parameters
 - d) ABCD parameters are a sum of individual parameters
- 9) Example of a two port network is _____.
- a) Transformer
 - b) transmission line
 - c) bridge circuit and transistor circuit
 - d) all of the above
- 10) If a series circuit RLC circuit, the quality factor is defined as _____.
- a) C
 - b) ωRC
 - c) ωC
 - d) $1/\omega RC$
- 11) In the parallel RLC circuit the impedance at resonance is _____.
- a) Maximum
 - b) Minimum
 - c) Zero
 - d) Infinity
- 12) Norton's equivalent circuit consists of _____.
- a) Voltage Source in parallel with resistance
 - b) Voltage Source in series with resistance
 - c) Current Source in parallel with resistance
 - d) Current Source in series with resistance
- 13) The system is said to be stable if and only if _____.
- a) All the poles lie on right half of the s -plane
 - b) Some of the poles lie on right half of the s -plane
 - c) All the poles lie on the left half of the s -plane
 - d) None
- 14) For driving point function $N(s)=P(s)/Q(s)$, coefficients of $P(s)$ and $Q(s)$ must be _____.
- a) real and positive
 - b) Complex
 - c) real and negative
 - d) none of these

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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
NETWORK THEORY AND ANALYSIS**

Day & Date: Thursday, 12-12-2019
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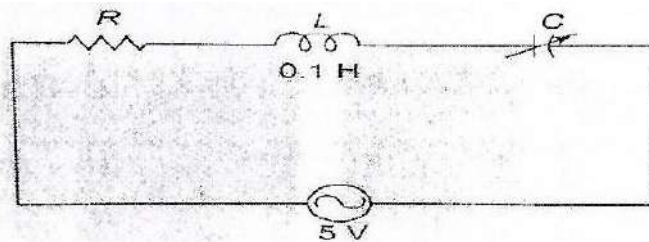
Max. Marks: 56

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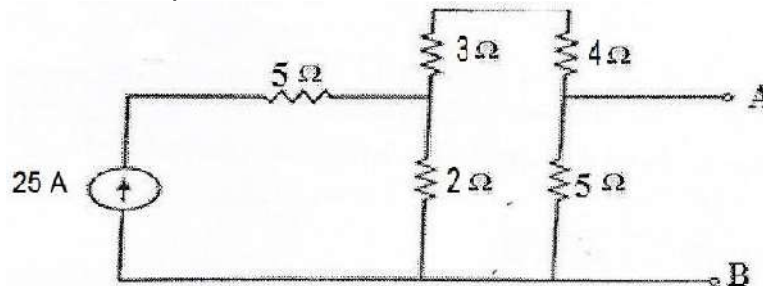
Section – I

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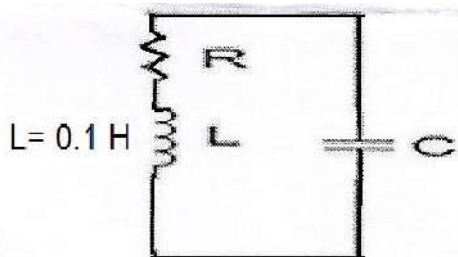
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- b) State and prove Maximum power transfer theorem.
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- d) Express Z parameters in terms of Y parameter.
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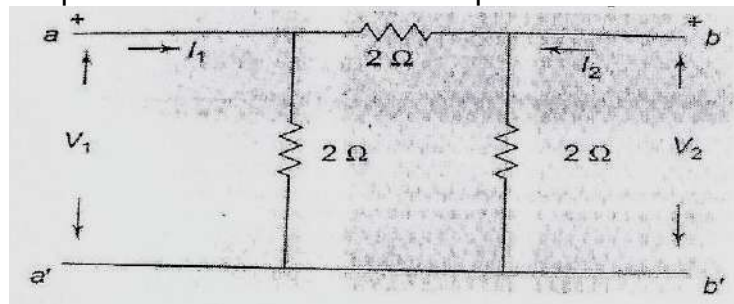


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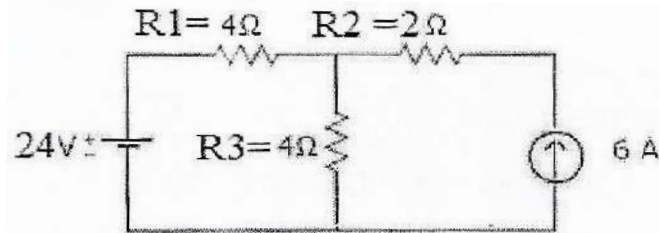
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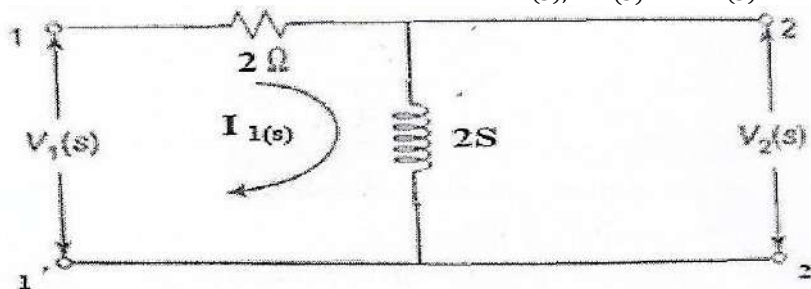


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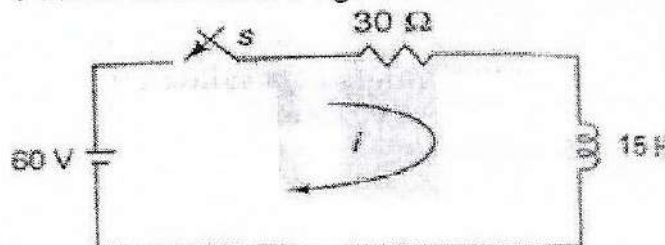
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
DIGITAL LOGIC DESIGN

Day & Date: Saturday, 14-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The logical Expression $F=AB+BC+AC$ is in _____.
 - a) SOP form
 - b) POP Form
 - c) Standard SOP form
 - d) Standard POS form
- 2) Gray code is _____.
 - a) Non weighted code
 - b) Weighted code
 - c) Alphanumeric Code
 - d) None of these
- 3) The SOP form is most suitable for designing logic circuit using only _____.
 - a) NOR Gates
 - b) NAND gates
 - c) AND gates
 - d) EX-OR gates
- 4) The NOR-NOR realization is equivalent to _____ realization.
 - a) AND-NOT
 - b) AND-OR
 - c) OR-AND
 - d) NOT-OR
- 5) Multiplexer is represented by _____.
 - a) $2^n \times n$
 - b) $2^n \times 1$
 - c) 1×2^n
 - d) $n \times 2^n$
- 6) The slowest logic family is _____.
 - a) TTL
 - b) IIL
 - c) MOS
 - d) CMOS
- 7) In a k-map, if two cells are said to be adjacent, they are differentiated by _____ number of variables.
 - a) 1
 - b) 2
 - c) n
 - d) 2^n
- 8) A flip flop has two outputs which are _____.
 - a) always zero
 - b) always complimentary
 - c) always one
 - d) in one of the above states
- 9) A flip-flop can be used to realize a _____.
 - a) Counter
 - b) Shift register
 - c) FSM
 - d) all above the above

- 10) The MOD number of counter is _____.
a) the max. possible number of states
b) the actual number of states in sequence
c) the number of flip-flops
d) none of these
- 11) A PLA is _____.
a) a LSI device
b) a MSI device
c) a SSI Device
d) a discrete Device
- 12) A combinational PLD with a fixed AND array and programmable OR array is called _____.
a) PLD
b) PROM
c) PAL
d) PLA
- 13) The output of the Moore machine is the function of _____.
a) next state
b) present inputs
c) present state and present inputs
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- 14) A flip-flop can store _____.
a) 1 bit data
b) 2 bit of data
c) 3 bits of data
d) 4 bit of data

Seat
No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
DIGITAL LOGIC DESIGN

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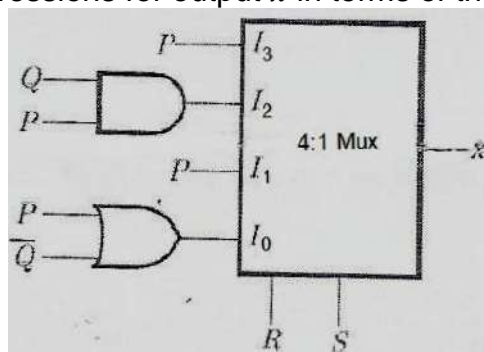
Section – I

Q.2 Attempt any four. **16**

- Tabulate the code tables for 2421 BCD codes which satisfy self complementary property.
- Subtract $(1010)_2$ from $(1000)_2$ using r's complement and $(r-1)$'s complement arithmetic.
- Optimize the following Boolean functions by means of a k-map.
 $F(W, X, Y, Z) = \Pi M(3, 11, 13, 15)$
- Prove that a full subtractor can be designed using two half-subtractors and one OR gate.
- Design a 14:1 multiplexer using only 4:1 multiplexers. Explain the operation with truth table.

Q.3 Attempt any two. **12**

- Design a combinational circuit with three inputs and one output using only NAND gates. The output is '1' when the binary value of the inputs is large than 4. The output is '0' otherwise.
- Design and implement combinational circuit that converts a 4-bit gray code to binary code.
- Consider the combinational circuit shown. Analyze the circuit to obtain the simplified Boolean expressions for output x in terms of the input variables.

**Section – II**

Q.4 Attempt any Four. **16**

- Construct a T flip-flop using NAND gates. Derive the characteristic equation for SR flip-flop.
- Implement the Boolean function $F(x, y, z) = \sum m(0, 3, 5, 6)$ using PLA.
- What are different types of shift register? Explain PIPO shift register.
- Discuss a 3 bit twisted ring counter using JK flip-flop with neat sketch. What is the mod of this counter?
- Develop Melay state diagrams to detect sequence..101..(overlapped & non-overlapped).

Q.5 Attempt any Two.

- a) A toggle (T) flip-flop has two operations no change, and complement, when input T is '0' and '1' respectively. Design a T flip-flop using JK flip-flop. Also derive the characteristic equation, tabulate the characteristic table, and the excitation table for the T flip-flop.
- b) Design a mod 4 synchronous counter using JK flip-flop. Draw neat circuit diagram and waveforms.
- c) A sequential circuit has two JK flip-flops A and B and one input x. The circuit is described by the following flip-flop input equations:

$$JA = x, KA = B$$

$$JB = x, KB = A'$$

- 1) Derive the state equations A^+ and B^+ by substituting the input equations for the J and K variables.
- 2) Draw the state diagram of the circuit.

Seat No.	
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
DIGITAL LOGIC DESIGN

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Duration: 30 Minutes

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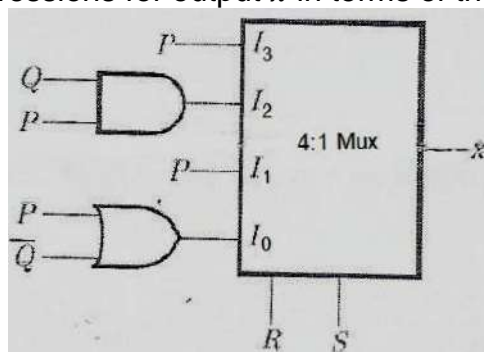
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- Design a combinational circuit with three inputs and one output using only NAND gates. The output is '1' when the binary value of the inputs is large than 4. The output is '0' otherwise.
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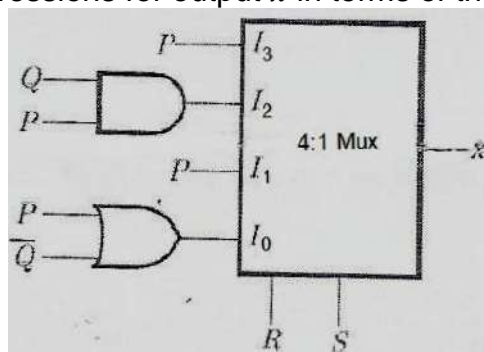
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 b) 2 bit of data
 c) 3 bits of data
 d) 4 bit of data
- 6) The logical Expression $F=AB+BC+AC$ is in _____.
 a) SOP form
 b) POP Form
 c) Standard SOP form
 d) Standard POS form
- 7) Gray code is _____.
 a) Non weighted code
 b) Weighted code
 c) Alphanumeric Code
 d) None of these
- 8) The SOP form is most suitable for designing logic circuit using only _____.
 a) NOR Gates
 b) NAND gates
 c) AND gates
 d) EX-OR gates
- 9) The NOR-NOR realization is equivalent to _____ realization.
 a) AND-NOT
 b) AND-OR
 c) OR-AND
 d) NOT-OR

- 10) Multiplexer is represented by _____.
- | | |
|-------------------|-------------------|
| a) $2^n \times n$ | b) $2^n \times 1$ |
| c) 1×2^n | d) $n \times 2^n$ |
- 11) The slowest logic family is _____.
- | | |
|--------|---------|
| a) TTL | b) IIL |
| c) MOS | d) CMOS |
- 12) In a k-map, if two cells are said to be adjacent, they are differentiated by _____ number of variables.
- | | |
|------|----------|
| a) 1 | b) 2 |
| c) n | d) 2^n |
- 13) A flip flop has two outputs which are _____.
- | | |
|----------------|-------------------------------|
| a) always zero | b) always complimentary |
| c) always one | d) in one of the above states |
- 14) A flip-flop can be used to realize a _____.
- | | |
|------------|------------------------|
| a) Counter | b) Shift register |
| c) FSM | d) all above the above |

Seat
No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
DIGITAL LOGIC DESIGN

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data wherever necessary.

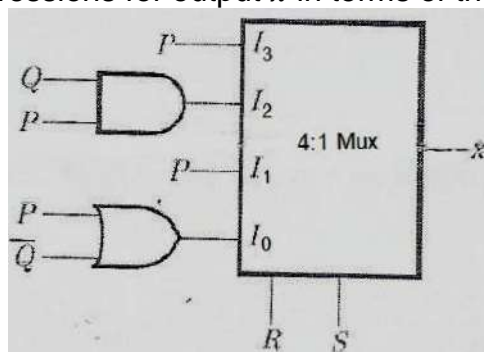
Section – I

Q.2 Attempt any four. **16**

- Tabulate the code tables for 2421 BCD codes which satisfy self complementary property.
- Subtract $(1010)_2$ from $(1000)_2$ using r's complement and $(r-1)$'s complement arithmetic.
- Optimize the following Boolean functions by means of a k-map.
 $F(W, X, Y, Z) = \Pi M(3, 11, 13, 15)$
- Prove that a full subtractor can be designed using two half-subtractors and one OR gate.
- Design a 14:1 multiplexer using only 4:1 multiplexers. Explain the operation with truth table.

Q.3 Attempt any two. **12**

- Design a combinational circuit with three inputs and one output using only NAND gates. The output is '1' when the binary value of the inputs is large than 4. The output is '0' otherwise.
- Design and implement combinational circuit that converts a 4-bit gray code to binary code.
- Consider the combinational circuit shown. Analyze the circuit to obtain the simplified Boolean expressions for output x in terms of the input variables.

**Section – II**

Q.4 Attempt any Four. **16**

- Construct a T flip-flop using NAND gates. Derive the characteristic equation for SR flip-flop.
- Implement the Boolean function $F(x, y, z) = \sum m(0, 3, 5, 6)$ using PLA.
- What are different types of shift register? Explain PIPO shift register.
- Discuss a 3 bit twisted ring counter using JK flip-flop with neat sketch. What is the mod of this counter?
- Develop Melay state diagrams to detect sequence..101..(overlapped & non-overlapped).

Q.5 Attempt any Two.

- a) A toggle (T) flip-flop has two operations no change, and complement, when input T is '0' and '1' respectively. Design a T flip-flop using JK flip-flop. Also derive the characteristic equation, tabulate the characteristic table, and the excitation table for the T flip-flop.
- b) Design a mod 4 synchronous counter using JK flip-flop. Draw neat circuit diagram and waveforms.
- c) A sequential circuit has two JK flip-flops A and B and one input x. The circuit is described by the following flip-flop input equations:

$$J_A = x, K_A = B$$

$$J_B = x, K_B = A'$$

- 1) Derive the state equations A^+ and B^+ by substituting the input equations for the J and K variables.
- 2) Draw the state diagram of the circuit.

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) You have 5 information signals and only one transmitter. What technique will help in transmitting all the 5 signals?
 - a) Frequency modulation
 - b) Multiplexing
 - c) Amplification
 - d) Amplitude Modulation
- 2) The process of making the signal more compatible with the medium is called as _____.
 - a) Modulation
 - b) Transmission
 - c) Encrypting
 - d) Multiplexing
- 3) Noise introduces a frequency variation into the signal.
 - a) True
 - b) False
 - c) None of above
- 4) What is the technique in which the high frequency components are amplified more than the low frequency components in FM?
 - a) Garble
 - b) Pre-emphasis
 - c) Selective amplification
 - d) None of above
- 5) Shot noise is produced by, _____.
 - a) Electrons
 - b) Photons
 - c) Electrons & Photons
 - d) None of above
- 6) The ratio of transmitted power which contains the information to the total transmitted power is, known as _____.
 - a) Modulation Index
 - b) Total power
 - c) Transmission efficiency
 - d) Sideband power
- 7) The total antenna current of an AM transmitter is 5A. If modulation index is 0.06, Calculate the antenna current when only carrier is sent _____.
 - a) 5A
 - b) 4.6A
 - c) 3A
 - d) 2A
- 8) In FM for a given frequency deviation the modulation index varies _____.
 - a) inversely as the modulating frequency
 - b) directly as the modulating frequency
 - c) independent of the changes in modulating signal
 - d) none of above

- 9) A pre-emphasis circuit provides extra noise immunity by _____.
a) boosting the bass frequencies
b) amplifying the higher audio frequencies
c) preamplifying the whole audio band
d) converting the phase modulation to FM
- 10) In PM, the modulation index is proportional to _____.
a) only modulating frequency
b) both amplitude and frequency
c) only amplitude of modulating signal
d) antenna height
- 11) A signal of maximum frequency of 8 KHz is sampled at Nyquist rate. The time intervals between the two successive samples will be _____.
a) 62.5 μ sec
b) 125 μ sec
c) 1250 μ sec
d) 62.5 sec
- 12) Which of the following pulse system is most efficient?
a) PPM
b) PWM
c) PAM
d) None of these
- 13) All broadcast radio signals received in daytime propagate by means of _____.
a) tropospheric waves
b) Troposcatter
c) surface waves
d) none of above
- 14) The ionosphere plays a significant role in radio wave propagation at _____.
a) high frequency
b) ultra high frequency
c) microwaves frequencies
d) optical frequencies

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

- Q.2 Attempt any Four questions. 16**
- a) Discuss the term modulation & how the antenna height can be reduced in communication.
 - b) Illustrate & discuss in detail the equation in detail $m=1$, $m<1$, & $m>1$.
 - c) Discuss the term noise & state different sources of noise?
 - d) A broadcast AM transmitter radiates 50 kW of carrier power what will be radiated power at 85% modulation?
 - e) Define SNR and derive the equation for the same?

- Q.3 Attempt any Two questions. 12**
- a) With suitable block diagram explain the Independent Sideband Transmission Systems.
 - b) Discuss the characteristics of AM Radio Receiver with their respective curve responses.
 - c) Discuss how noise is calculated for several amplifiers connected in cascade?

Section – II

- Q.4 Attempt any Four questions. 16**
- a) Explain pre-emphasis and de-emphasis in FM modulation.
 - b) Explain PM modulation with mathematical analysis.
 - c) State and explain Sampling theorem. What are its types?
 - d) With neat diagram explain Yagi antenna.
 - e) In an FM system, when the audio frequency is 500 Hz and the AF voltage is 2.4 V, the deviation is 4.8 KHz. If the AF voltage is raised to 10 V while the AF is dropped to 200 Hz, what is the new deviation and also find the modulation index in this case.

- Q.5 Attempt any two questions: 12**
- a) Explain working of Foster-Seeley discriminator with suitable diagram.
 - b) With circuit diagram explain working of a PWM modulator and demodulator. Also draw the waveforms.
 - c) What are the three basic paths that a radio signal can take through space? Explain each one in detail.

Seat
No.

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) In FM for a given frequency deviation the modulation index varies _____.
 - a) inversely as the modulating frequency
 - b) directly as the modulating frequency
 - c) independent of the changes in modulating signal
 - d) none of above
- 2) A pre-emphasis circuit provides extra noise immunity by _____.
 - a) boosting the bass frequencies
 - b) amplifying the higher audio frequencies
 - c) preamplifying the whole audio band
 - d) converting the phase modulation to FM
- 3) In PM, the modulation index is proportional to _____.
 - a) only modulating frequency
 - b) both amplitude and frequency
 - c) only amplitude of modulating signal
 - d) antenna height
- 4) A signal of maximum frequency of 8 KHz is sampled at Nyquist rate. The time intervals between the two successive samples will be _____.

a) 62.5 μ sec	b) 125 μ sec
c) 1250 μ sec	d) 62.5 sec
- 5) Which of the following pulse system is most efficient?

a) PPM	b) PWM
c) PAM	d) None of these
- 6) All broadcast radio signals received in daytime propagate by means of _____.

a) tropospheric waves	b) Troposcatter
c) surface waves	d) none of above
- 7) The ionosphere plays a significant role in radio wave propagation at _____.

a) high frequency	b) ultra high frequency
c) microwaves frequencies	d) optical frequencies
- 8) You have 5 information signals and only one transmitter. What technique will help in transmitting all the 5 signals?

a) Frequency modulation	b) Multiplexing
c) Amplification	d) Amplitude Modulation

- 9) The process of making the signal more compatible with the medium is called as _____.
- | | |
|---------------|-----------------|
| a) Modulation | b) Transmission |
| c) Encrypting | d) Multiplexing |
- 10) Noise introduces a frequency variation into the signal.
- | | |
|------------------|----------|
| a) True | b) False |
| c) None of above | |
- 11) What is the technique in which the high frequency components are amplified more than the low frequency components in FM?
- | | |
|----------------------------|------------------|
| a) Garble | b) Pre-emphasis |
| c) Selective amplification | d) None of above |
- 12) Shot noise is produced by, _____.
- | | |
|------------------------|------------------|
| a) Electrons | b) Photons |
| c) Electrons & Photons | d) None of above |
- 13) The ratio of transmitted power which contains the information to the total transmitted power is, known as _____.
- | | |
|----------------------------|-------------------|
| a) Modulation Index | b) Total power |
| c) Transmission efficiency | d) Sideband power |
- 14) The total antenna current of an AM transmitter is 5A. If modulation index is 0.06, Calculate the antenna current when only carrier is sent _____.
- | | |
|-------|---------|
| a) 5A | b) 4.6A |
| c) 3A | d) 2A |

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

- Q.2 Attempt any Four questions. 16**
- Discuss the term modulation & how the antenna height can be reduced in communication.
 - Illustrate & discuss in detail the equation in detail $m=1$, $m<1$, & $m>1$.
 - Discuss the term noise & state different sources of noise?
 - A broadcast AM transmitter radiates 50 kW of carrier power what will be radiated power at 85% modulation?
 - Define SNR and derive the equation for the same?

- Q.3 Attempt any Two questions. 12**
- With suitable block diagram explain the Independent Sideband Transmission Systems.
 - Discuss the characteristics of AM Radio Receiver with their respective curve responses.
 - Discuss how noise is calculated for several amplifiers connected in cascade?

Section – II

- Q.4 Attempt any Four questions. 16**
- Explain pre-emphasis and de-emphasis in FM modulation.
 - Explain PM modulation with mathematical analysis.
 - State and explain Sampling theorem. What are its types?
 - With neat diagram explain Yagi antenna.
 - In an FM system, when the audio frequency is 500 Hz and the AF voltage is 2.4 V, the deviation is 4.8 KHz. If the AF voltage is raised to 10 V while the AF is dropped to 200 Hz, what is the new deviation and also find the modulation index in this case.

- Q.5 Attempt any two questions: 12**
- Explain working of Foster-Seeley discriminator with suitable diagram.
 - With circuit diagram explain working of a PWM modulator and demodulator. Also draw the waveforms.
 - What are the three basic paths that a radio signal can take through space? Explain each one in detail.

Seat
No.**S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019****Electronics Engineering
ANALOG COMMUNICATION**

Day & Date: Tuesday, 17-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.**14**

- 1) Shot noise is produced by, _____.
 - a) Electrons
 - b) Photons
 - c) Electrons & Photons
 - d) None of above
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 - a) 62.5 μ sec
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 - c) 1250 μ sec
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 - b) PWM
 - c) PAM
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- 9) All broadcast radio signals received in daytime propagate by means of _____.
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c) surface waves d) none of above
- 10) The ionosphere plays a significant role in radio wave propagation at _____.
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- 11) You have 5 information signals and only one transmitter. What technique will help in transmitting all the 5 signals?
a) Frequency modulation b) Multiplexing
c) Amplification d) Amplitude Modulation
- 12) The process of making the signal more compatible with the medium is called as _____.
a) Modulation b) Transmission
c) Encrypting d) Multiplexing
- 13) Noise introduces a frequency variation into the signal.
a) True b) False
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- 14) What is the technique in which the high frequency components are amplified more than the low frequency components in FM?
a) Garble b) Pre-emphasis
c) Selective amplification d) None of above

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

- Q.2 Attempt any Four questions. 16**
- Discuss the term modulation & how the antenna height can be reduced in communication.
 - Illustrate & discuss in detail the equation in detail $m=1$, $m<1$, & $m>1$.
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- Q.5 Attempt any two questions: 12**
- Explain working of Foster-Seeley discriminator with suitable diagram.
 - With circuit diagram explain working of a PWM modulator and demodulator. Also draw the waveforms.
 - What are the three basic paths that a radio signal can take through space? Explain each one in detail.

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

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 c) PAM d) None of these

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 c) surface waves d) none of above

- 5) The ionosphere plays a significant role in radio wave propagation at _____.
 a) high frequency b) ultra high frequency
 c) microwaves frequencies d) optical frequencies

- 6) You have 5 information signals and only one transmitter. What technique will help in transmitting all the 5 signals?
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 c) Amplification d) Amplitude Modulation

- 7) The process of making the signal more compatible with the medium is called as _____.
 a) Modulation b) Transmission
 c) Encrypting d) Multiplexing

- 8) Noise introduces a frequency variation into the signal.
 a) True b) False
 c) None of above

- 9) What is the technique in which the high frequency components are amplified more than the low frequency components in FM?
 a) Garble b) Pre-emphasis
 c) Selective amplification d) None of above

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

- Q.2 Attempt any Four questions. 16**
- Discuss the term modulation & how the antenna height can be reduced in communication.
 - Illustrate & discuss in detail the equation in detail $m=1$, $m<1$, & $m>1$.
 - Discuss the term noise & state different sources of noise?
 - A broadcast AM transmitter radiates 50 kW of carrier power what will be radiated power at 85% modulation?
 - Define SNR and derive the equation for the same?

- Q.3 Attempt any Two questions. 12**
- With suitable block diagram explain the Independent Sideband Transmission Systems.
 - Discuss the characteristics of AM Radio Receiver with their respective curve responses.
 - Discuss how noise is calculated for several amplifiers connected in cascade?

Section – II

- Q.4 Attempt any Four questions. 16**
- Explain pre-emphasis and de-emphasis in FM modulation.
 - Explain PM modulation with mathematical analysis.
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- Q.5 Attempt any two questions: 12**
- Explain working of Foster-Seeley discriminator with suitable diagram.
 - With circuit diagram explain working of a PWM modulator and demodulator. Also draw the waveforms.
 - What are the three basic paths that a radio signal can take through space? Explain each one in detail.

- 8) The Laplace transform of $e^{2t} + \cos 2t$ is _____.
- a) $\frac{s}{s^2+4} + \frac{1}{s-2}$ b) $\frac{2}{s^2+4} + \frac{1}{s-2}$
- c) $\frac{s}{s^2+4} + \frac{1}{s+2}$ d) None of these
- 9) If $L\{f(t)\} = \frac{1}{s} e^{-\frac{1}{s}}$, then $L\{f(4t)\}$ is _____.
- a) $\frac{1}{4} e^{-4/s}$ b) $\frac{1}{4} e^{-s/4}$
- c) None of these d) $\frac{1}{s} e^{-4/s}$
- 10) $L^{-1}\left\{\frac{s^2+s}{s^3}\right\} =$ _____.
- a) $t^2 + t$ b) $t + 1$
- c) $t^2 + 1$ d) t
- 11) If $U(k) = \begin{cases} 1, & k \geq 0 \\ 0, & \text{otherwise} \end{cases}$ the $z\{U(k)\} =$ _____.
- a) $\frac{1}{z-1}$ b) $\frac{-1}{z-1}$
- c) $\frac{z}{z-1}$ d) $\frac{-z}{z-1}$
- 12) If $z\{f(k)\} = F(z)$, then $z\{kf(k)\} =$ _____.
- a) $-z \frac{d}{dz} F(z)$ b) $z \frac{d}{dz} F(z)$
- c) $\frac{d}{dz} F(z)$ d) None of these
- 13) The Fourier cosine integral form of $f(x)$ is _____.
- a) $\int_0^{\infty} f(s) \cos ws ds$
- b) $\int_0^{\infty} \cos wx \left[\int_0^{\infty} f(s) \cos ws ds \right] dw$
- c) $\frac{2}{\pi} \int_0^{\infty} \cos wx \left[\int_0^{\infty} f(s) \cos ws ds \right] dw$
- d) None of these
- 14) The Fourier sine transform of $f(x) = e^{-x}, x \geq 0$ is _____.
- a) $\frac{s}{s^2+1}$ b) $\frac{2}{\pi} \frac{s}{1+s^2}$
- c) $\frac{s}{1-s^2}$ d) $\sqrt{\frac{2}{\pi}} \frac{s}{1+s^2}$

Seat No.	
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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ENGINEERING MATHEMATICS – III**

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non - programmable calculator is allowed.

Section – I

Q.2 Solve any three of the following questions. 09

- Solve: $(D^2 + 9)y = e^{-x} + \sin(3x)$.
- Solve: $(D^2 - 6D + 9)y = e^{3x}(1 + x)$.
- Obtain the Fourier series of the function $f(x) = x^3$ in interval $(-\pi, \pi)$.
- Find the coefficient of correlation between x and y from the following data
 $N = 20, \sum x = 80, \sum x^2 = 900, \sum y = 70, \sum y^2 = 800, \sum xy = 700$.
- If on an average one candidate out of 10 fails in a certain examination, find the chance that out of 5 candidates that have appeared for the examination at least 4 will be successful.

Q.3 Solve any three of the following questions. 09

- Solve: $(D^2 - 1)y = \frac{2}{1+e^x}$
- Expand $f(x) = x - x^2$ as half range cosine series in $0 \leq x \leq 1$.
- Expand $f(x) = a^2 - x^2$ as Fourier series in $(-a, a)$.
- If 3% of bulbs manufactured by a company are defective assuming Poisson distribution, find the probability that in a pack of 100 bulbs.
 - zero
 - two bulbs are defective
- Given the following results of weights ' x ' and heights ' y ' of 1000 men.

	Weight ' x '(in lbs)	Height ' y '(inches)
Mean:	150	68
Standard deviation	20	2.5

and coefficient of correlation is $r = 0.6$, find the equations of the lines of regression.

Q.4 Solve any two of the following questions. 10

- An electric circuit consists of an inductance L , a condenser of capacity C and an e.m.f of $E_0 \cos(\omega t)$, so that the charge q satisfies the differential equation.

$$\frac{d^2q}{dt^2} + \frac{1}{LC}q = \frac{E_0}{L} \cos(\omega t)$$

If $\omega^2 = \frac{1}{LC}$ and $q = q_0, i = i_0$ at $t = 0$ then find the charge q at any time t .

- Find the Fourier series of the function

$$f(x) = \begin{cases} x, & 0 < x \leq \pi \\ 2\pi - x, & \pi < x < 2\pi \end{cases}$$

- c) If the mean life time and standard deviation of battery cells are 12 hrs and 3 hrs, then find the percentage of batteries will have life time
- between 10 and 14 hrs
 - more than 15 hrs.
- (Given S.N.V of z, area from z = 0 to z = 0.6667 is 0.2486, that from z = 0 to z = 1 is 0.3413)

Section – II

Q.5 Solve any three of the following questions. 09

- Find $L\{te^{-3t} \sin t\}$
- Evaluate $\int_0^{\infty} \frac{e^{-2t} - e^{-3t}}{t} dt$
- Find the z-transform and its region of convergence of $f(k) = \frac{5^k}{k!}, k \geq 0$.
- Find $Z\left\{\sin\left(\alpha k + \frac{\pi}{2}\right)\right\}$ for $k \geq 0$.
- Find the Fourier cosine transform of $f(x) = e^{-2x} + 4e^{-3x}$

Q.6 Solve any three of the following questions. 09

- Find z-transform of $f(k) = \left\{\frac{2^k}{k} + \frac{3^k}{k}\right\}, k \geq 1$.
- Find inverse Laplace transform of $\log\left[\frac{s^2-4}{(s-3)^2}\right]$
- Using convolution theorem find the inverse Laplace transform of $\frac{1}{(s-3)(s+4)^2}$
- Find $f(x)$ if its Fourier sine transform is e^{-as} _____.
- Find the Fourier Transform of $f(x) = e^{-x^2/2}$

Q.7 Solve any two of the following questions. 10

- Express the function $f(x) = \begin{cases} 1, & \text{when } |x| \leq 1 \\ 0, & \text{when } |x| > 1 \end{cases}$ as a Fourier integral. Hence evaluate $\int_0^{\infty} \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda$
- Using Laplace transform solve the following differential equation with the given conditions $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} = -8t, x(0) = 0, x'(0) = 0$.
- Find the inverse z-transform of $F(z) = \frac{1}{(z-3)(z-2)}$ is ROC is $|z| > 3$.

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The Laplace transform of $e^{2t} + \cos 2t$ is _____.
- a) $\frac{s}{s^2+4} + \frac{1}{s-2}$ b) $\frac{2}{s^2+4} + \frac{1}{s-2}$
 c) $\frac{s}{s^2+4} + \frac{1}{s+2}$ d) None of these
- 2) If $L\{f(t)\} = \frac{1}{s}e^{-\frac{1}{s}}$, then $L\{f(4t)\}$ is _____.
- a) $\frac{1}{4}e^{-4/s}$ b) $\frac{1}{4}e^{-s/4}$
 c) None of these d) $\frac{1}{s}e^{-4/s}$
- 3) $L^{-1}\left\{\frac{s^2+s}{s^3}\right\} =$ _____.
- a) $t^2 + t$ b) $t + 1$
 c) $t^2 + 1$ d) t
- 4) If $U(k) = \begin{cases} 1, & k \geq 0 \\ 0, & \text{otherwise} \end{cases}$ the $z\{U(k)\} =$ _____.
- a) $\frac{1}{z-1}$ b) $\frac{-1}{z-1}$
 c) $\frac{z}{z-1}$ d) $\frac{-z}{z-1}$
- 5) If $z\{f(k)\} = F(z)$, then $z\{kf(k)\} =$ _____.
- a) $-z \frac{d}{dz} F(z)$ b) $z \frac{d}{dz} F(z)$
 c) $\frac{d}{dz} F(z)$ d) None of these

- 6) The Fourier cosine integral form of $f(x)$ is _____.
- a) $\int_0^{\infty} f(s) \cos ws ds$
- b) $\int_0^{\infty} \cos wx \left[\int_0^{\infty} f(s) \cos ws ds \right] dw$
- c) $\frac{2}{\pi} \int_0^{\infty} \cos wx \left[\int_0^{\infty} f(s) \cos ws ds \right] dw$
- d) None of these
- 7) The Fourier sine transform of $f(x) = e^{-x}, x \geq 0$ is _____.
- a) $\frac{s}{s^2+1}$
- b) $\frac{2}{\pi} \frac{s}{1+s^2}$
- c) $\frac{s}{1-s^2}$
- d) $\sqrt{\frac{2}{\pi}} \frac{s}{1+s^2}$
- 8) $\frac{1}{D^2+9}\{\sin 3x\}$ is equal to _____.
- a) $\frac{x}{6} \cos(3x)$
- b) $\frac{-x}{6} \sin(3x)$
- c) $\frac{-x}{6} \cos(3x)$
- d) $\frac{-x}{3} \cos(3x)$
- 9) The general solution of differential equation $(D^2 - 1)^2 y = 0$ is _____.
- a) $y = (c_1 + c_2 x)e^x + (c_3 + c_4 x)e^{-x}$
- b) $y = (c_1 + c_2 x + c_3 x^2 + c_4 x^3)e^{-x}$
- c) $y = e^{-x}\{(c_1 + c_2 x) \cos x + (c_3 + c_4 x) \sin x\}$
- d) $y = (c_1 + c_2 x + c_3 x^2 + c_4 x^3)e^x$
- 10) A continuous random variable has the probability density function $f(x) = kx^2$ for $0 \leq x \leq 2$, then $k =$ _____.
- a) $\frac{8}{3}$
- b) $\frac{3}{2}$
- c) $\frac{5}{8}$
- d) $\frac{3}{8}$
- 11) If a random variable X has a Poisson distribution with mean 6, then $P(x = 1)$ is equal to _____.
- a) 0.015
- b) 0.055
- c) 0.15
- d) 0.25
- 12) The lines of regressions equations are given by $-x = -10y + 17$ and $x - 5y = -7$, then the mean \bar{x} and mean \bar{y} are _____.
- a) 1 and 10
- b) 1 and 5
- c) 4 and 3
- d) 3 and 2
- 13) In the interval $(0, \pi)$ the constant term in the half range cosine series of $f(x) = x$ is _____.
- a) π
- b) $\frac{\pi}{2}$
- c) $\frac{\pi}{4}$
- d) 0
- 14) The Fourier series of $f(x) = 1 - x^2$ interval $(-1, 1)$ contains _____.
- a) Only sine terms
- b) Only cosine terms
- c) Both sine and cosine terms
- d) None of these

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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ENGINEERING MATHEMATICS – III**

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.

Section – I

Q.2 Solve any three of the following questions. 09

- Solve: $(D^2 + 9)y = e^{-x} + \sin(3x)$.
- Solve: $(D^2 - 6D + 9)y = e^{3x}(1 + x)$.
- Obtain the Fourier series of the function $f(x) = x^3$ in interval $(-\pi, \pi)$.
- Find the coefficient of correlation between x and y from the following data
 $N = 20, \sum x = 80, \sum x^2 = 900, \sum y = 70, \sum y^2 = 800, \sum xy = 700$.
- If on an average one candidate out of 10 fails in a certain examination, find the chance that out of 5 candidates that have appeared for the examination at least 4 will be successful.

Q.3 Solve any three of the following questions. 09

- Solve: $(D^2 - 1)y = \frac{2}{1+e^x}$
- Expand $f(x) = x - x^2$ as half range cosine series in $0 \leq x \leq 1$.
- Expand $f(x) = a^2 - x^2$ as Fourier series in $(-a, a)$.
- If 3% of bulbs manufactured by a company are defective assuming Poisson distribution, find the probability that in a pack of 100 bulbs.
 - zero
 - two bulbs are defective
- Given the following results of weights ' x ' and heights ' y ' of 1000 men.

	Weight ' x '(in lbs)	Height ' y '(inches)
Mean:	150	68
Standard deviation	20	2.5

and coefficient of correlation is $r = 0.6$, find the equations of the lines of regression.

Q.4 Solve any two of the following questions. 10

- An electric circuit consists of an inductance L , a condenser of capacity C and an e.m.f of $E_0 \cos(\omega t)$, so that the charge q satisfies the differential equation.

$$\frac{d^2q}{dt^2} + \frac{1}{LC}q = \frac{E_0}{L} \cos(\omega t)$$

If $\omega^2 = \frac{1}{LC}$ and $q = q_0, i = i_0$ at $t = 0$ then find the charge q at any time t .

- Find the Fourier series of the function

$$f(x) = \begin{cases} x, & 0 < x \leq \pi \\ 2\pi - x, & \pi < x < 2\pi \end{cases}$$

- c) If the mean life time and standard deviation of battery cells are 12 hrs and 3 hrs, then find the percentage of batteries will have life time
- between 10 and 14 hrs
 - more than 15 hrs.
- (Given S.N.V of z, area from z = 0 to z = 0.6667 is 0.2486, that from z = 0 to z = 1 is 0.3413)

Section – II

Q.5 Solve any three of the following questions. 09

- Find $L\{te^{-3t} \sin t\}$
- Evaluate $\int_0^{\infty} \frac{e^{-2t} - e^{-3t}}{t} dt$
- Find the z-transform and its region of convergence of $f(k) = \frac{5^k}{k!}, k \geq 0$.
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- Find z-transform of $f(k) = \left\{\frac{2^k}{k} + \frac{3^k}{k}\right\}, k \geq 1$.
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- Find $f(x)$ if its Fourier sine transform is e^{-as} _____.
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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Section – I

Q.2 Solve any three of the following questions. 09

- a) Solve: $(D^2 + 9)y = e^{-x} + \sin(3x)$.
 b) Solve: $(D^2 - 6D + 9)y = e^{3x}(1 + x)$.
 c) Obtain the Fourier series of the function $f(x) = x^3$ in interval $(-\pi, \pi)$.
 d) Find the coefficient of correlation between x and y from the following data
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- a) Solve: $(D^2 - 1)y = \frac{2}{1+e^x}$
 b) Expand $f(x) = x - x^2$ as half range cosine series in $0 \leq x \leq 1$.
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 d) If 3% of bulbs manufactured by a company are defective assuming Poisson distribution, find the probability that in a pack of 100 bulbs.
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 e) Given the following results of weights ' x ' and heights ' y ' of 1000 men.

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$$f(x) = \begin{cases} x, & 0 < x \leq \pi \\ 2\pi - x, & \pi < x < 2\pi \end{cases}$$

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- (Given S.N.V of z, area from z = 0 to z = 0.6667 is 0.2486, that from z = 0 to z = 1 is 0.3413)

Section – II

Q.5 Solve any three of the following questions. 09

- Find $L\{te^{-3t} \sin t\}$
- Evaluate $\int_0^{\infty} \frac{e^{-2t} - e^{-3t}}{t} dt$
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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Section – I**Q.2 Solve any three of the following questions. 09**

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 c) Obtain the Fourier series of the function $f(x) = x^3$ in interval $(-\pi, \pi)$.
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Section – II

Q.5 Solve any three of the following questions.

09

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- Evaluate $\int_0^{\infty} \frac{e^{-2t} - e^{-3t}}{t} dt$
- Find the z-transform and its region of convergence of $f(k) = \frac{5^k}{k!}, k \geq 0$.
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- Find z-transform of $f(k) = \left\{\frac{2^k}{k} + \frac{3^k}{k}\right\}, k \geq 1$.
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10

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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Coefficient of coupling K for magnetic circuit is given by _____.
 - a) $L / \sqrt{M_1 M_2}$
 - b) L/M
 - c) $M \sqrt{L_1 L_2}$
 - d) $M / \sqrt{L_1 L_2}$
- 2) RMS value of the supply voltage is 200V then the maximum value is _____.
 - a) 200 X Form factor
 - b) 200 X peak factor
 - c) 200 X power factor
 - d) none of the above
- 3) A 2 cm long coil has 10 turns and carries a current of 750 mA The magnetizing force of the coil is _____.
 - a) 225 AT/m
 - b) 675 AT/m
 - c) 450 AT/m
 - d) 375 AT/m
- 4) In a balanced delta-connected system, line currents lag their respective phase currents by _____.
 - a) 30°
 - b) 60°
 - c) 120°
 - d) 45°
- 5) A transformer having 1000 primary turns is connected to a 250 V a.c supply. For a secondary voltage of 400 V, the number of secondary turns should be _____.
 - a) 1600
 - b) 250
 - c) 400
 - d) 1250
- 6) If $e_1 = A \sin \omega t$ and $e_2 = B \sin(\omega t - \theta)$, then _____.
 - a) e_1 lags e_2 by θ
 - b) e_2 lags e_1 by θ
 - c) e_2 leads e_2 by θ
 - d) e_1 is in phase with e_2
- 7) Pure inductive circuit _____.
 - a) consumes some power on average
 - b) does not take power at all from a line
 - c) takes power from the line during some part of the cycle and then returns back to it during other part of the cycle
 - d) none of the above
- 8) How many entries will be in the truth table of a 3 input NAND gate?
 - a) 3
 - b) 6
 - c) 8
 - d) 9
- 9) A Nibble is equal to _____ bit(s).
 - a) 1
 - b) 2
 - c) 4
 - d) 8

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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
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Section - I

Q.2 Attempt any four of the following.

16

- Define the following terms.
 - MMF
 - Reluctance
 - Permeability
 - magnetic field strength
- The voltage of 400 V is applied to three phase star connected load of impedance $Z = (4 + j3) \Omega/\text{phase}$. Find:
 - Phase voltage
 - Line current
 - Total power consumed
- Derive emf equation for 1 phase transformer. Write emf equation in terms of B_m .
- State and explain Kirchoff's laws with sign conventions.
- An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of 200 turns. If the permeability of iron is 300 when a current of 1 A flows through the coil, find the flux density.
- Define Average value of alternating quantity and derive its expression.

Q.3 Attempt the following questions.

12

- Find the resistance at the A-B terminals in the electric circuit of Figure. a, using Δ -Y transformations.

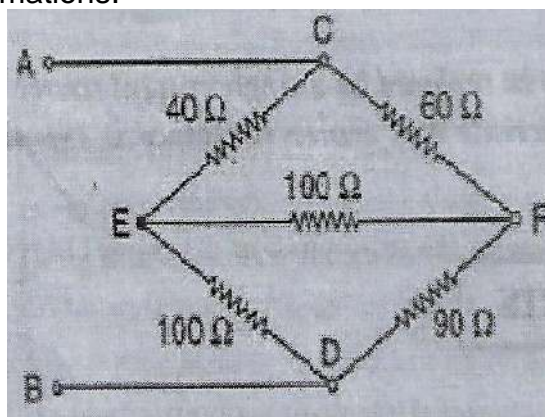


Figure (a)

- The voltage applied to a circuit is $v = 100 \sin(\omega t + 30^\circ)$ and the current flowing in the circuit is $i = 15 \sin(\omega t + 60^\circ)$. Determine the impedance, resistance, reactance, power and the power factor of the circuit Also draw phasor diagram.

OR

- Derive the relationship between line and phase quantities in balanced Delta connected 3-phase load.

Section – II

- Q.4 Attempt any four of the following.** **16**
- a) What is universal gate? Derive basic gates using NAND gates.
 - b) With neat diagram Explain “Solar cell”.
 - c) Convert $(EF)_{16}$ to decimal and binary.
 - d) Perform the subtraction by using 2's complement method $(8E)_{16} - (78)_{16}$.
 - e) Explain half wave rectifier with necessary diagrams.
 - f) What is BJT? Compare CB,CC,CE Configurations of transistor.
- Q.5 Attempt any two of the following questions.** **12**
- a) Explain in detail ‘Linear variable differential transducer’ as transducer and its working. Give its advantages and applications.
 - b) Explain the working of bridge rectifier. Define the terms:
 - 1) Rectification efficiency
 - 2) Ripple Factor
 - c) Explain the working of transistor in CE configurations. Explain the input and output characteristics of CE configuration.

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MCQ/Objective Type Questions

Duration: 30 Minutes

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Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) How many entries will be in the truth table of a 3 input NAND gate?

a) 3	b) 6
c) 8	d) 9
- 2) A Nibble is equal to _____ bit(s).

a) 1	b) 2
c) 4	d) 8
- 3) Convert the binary number (1101000011110000) to hexadecimal number _____.

a) 1010	b) F0F0
c) D0F0	d) 7070
- 4) The forward voltage drop across a silicon diode is about _____.

a) 2.5 V	b) 3 V
c) 10 V	d) 0.7 V
- 5) Which of following represent active transducer?

a) Strain gauge	b) Thermistor
c) LVDT	d) Thermocouple
- 6) A transistor has a β_{DC} of 250 and a base current, I_B , of 20μ A. The collector current, I_C , equals _____.

a) 500μ A	b) 5 mA
c) 50 mA	d) 5A
- 7) Gauge factor of Strain gauge is _____.

a) $\frac{R/\Delta R}{l/\Delta l}$	b) $\frac{l/\Delta l}{R/\Delta R}$
c) $\frac{\Delta R/R}{\Delta l/l}$	d) $\frac{R/\Delta R}{\Delta l/l}$
- 8) Coefficient of coupling K for magnetic circuit is given by _____.

a) $L/\sqrt{M_1 M_2}$	b) L/M
c) $M/\sqrt{L_1 L_2}$	d) $M/\sqrt{L_1 L_2}$
- 9) RMS value of the supply voltage is 200V then the maximum value is _____.

a) 200 X Form factor	b) 200 X peak factor
c) 200 X power factor	d) none of the above

Seat No.	
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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section - I

Q.2 Attempt any four of the following.

16

- Define the following terms.
 - MMF
 - Reluctance
 - Permeability
 - magnetic field strength
- The voltage of 400 V is applied to three phase star connected load of impedance $Z = (4 + j3) \Omega/\text{phase}$. Find:
 - Phase voltage
 - Line current
 - Total power consumed
- Derive emf equation for 1 phase transformer. Write emf equation in terms of B_m .
- State and explain Kirchhoff's laws with sign conventions.
- An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of 200 turns. If the permeability of iron is 300 when a current of 1 A flows through the coil, find the flux density.
- Define Average value of alternating quantity and derive its expression.

Q.3 Attempt the following questions.

12

- Find the resistance at the A-B terminals in the electric circuit of Figure. a, using Δ -Y transformations.

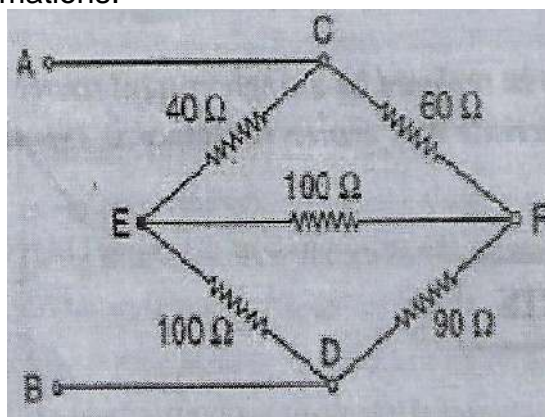


Figure (a)

- The voltage applied to a circuit is $v = 100 \sin(\omega t + 30^\circ)$ and the current flowing in the circuit is $i = 15 \sin(\omega t + 60^\circ)$. Determine the impedance, resistance, reactance, power and the power factor of the circuit Also draw phasor diagram.

OR

- Derive the relationship between line and phase quantities in balanced Delta connected 3-phase load.

Section – II

- Q.4 Attempt any four of the following.** **16**
- a) What is universal gate? Derive basic gates using NAND gates.
 - b) With neat diagram Explain “Solar cell”.
 - c) Convert $(EF)_{16}$ to decimal and binary.
 - d) Perform the subtraction by using 2's complement method $(8E)_{16} - (78)_{16}$.
 - e) Explain half wave rectifier with necessary diagrams.
 - f) What is BJT? Compare CB,CC,CE Configurations of transistor.
- Q.5 Attempt any two of the following questions.** **12**
- a) Explain in detail ‘Linear variable differential transducer’ as transducer and its working. Give its advantages and applications.
 - b) Explain the working of bridge rectifier. Define the terms:
 - 1) Rectification efficiency
 - 2) Ripple Factor
 - c) Explain the working of transistor in CE configurations. Explain the input and output characteristics of CE configuration.

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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) A transformer having 1000 primary turns is connected to a 250 V a.c supply. For a secondary voltage of 400 V, the number of secondary turns should be _____.
 - a) 1600
 - b) 250
 - c) 400
 - d) 1250
- 2) If $e_1 = A \sin \omega t$ and $e_2 = B \sin(\omega t - \theta)$, then _____.
 - a) e_1 lags e_2 by θ
 - b) e_2 lags e_1 by θ
 - c) e_2 leads e_2 by θ
 - d) e_1 is in phase with e_2
- 3) Pure inductive circuit _____.
 - a) consumes some power on average
 - b) does not take power at all from a line
 - c) takes power from the line during some part of the cycle and then returns back to it during other part of the cycle
 - d) none of the above
- 4) How many entries will be in the truth table of a 3 input NAND gate?
 - a) 3
 - b) 6
 - c) 8
 - d) 9
- 5) A Nibble is equal to _____ bit(s).
 - a) 1
 - b) 2
 - c) 4
 - d) 8
- 6) Convert the binary number (1101000011110000) to hexadecimal number _____.
 - a) 1010
 - b) F0F0
 - c) D0F0
 - d) 7070
- 7) The forward voltage drop across a silicon diode is about _____.
 - a) 2.5 V
 - b) 3 V
 - c) 10 V
 - d) 0.7 V
- 8) Which of following represent active transducer?
 - a) Strain gauge
 - b) Thermistor
 - c) LVDT
 - d) Thermocouple
- 9) A transistor has a β_{DC} of 250 and a base current, I_B , of $20 \mu A$. The collector current, I_C , equals _____.
 - a) $500 \mu A$
 - b) 5 mA
 - c) 50 mA
 - d) 5A

- 10) Gauge factor of Strain gauge is _____.
 a) $\frac{R/\Delta R}{l/\Delta l}$ b) $\frac{l/\Delta l}{R/\Delta R}$
 c) $\frac{\Delta R/R}{\Delta l/l}$ d) $\frac{R/\Delta R}{\Delta l/l}$
- 11) Coefficient of coupling K for magnetic circuit is given by _____.
 a) $L/\sqrt{M_1 M_2}$ b) L/M
 c) $M/\sqrt{L_1 L_2}$ d) $M/\sqrt{L_1 L_2}$
- 12) RMS value of the supply voltage is 200V then the maximum value is _____.
 a) 200 X Form factor b) 200 X peak factor
 c) 200 X power factor d) none of the above
- 13) A 2 cm long coil has 10 turns and carries a current of 750 mA The magnetizing force of the coil is _____.
 a) 225 AT/m b) 675 AT/m
 c) 450 AT/m d) 375 AT/m
- 14) In a balanced delta-connected system, line currents lag their respective phase currents by _____.
 a) 30° b) 60°
 c) 120° d) 45°

Seat No.	
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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
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Section - I

Q.2 Attempt any four of the following.

16

- Define the following terms.
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 - Reluctance
 - Permeability
 - magnetic field strength
- The voltage of 400 V is applied to three phase star connected load of impedance $Z = (4 + j3) \Omega/\text{phase}$. Find:
 - Phase voltage
 - Line current
 - Total power consumed
- Derive emf equation for 1 phase transformer. Write emf equation in terms of B_m .
- State and explain Kirchhoff's laws with sign conventions.
- An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of 200 turns. If the permeability of iron is 300 when a current of 1 A flows through the coil, find the flux density.
- Define Average value of alternating quantity and derive its expression.

Q.3 Attempt the following questions.

12

- Find the resistance at the A-B terminals in the electric circuit of Figure. a, using Δ -Y transformations.

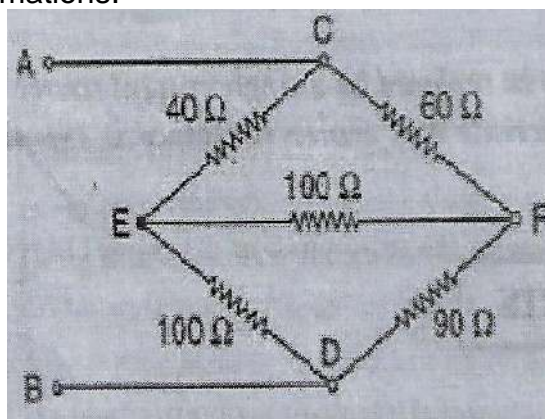


Figure (a)

- The voltage applied to a circuit is $v = 100 \sin(\omega t + 30^\circ)$ and the current flowing in the circuit is $i = 15 \sin(\omega t + 60^\circ)$. Determine the impedance, resistance, reactance, power and the power factor of the circuit Also draw phasor diagram.

OR

- Derive the relationship between line and phase quantities in balanced Delta connected 3-phase load.

Section – II

- Q.4 Attempt any four of the following.** **16**
- a) What is universal gate? Derive basic gates using NAND gates.
 - b) With neat diagram Explain “Solar cell”.
 - c) Convert $(EF)_{16}$ to decimal and binary.
 - d) Perform the subtraction by using 2's complement method $(8E)_{16} - (78)_{16}$.
 - e) Explain half wave rectifier with necessary diagrams.
 - f) What is BJT? Compare CB,CC,CE Configurations of transistor.
- Q.5 Attempt any two of the following questions.** **12**
- a) Explain in detail ‘Linear variable differential transducer’ as transducer and its working. Give its advantages and applications.
 - b) Explain the working of bridge rectifier. Define the terms:
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 - 2) Ripple Factor
 - c) Explain the working of transistor in CE configurations. Explain the input and output characteristics of CE configuration.

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No.

**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Convert the binary number (1101000011110000) to hexadecimal number _____.
 - a) 1010
 - b) F0F0
 - c) D0F0
 - d) 7070
- 2) The forward voltage drop across a silicon diode is about _____.
 - a) 2.5 V
 - b) 3 V
 - c) 10 V
 - d) 0.7 V
- 3) Which of following represent active transducer?
 - a) Strain gauge
 - b) Thermistor
 - c) LVDT
 - d) Thermocouple
- 4) A transistor has a β_{DC} of 250 and a base current, I_B , of 20μ A. The collector current, I_C , equals _____.
 - a) 500μ A
 - b) 5 mA
 - c) 50 mA
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- 5) Gauge factor of Strain gauge is _____.
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 - c) $M/\sqrt{L_1 L_2}$
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 - a) 200 X Form factor
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 - d) none of the above
- 8) A 2 cm long coil has 10 turns and carries a current of 750 mA The magnetizing force of the coil is _____.
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 - b) 675 AT/m
 - c) 450 AT/m
 - d) 375 AT/m
- 9) In a balanced delta-connected system, line currents lag their respective phase currents by _____.
 - a) 30°
 - b) 60°
 - c) 120°
 - d) 45°

Seat
No.

**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section - I**Q.2 Attempt any four of the following.****16**

- a) Define the following terms.
1) MMF
2) Reluctance
3) Permeability
4) magnetic field strength
- b) The voltage of 400 V is applied to three phase star connected load of impedance $Z = (4 + j3) \Omega/\text{phase}$. Find:
1) Phase voltage
2) Line current
3) Total power consumed
- c) Derive emf equation for 1 phase transformer. Write emf equation in terms of B_m .
- d) State and explain Kirchoff's laws with sign conventions.
- e) An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of 200 turns. If the permeability of iron is 300 when a current of 1 A flows through the coil, find the flux density.
- f) Define Average value of alternating quantity and derive its expression.

Q.3 Attempt the following questions.**12**

- a) Find the resistance at the A-B terminals in the electric circuit of Figure. a, using Δ -Y transformations.

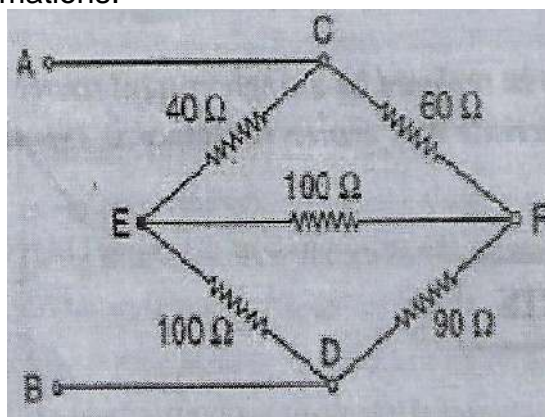


Figure (a)

- b) The voltage applied to a circuit is $v = 100 \sin(\omega t + 30^\circ)$ and the current flowing in the circuit is $i = 15 \sin(\omega t + 60^\circ)$. Determine the impedance, resistance, reactance, power and the power factor of the circuit Also draw phasor diagram.

OR

- b) Derive the relationship between line and phase quantities in balanced Delta connected 3-phase load.

Section – II

- Q.4 Attempt any four of the following.** **16**
- a) What is universal gate? Derive basic gates using NAND gates.
 - b) With neat diagram Explain “Solar cell”.
 - c) Convert $(EF)_{16}$ to decimal and binary.
 - d) Perform the subtraction by using 2's complement method $(8E)_{16} - (78)_{16}$.
 - e) Explain half wave rectifier with necessary diagrams.
 - f) What is BJT? Compare CB,CC,CE Configurations of transistor.
- Q.5 Attempt any two of the following questions.** **12**
- a) Explain in detail ‘Linear variable differential transducer’ as transducer and its working. Give its advantages and applications.
 - b) Explain the working of bridge rectifier. Define the terms:
 - 1) Rectification efficiency
 - 2) Ripple Factor
 - c) Explain the working of transistor in CE configurations. Explain the input and output characteristics of CE configuration.

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Set P

S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.
 3) Use of datasheet and non-programmable calculator is allowed.
 4) Assume suitable data wherever required.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) A JFET always operates with _____.
 a) gate to source reverse biased b) gate conned to source
 c) gate to source forward biased d) drain conned to ground
- 2) The drain current will always be one-fourth of I_{DSS} as long as the gate-to-source voltage is _____ the pinch-off value
 a) one-fourth b) one-half
 c) three-fourths d) None
- 3) Which of the following ratings appear(s) in the specification sheet for an FET?
 a) Voltages between specific terminals
 b) Current levels
 c) Power dissipation
 d) All of the above
- 4) Which of the following describe(s) the difference(s) between JFETs and depletion type MOSFETs?
 a) V only negative for GS the depletion type
 b) I_{DSS} can exceed I_D for the depletion type
 c) The depletion type can operate in the enhancement mode
 d) All of the above
- 5) For the FET, the relationship between the input and output quantities is _____ due to the _____ term in Shockley's equation.
 a) Nonlinear, cubed b) Nonlinear, squared
 c) linear, Proportion d) Nonlinear, Proportional
- 6) A cascaded amplifier comprises N identical non interacting stages, each having a upper 3 dB frequency of f_H . If $f_H(n)$ is the upper 3 dB frequency of the cascaded amplifier, then which one of the following is correct?
 a) $f_H(n) = 0.707 f_H$ b) $f_H(n) = \sqrt{(2^{\frac{1}{N}} - 1)} f_H$
 c) $f_H = \sqrt{(2^{\frac{1}{N}} - 1)} f_H(n)$ d) $f_H(n) = \frac{f_H}{\sqrt{(2^{\frac{1}{N}} - 1)}}$

- 7) Drift is the serious problem in _____.
- RC coupled amplifier
 - Direct couple amplifier
 - Complementary symm. Power amplifier
 - Transformer coupled amplifier
- 8) An emitter follower circuit is an example of _____.
- Voltage series negative feed back
 - Current series negative feedback
 - Both voltage and current
 - None of the above
- 9) Gain Stability equation in Negative feedback is given by following
- $\frac{dAvf}{Avf} = \frac{1}{(1 + Av \beta)} \frac{dAv}{Av}$
 - $\frac{dAv}{Av} = \frac{1}{(1 + Av \beta)} \frac{dAvf}{Avf}$
 - $\frac{dAvf}{Avf} = \frac{1}{(1 - Av \beta)} \frac{dAv}{Av}$
 - $\frac{dAv}{Av} = \frac{1}{(1 - Av \beta)} \frac{dAvf}{Avf}$
- 10) When current series negative feedback is applied to an amplifier, its input impedance and output impedance _____.
- Increases, decreases
 - Decreases, increase
 - Remains the same
 - Increases, increases
- 11) Wien bridge oscillator is most often used whenever _____.
- Wide range of high purity sign waves is to be generated
 - High feedback ratio is needed
 - Square wave output waves are required
 - Extremely high resonant frequencies are required
- 12) Condition to get sustained oscillation is _____.
- A Loop gain is greater than or equal to unity
 - gain around the feedback loop of one-third
 - A phase shift around the Amplifier & feedback loop of 0°
 - Both a & c
- 13) In Colppits oscillator minimum condition on gain to get sustained oscillation.
- $h_{fe} = \frac{L1}{L2}$
 - $Av = \frac{C1}{C2}$
 - $h_{fe} = \frac{C2}{C1}$
 - $h_{fe} = \frac{L2}{L1}$
- 14) Class AB operation is often used in large signal amplifiers in order to _____.
- get maximum efficiency
 - remove even harmonics
 - overcome crossover distortion
 - reduce collector dissipation

Seat No.	
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
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Max. Marks: 70

- Instructions:** 1) All questions are compulsory.
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Section – I

Q.2 Solve any four of the following questions. 16

- a) Why we need multistage amplifier? Prove that overall voltage gain in dB is sum of individual stage voltage gain expressed in dB.
- b) Explain important parameter of JFET and prove that $\mu = r_d * g_m$.
- c) Explain CMOS structure & CMOS as Inverter.
- d) Compare all coupling scheme in multistage amplifier.
- e) Design JFET as CS amplifier to provide voltage gain of 25 at peak o/p voltage of 3.5 V to give $I_D = I_{DSS}/2$ with JFET 2N3822 having Specification, $I_{DSS} = 2 \text{ mA}$ $V_p = -6 \text{ V}$ $r_d = 50 \text{ K}\Omega$ $g_m = 3 \text{ m mho}$.
- f) Derive expression for voltage divider biasing of JFET with mathematical and Graphical approach.

Q.3 Solve any two of the following questions. 12

- a) Explain Construction & working of n-channel JFET with drain & transfer characteristics along with experimental set-up.
- b) Explain Hybrid parameters of Transistor and Derive the expression for A_v , A_i , R_i , R_o for two stage RC couple amplifier using voltage divider Bias method.
- c) Explain Construction & working of n-channel D-MOSFET with drain & transfer characteristics along with experimental set-up.

Section – II

Q.4 Solve any four of the following questions. 16

- a) What is the effect of negative feedback on gain stability of amplifier? Explain.
- b) Explain the need of negative feedback in an amplifier. With suitable block diagram calculate input resistance and output resistance of voltage series negative feedback.
- c) Explain principal of crystal oscillator and Derive the equations for resonant frequencies with equivalent circuit.
- d) Explain the essential conditions to have sustained oscillations with frequency of oscillation of Colpitts oscillator.
- e) Explain transformerless Class A power amplifier.
- f) Explain Cross-over distortion in power amplifier. Explain method to eliminate this Distortion.

Q.5 Solve any two of the following questions.

- a)** Design RC phase shift oscillator for output frequency of oscillations of 20 KHz with load impedance of $5\text{ K}\Omega$ and peak to peak output of 6 V. Use $V_{cc} = 12\text{ V}$.
- b)** Explain the operation of class B push-pull power amplifier. Derive the equation for conversion efficiency for Class B push pull power amplifier.
- c)** Design Voltage series feedback amplifier for rms voltage 5V and O/P freq. 10 KHz using transistor. Transistor used is having following specifications $V_{cc}=12\text{V}$ $h_{fe} = 110$, $h_{ie} = 1.5\text{ k}\Omega$. $V_{CE\text{ max}} = 45\text{ V}$, Stability factor = 10, $V_{BE} = 0.7\text{ V}$.

Seat No.	
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Set	Q
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

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 a) $\frac{dAvf}{Avf} = \frac{1}{(1 + Av \beta)} \frac{dAv}{Av}$ b) $\frac{dAv}{Av} = \frac{1}{(1 + Av \beta)} \frac{dAvf}{Avf}$
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- 12) For the FET, the relationship between the input and output quantities is _____ due to the _____ term in Shockley's equation.
- a) Nonlinear, cubed b) Nonlinear, squared
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d) Transformer coupled amplifier

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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

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Section – I

Q.2 Solve any four of the following questions. 16

- Why we need multistage amplifier? Prove that overall voltage gain in dB is sum of individual stage voltage gain expressed in dB.
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- Explain CMOS structure & CMOS as Inverter.
- Compare all coupling scheme in multistage amplifier.
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- Derive expression for voltage divider biasing of JFET with mathematical and Graphical approach.

Q.3 Solve any two of the following questions. 12

- Explain Construction & working of n-channel JFET with drain & transfer characteristics along with experimental set-up.
- Explain Hybrid parameters of Transistor and Derive the expression for A_v , A_i , R_i , R_o for two stage RC couple amplifier using voltage divider Bias method.
- Explain Construction & working of n-channel D-MOSFET with drain & transfer characteristics along with experimental set-up.

Section – II

Q.4 Solve any four of the following questions. 16

- What is the effect of negative feedback on gain stability of amplifier? Explain.
- Explain the need of negative feedback in an amplifier. With suitable block diagram calculate input resistance and output resistance of voltage series negative feedback.
- Explain principal of crystal oscillator and Derive the equations for resonant frequencies with equivalent circuit.
- Explain the essential conditions to have sustained oscillations with frequency of oscillation of Colpitts oscillator.
- Explain transformerless Class A power amplifier.
- Explain Cross-over distortion in power amplifier. Explain method to eliminate this Distortion.

Q.5 Solve any two of the following questions.

- a)** Design RC phase shift oscillator for output frequency of oscillations of 20 KHz with load impedance of $5\text{ K}\Omega$ and peak to peak output of 6 V. Use $V_{cc} = 12\text{ V}$.
- b)** Explain the operation of class B push-pull power amplifier. Derive the equation for conversion efficiency for Class B push pull power amplifier.
- c)** Design Voltage series feedback amplifier for rms voltage 5V and O/P freq. 10 KHz using transistor. Transistor used is having following specifications $V_{cc}=12\text{V}$ $h_{fe} = 110$, $h_{ie} = 1.5\text{ k}\Omega$. $V_{CE\text{ max}} = 45\text{ V}$, Stability factor = 10, $V_{BE} = 0.7\text{ V}$.

Seat
No.

S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.
 3) Use of datasheet and non-programmable calculator is allowed.
 4) Assume suitable data wherever required.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) For the FET, the relationship between the input and output quantities is _____ due to the _____ term in Shockley's equation.

a) Nonlinear, cubed	b) Nonlinear, squared
c) linear, Proportion	d) Nonlinear, Proportional

- 2) A cascaded amplifier comprises N identical non interacting stages, each having a upper 3 dB frequency of f_H . If $f_H(n)$ is the upper 3 dB frequency of the cascaded amplifier, then which one of the following is correct?

a) $f_H(n) = 0.707 f_H$	b) $f_H(n) = \sqrt{(2^N - 1)} f_H$
c) $f_H = \sqrt{(2^N - 1)} f_H(n)$	d) $f_H(n) = \frac{f_H}{\sqrt{(2^N - 1)}}$

- 3) Drift is the serious problem in _____.

a) RC coupled amplifier
b) Direct couple amplifier
c) Complementary symm. Power amplifier
d) Transformer coupled amplifier

- 4) An emitter follower circuit is an example of _____.

a) Voltage series negative feed back
b) Current series negative feedback
c) Both voltage and current
d) None of the above

- 5) Gain Stability equation in Negative feedback is given by following

a) $\frac{dAvf}{Avf} = \frac{1}{(1 + Av \beta)} \frac{dAv}{Av}$	b) $\frac{dAv}{Av} = \frac{1}{(1 + Av \beta)} \frac{dAvf}{Avf}$
c) $\frac{dAvf}{Avf} = \frac{1}{(1 - Av \beta)} \frac{dAv}{Av}$	d) $\frac{dAv}{Av} = \frac{1}{(1 - Av \beta)} \frac{dAvf}{Avf}$

- 6) When current series negative feedback is applied to an amplifier, its input impedance and output impedance _____.

a) Increases, decreases	b) Decreases, increase
c) Remains the same	d) Increases, increases

- 7) Wien bridge oscillator is most often used whenever _____.
- Wide range of high purity sign waves is to be generated
 - High feedback ratio is needed
 - Square wave output waves are required
 - Extremely high resonant frequencies are required
- 8) Condition to get sustained oscillation is _____.
- A Loop gain is greater than or equal to unity
 - gain around the feedback loop of one-third
 - A phase shift around the Amplifier & feedback loop of 0°
 - Both a & c
- 9) In Colppits oscillator minimum condition on gain to get sustained oscillation.
- $h_{fe} = \frac{L1}{L2}$
 - $Av = \frac{C1}{C2}$
 - $h_{fe} = \frac{C2}{C1}$
 - $h_{fe} = \frac{L2}{L1}$
- 10) Class AB operation is often used in large signal amplifiers in order to _____.
- get maximum efficiency
 - remove even harmonics
 - overcome crossover distortion
 - reduce collector dissipation
- 11) A JFET always operates with _____.
- gate to source reverse biased
 - gate conned to source
 - gate to source forward biased
 - drain conned to ground
- 12) The drain current will always be one-fourth of $IDSS$ as long as the gate-to-source voltage is _____ the pinch-off value
- one-fourth
 - one-half
 - three-fourths
 - None
- 13) Which of the following ratings appear(s) in the specification sheet for an FET?
- Voltages between specific terminals
 - Current levels
 - Power dissipation
 - All of the above
- 14) Which of the following describe(s) the difference(s) between JFETs and depletion type MOSFETs?
- V only negative for GS the depletion type
 - $IDSS$ can exceed ID for the depletion type
 - The depletion type can operate in the enhancement mode
 - All of the above

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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

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Section – I

Q.2 Solve any four of the following questions. 16

- a) Why we need multistage amplifier? Prove that overall voltage gain in dB is sum of individual stage voltage gain expressed in dB.
- b) Explain important parameter of JFET and prove that $\mu = r_d * g_m$.
- c) Explain CMOS structure & CMOS as Inverter.
- d) Compare all coupling scheme in multistage amplifier.
- e) Design JFET as CS amplifier to provide voltage gain of 25 at peak o/p voltage of 3.5 V to give $I_D = I_{DSS}/2$ with JFET 2N3822 having Specification, $I_{DSS} = 2 \text{ mA}$ $V_p = -6 \text{ V}$ $r_d = 50 \text{ K}\Omega$ $g_m = 3 \text{ m mho}$.
- f) Derive expression for voltage divider biasing of JFET with mathematical and Graphical approach.

Q.3 Solve any two of the following questions. 12

- a) Explain Construction & working of n-channel JFET with drain & transfer characteristics along with experimental set-up.
- b) Explain Hybrid parameters of Transistor and Derive the expression for A_v , A_i , R_i , R_o for two stage RC couple amplifier using voltage divider Bias method.
- c) Explain Construction & working of n-channel D-MOSFET with drain & transfer characteristics along with experimental set-up.

Section – II

Q.4 Solve any four of the following questions. 16

- a) What is the effect of negative feedback on gain stability of amplifier? Explain.
- b) Explain the need of negative feedback in an amplifier. With suitable block diagram calculate input resistance and output resistance of voltage series negative feedback.
- c) Explain principal of crystal oscillator and Derive the equations for resonant frequencies with equivalent circuit.
- d) Explain the essential conditions to have sustained oscillations with frequency of oscillation of Colpitts oscillator.
- e) Explain transformerless Class A power amplifier.
- f) Explain Cross-over distortion in power amplifier. Explain method to eliminate this Distortion.

Q.5 Solve any two of the following questions.

- a) Design RC phase shift oscillator for output frequency of oscillations of 20 KHz with load impedance of $5\text{ K}\Omega$ and peak to peak output of 6 V. Use $V_{cc} = 12\text{ V}$.
- b) Explain the operation of class B push-pull power amplifier. Derive the equation for conversion efficiency for Class B push pull power amplifier.
- c) Design Voltage series feedback amplifier for rms voltage 5V and O/P freq. 10 KHz using transistor. Transistor used is having following specifications $V_{cc}=12\text{V}$ $h_{fe} = 110$, $h_{ie} = 1.5\text{ k}\Omega$. $V_{CE\text{ max}} = 45\text{ V}$, Stability factor = 10, $V_{BE} = 0.7\text{ V}$.

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**S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN**

Day & Date: Tuesday, 10-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. 1 is compulsory and should be solved in first 30 minutes in answer book.
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4) Assume suitable data wherever required.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) When current series negative feedback is applied to an amplifier, its input impedance and output impedance _____.
a) Increases, decreases b) Decreases, increase
c) Remains the same d) Increases, increases
- 2) Wien bridge oscillator is most often used whenever _____.
a) Wide range of high purity sign waves is to be generated
b) High feedback ratio is needed
c) Square wave output waves are required
d) Extremely high resonant frequencies are required
- 3) Condition to get sustained oscillation is _____.
a) A Loop gain is greater than or equal to unity
b) gain around the feedback loop of one-third
c) A phase shift around the Amplifier & feedback loop of 0°
d) Both a & c
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c) $h_{fe} = \frac{C2}{C1}$ d) $h_{fe} = \frac{L2}{L1}$
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- 6) A JFET always operates with _____.
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- 8) Which of the following ratings appear(s) in the specification sheet for an FET?
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 - Power dissipation
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 - IDSS can exceed ID for the depletion type
 - The depletion type can operate in the enhancement mode
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 - Nonlinear, squared
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 - $f_H = \sqrt{(2^{\frac{1}{N}} - 1)} f_H(n)$
 - $f_H(n) = \frac{f_H}{\sqrt{(2^{\frac{1}{N}} - 1)}}$
- 12) Drift is the serious problem in _____.
- RC coupled amplifier
 - Direct couple amplifier
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- 13) An emitter follower circuit is an example of _____.
- Voltage series negative feed back
 - Current series negative feedback
 - Both voltage and current
 - None of the above
- 14) Gain Stability equation in Negative feedback is given by following
- $\frac{dAvf}{Avf} = \frac{1}{(1 + Av \beta)} \frac{dAv}{Av}$
 - $\frac{dAv}{Av} = \frac{1}{(1 + Av \beta)} \frac{dAvf}{Avf}$
 - $\frac{dAvf}{Avf} = \frac{1}{(1 - Av \beta)} \frac{dAv}{Av}$
 - $\frac{dAv}{Av} = \frac{1}{(1 - Av \beta)} \frac{dAvf}{Avf}$

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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

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 2) Figures to right indicate full marks.
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Section – I

Q.2 Solve any four of the following questions. 16

- a) Why we need multistage amplifier? Prove that overall voltage gain in dB is sum of individual stage voltage gain expressed in dB.
- b) Explain important parameter of JFET and prove that $\mu = r_d * g_m$.
- c) Explain CMOS structure & CMOS as Inverter.
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- e) Design JFET as CS amplifier to provide voltage gain of 25 at peak o/p voltage of 3.5 V to give $I_D = I_{DSS}/2$ with JFET 2N3822 having Specification, $I_{DSS} = 2 \text{ mA}$ $V_p = -6 \text{ V}$ $r_d = 50 \text{ K}\Omega$ $g_m = 3 \text{ m mho}$.
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Q.3 Solve any two of the following questions. 12

- a) Explain Construction & working of n-channel JFET with drain & transfer characteristics along with experimental set-up.
- b) Explain Hybrid parameters of Transistor and Derive the expression for A_v , A_i , R_i , R_o for two stage RC couple amplifier using voltage divider Bias method.
- c) Explain Construction & working of n-channel D-MOSFET with drain & transfer characteristics along with experimental set-up.

Section – II

Q.4 Solve any four of the following questions. 16

- a) What is the effect of negative feedback on gain stability of amplifier? Explain.
- b) Explain the need of negative feedback in an amplifier. With suitable block diagram calculate input resistance and output resistance of voltage series negative feedback.
- c) Explain principal of crystal oscillator and Derive the equations for resonant frequencies with equivalent circuit.
- d) Explain the essential conditions to have sustained oscillations with frequency of oscillation of Colpitts oscillator.
- e) Explain transformerless Class A power amplifier.
- f) Explain Cross-over distortion in power amplifier. Explain method to eliminate this Distortion.

Q.5 Solve any two of the following questions.

- a) Design RC phase shift oscillator for output frequency of oscillations of 20 KHz with load impedance of $5\text{ K}\Omega$ and peak to peak output of 6 V. Use $V_{cc} = 12\text{ V}$.
- b) Explain the operation of class B push-pull power amplifier. Derive the equation for conversion efficiency for Class B push pull power amplifier.
- c) Design Voltage series feedback amplifier for rms voltage 5V and O/P freq. 10 KHz using transistor. Transistor used is having following specifications $V_{cc}=12\text{V}$ $h_{fe} = 110$, $h_{ie} = 1.5\text{ k}\Omega$. $V_{CE\text{ max}} = 45\text{ V}$, Stability factor = 10, $V_{BE} = 0.7\text{ V}$.

Seat No.	
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S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The transient response occurs _____.
 - a) Only in resistive circuits
 - b) Only in inductive circuits
 - c) Only in capacitive circuits
 - d) Both in inductive and capacitive
- 2) The time constant of a series RL circuit is _____.
 - a) LR
 - b) L/R
 - c) R/L
 - d) e-R/L
- 3) The function is said to be having simple poles and zeros only if _____.
 - a) The poles are not repeated
 - b) The zeros are not repeated
 - c) Both poles and zeros are not repeated
 - d) None of the above
- 4) The characteristic equation of a network function $F(s)$ has roots denoted by $s_1=s_2=-a$. How is the root categorized?
 - a) A zero at $-a$
 - b) A double zero at $-a$
 - c) A simple pole at $-a$
 - d) A double pole at $-a$
- 5) A one-port network is made up of an inductor only. Which of the following is not a correct depiction of the poles and zeros?
 - a) Pole at $s=0$
 - b) Zero at $s=0$
 - c) Pole at $s=\infty$
 - d) None of these
- 6) In the m -derived high pass filter, the resonant frequency is to be chosen so that it is _____.
 - a) Above the cut-off frequency
 - b) Below the cut-off frequency
 - c) Random frequency
 - d) None of the above
- 7) A filter is formed by reverse type of reactances. What should be the range of variation of Z_1/Z_2 for the filter to have a pass band?
 - a) $+\infty$ to 0
 - b) 0 to -1
 - c) -1 to $-\infty$
 - d) None of these

- 8) In parallel resonance, resonance occurs when susceptance part of admittance is _____.
 a) infinite b) $X_L > X_C$
 c) $X_C > X_L$ d) Zero
- 9) In a series RLC circuit, the resonant frequency _____ if C is increased.
 a) Increases b) Decreases
 c) Remains unchanged d) Becomes zero
- 10) For a two port network to be reciprocal _____.
 a) $Z_{11} = Z_{22}$ b) $Y_{21} = Y_{12}$
 c) $h_{21} = -h_{12}$ d) $AD - BC = 0$
- 11) For a two-port bilateral network, the three transmission parameters are given by $A=6/5$, $B=17/5$ and $C=1/5$, what is the value of D?
 a) $7/5$ b) $1/5$
 c) 1 d) 3
- 12) Superposition theorem is not valid for _____.
 a) Voltage responses b) Current responses
 c) Power responses d) All of above
- 13) Norton's equivalent circuit consists of _____.
 a) Voltage source in parallel with impedance
 b) Voltage source in series with impedance
 c) Current source in parallel with impedance
 d) Current source in series with impedance
- 14) Superposition theorem is not applicable to networks containing
 a) Non-linear elements b) Dependent voltage sources
 c) Dependent current sources d) Transformers

Seat No.	
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**S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
NETWORK THEORY AND ANALYSIS**

Day & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

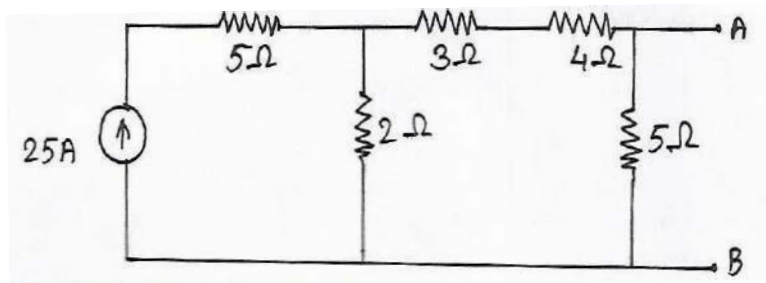
- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

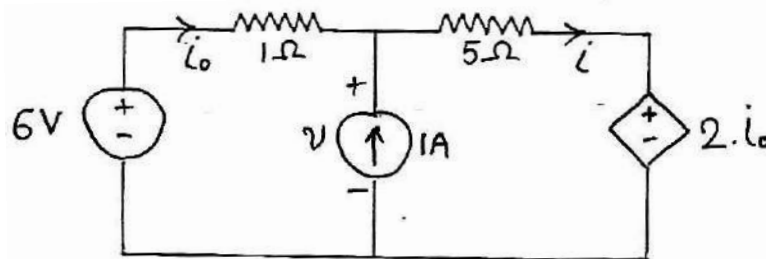
Q.2 Attempt any four.

16

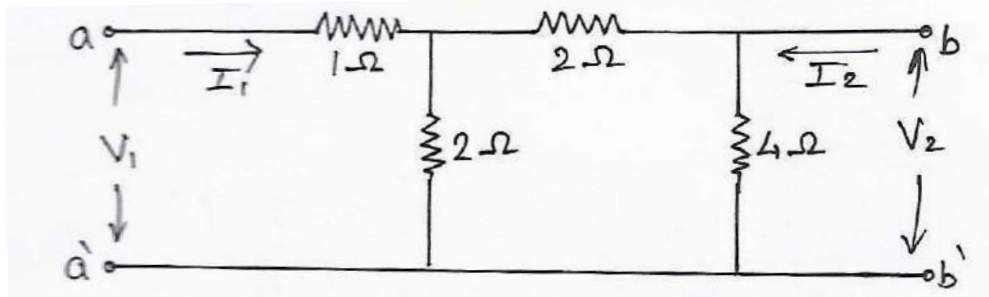
- a) Determine the Norton's equivalent circuit for the network shown below.



- b) Find i_0 and i using Superposition theorem for the network shown below.



- c) Explain Bandwidth and Selectivity w. r. t. series resonant circuit.
d) Find the short circuit parameters for the circuit shown below.



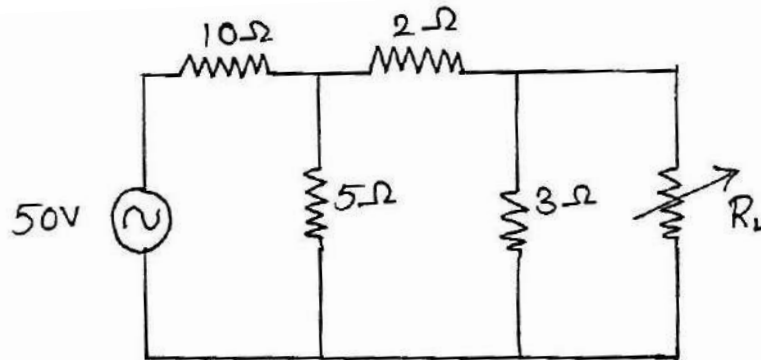
- e) Draw and explain cascade connection of a two port network.

Q.3 Attempt any two.

12

- a) Derive an expression of frequencies at which V_L and V_C are maximum for a series resonant circuit.
b) Express driving point impedance at input port of a load terminated two port networks.

- c) State Maximum Power Transfer Theorem and also find maximum power delivered to the load for the network shown below.



Section – II

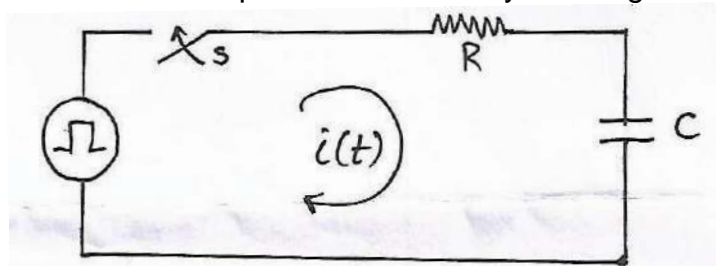
Q.4 Attempt any four

16

- a) Design a K-type low pass filter (T and π) for having a cut-off frequency of 2 KHz for a load impedance of 500 Ohms.
 b) Draw the pole zero plot for the given network function below and obtain the time domain response

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

- c) Determine the current $i(t)$ for the circuit shown below with a rectangular pulse of unit height and T seconds duration as an input when switch is closed at $t=0$. Assume the capacitor to be initially uncharged.

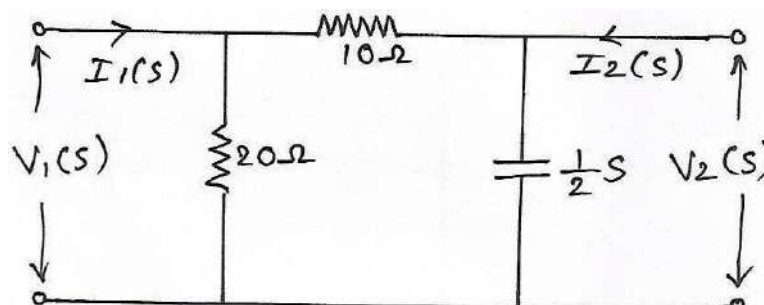


- d) Explain the significance of poles and zeros w. r. t transfer function of a network.
 e) Compute parameters of a π configuration attenuator with load resistance of 150 Ohms to cause an attenuation of 24 dB.

Q.5 Attempt any two.

12

- a) Explain what is forced and natural response. Also derive an expression for $i(t)$ then $V_u(t)$ is applied to a series RLC circuit.
 b) Obtain the design equations for m-derived high pass filter.
 c) For the two-port network shown below, calculate the input impedance $Z_{11}(s)$.



Seat No.	
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**S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
NETWORK THEORY AND ANALYSIS**

Day & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In parallel resonance, resonance occurs when susceptance part of admittance is _____.
 - a) infinite
 - b) $X_L > X_C$
 - c) $X_C > X_L$
 - d) Zero
- 2) In a series RLC circuit, the resonant frequency _____ if C is increased.
 - a) Increases
 - b) Decreases
 - c) Remains unchanged
 - d) Becomes zero
- 3) For a two port network to be reciprocal _____.
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- 4) For a two-port bilateral network, the three transmission parameters are given by $A=6/5$, $B=17/5$ and $C=1/5$, what is the value of D?
 - a) $7/5$
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 - c) 1
 - d) 3
- 5) Superposition theorem is not valid for _____.
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Seat No.	
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**S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
NETWORK THEORY AND ANALYSIS**

Day & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

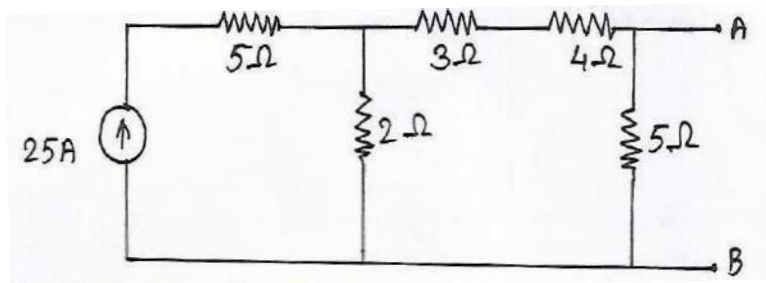
- Instructions:** 1) All questions are compulsory.
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Section – I

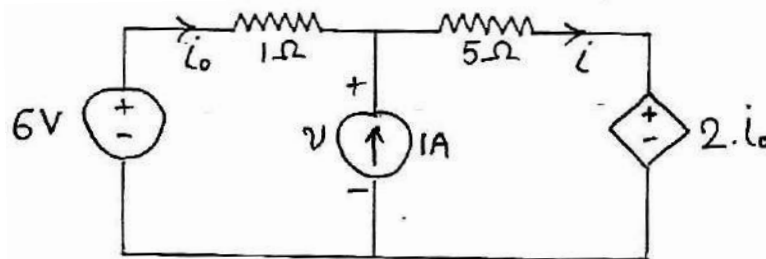
Q.2 Attempt any four.

16

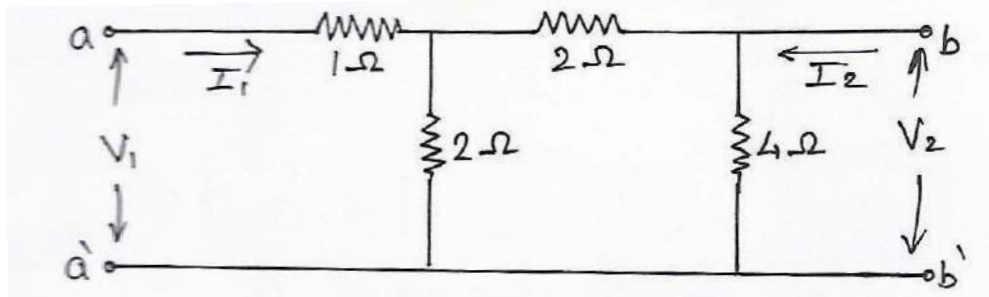
- a) Determine the Norton's equivalent circuit for the network shown below.



- b) Find i_0 and i using Superposition theorem for the network shown below.



- c) Explain Bandwidth and Selectivity w. r. t. series resonant circuit.
d) Find the short circuit parameters for the circuit shown below.



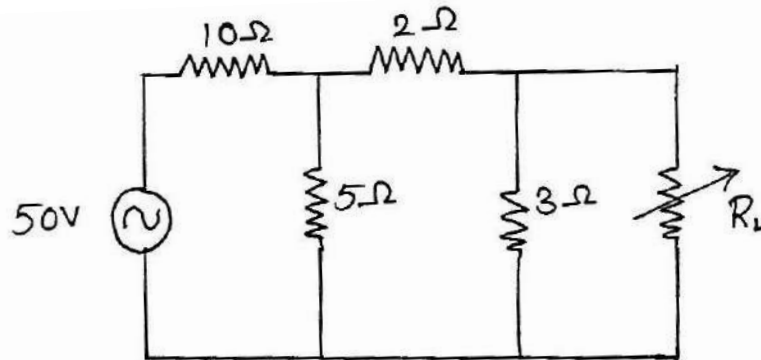
- e) Draw and explain cascade connection of a two port network.

Q.3 Attempt any two.

12

- a) Derive an expression of frequencies at which V_L and V_C are maximum for a series resonant circuit.
b) Express driving point impedance at input port of a load terminated two port networks.

- c) State Maximum Power Transfer Theorem and also find maximum power delivered to the load for the network shown below.



Section – II

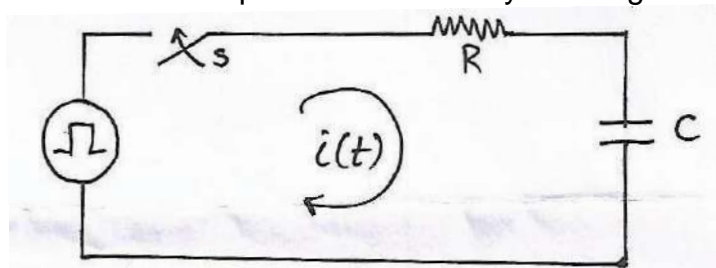
Q.4 Attempt any four

16

- a) Design a K-type low pass filter (T and π) for having a cut-off frequency of 2 KHz for a load impedance of 500 Ohms.
 b) Draw the pole zero plot for the given network function below and obtain the time domain response

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

- c) Determine the current $i(t)$ for the circuit shown below with a rectangular pulse of unit height and T seconds duration as an input when switch is closed at $t=0$. Assume the capacitor to be initially uncharged.

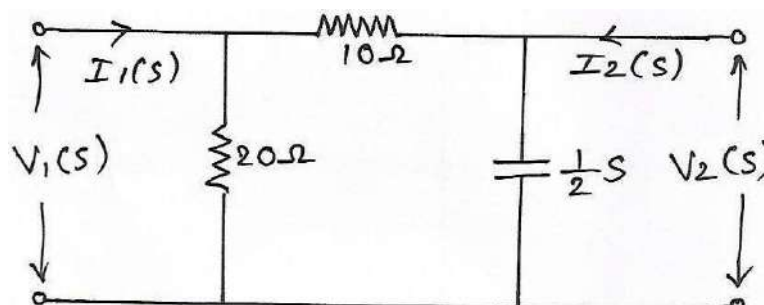


- d) Explain the significance of poles and zeros w. r. t transfer function of a network.
 e) Compute parameters of a π configuration attenuator with load resistance of 150 Ohms to cause an attenuation of 24 dB.

Q.5 Attempt any two.

12

- a) Explain what is forced and natural response. Also derive an expression for $i(t)$ then $V_u(t)$ is applied to a series RLC circuit.
 b) Obtain the design equations for m-derived high pass filter.
 c) For the two-port network shown below, calculate the input impedance $Z_{11}(s)$.



Seat
No.

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S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) A one-port network is made up of an inductor only. Which of the following is not a correct depiction of the poles and zeros?
 - a) Pole at $s=0$
 - b) Zero at $s=0$
 - c) Pole at $s=\infty$
 - d) None of these
- 2) In the m-derived high pass filter, the resonant frequency is to be chosen so that it is _____.
 - a) Above the cut-off frequency
 - b) Below the cut-off frequency
 - c) Random frequency
 - d) None of the above
- 3) A filter is formed by reverse type of reactances. What should be the range of variation of $Z_1/4Z_2$ for the filter to have a pass band?
 - a) $+\infty$ to 0
 - b) 0 to -1
 - c) -1 to $-\infty$
 - d) None of these
- 4) In parallel resonance, resonance occurs when susceptance part of admittance is _____.
 - a) infinite
 - b) $X_L > X_C$
 - c) $X_C > X_L$
 - d) Zero
- 5) In a series RLC circuit, the resonant frequency _____ if C is increased.
 - a) Increases
 - b) Decreases
 - c) Remains unchanged
 - d) Becomes zero
- 6) For a two port network to be reciprocal _____.
 - a) $Z_{11}=Z_{22}$
 - b) $Y_{21}=Y_{12}$
 - c) $h_{21} = -h_{12}$
 - d) $AD - BC=0$
- 7) For a two-port bilateral network, the three transmission parameters are given by $A=6/5$, $B=17/5$ and $C=1/5$, what is the value of D?
 - a) $7/5$
 - b) $1/5$
 - c) 1
 - d) 3
- 8) Superposition theorem is not valid for _____.
 - a) Voltage responses
 - b) Current responses
 - c) Power responses
 - d) All of above

- 9) Norton's equivalent circuit consists of _____.
a) Voltage source in parallel with impedance
b) Voltage source in series with impedance
c) Current source in parallel with impedance
d) Current source in series with impedance
- 10) Superposition theorem is not applicable to networks containing
a) Non-linear elements b) Dependent voltage sources
c) Dependent current sources d) Transformers
- 11) The transient response occurs _____.
a) Only in resistive circuits
b) Only in inductive circuits
c) Only in capacitive circuits
d) Both in inductive and capacitive
- 12) The time constant of a series RL circuit is _____.
a) LR b) L/R
c) R/L d) e-R/L
- 13) The function is said to be having simple poles and zeros only if _____.
a) The poles are not repeated
b) The zeros are not repeated
c) Both poles and zeros are not repeated
d) None of the above
- 14) The characteristic equation of a network function $F(s)$ has roots denoted by $s_1=s_2=-a$. How is the root categorized?
a) A zero at $-a$ b) A double zero at $-a$
c) A simple pole at $-a$ d) A double pole at $-a$

Seat No.	
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Set	R
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**S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
NETWORK THEORY AND ANALYSIS**

Day & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

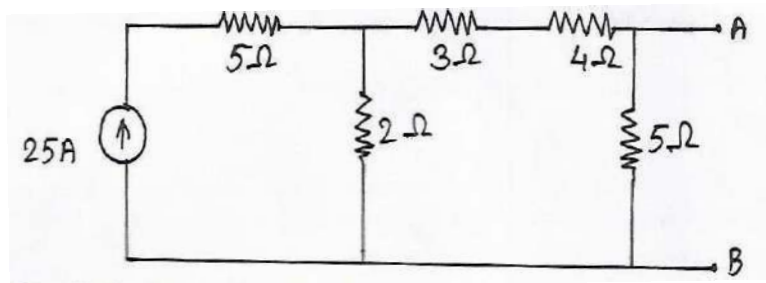
- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

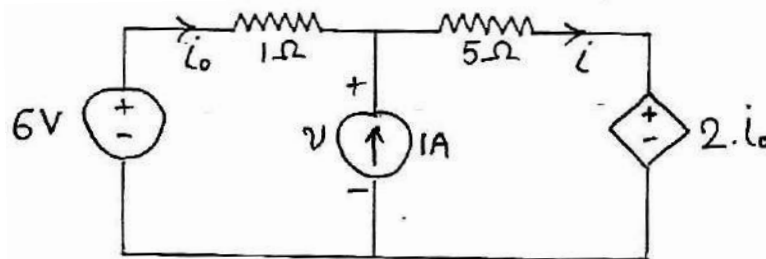
Q.2 Attempt any four.

16

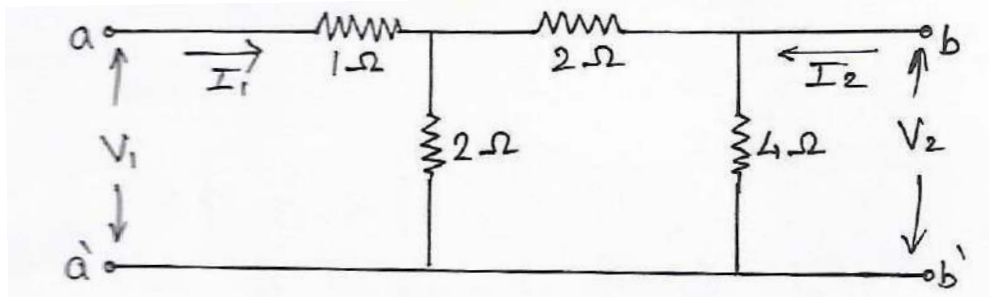
- a) Determine the Norton's equivalent circuit for the network shown below.



- b) Find i_0 and i using Superposition theorem for the network shown below.



- c) Explain Bandwidth and Selectivity w. r. t. series resonant circuit.
d) Find the short circuit parameters for the circuit shown below.



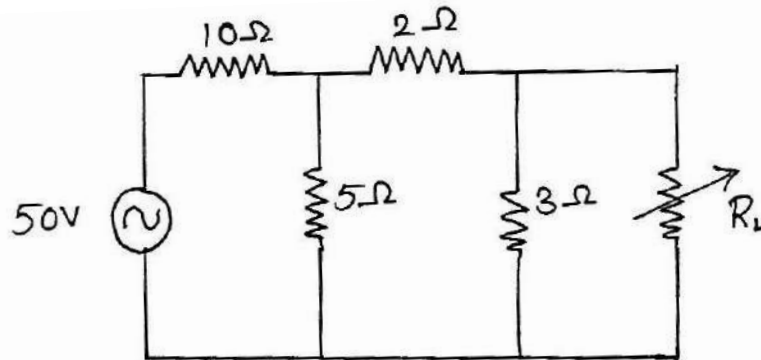
- e) Draw and explain cascade connection of a two port network.

Q.3 Attempt any two.

12

- a) Derive an expression of frequencies at which V_L and V_C are maximum for a series resonant circuit.
b) Express driving point impedance at input port of a load terminated two port networks.

- c) State Maximum Power Transfer Theorem and also find maximum power delivered to the load for the network shown below.



Section – II

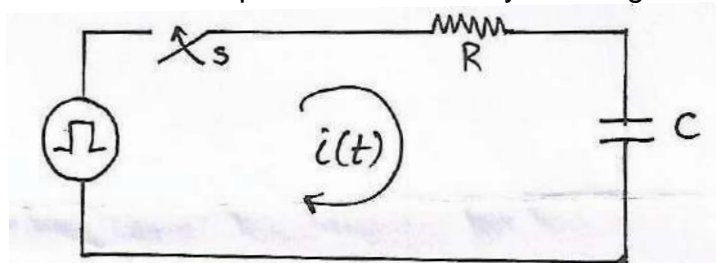
Q.4 Attempt any four

16

- a) Design a K-type low pass filter (T and π) for having a cut-off frequency of 2 KHz for a load impedance of 500 Ohms.
 b) Draw the pole zero plot for the given network function below and obtain the time domain response

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

- c) Determine the current $i(t)$ for the circuit shown below with a rectangular pulse of unit height and T seconds duration as an input when switch is closed at $t=0$. Assume the capacitor to be initially uncharged.

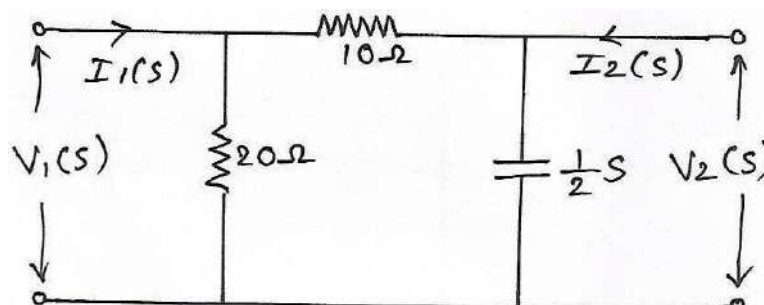


- d) Explain the significance of poles and zeros w. r. t transfer function of a network.
 e) Compute parameters of a π configuration attenuator with load resistance of 150 Ohms to cause an attenuation of 24 dB.

Q.5 Attempt any two.

12

- a) Explain what is forced and natural response. Also derive an expression for $i(t)$ then $V_u(t)$ is applied to a series RLC circuit.
 b) Obtain the design equations for m-derived high pass filter.
 c) For the two-port network shown below, calculate the input impedance $Z_{11}(s)$.



Seat No.	
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Set **S**

S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) For a two port network to be reciprocal _____.
 - a) $Z_{11}=Z_{22}$
 - b) $Y_{21}=Y_{22}$
 - c) $h_{21}= - h_{12}$
 - d) $AD - BC=0$
- 2) For a two-port bilateral network, the three transmission parameters are given by $A=6/5$, $B=17/5$ and $C=1/5$, what is the value of D?
 - a) $7/5$
 - b) $1/5$
 - c) 1
 - d) 3
- 3) Superposition theorem is not valid for _____.
 - a) Voltage responses
 - b) Current responses
 - c) Power responses
 - d) All of above
- 4) Norton's equivalent circuit consists of _____.
 - a) Voltage source in parallel with impedance
 - b) Voltage source in series with impedance
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 - d) Current source in series with impedance
- 5) Superposition theorem is not applicable to networks containing
 - a) Non-linear elements
 - b) Dependent voltage sources
 - c) Dependent current sources
 - d) Transformers
- 6) The transient response occurs _____.
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 - b) Only in inductive circuits
 - c) Only in capacitive circuits
 - d) Both in inductive and capacitive
- 7) The time constant of a series RL circuit is _____.
 - a) LR
 - b) L/R
 - c) R/L
 - d) e-R/L
- 8) The function is said to be having simple poles and zeros only if _____.
 - a) The poles are not repeated
 - b) The zeros are not repeated
 - c) Both poles and zeros are not repeated
 - d) None of the above

- 9) The characteristic equation of a network function $F(s)$ has roots denoted by $s_1=s_2=-a$. How is the root categorized?
- a) A zero at $-a$
 - b) A double zero at $-a$
 - c) A simple pole at $-a$
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 - b) Zero at $s=0$
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- 11) In the m -derived high pass filter, the resonant frequency is to be chosen so that it is _____.
- a) Above the cut-off frequency
 - b) Below the cut-off frequency
 - c) Random frequency
 - d) None of the above
- 12) A filter is formed by reverse type of reactances. What should be the range of variation of $Z_1/4Z_2$ for the filter to have a pass band?
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- 13) In parallel resonance, resonance occurs when susceptance part of admittance is _____.
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 - b) $X_L > X_C$
 - c) $X_C > X_L$
 - d) Zero
- 14) In a series RLC circuit, the resonant frequency _____ if C is increased.
- a) Increases
 - b) Decreases
 - c) Remains unchanged
 - d) Becomes zero

Seat No.	
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**S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
NETWORK THEORY AND ANALYSIS**

Day & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

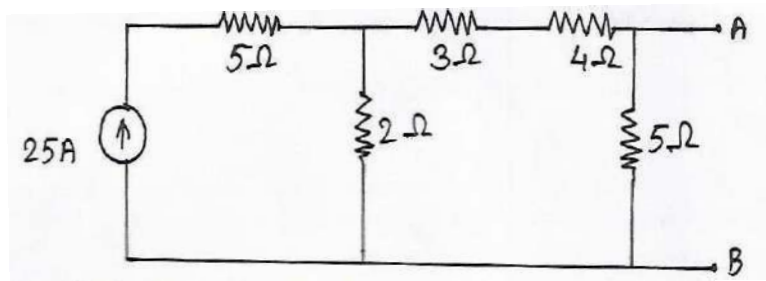
- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

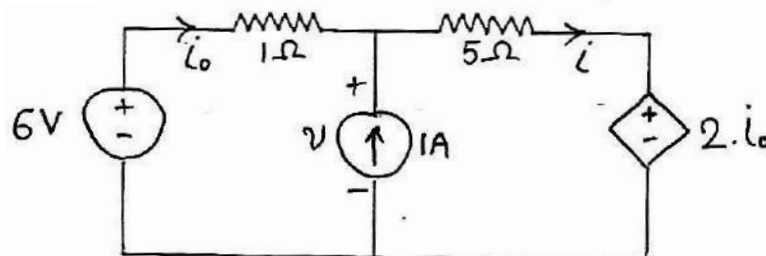
Q.2 Attempt any four.

16

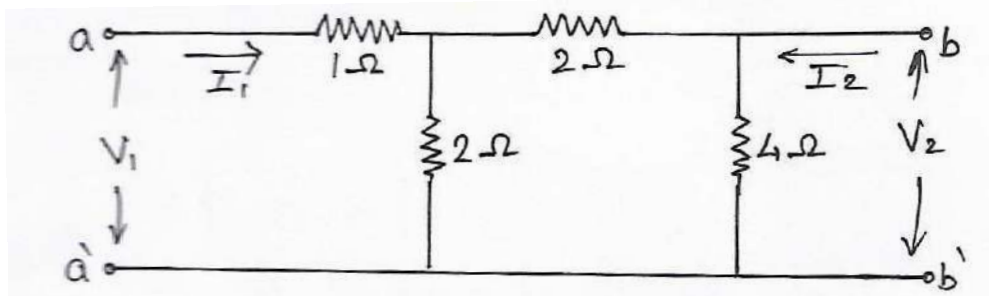
- a) Determine the Norton's equivalent circuit for the network shown below.



- b) Find i_0 and i using Superposition theorem for the network shown below.



- c) Explain Bandwidth and Selectivity w. r. t. series resonant circuit.
d) Find the short circuit parameters for the circuit shown below.



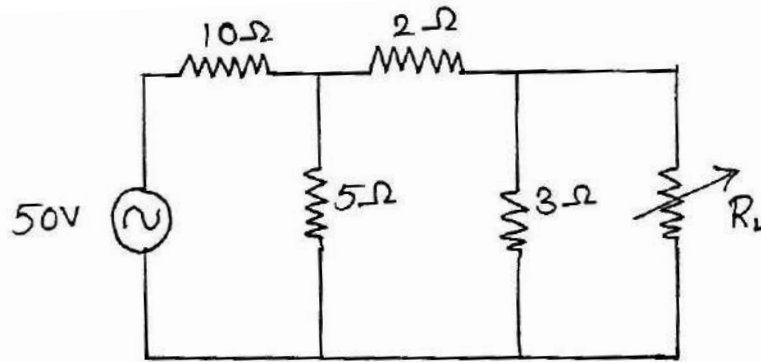
- e) Draw and explain cascade connection of a two port network.

Q.3 Attempt any two.

12

- a) Derive an expression of frequencies at which V_L and V_C are maximum for a series resonant circuit.
b) Express driving point impedance at input port of a load terminated two port networks.

- c) State Maximum Power Transfer Theorem and also find maximum power delivered to the load for the network shown below.



Section – II

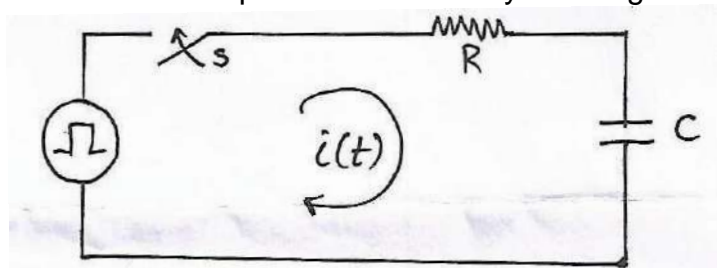
Q.4 Attempt any four

16

- a) Design a K-type low pass filter (T and π) for having a cut-off frequency of 2 KHz for a load impedance of 500 Ohms.
 b) Draw the pole zero plot for the given network function below and obtain the time domain response

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

- c) Determine the current $i(t)$ for the circuit shown below with a rectangular pulse of unit height and T seconds duration as an input when switch is closed at $t=0$. Assume the capacitor to be initially uncharged.

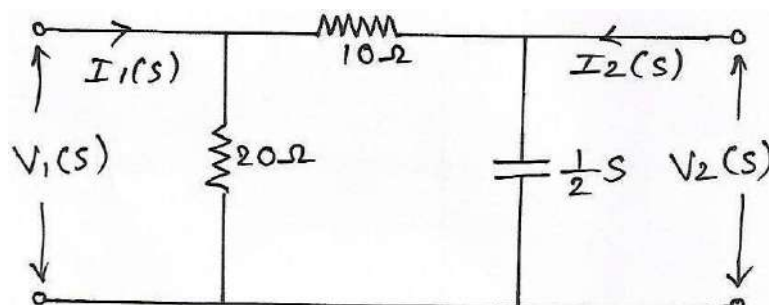


- d) Explain the significance of poles and zeros w. r. t transfer function of a network.
 e) Compute parameters of a π configuration attenuator with load resistance of 150 Ohms to cause an attenuation of 24 dB.

Q.5 Attempt any two.

12

- a) Explain what is forced and natural response. Also derive an expression for $i(t)$ then $V_u(t)$ is applied to a series RLC circuit.
 b) Obtain the design equations for m-derived high pass filter.
 c) For the two-port network shown below, calculate the input impedance $Z_{11}(s)$.



Seat No.	
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Set	P
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**S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
 Electronics and Telecommunication Engineering
 DIGITAL TECHNIQUES**

Day & Date: Saturday,14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) For each cell, no. of adjacent cell on a 4-variable K-map is _____.

a) 2	b) 4
c) 3	d) 8

- 2) In 4-variable k-map, the function contains all min-terms then the minimal expression is, _____.

a) A	b) 1
c) 0	d) Don't care

- 3) A Multiplexer is also known as _____.

a) Counter	b) Data distributor
c) Data selector	d) None of these

- 4) The following IC works as parallel adder _____.

a) IC 7483	b) IC 7485
c) IC 7490	d) IC 7495

- 5) The given gray number 1011, its equivalent binary number is _____.

a) 1101	b) 1000
c) 1110	d) 1011

- 6) A flip-flop has two outputs which are _____.

a) always zero	b) always complementary
c) always one	d) in one of the above states

- 7) What is the long form of TTL?

a) Transistor-transistor logic	b) Time-to-live
c) Transducer-transistor logic	d) Transistor Transducer-logic

- 8) The bit sequence 0010 is serially entered (right-most) into a 4-bit parallel out shift register that initially clear. What are the Q outputs after two clock pulses?

a) 0000	b) 0010
c) 1000	d) 1111

- 9) The number of flip-flops required to implement mod-6 counter is _____.

a) 6	b) 3
c) 2	d) 5

- 10) In PLA _____.
- a) Both AND and OR matrix are programmable
 - b) AND array is fixed and OR is programmable
 - c) AND is programmable OR is fixed
 - d) None of these
- 11) The output of the Melay machine is the function of _____.
- a) next state
 - b) present inputs
 - c) present state and present inputs
 - d) present state
- 12) What is a shift register that will accept a parallel input, or bi-directional serial load and internal shift features?
- a) tristate
 - b) end around
 - c) universal
 - d) Conversion
- 13) Which of the following is an invalid name in VHDL?
- a) DECODE8
 - b) _What_4
 - c) Invalid
 - d) All are valid
- 14) The output of a mod-2 counter given as a clock input of a MOD-5 counter gives a _____.
- a) Mod-5 counter
 - b) MOD-10 counter
 - c) MOD-25 counter
 - d) None of these

Seat No.	
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Set **P**

S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I

- Q.2 Solve any four of the following. 16**
- Design and explain full adder.
 - Implement the following function using single 8:1 MUX
 $F(P,Q,R,S) = \sum m(0,1,3,5,8,10,15)$
 - Explain the race around condition. How it is eliminated?
 - Reduce the following logical expression using K-map and implement reduced expression by using NOR Gate $F = \prod M(0,2,5,7,8,10,13,15)$
 - Explain Static Hazard and Dynamic Hazard.
- Q.3 Solve any two of the following. 12**
- Design gray to binary code converter.
 - Explain the design of 2-bit magnitude comparator.
 - Explain general model of flip-flop convert & conversion of SR flip-flop into D flip-flop.

Section – II

- Q.4 Solve any four of the following. 16**
- What are different modes of operation of shift register? Explain any one of it.
 - Write a note on Moore & Mealy machines.
 - Design MOD-7 counter using IC7490.
 - Draw and Explain twisted ring counter.
 - Write VHDL code for full adder.
- Q.5 Solve any two of the following. 12**
- Design 3-bit synchronous up counter using T flip-flop.
 - Explain universal shift register using IC 7495.
 - Implement the following function using PLA.
 $F1(A,B,C) = \sum m(0,4,7)$
 $F2(A,B,C) = \sum m(1,3,6)$

Seat No.	
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S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The bit sequence 0010 is serially entered (right-most) into a 4-bit parallel out shift register that initially clear. What are the Q outputs after two clock pulses?

a) 0000	b) 0010
c) 1000	d) 1111
- 2) The number of flip-flops required to implement mod-6 counter is _____.

a) 6	b) 3
c) 2	d) 5
- 3) In PLA _____.
 - a) Both AND and OR matrix are programmable
 - b) AND array is fixed and OR is programmable
 - c) AND is programmable OR is fixed
 - d) None of these
- 4) The output of the Melay machine is the function of _____.
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 - b) present inputs
 - c) present state and present inputs
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- 5) What is a shift register that will accept a parallel input, or bi-directional serial load and internal shift features?

a) tristate	b) end around
c) universal	d) Conversion
- 6) Which of the following is an invalid name in VHDL?

a) DECODE8	b) _What_4
c) Invalid	d) All are valid
- 7) The output of a mod-2 counter given as a clock input of a MOD-5 counter gives a _____.

a) Mod-5 counter	b) MOD-10 counter
c) MOD-25 counter	d) None of these
- 8) For each cell, no. of adjacent cell on a 4-variable K-map is _____.

a) 2	b) 4
c) 3	d) 8

- 9) In 4-variable k-map, the function contains all min-terms then the minimal expression is, _____.
- | | |
|------|---------------|
| a) A | b) 1 |
| c) 0 | d) Don't care |
- 10) A Multiplexer is also known as _____.
- | | |
|------------------|---------------------|
| a) Counter | b) Data distributor |
| c) Data selector | d) None of these |
- 11) The following IC works as parallel adder _____.
- | | |
|------------|------------|
| a) IC 7483 | b) IC 7485 |
| c) IC 7490 | d) IC 7495 |
- 12) The given gray number 1011, its equivalent binary number is _____.
- | | |
|---------|---------|
| a) 1101 | b) 1000 |
| c) 1110 | d) 1011 |
- 13) A flip-flop has two outputs which are _____.
- | | |
|----------------|-------------------------------|
| a) always zero | b) always complementary |
| c) always one | d) in one of the above states |
- 14) What is the long form of TTL?
- | | |
|--------------------------------|--------------------------------|
| a) Transistor-transistor logic | b) Time-to-live |
| c) Transducer-transistor logic | d) Transistor Transducer-logic |

Seat No.	
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Set Q

S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
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Section – I

- Q.2 Solve any four of the following. 16**
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 - Implement the following function using single 8:1 MUX
 $F(P,Q,R,S) = \sum m(0,1,3,5,8,10,15)$
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 $F2(A,B,C) = \sum m(1,3,6)$

Seat No.	
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S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The given gray number 1011, its equivalent binary number is _____.
 - a) 1101
 - b) 1000
 - c) 1110
 - d) 1011

- 2) A flip-flop has two outputs which are _____.
 - a) always zero
 - b) always complementary
 - c) always one
 - d) in one of the above states

- 3) What is the long form of TTL?
 - a) Transistor-transistor logic
 - b) Time-to-live
 - c) Transducer-transistor logic
 - d) Transistor Transducer-logic

- 4) The bit sequence 0010 is serially entered (right-most) into a 4-bit parallel out shift register that initially clear. What are the Q outputs after two clock pulses?
 - a) 0000
 - b) 0010
 - c) 1000
 - d) 1111

- 5) The number of flip-flops required to implement mod-6 counter is _____.
 - a) 6
 - b) 3
 - c) 2
 - d) 5

- 6) In PLA _____.
 - a) Both AND and OR matrix are programmable
 - b) AND array is fixed and OR is programmable
 - c) AND is programmable OR is fixed
 - d) None of these

- 7) The output of the Melay machine is the function of _____.
 - a) next state
 - b) present inputs
 - c) present state and present inputs
 - d) present state

- 8) What is a shift register that will accept a parallel input, or bi-directional serial load and internal shift features?
 - a) tristate
 - b) end around
 - c) universal
 - d) Conversion

- 9) Which of the following is an invalid name in VHDL?
 a) DECODE8 b) _What_4
 c) Invalid d) All are valid
- 10) The output of a mod-2 counter given as a clock input of a MOD-5 counter gives a _____.
 a) Mod-5 counter b) MOD-10 counter
 c) MOD-25 counter d) None of these
- 11) For each cell, no. of adjacent cell on a 4-variable K-map is _____.
 a) 2 b) 4
 c) 3 d) 8
- 12) In 4-variable k-map, the function contains all min-terms then the minimal expression is, _____.
 a) A b) 1
 c) 0 d) Don't care
- 13) A Multiplexer is also known as _____.
 a) Counter b) Data distributor
 c) Data selector d) None of these
- 14) The following IC works as parallel adder _____.
 a) IC 7483 b) IC 7485
 c) IC 7490 d) IC 7495

Seat No.	
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Set

R

S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I

- Q.2 Solve any four of the following.** **16**
- a) Design and explain full adder.
 - b) Implement the following function using single 8:1 MUX
 $F(P,Q,R,S) = \sum m(0,1,3,5,8,10,15)$
 - c) Explain the race around condition. How it is eliminated?
 - d) Reduce the following logical expression using K-map and implement reduced expression by using NOR Gate $F = \prod M(0,2,5,7,8,10,13,15)$
 - e) Explain Static Hazard and Dynamic Hazard.
- Q.3 Solve any two of the following.** **12**
- a) Design gray to binary code converter.
 - b) Explain the design of 2-bit magnitude comparator.
 - c) Explain general model of flip-flop convert & conversion of SR flip-flop into D flip-flop.

Section – II

- Q.4 Solve any four of the following.** **16**
- a) What are different modes of operation of shift register? Explain any one of it.
 - b) Write a note on Moore & Mealy machines.
 - c) Design MOD-7 counter using IC7490.
 - d) Draw and Explain twisted ring counter.
 - e) Write VHDL code for full adder.
- Q.5 Solve any two of the following.** **12**
- a) Design 3-bit synchronous up counter using T flip-flop.
 - b) Explain universal shift register using IC 7495.
 - c) Implement the following function using PLA.
 $F1(A,B,C) = \sum m(0,4,7)$
 $F2(A,B,C) = \sum m(1,3,6)$

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S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In PLA _____.
 - a) Both AND and OR matrix are programmable
 - b) AND array is fixed and OR is programmable
 - c) AND is programmable OR is fixed
 - d) None of these
- 2) The output of the Melay machine is the function of _____.
 - a) next state
 - b) present inputs
 - c) present state and present inputs
 - d) present state
- 3) What is a shift register that will accept a parallel input, or bi-directional serial load and internal shift features?
 - a) tristate
 - b) end around
 - c) universal
 - d) Conversion
- 4) Which of the following is an invalid name in VHDL?
 - a) DECODE8
 - b) _What_4
 - c) Invalid
 - d) All are valid
- 5) The output of a mod-2 counter given as a clock input of a MOD-5 counter gives a _____.
 - a) Mod-5 counter
 - b) MOD-10 counter
 - c) MOD-25 counter
 - d) None of these
- 6) For each cell, no. of adjacent cell on a 4-variable K-map is _____.
 - a) 2
 - b) 4
 - c) 3
 - d) 8
- 7) In 4-variable k-map, the function contains all min-terms then the minimal expression is, _____.
 - a) A
 - b) 1
 - c) 0
 - d) Don't care
- 8) A Multiplexer is also known as _____.
 - a) Counter
 - b) Data distributor
 - c) Data selector
 - d) None of these

- 9) The following IC works as parallel adder _____.
- a) IC 7483
 - b) IC 7485
 - c) IC 7490
 - d) IC 7495
- 10) The given gray number 1011, its equivalent binary number is _____.
- a) 1101
 - b) 1000
 - c) 1110
 - d) 1011
- 11) A flip-flop has two outputs which are _____.
- a) always zero
 - b) always complementary
 - c) always one
 - d) in one of the above states
- 12) What is the long form of TTL?
- a) Transistor-transistor logic
 - b) Time-to-live
 - c) Transducer-transistor logic
 - d) Transistor Transducer-logic
- 13) The bit sequence 0010 is serially entered (right-most) into a 4-bit parallel out shift register that initially clear. What are the Q outputs after two clock pulses?
- a) 0000
 - b) 0010
 - c) 1000
 - d) 1111
- 14) The number of flip-flops required to implement mod-6 counter is _____.
- a) 6
 - b) 3
 - c) 2
 - d) 5

Seat No.	
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Set **S**

S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I

- Q.2 Solve any four of the following.** **16**
- Design and explain full adder.
 - Implement the following function using single 8:1 MUX
 $F(P,Q,R,S) = \sum m(0,1,3,5,8,10,15)$
 - Explain the race around condition. How it is eliminated?
 - Reduce the following logical expression using K-map and implement reduced expression by using NOR Gate $F = \prod M(0,2,5,7,8,10,13,15)$
 - Explain Static Hazard and Dynamic Hazard.
- Q.3 Solve any two of the following.** **12**
- Design gray to binary code converter.
 - Explain the design of 2-bit magnitude comparator.
 - Explain general model of flip-flop convert & conversion of SR flip-flop into D flip-flop.

Section – II

- Q.4 Solve any four of the following.** **16**
- What are different modes of operation of shift register? Explain any one of it.
 - Write a note on Moore & Mealy machines.
 - Design MOD-7 counter using IC7490.
 - Draw and Explain twisted ring counter.
 - Write VHDL code for full adder.
- Q.5 Solve any two of the following.** **12**
- Design 3-bit synchronous up counter using T flip-flop.
 - Explain universal shift register using IC 7495.
 - Implement the following function using PLA.
 $F1(A,B,C) = \sum m(0,4,7)$
 $F2(A,B,C) = \sum m(1,3,6)$

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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.**14**

- 1) Wideband FM uses a frequency deviation of _____.

a) 75kHz	b) 10kHz
c) 180kHz	d) 100kHz
- 2) The bandwidth of AM system _____.

a) f_m	b) $2f_m$
c) $0.5f_m$	d) $4f_m$
- 3) In a communication receiver, the noise is most likely to affect the signal _____.

a) At the transmitter	b) In the Channel
c) In the information source	d) At the signal receiver
- 4) A 100 MHz carrier is deviated 50kHz by 4kHz signal. The modulation index is _____.

a) 5	b) 8
c) 12.5	d) 20
- 5) Vestigial Sideband is used for transmission of _____.

a) Point to point communication	b) Stereo broadcasting
c) Monaural broadcasting	d) TV broadcasting
- 6) If modulation index of an AM wave is changed from 0 to 1 the transmitted power _____.

a) Increases by 50%	b) Increases by 33.33%
c) Increases by 75%	d) Increases by 100%
- 7) An amplifier has an output SNR of 16db and noise figure of 5.4 db. Its input SNR is db _____.

a) 10.4	b) 21.4
c) 16	d) 5.4
- 8) A pre-emphasis circuit is a _____.

a) Low pass filter	b) High pass filter
c) Band pass filter	d) None of the above
- 9) What is the effect on the deviation d of an FM signal when it is passed through a mixer?

a) Doubled	b) Halved
c) Remains same	d) Not predictable

- 10) A Superhetrodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz _____.
 a) 750 kHz b) 900 kHz
 c) 1650 kHz d) 2100 kHz
- 11) One of the following cannot be used to remove unwanted sideband in SSB _____.
 a) Filter system b) Balanced modulator
 c) Third method d) Phase shift method
- 12) Over modulation occurs when _____.
 a) $V_m < V_c$ b) $V_m = V_c = 0$
 c) $V_m > V_c$ d) $V_m = V_c$
- 13) Power in one of the sideband _____.
 a) $M^2 P_c / 4$ b) $M^2 P_c / 8$
 c) $M^2 P_c / 2$ d) $M^2 P_c / 16$
- 14) The audio frequency range is _____.
 a) 10Hz to 1kHz b) 20Hz to 20kHz
 c) 80MHz to 108MHz d) 1kHz to 100kHz

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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.
 3) Assume suitable data if necessary.

Section – I

Q.2 Solve any four questions. 16

- a) Explain different types of modulation techniques with diagram?
- b) Define noise figure and derive its expression.
- c) A broadcast transmitter radiates 20KW when the modulation percentage is 75. How much is carrier power? Also calculate the power of each sideband?
- d) Define noise. Explain white noise?
- e) What are the advantages of SSB over DSB and AM?

Q.3 Solve any two questions. 12

- a) The output current of 60 percent modulated AM generator is 1.5A. To what value will this current rise if the generator is modulated additionally by another audio wave, whose modulation index is 0.7? what will be the percentage power saving if the carrier and one of the sidebands are now suppressed.
- b) Derive an equation of AM signal.
- c) Explain with the help of neat diagram working of Balanced modulator.

Section – II

Q.4 Solve any four questions. 16

- a) Explain the working of envelop detection with neat diagram.
- b) Explain the characteristics of radio receivers.
- c) Explain the need for pre-emphasis and de-emphasis.
- d) Write the difference between FM and AM.
- e) Write a note on natural sampling and flat top sampling.

Q.5 Solve any two questions. 12

- a) Explain with the help of neat diagram, working of Superhetrodyne Receiver.
- b) With the help of diagram explain the working of Frequency modulation using Armstrong method.
- c) Explain the modulation of PWM signal with necessary diagram.

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No.

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) A pre-emphasis circuit is a _____.
 - a) Low pass filter
 - b) High pass filter
 - c) Band pass filter
 - d) None of the above
- 2) What is the effect on the deviation d of an FM signal when it is passed through a mixer?
 - a) Doubled
 - b) Halved
 - c) Remains same
 - d) Not predictable
- 3) A Superhetrodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz _____.
 - a) 750 kHz
 - b) 900 kHz
 - c) 1650 kHz
 - d) 2100 kHz
- 4) One of the following cannot be used to remove unwanted sideband in SSB _____.
 - a) Filter system
 - b) Balanced modulator
 - c) Third method
 - d) Phase shift method
- 5) Over modulation occurs when _____.
 - a) $V_m < V_c$
 - b) $V_m = V_c = 0$
 - c) $V_m > V_c$
 - d) $V_m = V_c$
- 6) Power in one of the sideband _____.
 - a) $M^2 P_c / 4$
 - b) $M^2 P_c / 8$
 - c) $M^2 P_c / 2$
 - d) $M^2 P_c / 16$
- 7) The audio frequency range is _____.
 - a) 10Hz to 1kHz
 - b) 20Hz to 20kHz
 - c) 80MHz to 108MHz
 - d) 1kHz to 100kHz
- 8) Wideband FM uses a frequency deviation of _____.
 - a) 75kHz
 - b) 10kHz
 - c) 180kHz
 - d) 100kHz
- 9) The bandwidth of AM system _____.
 - a) f_m
 - b) $2f_m$
 - c) $0.5f_m$
 - d) $4f_m$

- 10) In a communication receiver, the noise is most likely to affect the signal _____.
- a) At the transmitter b) In the Channel
c) In the information source d) At the signal receiver
- 11) A 100 MHz carrier is deviated 50kHz by 4kHz signal. The modulation index is _____.
- a) 5 b) 8
c) 12.5 d) 20
- 12) Vestigial Sideband is used for transmission of _____.
- a) Point to point communication b) Stereo broadcasting
c) Monaural broadcasting d) TV broadcasting
- 13) If modulation index of an AM wave is changed from 0 to 1 the transmitted power _____.
- a) Increases by 50% b) Increases by 33.33%
c) Increases by 75% d) Increases by 100%
- 14) An amplifier has an output SNR of 16db and noise figure of 5.4 db. Its input SNR is db _____.
- a) 10.4 b) 21.4
c) 16 d) 5.4

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Set	Q
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.
 3) Assume suitable data if necessary.

Section – I

- Q.2 Solve any four questions. 16**
- a) Explain different types of modulation techniques with diagram?
 - b) Define noise figure and derive its expression.
 - c) A broadcast transmitter radiates 20KW when the modulation percentage is 75. How much is carrier power? Also calculate the power of each sideband?
 - d) Define noise. Explain white noise?
 - e) What are the advantages of SSB over DSB and AM?
- Q.3 Solve any two questions. 12**
- a) The output current of 60 percent modulated AM generator is 1.5A. To what value will this current rise if the generator is modulated additionally by another audio wave, whose modulation index is 0.7? what will be the percentage power saving if the carrier and one of the sidebands are now suppressed.
 - b) Derive an equation of AM signal.
 - c) Explain with the help of neat diagram working of Balanced modulator.

Section – II

- Q.4 Solve any four questions. 16**
- a) Explain the working of envelop detection with neat diagram.
 - b) Explain the characteristics of radio receivers.
 - c) Explain the need for pre-emphasis and de-emphasis.
 - d) Write the difference between FM and AM.
 - e) Write a note on natural sampling and flat top sampling.
- Q.5 Solve any two questions. 12**
- a) Explain with the help of neat diagram, working of Superhetrodyne Receiver.
 - b) With the help of diagram explain the working of Frequency modulation using Armstrong method.
 - c) Explain the modulation of PWM signal with necessary diagram.

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No.

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Vestigial Sideband is used for transmission of _____.
 a) Point to point communication b) Stereo broadcasting
 c) Monaural broadcasting d) TV broadcasting
- 2) If modulation index of an AM wave is changed from 0 to 1 the transmitted power _____.
 a) Increases by 50% b) Increases by 33.33%
 c) Increases by 75% d) Increases by 100%
- 3) An amplifier has an output SNR of 16db and noise figure of 5.4 db. Its input SNR is db _____.
 a) 10.4 b) 21.4
 c) 16 d) 5.4
- 4) A pre-emphasis circuit is a _____.
 a) Low pass filter b) High pass filter
 c) Band pass filter d) None of the above
- 5) What is the effect on the deviation d of an FM signal when it is passed through a mixer?
 a) Doubled b) Halved
 c) Remains same d) Not predictable
- 6) A Superhetrodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz _____.
 a) 750 kHz b) 900 kHz
 c) 1650 kHz d) 2100 kHz
- 7) One of the following cannot be used to remove unwanted sideband in SSB _____.
 a) Filter system b) Balanced modulator
 c) Third method d) Phase shift method
- 8) Over modulation occurs when _____.
 a) $V_m < V_c$ b) $V_m = V_c = 0$
 c) $V_m > V_c$ d) $V_m = V_c$
- 9) Power in one of the sideband _____.
 a) $M^2 P_c / 4$ b) $M^2 P_c / 8$
 c) $M^2 P_c / 2$ d) $M^2 P_c / 16$

- 10) The audio frequency range is _____.
- | | |
|--------------------|-------------------|
| a) 10Hz to 1kHz | b) 20Hz to 20kHz |
| c) 80MHz to 108MHz | d) 1kHz to 100kHz |
- 11) Wideband FM uses a frequency deviation of _____.
- | | |
|-----------|-----------|
| a) 75kHz | b) 10kHz |
| c) 180kHz | d) 100kHz |
- 12) The bandwidth of AM system _____.
- | | |
|-------------|-----------|
| a) f_m | b) $2f_m$ |
| c) $0.5f_m$ | d) $4f_m$ |
- 13) In a communication receiver, the noise is most likely to affect the signal _____.
- | | |
|------------------------------|---------------------------|
| a) At the transmitter | b) In the Channel |
| c) In the information source | d) At the signal receiver |
- 14) A 100 MHz carrier is deviated 50kHz by 4kHz signal. The modulation index is _____.
- | | |
|---------|-------|
| a) 5 | b) 8 |
| c) 12.5 | d) 20 |

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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.
 3) Assume suitable data if necessary.

Section – I

- Q.2 Solve any four questions. 16**
- a) Explain different types of modulation techniques with diagram?
 - b) Define noise figure and derive its expression.
 - c) A broadcast transmitter radiates 20KW when the modulation percentage is 75. How much is carrier power? Also calculate the power of each sideband?
 - d) Define noise. Explain white noise?
 - e) What are the advantages of SSB over DSB and AM?

- Q.3 Solve any two questions. 12**
- a) The output current of 60 percent modulated AM generator is 1.5A. To what value will this current rise if the generator is modulated additionally by another audio wave, whose modulation index is 0.7? what will be the percentage power saving if the carrier and one of the sidebands are now suppressed.
 - b) Derive an equation of AM signal.
 - c) Explain with the help of neat diagram working of Balanced modulator.

Section – II

- Q.4 Solve any four questions. 16**
- a) Explain the working of envelop detection with neat diagram.
 - b) Explain the characteristics of radio receivers.
 - c) Explain the need for pre-emphasis and de-emphasis.
 - d) Write the difference between FM and AM.
 - e) Write a note on natural sampling and flat top sampling.

- Q.5 Solve any two questions. 12**
- a) Explain with the help of neat diagram, working of Superhetrodyne Receiver.
 - b) With the help of diagram explain the working of Frequency modulation using Armstrong method.
 - c) Explain the modulation of PWM signal with necessary diagram.

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Set	S
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) A Superhetrodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz _____.
 - a) 750 kHz
 - b) 900 kHz
 - c) 1650 kHz
 - d) 2100 kHz
- 2) One of the following cannot be used to remove unwanted sideband in SSB _____.
 - a) Filter system
 - b) Balanced modulator
 - c) Third method
 - d) Phase shift method
- 3) Over modulation occurs when _____.
 - a) $V_m < V_c$
 - b) $V_m = V_c = 0$
 - c) $V_m > V_c$
 - d) $V_m = V_c$
- 4) Power in one of the sideband _____.
 - a) $M^2P_c/4$
 - b) $M^2P_c/8$
 - c) $M^2P_c/2$
 - d) $M^2P_c/16$
- 5) The audio frequency range is _____.
 - a) 10Hz to 1kHz
 - b) 20Hz to 20kHz
 - c) 80MHz to 108MHz
 - d) 1kHz to 100kHz
- 6) Wideband FM uses a frequency deviation of _____.
 - a) 75kHz
 - b) 10kHz
 - c) 180kHz
 - d) 100kHz
- 7) The bandwidth of AM system _____.
 - a) f_m
 - b) $2f_m$
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 - d) $4f_m$
- 8) In a communication receiver, the noise is most likely to affect the signal _____.
 - a) At the transmitter
 - b) In the Channel
 - c) In the information source
 - d) At the signal receiver
- 9) A 100 MHz carrier is deviated 50kHz by 4kHz signal. The modulation index is _____.
 - a) 5
 - b) 8
 - c) 12.5
 - d) 20

- 10) Vestigial Sideband is used for transmission of _____.
a) Point to point communication b) Stereo broadcasting
c) Monaural broadcasting d) TV broadcasting
- 11) If modulation index of an AM wave is changed from 0 to 1 the transmitted power _____.
a) Increases by 50% b) Increases by 33.33%
c) Increases by 75% d) Increases by 100%
- 12) An amplifier has an output SNR of 16db and noise figure of 5.4 db. Its input SNR is db _____.
a) 10.4 b) 21.4
c) 16 d) 5.4
- 13) A pre-emphasis circuit is a _____.
a) Low pass filter b) High pass filter
c) Band pass filter d) None of the above
- 14) What is the effect on the deviation d of an FM signal when it is passed through a mixer?
a) Doubled b) Halved
c) Remains same d) Not predictable

Seat No.	
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Set	S
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electronics and Telecommunication Engineering
ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.
 3) Assume suitable data if necessary.

Section – I

- Q.2 Solve any four questions. 16**
- a) Explain different types of modulation techniques with diagram?
 - b) Define noise figure and derive its expression.
 - c) A broadcast transmitter radiates 20KW when the modulation percentage is 75. How much is carrier power? Also calculate the power of each sideband?
 - d) Define noise. Explain white noise?
 - e) What are the advantages of SSB over DSB and AM?

- Q.3 Solve any two questions. 12**
- a) The output current of 60 percent modulated AM generator is 1.5A. To what value will this current rise if the generator is modulated additionally by another audio wave, whose modulation index is 0.7? what will be the percentage power saving if the carrier and one of the sidebands are now suppressed.
 - b) Derive an equation of AM signal.
 - c) Explain with the help of neat diagram working of Balanced modulator.

Section – II

- Q.4 Solve any four questions. 16**
- a) Explain the working of envelop detection with neat diagram.
 - b) Explain the characteristics of radio receivers.
 - c) Explain the need for pre-emphasis and de-emphasis.
 - d) Write the difference between FM and AM.
 - e) Write a note on natural sampling and flat top sampling.

- Q.5 Solve any two questions. 12**
- a) Explain with the help of neat diagram, working of Superhetrodyne Receiver.
 - b) With the help of diagram explain the working of Frequency modulation using Armstrong method.
 - c) Explain the modulation of PWM signal with necessary diagram.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

3) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) $(c_1 + c_2x)e^{2x} + (c_3 + c_4x)e^{-2x}$ is a general solution of _____.
 a) $(D^2 - 4)^2y = 0$ b) $(D^2 + 4)^2y = 0$
 c) $(D^2 - 2)^2y = 0$ d) $(D^2 + 2)^2y = 0$
- 2) The particular Integral of $(D^2 - 2D + 1)y = -4e^x$ is _____.
 a) $-2x^2e^x$ b) $-4x^2e^x$
 c) $(c_1 + c_2x)e^x$ d) x^2e^x
- 3) If a Poisson Distribution is such that $P(x = 2) = P(x = 3)$ then the mean is _____.
 a) 2 b) 4
 c) 3 d) 9
- 4) $L^{-1} \left[\frac{1}{s^2 + 4s + 13} \right] =$ _____.
 a) $e^{-2t} \cos 3t$ b) $\frac{1}{3}e^{2t} \sin 3t$
 c) $\frac{1}{3}e^{-2t} \sin 3t$ d) $e^{-2t} \sin 3t$
- 5) Idle time of the queuing system is _____.
 a) $\frac{\lambda}{\mu}$ b) $1 - \frac{\lambda}{\mu}$
 c) $\frac{\mu}{\lambda}$ d) $1 - \frac{\mu}{\lambda}$
- 6) If mean of $x = 70$ mean of $y = 149$ and $b_{yx} = 0.7$ then the line of regression of y on x is _____.
 a) $y = 0.8x + 120$ b) $y = 0.6x + 80$
 c) $y = 0.5x + 60$ d) $y = 0.7x + 100$
- 7) The number of defective ballot papers follows a Poisson distribution with mean 2. The probability that there will be no defective ballot paper in a box is _____.
 a) 0.101 b) 0.113
 c) 0.124 d) 0.135
- 8) In $M|M|1|\infty$ system with $\lambda = 12$ hrs and $\mu = 16$ hrs the average number of customers in the system is _____.
 a) 5 b) 4
 c) 3 d) 2

9) The half range sine series of $f(x)$ defined in the interval $(0, 2)$ is _____.

- a) $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$ b) $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$
 c) $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$ d) $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$

10) Laplace transform of $\int_0^t u^3 du =$ _____.

- a) $\frac{3}{s^5}$ b) $\frac{6}{s^5}$
 c) $\frac{1}{s^5}$ d) $\frac{6}{s^4}$

11) The two regression equations of the variables are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.5x$ then coefficient of correlation is _____.

- a) 0.659 b) -0.649
 c) 0.569 d) -0.659

12) $Lf(t) \delta(t - a) =$ _____.

- a) $e^{-as} f(t)$ b) $e^{-as} f(a)$
 c) $e^{as} f(a)$ d) $e^{-as} f(t - a)$

13) If $z\{f(k)\} = F(z)$, then $z\{a^k f(k)\} =$ _____.

- a) $f\left(\frac{a}{z}\right)$ b) $f\left(\frac{z}{a}\right)$
 c) $\frac{1}{a} f\left(\frac{z}{a}\right)$ d) None

14) $z\{k\} =$ _____ for $|z| > 1$

- a) $\frac{z}{z-1}$ b) $\frac{1}{(z-1)^2}$
 c) $\frac{z}{(z-1)^2}$ d) $\frac{z}{(z+1)^2}$

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Use of calculator is allowed.

Section - I

Q.2 Solve any three of the following questions. 09

- a) Solve $(D^3 + 2D^2 + D)y = x^2 + x$
 b) Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$
 c) Find $z \left\{ 2^k \cos \left(\frac{k\pi}{3} + \alpha \right) \right\}, k \geq 0$
 d) Find $L \left[\int_0^t u e^{-2u} \sin 3u \, du \right]$
 e) Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$

Q.3 Solve any three of the following questions. 09

- a) Solve $\frac{d^3y}{dt^3} + y = \cos 2t$
 b) If $f(t) = \begin{cases} 1 & 0 \leq t \leq 1 \\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that
 $L[f(t)] = \frac{1}{s(1+e^{-s})}$
 c) Find $L^{-1} \left[\frac{s+29}{(s+4)(s^2+9)} \right]$
 d) Find z-transform of $\left\{ \left(\frac{1}{3} \right)^{|k|} \right\}$
 e) Find $z\{k\alpha^k + k\beta^k\}, k \geq 0$

Q.4 Solve any two of the following questions. 10

- a) Solve $\frac{d^2y}{dx^2} + y = \sin x \sin 2x + 3^x$
 b) Find inverse z-transform of
 $f(z) = \frac{z}{(z-2)(z-3)} \quad |z| < 2, \quad |z| > 3$
 c) Use Laplace transform to solve
 $\frac{dy}{dt} + 3y(t) + 2 \int_0^t y(t)dt = t \quad y = 0 \text{ when } t = 0$

Section – II

09

Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for

$$f(x) = (x - 1)^2, \quad 0 \leq x \leq 1$$
- b) For a certain data the regression equations are $3x + 2y - 26 = 0$ and $6x + y - 31 = 0$ find the following.
- 1) Mean of x & y
 - 2) Coefficient of correlation
 - 3) Most probable value of x when $y = 15$
- c) Assuming that 20% the population is literate so that the change of an individual being literate is $\frac{1}{5}$ and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you expect to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.
- | | | | | | | |
|------------------|-----|----|----|---|---|-------|
| No. of mistakes: | 0 | 1 | 2 | 3 | 4 | Total |
| No. of pages: | 211 | 90 | 19 | 5 | 0 | 325 |
- Fit a Poisson distribution.
- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
- 1) The average idle time
 - 2) The average time a customer has to remain in the shop.

Q.6 Solve any three of the following questions.

09

- a) Find fourier series for $f(x) = \frac{x(\pi^2 - x^2)}{12}$ in $(-\pi, \pi)$
- b) from the following data find the line of regression y on x

	y	x
Mean	508.4	26.7
SD	36.8	4.6

 $r=0.52$

- c) Calculate the coefficient of correlation from the following data.
- | | | | | | | | |
|-------|----|----|----|----|----|----|----|
| x : | 42 | 44 | 58 | 55 | 89 | 98 | 66 |
| y : | 56 | 59 | 53 | 58 | 65 | 78 | 58 |
- d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is 0.752 ± 0.004
 (Given: for a SNV z area between $z=0$ and $z=1.75$ is 0.4599 and that between $z=0$ and $z=2.25$ is 0.4878)
- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be $M|M|1|\infty$ system.
- 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
 - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

x :	91	97	108	121	67	124	51	73	111	57
y :	71	75	69	97	70	91	39	61	80	47

b) Find the fourier series for $f(x)$ in $(0,2\pi)$

$$f(x) = \begin{cases} x & , 0 < x \leq \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.

- 1) Find the expected number of patients at the clinic and in the queue?
- 2) Find the percentage of patients who are not required to wait?
- 3) Find the percentage of patients who have to wait?
- 4) Find Average time spent by a patient at the clinic?

Seat No.	
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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
APPLIED MATHEMATICS - I**

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In $M|M|1|\infty$ system with $\lambda = 12$ hrs and $\mu = 16$ hrs the average number of customers in the system is _____.
- a) 5
b) 4
c) 3
d) 2

- 2) The half range sine series of $f(x)$ defined in the interval $(0, 2)$ is _____.

a) $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$

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- 3) Laplace transform of $\int_0^t u^3 du =$ _____.

a) $\frac{3}{s^5}$

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- 12) Idle time of the queuing system is .
a) $\frac{\lambda}{\mu}$ b) $1 - \frac{\lambda}{\mu}$
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- 13) If mean of $x = 70$ mean of $y = 149$ and $b_{yx} = 0.7$ then the line of regression of y on x is .
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Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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Section - I

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Section – II

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

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Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
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Max. Marks: 56

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Section - I

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$$L[f(t)] = \frac{1}{s(1 + e^{-s})}$$

 c) Find $L^{-1} \left[\frac{s+29}{(s+4)(s^2+9)} \right]$
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$$f(z) = \frac{z}{(z-2)(z-3)} \quad |z| < 2, \quad |z| > 3$$

 c) Use Laplace transform to solve

$$\frac{dy}{dt} + 3y(t) + 2 \int_0^t y(t) dt = t \quad y = 0 \text{ when } t = 0$$

Section – II

09

Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for

$$f(x) = (x - 1)^2, \quad 0 \leq x \leq 1$$
- b) For a certain data the regression equations are $3x + 2y - 26 = 0$ and $6x + y - 31 = 0$ find the following.
- 1) Mean of x & y
 - 2) Coefficient of correlation
 - 3) Most probable value of x when $y = 15$
- c) Assuming that 20% the population is literate so that the change of an individual being literate is $\frac{1}{5}$ and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you expect to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.
- | | | | | | | |
|------------------|-----|----|----|---|---|-------|
| No. of mistakes: | 0 | 1 | 2 | 3 | 4 | Total |
| No. of pages: | 211 | 90 | 19 | 5 | 0 | 325 |
- Fit a Poisson distribution.
- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
- 1) The average idle time
 - 2) The average time a customer has to remain in the shop.

Q.6 Solve any three of the following questions.

09

- a) Find fourier series for $f(x) = \frac{x(\pi^2 - x^2)}{12}$ in $(-\pi, \pi)$
- b) from the following data find the line of regression y on x

	y	x
Mean	508.4	26.7
SD	36.8	4.6

 $r=0.52$

- c) Calculate the coefficient of correlation from the following data.
- | | | | | | | | |
|-------|----|----|----|----|----|----|----|
| x : | 42 | 44 | 58 | 55 | 89 | 98 | 66 |
| y : | 56 | 59 | 53 | 58 | 65 | 78 | 58 |
- d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is 0.752 ± 0.004
 (Given: for a SNV z area between $z=0$ and $z=1.75$ is 0.4599 and that between $z=0$ and $z=2.25$ is 0.4878)
- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be $M|M|1|\infty$ system.
- 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
 - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

$x:$	91	97	108	121	67	124	51	73	111	57
$y:$	71	75	69	97	70	91	39	61	80	47

b) Find the fourier series for $f(x)$ in $(0,2\pi)$

$$f(x) = \begin{cases} x & , 0 < x \leq \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.

- 1) Find the expected number of patients at the clinic and in the queue?
- 2) Find the percentage of patients who are not required to wait?
- 3) Find the percentage of patients who have to wait?
- 4) Find Average time spent by a patient at the clinic?

Seat No.	
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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
APPLIED MATHEMATICS - I**

Day & Date: Saturday, 07-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

3) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Laplace transform of $\int_0^t u^3 du = \underline{\hspace{2cm}}$.
- a) $\frac{3}{s^5}$ b) $\frac{6}{s^5}$
c) $\frac{1}{s^5}$ d) $\frac{6}{s^4}$
- 2) The two regression equations of the variables are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.5x$ then coefficient of correlation is $\underline{\hspace{2cm}}$.
- a) 0.659 b) -0.649
c) 0.569 d) -0.659
- 3) $Lf(t) \delta(t - a) = \underline{\hspace{2cm}}$.
- a) $e^{-as} f(t)$ b) $e^{-as} f(a)$
c) $e^{as} f(a)$ d) $e^{-as} f(t - a)$
- 4) If $z\{f(k)\} = F(z)$, then $z\{a^k f(k)\} = \underline{\hspace{2cm}}$.
- a) $f\left(\frac{a}{z}\right)$ b) $f\left(\frac{z}{a}\right)$
c) $\frac{1}{a} f\left(\frac{z}{a}\right)$ d) None
- 5) $z\{k\} = \underline{\hspace{2cm}}$ for $|z| > 1$
- a) $\frac{z}{z-1}$ b) $\frac{1}{(z-1)^2}$
c) $\frac{z}{(z-1)^2}$ d) $\frac{z}{(z+1)^2}$
- 6) $(c_1 + c_2x)e^{2x} + (c_3 + c_4x)e^{-2x}$ is a general solution of $\underline{\hspace{2cm}}$.
- a) $(D^2 - 4)^2y = 0$ b) $(D^2 + 4)^2y = 0$
c) $(D^2 - 2)^2y = 0$ d) $(D^2 + 2)^2y = 0$
- 7) The particular Integral of $(D^2 - 2D + 1)y = -4e^x$ is $\underline{\hspace{2cm}}$.
- a) $-2x^2e^x$ b) $-4x^2e^x$
c) $(c_1 + c_2x)e^x$ d) x^2e^x

8) If a Poisson Distribution is such that $P(x = 2) = P(x = 3)$ then the mean is _____.

- a) 2 b) 4
c) 3 d) 9

9) $L^{-1} \left[\frac{1}{s^2+4s+13} \right] =$ _____.

- a) $e^{-2t} \cos 3t$ b) $\frac{1}{3}e^{2t} \sin 3t$
c) $\frac{1}{3}e^{-2t} \sin 3t$ d) $e^{-2t} \sin 3t$

10) Idle time of the queuing system is _____.

- a) $\frac{\lambda}{\mu}$ b) $1 - \frac{\lambda}{\mu}$
c) $\frac{\mu}{\lambda}$ d) $1 - \frac{\mu}{\lambda}$

11) If mean of $x = 70$ mean of $y = 149$ and $b_{yx} = 0.7$ then the line of regression of y on x is _____.

- a) $y = 0.8x + 120$ b) $y = 0.6x + 80$
c) $y = 0.5x + 60$ d) $y = 0.7x + 100$

12) The number of defective ballot papers follows a Poisson distribution with mean 2. The probability that there will be no defective ballot paper in a box is _____.

- a) 0.101 b) 0.113
c) 0.124 d) 0.135

13) In $M|M|1|\infty$ system with $\lambda = 12$ hrs and $\mu = 16$ hrs the average number of customers in the system is _____.

- a) 5 b) 4
c) 3 d) 2

14) The half range sine series of $f(x)$ defined in the interval $(0, 2)$ is _____.

- | | |
|---|---|
| a) $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$ | b) $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ |
| c) $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$ | d) $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$ |

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Use of calculator is allowed.

Section - I

Q.2 Solve any three of the following questions. 09

- a) Solve $(D^3 + 2D^2 + D)y = x^2 + x$
 b) Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$
 c) Find $z \left\{ 2^k \cos \left(\frac{k\pi}{3} + \alpha \right) \right\}, k \geq 0$
 d) Find $L \left[\int_0^t u e^{-2u} \sin 3u \, du \right]$
 e) Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$

Q.3 Solve any three of the following questions. 09

- a) Solve $\frac{d^3 y}{dt^3} + y = \cos 2t$
 b) If $f(t) = \begin{cases} 1 & 0 \leq t \leq 1 \\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that

$$L[f(t)] = \frac{1}{s(1 + e^{-s})}$$

 c) Find $L^{-1} \left[\frac{s+29}{(s+4)(s^2+9)} \right]$
 d) Find z-transform of $\left\{ \left(\frac{1}{3} \right)^{|k|} \right\}$
 e) Find $z\{k\alpha^k + k\beta^k\}, k \geq 0$

Q.4 Solve any two of the following questions. 10

- a) Solve $\frac{d^2 y}{dx^2} + y = \sin x \sin 2x + 3^x$
 b) Find inverse z-transform of

$$f(z) = \frac{z}{(z-2)(z-3)} \quad |z| < 2, \quad |z| > 3$$

 c) Use Laplace transform to solve

$$\frac{dy}{dt} + 3y(t) + 2 \int_0^t y(t) dt = t \quad y = 0 \text{ when } t = 0$$

Section – II

09

Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for

$$f(x) = (x - 1)^2, \quad 0 \leq x \leq 1$$
- b) For a certain data the regression equations are $3x + 2y - 26 = 0$ and $6x + y - 31 = 0$ find the following.
- 1) Mean of x & y
 - 2) Coefficient of correlation
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09

Q.6 Solve any three of the following questions.

- a) Find fourier series for $f(x) = \frac{x(\pi^2 - x^2)}{12}$ in $(-\pi, \pi)$
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- | | | |
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| | y | x |
| Mean | 508.4 | 26.7 |
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 $r=0.52$

- c) Calculate the coefficient of correlation from the following data.
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- d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is 0.752 ± 0.004
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a) From the following data obtain the two lines of regression.

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b) Find the fourier series for $f(x)$ in $(0,2\pi)$

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- 4) Find Average time spent by a patient at the clinic?

Seat No.	
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S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Computer Science & Engineering

DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes and Each question carries one mark.
2) Figure to the indicate full marks

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If J: Jerry takes calculus, K: Ken takes Sociology and L: Larry takes English Then following statement is denoted as:
If either Jerry takes Calculus or Ken takes Sociology, then Larry will take English.

a) $(J \wedge K) \rightarrow L$	b) $(J \vee K) \rightarrow L$
c) $J \vee (K \rightarrow L)$	d) $J \wedge (K \rightarrow L)$
- 2) For any statement formula $P \rightarrow Q$, the statement formula $\neg P \rightarrow \neg Q$ is called its _____.

a) Converse	b) Inverse
c) Contrapositive	d) Implies
- 3) PCNF is also called _____.

a) sum of product canonical form	b) product of sum canonical form
c) sum canonical form	d) product canonical form
- 4) The complement of the set A is _____.

a) $A - B$	b) $U - A$
c) $A - U$	d) $B - A$
- 5) If A is $\{\{\Phi\}, \{\Phi, \{\Phi\}\}\}$, then the power set of A has how many element?

a) 2	b) 4
c) 6	d) 8
- 6) Let $R = \{(3, 3), (6, 6), (9, 9), (12, 12), (3, 6), (6, 3), (3, 9), (9, 3), (9, 12), (12, 9)\}$ be a relation on the set $A = \{3, 6, 9, 12\}$. The relation is _____.

a) reflexive and transitive	b) reflexive and symmetric
c) symmetric and transitive	d) equivalence relation
- 7) A relation R in X is said to be a _____, if it is reflexive and symmetric.

a) void relation	b) Circular
c) partial order relation	d) compatibility relation
- 8) Let f and g be the function from the set of integers to itself, defined by $f(x) = 2x + 1$ and $g(x) = 3x + 4$. Then the composition of f and g is _____.

a) $6x + 9$	b) $6x + 7$
c) $6x + 6$	d) $6x + 8$

- 9) $\langle A, + \rangle$ is the given algebraic system where $A = \{0, 1, 2, 3, 4\}$ $\langle A, + \rangle$ is _____.
a) Group
b) Semigroup
c) Monoid
d) None of these
- 10) In the algebraic system $\langle A, * \rangle$ the mapping $f: A \rightarrow A$ which is one to one onto is called as _____.
a) Automorphism
b) Isomorphism
c) Endomorphism
d) Epimorphism
- 11) If $\langle G, * \rangle$ is a group and order of the group is 1 then G set is _____.
a) $\{\phi\}$
b) $\{e\}$
c) ϕ
d) $\{e, a\}$
- 12) In lattice L , $\text{GLB}\{a, b\}$ is denoted by _____.
a) $a+b$
b) $a*b$
c) $a < b$
d) none of the above
- 13) Boolean algebra must be _____ lattice.
a) Complement
b) Distributive
c) Both a and b
d) None of the above
- 14) A group $\langle G, * \rangle$ in which the operation $*$ is commutative is called _____.
a) Subgroup
b) Acyclic Group
c) Abelian Group
d) All of the above

Seat No.	
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S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Computer Science & Engineering
DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019

Max. Marks: 56

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) All questions are compulsory
2) Figure to the indicate full marks

Section I

Q.2 Answer the following questions. (any Three) 12

- a) What is equivalence of formula? Show that following equivalence without constructing truth table.
 $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$
- b) Explain with example partition and covering of sets.
- c) Explain the following terms with example.
 1) Duality Law
 2) Tautological implication
- d) Let $X = \{2, 3, 6, 12, 24, 36\}$ and relation \leq be such that $x \leq y$ if x divides y . Find the relation R and Draw hasse diagram of $\langle X, \leq \rangle$.

Q.3 Answer the following questions. (Any One) 08

- a) What is Cartesian product? If $A = \{1\}$, $B = \{a, b\}$ and $C = \{2, 3\}$ find $A \times B \times C$, B^2 and $B^2 \times A$.
- b) Given relation $R = \{\langle 1, 2 \rangle, \langle 3, 4 \rangle, \langle 2, 2 \rangle\}$ and $S = \{\langle 4, 2 \rangle, \langle 2, 5 \rangle, \langle 3, 1 \rangle, \langle 1, 3 \rangle\}$. Find $R \circ S$, $S \circ R$, $R \circ (S \circ R)$, $(R \circ S) \circ R$, $R \circ R$, $S \circ S$, $R \circ R \circ R$, $S \circ S \circ S$.

Q.4 a) Find PCNF of the following without constructing truth table. 08

$$(\neg p \rightarrow r) \wedge (q \leftrightarrow p)$$

- b) Find PDNF of the following without constructing truth table.

$$(p \wedge q) \vee (\neg p \wedge r) \vee (q \wedge r)$$

Section II

Q.5 Answer the following questions. (Any Three) 12

- a) Let $X = \{1, 2, 3\}$ and f, g, h and s be functions from X to X given by.
 $f = \{\langle 1, 2 \rangle, \langle 2, 3 \rangle, \langle 3, 1 \rangle\}$
 $g = \{\langle 1, 2 \rangle, \langle 2, 1 \rangle, \langle 3, 3 \rangle\}$
 $h = \{\langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 1 \rangle\}$
 $s = \{\langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 3 \rangle\}$
 Find.
 1) $F \circ g$
 2) $G \circ f$
 3) $F \circ h \circ g$
 4) $S \circ f \circ h$
- b) Define Algebraic System and Explain its properties with example.
- c) Define semigroup. Prove that $\langle Z, * \rangle$ is a semigroup; where Z is a set of integers and $*$ is multiplication. Whether it is monoid or not justify.
- d) What is Boolean algebra? Explain different properties of Boolean algebra.

Q.6 Answer the following questions. (Any One).

a) What is inverse function? Find the inverse of following.

1) $f(x)=2x-5$

2) $f(x)= (x-2)^3$

b) Define the following terms:

1) Subsemigroup

2) Submonoid

3) Semigroup homomorphism

4) Monoid homomorphism

Q.7 What is lattice? Explain with example following.

a) Bounded lattice

b) Complement Lattice

c) Distributive lattice

- 9) For any statement formula $P \rightarrow Q$, the statement formula $\neg P \rightarrow \neg Q$ is called its _____.
- | | |
|-------------------|------------|
| a) Converse | b) Inverse |
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- 10) PCNF is also called _____.
- | | |
|----------------------------------|----------------------------------|
| a) sum of product canonical form | b) product of sum canonical form |
| c) sum canonical form | d) product canonical form |
- 11) The complement of the set A is _____.
- | | |
|------------|------------|
| a) $A - B$ | b) $U - A$ |
| c) $A - U$ | d) $B - A$ |
- 12) If A is $\{\{\Phi\}, \{\Phi, \{\Phi\}\}\}$, then the power set of A has how many element?
- | | |
|------|------|
| a) 2 | b) 4 |
| c) 6 | d) 8 |
- 13) Let $R = \{(3, 3), (6, 6), (9, 9), (12, 12), (3, 6), (6, 3), (3, 9), (9, 3), (9, 12), (12, 9)\}$ be a relation on the set $A = \{3, 6, 9, 12\}$. The relation is _____.
- | | |
|-----------------------------|----------------------------|
| a) reflexive and transitive | b) reflexive and symmetric |
| c) symmetric and transitive | d) equivalence relation |
- 14) A relation R in X is said to be a _____, if it is reflexive and symmetric.
- | | |
|---------------------------|---------------------------|
| a) void relation | b) Circular |
| c) partial order relation | d) compatibility relation |

Seat No.	
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S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Computer Science & Engineering

DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019

Max. Marks: 56

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) All questions are compulsory
2) Figure to the indicate full marks

Section I

Q.2 Answer the following questions. (any Three) 12

- a) What is equivalence of formula? Show that following equivalence without constructing truth table.
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- c) Explain the following terms with example.
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- d) Let $X = \{2, 3, 6, 12, 24, 36\}$ and relation \leq be such that $x \leq y$ if x divides y . Find the relation R and Draw hasse diagram of $\langle X, \leq \rangle$.

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- a) What is Cartesian product? If $A = \{1\}$, $B = \{a, b\}$ and $C = \{2, 3\}$ find $A \times B \times C$, B^2 and $B^2 \times A$.
- b) Given relation $R = \{\langle 1, 2 \rangle, \langle 3, 4 \rangle, \langle 2, 2 \rangle\}$ and $S = \{\langle 4, 2 \rangle, \langle 2, 5 \rangle, \langle 3, 1 \rangle, \langle 1, 3 \rangle\}$. Find $R \circ S$, $S \circ R$, $R \circ (S \circ R)$, $(R \circ S) \circ R$, $R \circ R$, $S \circ S$, $R \circ R \circ R$, $S \circ S \circ S$.

Q.4 a) Find PCNF of the following without constructing truth table. 08

$$(\neg p \rightarrow r) \wedge (q \leftrightarrow p)$$

- b) Find PDNF of the following without constructing truth table.

$$(p \wedge q) \vee (\neg p \wedge r) \vee (q \wedge r)$$

Section II

Q.5 Answer the following questions. (Any Three) 12

- a) Let $X = \{1, 2, 3\}$ and f, g, h and s be functions from X to X given by.
 $f = \{\langle 1, 2 \rangle, \langle 2, 3 \rangle, \langle 3, 1 \rangle\}$
 $g = \{\langle 1, 2 \rangle, \langle 2, 1 \rangle, \langle 3, 3 \rangle\}$
 $h = \{\langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 1 \rangle\}$
 $s = \{\langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 3 \rangle\}$
 Find.
 1) Fog
 2) Gof
 3) Fohog
 4) Sofoh
- b) Define Algebraic System and Explain its properties with example.
- c) Define semigroup. Prove that $\langle Z, * \rangle$ is a semigroup; where Z is a set of integers and $*$ is multiplication. Whether it is monoid or not justify.
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a) Bounded lattice

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c) Distributive lattice

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No.

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S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes and Each question carries one mark.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If A is $\{\{\Phi\}, \{\Phi, \{\Phi\}\}\}$, then the power set of A has how many element?
 - a) 2
 - b) 4
 - c) 6
 - d) 8
- 2) Let $R = \{(3, 3), (6, 6), (9, 9), (12, 12), (3, 6), (6, 3), (3, 9), (9, 3), (9, 12), (12, 9)\}$ be a relation on the set $A = \{3, 6, 9, 12\}$. The relation is _____.
 - a) reflexive and transitive
 - b) reflexive and symmetric
 - c) symmetric and transitive
 - d) equivalence relation
- 3) A relation R in X is said to be a _____, if it is reflexive and symmetric.
 - a) void relation
 - b) Circular
 - c) partial order relation
 - d) compatibility relation
- 4) Let f and g be the function from the set of integers to itself, defined by $f(x) = 2x + 1$ and $g(x) = 3x + 4$. Then the composition of f and g is _____.
 - a) $6x + 9$
 - b) $6x + 7$
 - c) $6x + 6$
 - d) $6x + 8$
- 5) $\langle A, + \rangle$ is the given algebraic system where $A = \{0, 1, 2, 3, 4\}$ $\langle A, + \rangle$ is _____.
 - a) Group
 - b) Semigroup
 - c) Monoid
 - d) None of these
- 6) In the algebraic system $\langle A, * \rangle$ the mapping $f: A \rightarrow A$ which is one to one onto is called as _____.
 - a) Automorphism
 - b) Isomorphism
 - c) Endomorphism
 - d) Epimorphism
- 7) If $\langle G, * \rangle$ is a group and order of the group is 1 then G set is _____.
 - a) $\{\phi\}$
 - b) $\{e\}$
 - c) ϕ
 - d) $\{e, a\}$
- 8) In lattice L , $\text{GLB } \{a, b\}$ is denoted by _____.
 - a) $a+b$
 - b) $a*b$
 - c) $a < b$
 - d) none of the above
- 9) Boolean algebra must be _____ lattice.
 - a) Complement
 - b) Distributive
 - c) Both a and b
 - d) None of the above
- 10) A group $\langle G, * \rangle$ in which the operation $*$ is commutative is called _____.
 - a) Subgroup
 - b) Acyclic Group
 - c) Abelian Group
 - d) All of the above

- 11) If J: Jerry takes calculus, K: Ken takes Sociology and L: Larry takes English. Then following statement is denoted as:
If either Jerry takes Calculus or Ken takes Sociology, then Larry will take English.
- | | |
|---------------------------------|---------------------------------|
| a) $(J \wedge K) \rightarrow L$ | b) $(J \vee K) \rightarrow L$ |
| c) $J \vee (K \rightarrow L)$ | d) $J \wedge (K \rightarrow L)$ |
- 12) For any statement formula $P \rightarrow Q$, the statement formula $\neg P \rightarrow \neg Q$ is called its _____.
- | | |
|-------------------|------------|
| a) Converse | b) Inverse |
| c) Contrapositive | d) Implies |
- 13) PCNF is also called _____.
- | | |
|----------------------------------|----------------------------------|
| a) sum of product canonical form | b) product of sum canonical form |
| c) sum canonical form | d) product canonical form |
- 14) The complement of the set A is _____.
- | | |
|------------|------------|
| a) $A - B$ | b) $U - A$ |
| c) $A - U$ | d) $B - A$ |

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S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Computer Science & Engineering

DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019

Max. Marks: 56

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) All questions are compulsory
2) Figure to the indicate full marks

Section I

Q.2 Answer the following questions. (any Three) 12

- a) What is equivalence of formula? Show that following equivalence without constructing truth table.
 $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$
- b) Explain with example partition and covering of sets.
- c) Explain the following terms with example.
 1) Duality Law
 2) Tautological implication
- d) Let $X = \{2, 3, 6, 12, 24, 36\}$ and relation \leq be such that $x \leq y$ if x divides y . Find the relation R and Draw hasse diagram of $\langle X, \leq \rangle$.

Q.3 Answer the following questions. (Any One) 08

- a) What is Cartesian product? If $A = \{1\}$, $B = \{a, b\}$ and $C = \{2, 3\}$ find $A \times B \times C$, B^2 and $B^2 \times A$.
- b) Given relation $R = \{\langle 1, 2 \rangle, \langle 3, 4 \rangle, \langle 2, 2 \rangle\}$ and $S = \{\langle 4, 2 \rangle, \langle 2, 5 \rangle, \langle 3, 1 \rangle, \langle 1, 3 \rangle\}$. Find $R \circ S$, $S \circ R$, $R \circ (S \circ R)$, $(R \circ S) \circ R$, $R \circ R$, $S \circ S$, $R \circ R \circ R$, $S \circ S \circ S$.

Q.4 a) Find PCNF of the following without constructing truth table. 08

$$(\neg p \rightarrow r) \wedge (q \leftrightarrow p)$$

- b) Find PDNF of the following without constructing truth table.

$$(p \wedge q) \vee (\neg p \wedge r) \vee (q \wedge r)$$

Section II

Q.5 Answer the following questions. (Any Three). 12

- a) Let $X = \{1, 2, 3\}$ and f, g, h and s be functions from X to X given by.
 $f = \{\langle 1, 2 \rangle, \langle 2, 3 \rangle, \langle 3, 1 \rangle\}$
 $g = \{\langle 1, 2 \rangle, \langle 2, 1 \rangle, \langle 3, 3 \rangle\}$
 $h = \{\langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 1 \rangle\}$
 $s = \{\langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 3 \rangle\}$
 Find.
 1) Fog
 2) Gof
 3) Fohog
 4) Sofoh
- b) Define Algebraic System and Explain its properties with example.
- c) Define semigroup. Prove that $\langle Z, * \rangle$ is a semigroup; where Z is a set of integers and $*$ is multiplication. Whether it is monoid or not justify.
- d) What is Boolean algebra? Explain different properties of Boolean algebra.

Q.6 Answer the following questions. (Any One).

a) What is inverse function? Find the inverse of following.

1) $f(x)=2x-5$

2) $f(x)=(x-2)^3$

b) Define the following terms:

1) Subsemigroup

2) Submonoid

3) Semigroup homomorphism

4) Monoid homomorphism

Q.7 What is lattice? Explain with example following.

a) Bounded lattice

b) Complement Lattice

c) Distributive lattice

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**S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DISCRETE MATHEMATICAL STRUCTURES**

Day & Date: Tuesday, 10-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes and Each question carries one mark.
2) Figure to the indicate full marks

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In the algebraic system $\langle A, * \rangle$ the mapping $f: A \rightarrow A$ which is one to one onto is called as _____.

a) Automorphism	b) Isomorphism
c) Endomorphism	d) Epimorphism

- 2) If $\langle G, * \rangle$ is a group and order of the group is 1 then G set is _____.

a) $\{\phi\}$	b) $\{e\}$
c) ϕ	d) $\{e, a\}$

- 3) In lattice L , $GLB \{a, b\}$ is denoted by _____.

a) $a+b$	b) $a*b$
c) $a<b$	d) none of the above

- 4) Boolean algebra must be _____ lattice.

a) Complement	b) Distributive
c) Both a and b	d) None of the above

- 5) A group $\langle G, * \rangle$ in which the operation $*$ is commutative is called _____.

a) Subgroup	b) Acyclic Group
c) Abelian Group	d) All of the above

- 6) If J : Jerry takes calculus, K : Ken takes Sociology and L : Larry takes English Then following statement is denoted as:
If either Jerry takes Calculus or Ken takes Sociology, then Larry will take English.

a) $(J \wedge K) \rightarrow L$	b) $(J \vee K) \rightarrow L$
c) $J \vee (K \rightarrow L)$	d) $J \wedge (K \rightarrow L)$

- 7) For any statement formula $P \rightarrow Q$, the statement formula $\neg P \rightarrow \neg Q$ is called its _____.

a) Converse	b) Inverse
c) Contrapositive	d) Implies

- 8) PCNF is also called _____.

a) sum of product canonical form	b) product of sum canonical form
c) sum canonical form	d) product canonical form

- 9) The complement of the set A is _____.

a) $A - B$	b) $U - A$
c) $A - U$	d) $B - A$

- 10) If A is $\{\{\Phi\}, \{\Phi, \{\Phi\}\}\}$, then the power set of A has how many element?
- a) 2 b) 4
c) 6 d) 8
- 11) Let $R = \{(3, 3), (6, 6), (9, 9), (12, 12), (3, 6), (6, 3), (3, 9), (9, 3), (9, 12), (12, 9)\}$ be a relation on the set $A = \{3, 6, 9, 12\}$. The relation is _____.
- a) reflexive and transitive b) reflexive and symmetric
c) symmetric and transitive d) equivalence relation
- 12) A relation R in X is said to be a _____, if it is reflexive and symmetric.
- a) void relation b) Circular
c) partial order relation d) compatibility relation
- 13) Let f and g be the function from the set of integers to itself, defined by $f(x) = 2x + 1$ and $g(x) = 3x + 4$. Then the composition of f and g is _____.
- a) $6x + 9$ b) $6x + 7$
c) $6x + 6$ d) $6x + 8$
- 14) $\langle A, + \rangle$ is the given algebraic system where $A = \{0, 1, 2, 3, 4\}$ $\langle A, + \rangle$ is _____.
- a) Group b) Semigroup
c) Monoid d) None of these

Seat No.	
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S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Computer Science & Engineering

DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019

Max. Marks: 56

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) All questions are compulsory
2) Figure to the indicate full marks

Section I

Q.2 Answer the following questions. (any Three) 12

- a) What is equivalence of formula? Show that following equivalence without constructing truth table.
 $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$
- b) Explain with example partition and covering of sets.
- c) Explain the following terms with example.
 1) Duality Law
 2) Tautological implication
- d) Let $X = \{2, 3, 6, 12, 24, 36\}$ and relation \leq be such that $x \leq y$ if x divides y . Find the relation R and Draw hasse diagram of $\langle X, \leq \rangle$.

Q.3 Answer the following questions. (Any One) 08

- a) What is Cartesian product? If $A = \{1\}$, $B = \{a, b\}$ and $C = \{2, 3\}$ find $A \times B \times C$, B^2 and $B^2 \times A$.
- b) Given relation $R = \{\langle 1, 2 \rangle, \langle 3, 4 \rangle, \langle 2, 2 \rangle\}$ and $S = \{\langle 4, 2 \rangle, \langle 2, 5 \rangle, \langle 3, 1 \rangle, \langle 1, 3 \rangle\}$. Find $R \circ S$, $S \circ R$, $R \circ (S \circ R)$, $(R \circ S) \circ R$, $R \circ R$, $S \circ S$, $R \circ R \circ R$, $S \circ S \circ S$.

Q.4 a) Find PCNF of the following without constructing truth table. 08

$$(\neg p \rightarrow r) \wedge (q \leftrightarrow p)$$

- b) Find PDNF of the following without constructing truth table.

$$(p \wedge q) \vee (\neg p \wedge r) \vee (q \wedge r)$$

Section II

Q.5 Answer the following questions. (Any Three). 12

- a) Let $X = \{1, 2, 3\}$ and f, g, h and s be functions from X to X given by.
 $f = \{\langle 1, 2 \rangle, \langle 2, 3 \rangle, \langle 3, 1 \rangle\}$
 $g = \{\langle 1, 2 \rangle, \langle 2, 1 \rangle, \langle 3, 3 \rangle\}$
 $h = \{\langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 1 \rangle\}$
 $s = \{\langle 1, 1 \rangle, \langle 2, 2 \rangle, \langle 3, 3 \rangle\}$
 Find.
 1) Fog
 2) Gof
 3) Fohog
 4) Sofoh
- b) Define Algebraic System and Explain its properties with example.
- c) Define semigroup. Prove that $\langle Z, * \rangle$ is a semigroup; where Z is a set of integers and $*$ is multiplication. Whether it is monoid or not justify.
- d) What is Boolean algebra? Explain different properties of Boolean algebra.

Q.6 Answer the following questions. (Any One).

a) What is inverse function? Find the inverse of following.

1) $f(x)=2x-5$

2) $f(x)=(x-2)^3$

b) Define the following terms:

1) Subsemigroup

2) Submonoid

3) Semigroup homomorphism

4) Monoid homomorphism

Q.7 What is lattice? Explain with example following.

a) Bounded lattice

b) Complement Lattice

c) Distributive lattice

Seat No.	
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
 2) Make suitable assumptions if necessary and state them clearly

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Following is practically implemented reference model _____.

a) OSI	b) TCP/IP
c) OSII	d) None
- 2) Framing is task of _____ layer.

a) Data link	b) Transport
c) Application	d) Presentation
- 3) An _____ signal is one which intensity varies smooth fashion over time.

a) Digital	b) Analog
c) Discrete	d) all of above
- 4) The slowest transmission speed are those of _____.

a) Twisted pair	b) coaxial cable
c) fiber optic	d) Microwave
- 5) _____ cable is used for a long distance transmission.

a) Fiber optic	b) Twisted pair
c) Co-axial	d) None
- 6) _____ is method is used to detect as well as to correct the error.

a) CRC	b) Hamming code
c) Both a & b	d) None of this
- 7) In IEEE std.802.3, 10 Base 2 cabling is called _____.

a) Ethernet	b) Thick Ethernet
c) Thin Ethernet	d) None of this
- 8) Count-to-infinity problem can occur in _____.

a) Link state routing	b) Distance vector routing
c) Shortest path routing	d) Both a and b
- 9) In DQDB stands for _____.

a) data queue distributed bus	b) distributed queue dual bus
c) Both	d) None
- 10) What is the purpose of preamble bits in an Ethernet frame?

a) Pre-bit counting	b) Synchronization
c) Error checking	d) Destination address

- 11) Protocols in which the sender sends one frame and then waits for Acknowledgment before proceeding are _____.
- a) Selective repeat
 - b) Go back n
 - c) Stop and wait
 - d) All
- 12) The technique in which incoming packet is sent on these lines that are going Approximately in the right direction is _____.
- a) Flooding
 - b) Flow-based routing
 - c) Selective flooding
 - d) Symmetric flooding
- 13) _____ is collision free protocol.
- a) Basic bit map
 - b) Binary countdown
 - c) Both a & b
 - d) None of this
- 14) Which of the following is a static channel allocation method?
- a) CSMA
 - b) TDM
 - c) CSMA/CD
 - d) Bit-map

Seat No.	
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S.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All Questions are compulsory.
 2) Make suitable assumptions if necessary and state them clearly

Section – I

- Q.2 Attempt any four** **16**
- a) Draw Manchester and differential Manchester for 00001111
 - b) Explain CRC with suitable example.
 - c) Write differences between Serial and Parallel transmission mode.
 - d) Explain different framing method.
 - e) Write uses of computer Network.
- Q.3 Attempt any one** **06**
- a) Explain OSI Model with diagram.
 - b) Explain different transmission Impairment.
- Q.4 Attempt the following** **06**
- What is the need of sliding windows protocol? Describe GO-Back N Protocol

Section - II

- Q.5 Attempt any four** **16**
- a) Compare virtual circuit and datagram subnet.
 - b) Explain Binary count down protocol with example.
 - c) Explain IEEE std.802.5.
 - d) Write a short note on CSMA.
 - e) Compare Leaky bucket and token bucket algorithm.
- Q.6 Attempt any one** **06**
- a) Explain Shortest path algorithm with example.
 - b) Explain IEEE std. 802.3 in details with frame format.
- Q.7 Attempt the following** **06**
- Explain distance vector algorithm with example. Discuss count to infinity problem.

Seat No.	
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Set **Q**

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.
 2) Make suitable assumptions if necessary and state them clearly

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Count-to-infinity problem can occur in _____.
 a) Link state routing b) Distance vector routing
 c) Shortest path routing d) Both a and b
- 2) In DQDB stands for _____.
 a) data queue distributed bus b) distributed queue dual bus
 c) Both d) None
- 3) What is the purpose of preamble bits in an Ethernet frame?
 a) Pre-bit counting b) Synchronization
 c) Error checking d) Destination address
- 4) Protocols in which the sender sends one frame and then waits for Acknowledgment before proceeding are _____.
 a) Selective repeat b) Go back n
 c) Stop and wait d) All
- 5) The technique in which incoming packet is sent on these lines that are going Approximately in the right direction is _____.
 a) Flooding b) Flow-based routing
 c) Selective flooding d) Symmetric flooding
- 6) _____ is collision free protocol.
 a) Basic bit map b) Binary countdown
 c) Both a & b d) None of this
- 7) Which of the following is a static channel allocation method?
 a) CSMA b) TDM
 c) CSMA/CD d) Bit-map
- 8) Following is practically implemented reference model _____.
 a) OSI b) TCP/IP
 c) OSII d) None
- 9) Framing is task of _____ layer.
 a) Data link b) Transport
 c) Application d) Presentation
- 10) An _____ signal is one which intensity varies smooth fashion over time.
 a) Digital b) Analog
 c) Discrete d) all of above

- 11) The slowest transmission speed are those of _____.
 - a) Twisted pair
 - b) coaxial cable
 - c) fiber optic
 - d) Microwave

- 12) _____ cable is used for a long distance transmission.
 - a) Fiber optic
 - b) Twisted pair
 - c) Co-axial
 - d) None

- 13) _____ is method is used to detect as well as to correct the error.
 - a) CRC
 - b) Hamming code
 - c) Both a & b
 - d) None of this

- 14) In IEEE std.802.3, 10 Base 2 cabling is called _____.
 - a) Ethernet
 - b) Thick Ethernet
 - c) Thin Ethernet
 - d) None of this

Seat No.	
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Set

Q

S.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DATA COMMUNICATION

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) _____ cable is used for a long distance transmission.
 - a) Fiber optic
 - b) Twisted pair
 - c) Co-axial
 - d) None
- 2) _____ is method is used to detect as well as to correct the error.
 - a) CRC
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 - c) Both a & b
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- 3) In IEEE std.802.3, 10 Base 2 cabling is called _____.
 - a) Ethernet
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- 12) Framing is task of _____ layer.
- a) Data link
 - b) Transport
 - c) Application
 - d) Presentation
- 13) An _____ signal is one which intensity varies smooth fashion over time.
- a) Digital
 - b) Analog
 - c) Discrete
 - d) all of above
- 14) The slowest transmission speed are those of _____.
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S.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
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- 1) What is the purpose of preamble bits in an Ethernet frame?
 - a) Pre-bit counting
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 - c) Error checking
 - d) Destination address
- 2) Protocols in which the sender sends one frame and then waits for Acknowledgment before proceeding are _____.
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|---------------|-----------------|
| a) CRC | b) Hamming code |
| c) Both a & b | d) None of this |
- 12) In IEEE std.802.3, 10 Base 2 cabling is called _____.
- | | |
|------------------|-------------------|
| a) Ethernet | b) Thick Ethernet |
| c) Thin Ethernet | d) None of this |
- 13) Count-to-infinity problem can occur in _____.
- | | |
|--------------------------|----------------------------|
| a) Link state routing | b) Distance vector routing |
| c) Shortest path routing | d) Both a and b |
- 14) In DQDB stands for _____.
- | | |
|-------------------------------|-------------------------------|
| a) data queue distributed bus | b) distributed queue dual bus |
| c) Both | d) None |

Seat No.	
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S.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All Questions are compulsory.
 2) Make suitable assumptions if necessary and state them clearly

Section – I

- Q.2 Attempt any four** **16**
- a) Draw Manchester and differential Manchester for 00001111
 - b) Explain CRC with suitable example.
 - c) Write differences between Serial and Parallel transmission mode.
 - d) Explain different framing method.
 - e) Write uses of computer Network.
- Q.3 Attempt any one** **06**
- a) Explain OSI Model with diagram.
 - b) Explain different transmission Impairment.
- Q.4 Attempt the following** **06**
- What is the need of sliding windows protocol? Describe GO-Back N Protocol

Section - II

- Q.5 Attempt any four** **16**
- a) Compare virtual circuit and datagram subnet.
 - b) Explain Binary count down protocol with example.
 - c) Explain IEEE std.802.5.
 - d) Write a short note on CSMA.
 - e) Compare Leaky bucket and token bucket algorithm.
- Q.6 Attempt any one** **06**
- a) Explain Shortest path algorithm with example.
 - b) Explain IEEE std. 802.3 in details with frame format.
- Q.7 Attempt the following** **06**
- Explain distance vector algorithm with example. Discuss count to infinity problem.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) How many NAND gates are require to implement OR gate?
 - a) 1
 - b) 2
 - c) 3
 - d) 4
- 2) When input J and K are equal to 1 then it is called as _____ Flip Flop.
 - a) MS JK FF
 - b) SR FF
 - c) D FF
 - d) T FF
- 3) Identify port used in verilog as input as well as output _____.
 - a) Input
 - b) Output
 - c) In out
 - d) None of these
- 4) The logical sum of two or more logical product term is called _____.
 - a) Sop
 - b) Pos
 - c) OR operation
 - d) None
- 5) A D – Flip – Flop can be constructed from an _____ Flip Flop.
 - a) JK
 - b) SR
 - c) T
 - d) None
- 6) Which is correct order of sequence for representing the input values in K-map?
 - a) (00, 01, 10, 11)
 - b) (00,10, 01, 11)
 - c) (00, 01, 11, 10)
 - d) (00, 10, 11, 01)
- 7) BCD counter is also known as _____.
 - a) Decade counter
 - b) Mod-10 counter
 - c) Mod-5 counter
 - d) Both a & b
- 8) If A & B are inputs of half adder the sum is given by _____.
 - a) A AND B
 - b) A OR B
 - c) A X-OR B
 - d) A X-NOR B
- 9) The symbol for bitwise AND in verilog _____.
 - a) ~
 - b) &
 - c) ^
 - d) |
- 10) In 8:1 Multiplexer how many select lines are required?
 - a) 2
 - b) 4
 - c) 3
 - d) 1

- 11) According to Boolean law: $A \cdot 1 = ?$
- | | |
|------|---------|
| a) 0 | b) 1 |
| c) A | d) None |
- 12) Verilog is an IEEE standard _____.
- | | |
|--------------|--------------|
| a) IEEE 1346 | b) IEEE 1364 |
| c) IEEE 1394 | d) IEEE 1349 |
- 13) Device used for converting BCD to seven segment is called as _____.
- | | |
|----------------|------------------|
| a) Encoder | b) Decoder |
| c) Multiplexer | d) Demultiplexer |
- 14) $(56)_{10} = (?)_2$
- | | |
|-----------|-----------|
| a) 111000 | b) 111001 |
| c) 101100 | d) 100111 |

Seat No.	
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Set

P

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

Section – I

- Q.2 Attempt any one. 08**
 a) Write short note on Number system. Explain how Decimal number converted into binary number with example?
 b) What is multiplexer? Design full adder using 4:1 MUX.
- Q.3 Attempt any two. 10**
 a) Obtain 1:8 demux using 1:2 demux only.
 b) Minimize the following logic function using k-map & realize it using the basic gates
 $Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$
 c) Convert $(128)_{10}$ into
 1) Binary number system
 2) Octal Number system
 3) Hexadecimal Number system
 4) BCD code
 5) Gray code
- Q.4 Attempt any two. 10**
 a) What is universal gate concept? Implement basic gates using NOR gate.
 b) Write short note on IC 74151.
 c) Explain use of don't care condition in k-map with example.

Section – II

- Q.5 Attempt any one. 08**
 a) What is verilog? Explain behavioral Modeling of HDL with example.
 b) List different types of counter. Explain 3 bit asynchronous down counter in detail.
- Q.6 Attempt any two. 10**
 a) Write verilog code for 8:1 Multiplexer.
 b) Explain Excitation table of Flip Flop in detail.
 c) State different modes of shift register. Explain any one in detail.
- Q.7 Attempt any two. 10**
 a) Design Mod-6 asynchronous counter.
 b) Write HDL code for Full adder.
 c) Explain D & T Flip Flop.

Seat No.	
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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DIGITAL TECHNIQUES**

Day & Date: Saturday, 14-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If A & B are inputs of half adder the sum is given by _____.

a) A AND B	b) A OR B
c) A X-OR B	d) A X-NOR B
- 2) The symbol for bitwise AND in verilog _____.

a) ~	b) &
c) ^	d)
- 3) In 8:1 Multiplexer how many select lines are required?

a) 2	b) 4
c) 3	d) 1
- 4) According to Boolean law: $A \cdot 1 = ?$

a) 0	b) 1
c) A	d) None
- 5) Verilog is an IEEE standard _____.

a) IEEE 1346	b) IEEE 1364
c) IEEE 1394	d) IEEE 1349
- 6) Device used for converting BCD to seven segment is called as _____.

a) Encoder	b) Decoder
c) Multiplexer	d) Demultiplexer
- 7) $(56)_{10} = (?)_2$

a) 111000	b) 111001
c) 101100	d) 100111
- 8) How many NAND gates are require to implement OR gate?

a) 1	b) 2
c) 3	d) 4
- 9) When input J and K are equal to 1 then it is called as _____ Flip Flop.

a) MS JK FF	b) SR FF
c) D FF	d) T FF
- 10) Identify port used in verilog as input as well as output _____.

a) Input	b) Output
c) In out	d) None of these

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

Section – I

- Q.2 Attempt any one. 08**
 a) Write short note on Number system. Explain how Decimal number converted into binary number with example?
 b) What is multiplexer? Design full adder using 4:1 MUX.
- Q.3 Attempt any two. 10**
 a) Obtain 1:8 demux using 1:2 demux only.
 b) Minimize the following logic function using k-map & realize it using the basic gates
 $Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$
 c) Convert $(128)_{10}$ into
 1) Binary number system
 2) Octal Number system
 3) Hexadecimal Number system
 4) BCD code
 5) Gray code
- Q.4 Attempt any two. 10**
 a) What is universal gate concept? Implement basic gates using NOR gate.
 b) Write short note on IC 74151.
 c) Explain use of don't care condition in k-map with example.

Section – II

- Q.5 Attempt any one. 08**
 a) What is verilog? Explain behavioral Modeling of HDL with example.
 b) List different types of counter. Explain 3 bit asynchronous down counter in detail.
- Q.6 Attempt any two. 10**
 a) Write verilog code for 8:1 Multiplexer.
 b) Explain Excitation table of Flip Flop in detail.
 c) State different modes of shift register. Explain any one in detail.
- Q.7 Attempt any two. 10**
 a) Design Mod-6 asynchronous counter.
 b) Write HDL code for Full adder.
 c) Explain D & T Flip Flop.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) A D – Flip – Flop can be constructed from an _____ Flip Flop.

a) JK	b) SR
c) T	d) None
- 2) Which is correct order of sequence for representing the input values in K-map?

a) (00, 01, 10, 11)	b) (00,10, 01, 11)
c) (00, 01, 11, 10)	d) (00, 10, 11, 01)
- 3) BCD counter is also known as _____.

a) Decade counter	b) Mod-10 counter
c) Mod-5 counter	d) Both a & b
- 4) If A & B are inputs of half adder the sum is given by _____.

a) A AND B	b) A OR B
c) A X-OR B	d) A X-NOR B
- 5) The symbol for bitwise AND in verilog _____.

a) ~	b) &
c) ^	d)
- 6) In 8:1 Multiplexer how many select lines are required?

a) 2	b) 4
c) 3	d) 1
- 7) According to Boolean law: $A \cdot 1 = ?$

a) 0	b) 1
c) A	d) None
- 8) Verilog is an IEEE standard _____.

a) IEEE 1346	b) IEEE 1364
c) IEEE 1394	d) IEEE 1349
- 9) Device used for converting BCD to seven segment is called as _____.

a) Encoder	b) Decoder
c) Multiplexer	d) Demultiplexer
- 10) $(56)_{10} = (?)_2$

a) 111000	b) 111001
c) 101100	d) 100111

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

Section – I

- Q.2 Attempt any one. 08**
 a) Write short note on Number system. Explain how Decimal number converted into binary number with example?
 b) What is multiplexer? Design full adder using 4:1 MUX.
- Q.3 Attempt any two. 10**
 a) Obtain 1:8 demux using 1:2 demux only.
 b) Minimize the following logic function using k-map & realize it using the basic gates
 $Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$
 c) Convert $(128)_{10}$ into
 1) Binary number system
 2) Octal Number system
 3) Hexadecimal Number system
 4) BCD code
 5) Gray code
- Q.4 Attempt any two. 10**
 a) What is universal gate concept? Implement basic gates using NOR gate.
 b) Write short note on IC 74151.
 c) Explain use of don't care condition in k-map with example.

Section – II

- Q.5 Attempt any one. 08**
 a) What is verilog? Explain behavioral Modeling of HDL with example.
 b) List different types of counter. Explain 3 bit asynchronous down counter in detail.
- Q.6 Attempt any two. 10**
 a) Write verilog code for 8:1 Multiplexer.
 b) Explain Excitation table of Flip Flop in detail.
 c) State different modes of shift register. Explain any one in detail.
- Q.7 Attempt any two. 10**
 a) Design Mod-6 asynchronous counter.
 b) Write HDL code for Full adder.
 c) Explain D & T Flip Flop.

- 11) Which is correct order of sequence for representing the input values in K-map?
- | | |
|---------------------|---------------------|
| a) (00, 01, 10, 11) | b) (00,10, 01, 11) |
| c) (00, 01, 11, 10) | d) (00, 10, 11, 01) |
- 12) BCD counter is also known as _____.
a) Decade counter b) Mod-10 counter
c) Mod-5 counter d) Both a & b
- 13) If A & B are inputs of half adder the sum is given by _____.
a) A AND B b) A OR B
c) A X-OR B d) A X-NOR B
- 14) The symbol for bitwise AND in verilog _____.
a) ~ b) &
c) ^ d) |

Seat No.	
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Set **S**

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

Section – I

- Q.2 Attempt any one.** **08**
- a) Write short note on Number system. Explain how Decimal number converted into binary number with example?
 b) What is multiplexer? Design full adder using 4:1 MUX.
- Q.3 Attempt any two.** **10**
- a) Obtain 1:8 demux using 1:2 demux only.
 b) Minimize the following logic function using k-map & realize it using the basic gates
 $Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$
 c) Convert $(128)_{10}$ into
 1) Binary number system
 2) Octal Number system
 3) Hexadecimal Number system
 4) BCD code
 5) Gray code
- Q.4 Attempt any two.** **10**
- a) What is universal gate concept? Implement basic gates using NOR gate.
 b) Write short note on IC 74151.
 c) Explain use of don't care condition in k-map with example.

Section – II

- Q.5 Attempt any one.** **08**
- a) What is verilog? Explain behavioral Modeling of HDL with example.
 b) List different types of counter. Explain 3 bit asynchronous down counter in detail.
- Q.6 Attempt any two.** **10**
- a) Write verilog code for 8:1 Multiplexer.
 b) Explain Excitation table of Flip Flop in detail.
 c) State different modes of shift register. Explain any one in detail.
- Q.7 Attempt any two.** **10**
- a) Design Mod-6 asynchronous counter.
 b) Write HDL code for Full adder.
 c) Explain D & T Flip Flop.

Seat
No.

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) User generally provides an initial pixel for _____ algorithm.
 - a) Edge fill
 - b) Seed fill
 - c) Fence fill
 - d) Edge flag
- 2) In quad tree data structure root of the tree is the display _____.
 - a) View port
 - b) Segment
 - c) Window
 - d) Byte
- 3) Reflection about X-axis means _____.
 - a) X=0
 - b) Y=0
 - c) X=Y
 - d) Y=X
- 4) Control points are used to control the _____ of the curve.
 - a) Iteration
 - b) Edges
 - c) Values
 - d) Shape
- 5) Pixel is the smallest _____ of computer graphics.
 - a) Unit
 - b) Picture
 - c) Section
 - d) Region
- 6) Bezier curves are generated by using _____ number of control points.
 - a) 6
 - b) 2
 - c) 5
 - d) 4
- 7) In a scaling when $S_x=S_y$, then it is _____ type of scaling.
 - a) Uniform
 - b) Non uniform
 - c) Random
 - d) None of above
- 8) Super sampling is a technique for _____.
 - a) Shading
 - b) Anti-aliasing
 - c) Half toning
 - d) None of the above
- 9) RLE stands for _____.
 - a) Run Length Editor
 - b) Run Length Encoding
 - c) Ram Length Encoding
 - d) None of these
- 10) A line with end point codes 0100 and 0010 respectively then the line is _____.
 - a) Completely Visible
 - b) Partially Visible
 - c) Invisible
 - d) All above

- 11) In generalised 4X4 transformation matrix for 3D, the upper left 3X3 sub matrix produces _____.
- | | |
|---------------|--------------|
| a) Reflection | b) Rotation |
| c) Scaling | d) All above |
- 12) _____ is a logical unit of display file.
- | | |
|-----------|------------|
| a) Pixel | b) Segment |
| c) Buffer | d) Memory |
- 13) The Bezier curve is contained within the _____ hull of defining polygon.
- | | |
|---------------|------------------|
| a) Concave | b) Convex |
| c) Both a & b | d) None of above |
- 14) _____ clipping algorithm follows divide and conquer strategy.
- | | |
|---------------------|------------------|
| a) Cohen-Sutherland | b) Mid-point |
| c) Four bit | d) None of above |

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

Q.2 Solve any THREE. **12**

- a) Explain the reflection through an arbitrary line in brief.
- b) Explain shadow mask technique with suitable diagram.
- c) Explain edge fill algorithm with example.
- d) Explain touch panel in brief.

Q.3 Consider a triangle A(2,2) B(4,2) and C(4,4) and apply combined transformation as: **08**

- 1) 90 degree rotation about origin
- 2) Reflection through the line $y=-x$

OR

Describe Bresenham's circle generation ($1/8^{\text{th}}$ part) in detail with example.

Q.4 Consider A(5,5) and B(9,7) as two end points of a line. Rasterise the line using Bresenham's line drawing algorithm. **08**

Section – II

Q.5 Solve any THREE. **12**

- a) Define fractal. Explain it in brief.
- b) Write note on viewing transformation.
- c) Explain the B-Spline curve in brief.
- d) Explain in brief parametric and non-parametric representation of curve.

Q.6 What is corruption? Explain the concept of double buffering. State its advantages and disadvantages. **08**

OR

Explain mid-point sub division algorithm in detail.

Q.7 Explain the working of Warnock algorithm in detail. Also explain quad tree data structure. **08**

Seat
No.

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Super sampling is a technique for _____.
 - a) Shading
 - b) Anti-aliasing
 - c) Half toning
 - d) None of the above
- 2) RLE stands for _____.
 - a) Run Length Editor
 - b) Run Length Encoding
 - c) Ram Length Encoding
 - d) None of these
- 3) A line with end point codes 0100 and 0010 respectively then the line is _____.
 - a) Completely Visible
 - b) Partially Visible
 - c) Invisible
 - d) All above
- 4) In generalised 4X4 transformation matrix for 3D, the upper left 3X3 sub matrix produces _____.
 - a) Reflection
 - b) Rotation
 - c) Scaling
 - d) All above
- 5) _____ is a logical unit of display file.
 - a) Pixel
 - b) Segment
 - c) Buffer
 - d) Memory
- 6) The Bezier curve is contained within the _____ hull of defining polygon.
 - a) Concave
 - b) Convex
 - c) Both a & b
 - d) None of above
- 7) _____ clipping algorithm follows divide and conquer strategy.
 - a) Cohen-Sutherland
 - b) Mid-point
 - c) Four bit
 - d) None of above
- 8) User generally provides an initial pixel for _____ algorithm.
 - a) Edge fill
 - b) Seed fill
 - c) Fence fill
 - d) Edge flag
- 9) In quad tree data structure root of the tree is the display _____.
 - a) View port
 - b) Segment
 - c) Window
 - d) Byte
- 10) Reflection about X-axis means _____.
 - a) X=0
 - b) Y=0
 - c) X=Y
 - d) Y=X

- 11) Control points are used to control the _____ of the curve.
- | | |
|--------------|----------|
| a) Iteration | b) Edges |
| c) Values | d) Shape |
- 12) Pixel is the smallest _____ of computer graphics.
- | | |
|------------|------------|
| a) Unit | b) Picture |
| c) Section | d) Region |
- 13) Bezier curves are generated by using _____ number of control points.
- | | |
|------|------|
| a) 6 | b) 2 |
| c) 5 | d) 4 |
- 14) In a scaling when $S_x=S_y$, then it is _____ type of scaling.
- | | |
|------------|------------------|
| a) Uniform | b) Non uniform |
| c) Random | d) None of above |

Seat No.	
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Set	Q
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

Q.2 Solve any THREE. **12**

- a) Explain the reflection through an arbitrary line in brief.
- b) Explain shadow mask technique with suitable diagram.
- c) Explain edge fill algorithm with example.
- d) Explain touch panel in brief.

Q.3 Consider a triangle A(2,2) B(4,2) and C(4,4) and apply combined transformation **08**
 as:

- 1) 90 degree rotation about origin
- 2) Reflection through the line $y=-x$

OR

Describe Bresenham's circle generation ($1/8^{\text{th}}$ part) in detail with example.

Q.4 Consider A(5,5) and B(9,7) as two end points of a line. Rasterise the line using **08**
 Bresenham's line drawing algorithm.

Section – II

Q.5 Solve any THREE. **12**

- a) Define fractal. Explain it in brief.
- b) Write note on viewing transformation.
- c) Explain the B-Spline curve in brief.
- d) Explain in brief parametric and non-parametric representation of curve.

Q.6 What is corruption? Explain the concept of double buffering. State its **08**
 advantages and disadvantages.

OR

Explain mid-point sub division algorithm in detail.

Q.7 Explain the working of Warnock algorithm in detail. Also explain quad tree data **08**
 structure.

Seat
No.

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Pixel is the smallest _____ of computer graphics.
 - a) Unit
 - b) Picture
 - c) Section
 - d) Region
- 2) Bezier curves are generated by using _____ number of control points.
 - a) 6
 - b) 2
 - c) 5
 - d) 4
- 3) In a scaling when $S_x=S_y$, then it is _____ type of scaling.
 - a) Uniform
 - b) Non uniform
 - c) Random
 - d) None of above
- 4) Super sampling is a technique for _____.
 - a) Shading
 - b) Anti-aliasing
 - c) Half toning
 - d) None of the above
- 5) RLE stands for _____.
 - a) Run Length Editor
 - b) Run Length Encoding
 - c) Ram Length Encoding
 - d) None of these
- 6) A line with end point codes 0100 and 0010 respectively then the line is _____.
 - a) Completely Visible
 - b) Partially Visible
 - c) Invisible
 - d) All above
- 7) In generalised 4X4 transformation matrix for 3D, the upper left 3X3 sub matrix produces _____.
 - a) Reflection
 - b) Rotation
 - c) Scaling
 - d) All above
- 8) _____ is a logical unit of display file.
 - a) Pixel
 - b) Segment
 - c) Buffer
 - d) Memory
- 9) The Bezier curve is contained within the _____ hull of defining polygon.
 - a) Concave
 - b) Convex
 - c) Both a & b
 - d) None of above
- 10) _____ clipping algorithm follows divide and conquer strategy.
 - a) Cohen-Sutherland
 - b) Mid-point
 - c) Four bit
 - d) None of above

- 11) User generally provides an initial pixel for _____ algorithm.
- | | |
|---------------|--------------|
| a) Edge fill | b) Seed fill |
| c) Fence fill | d) Edge flag |
- 12) In quad tree data structure root of the tree is the display _____.
- | | |
|--------------|------------|
| a) View port | b) Segment |
| c) Window | d) Byte |
- 13) Reflection about X-axis means _____.
- | | |
|----------|----------|
| a) $X=0$ | b) $Y=0$ |
| c) $X=Y$ | d) $Y=X$ |
- 14) Control points are used to control the _____ of the curve.
- | | |
|--------------|----------|
| a) Iteration | b) Edges |
| c) Values | d) Shape |

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

Q.2 Solve any THREE. **12**

- a) Explain the reflection through an arbitrary line in brief.
- b) Explain shadow mask technique with suitable diagram.
- c) Explain edge fill algorithm with example.
- d) Explain touch panel in brief.

Q.3 Consider a triangle A(2,2) B(4,2) and C(4,4) and apply combined transformation as: **08**

- 1) 90 degree rotation about origin
- 2) Reflection through the line $y=-x$

OR

Describe Bresenham's circle generation ($1/8^{\text{th}}$ part) in detail with example.

Q.4 Consider A(5,5) and B(9,7) as two end points of a line. Rasterise the line using Bresenham's line drawing algorithm. **08**

Section – II

Q.5 Solve any THREE. **12**

- a) Define fractal. Explain it in brief.
- b) Write note on viewing transformation.
- c) Explain the B-Spline curve in brief.
- d) Explain in brief parametric and non-parametric representation of curve.

Q.6 What is corruption? Explain the concept of double buffering. State its advantages and disadvantages. **08**

OR

Explain mid-point sub division algorithm in detail.

Q.7 Explain the working of Warnock algorithm in detail. Also explain quad tree data structure. **08**

Seat
No.

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options. 14

- 1) A line with end point codes 0100 and 0010 respectively then the line is _____.
 a) Completely Visible b) Partially Visible
 c) Invisible d) All above
- 2) In generalised 4X4 transformation matrix for 3D, the upper left 3X3 sub matrix produces _____.
 a) Reflection b) Rotation
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- 3) _____ is a logical unit of display file.
 a) Pixel b) Segment
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- 4) The Bezier curve is contained within the _____ hull of defining polygon.
 a) Concave b) Convex
 c) Both a & b d) None of above
- 5) _____ clipping algorithm follows divide and conquer strategy.
 a) Cohen-Sutherland b) Mid-point
 c) Four bit d) None of above
- 6) User generally provides an initial pixel for _____ algorithm.
 a) Edge fill b) Seed fill
 c) Fence fill d) Edge flag
- 7) In quad tree data structure root of the tree is the display _____.
 a) View port b) Segment
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- 8) Reflection about X-axis means _____.
 a) $X=0$ b) $Y=0$
 c) $X=Y$ d) $Y=X$
- 9) Control points are used to control the _____ of the curve.
 a) Iteration b) Edges
 c) Values d) Shape
- 10) Pixel is the smallest _____ of computer graphics.
 a) Unit b) Picture
 c) Section d) Region

- 11) Bezier curves are generated by using _____ number of control points.
- | | |
|------|------|
| a) 6 | b) 2 |
| c) 5 | d) 4 |
- 12) In a scaling when $S_x=S_y$, then it is _____ type of scaling.
- | | |
|------------|------------------|
| a) Uniform | b) Non uniform |
| c) Random | d) None of above |
- 13) Super sampling is a technique for _____.
- | | |
|----------------|----------------------|
| a) Shading | b) Anti-aliasing |
| c) Half toning | d) None of the above |
- 14) RLE stands for _____.
- | | |
|------------------------|------------------------|
| a) Run Length Editor | b) Run Length Encoding |
| c) Ram Length Encoding | d) None of these |

Seat No.	
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S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Computer Science & Engineering
COMPUTER GRAPHICS

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 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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Section – I

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- b) Explain shadow mask technique with suitable diagram.
- c) Explain edge fill algorithm with example.
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OR

Describe Bresenham's circle generation ($1/8^{\text{th}}$ part) in detail with example.

Q.4 Consider A(5,5) and B(9,7) as two end points of a line. Rasterise the line using Bresenham's line drawing algorithm. **08**

Section – II

Q.5 Solve any THREE. **12**

- a) Define fractal. Explain it in brief.
- b) Write note on viewing transformation.
- c) Explain the B-Spline curve in brief.
- d) Explain in brief parametric and non-parametric representation of curve.

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OR

Explain mid-point sub division algorithm in detail.

Q.7 Explain the working of Warnock algorithm in detail. Also explain quad tree data structure. **08**

9) The half range sine series of $f(x)$ defined in the interval $(0, 2)$ is _____.

- a) $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$ b) $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$
 c) $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$ d) $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$

10) Laplace transform of $\int_0^t u^3 du =$ _____.

- a) $\frac{3}{s^5}$ b) $\frac{6}{s^5}$
 c) $\frac{1}{s^5}$ d) $\frac{6}{s^4}$

11) The two regression equations of the variables are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.5x$ then coefficient of correlation is _____.

- a) 0.659 b) -0.649
 c) 0.569 d) -0.659

12) $Lf(t) \delta(t - a) =$ _____.

- a) $e^{-as} f(t)$ b) $e^{-as} f(a)$
 c) $e^{as} f(a)$ d) $e^{-as} f(t - a)$

13) If $z\{f(k)\} = F(z)$, then $z\{a^k f(k)\} =$ _____.

- a) $f\left(\frac{a}{z}\right)$ b) $f\left(\frac{z}{a}\right)$
 c) $\frac{1}{a} f\left(\frac{z}{a}\right)$ d) None

14) $z\{k\} =$ _____ for $|z| > 1$

- a) $\frac{z}{z-1}$ b) $\frac{1}{(z-1)^2}$
 c) $\frac{z}{(z-1)^2}$ d) $\frac{z}{(z+1)^2}$

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Use of calculator is allowed.

Section - I

Q.2 Solve any three of the following questions. 09

- a) Solve $(D^3 + 2D^2 + D)y = x^2 + x$
 b) Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$
 c) Find $z \left\{ 2^k \cos \left(\frac{k\pi}{3} + \alpha \right) \right\}, k \geq 0$
 d) Find $L \left[\int_0^t u e^{-2u} \sin 3u \, du \right]$
 e) Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$

Q.3 Solve any three of the following questions. 09

- a) Solve $\frac{d^3 y}{dt^3} + y = \cos 2t$
 b) If $f(t) = \begin{cases} 1 & 0 \leq t \leq 1 \\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that

$$L[f(t)] = \frac{1}{s(1 + e^{-s})}$$

 c) Find $L^{-1} \left[\frac{s+29}{(s+4)(s^2+9)} \right]$
 d) Find z-transform of $\left\{ \left(\frac{1}{3} \right)^{|k|} \right\}$
 e) Find $z\{k\alpha^k + k\beta^k\}, k \geq 0$

Q.4 Solve any two of the following questions. 10

- a) Solve $\frac{d^2 y}{dx^2} + y = \sin x \sin 2x + 3^x$
 b) Find inverse z-transform of

$$f(z) = \frac{z}{(z-2)(z-3)} \quad |z| < 2, \quad |z| > 3$$

 c) Use Laplace transform to solve

$$\frac{dy}{dt} + 3y(t) + 2 \int_0^t y(t) dt = t \quad y = 0 \text{ when } t = 0$$

Section – II

09

Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for

$$f(x) = (x - 1)^2, \quad 0 \leq x \leq 1$$
- b) For a certain data the regression equations are $3x + 2y - 26 = 0$ and $6x + y - 31 = 0$ find the following.
- 1) Mean of x & y
 - 2) Coefficient of correlation
 - 3) Most probable value of x when $y = 15$
- c) Assuming that 20% the population is literate so that the change of an individual being literate is $\frac{1}{5}$ and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you expect to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.
- | | | | | | | |
|------------------|-----|----|----|---|---|-------|
| No. of mistakes: | 0 | 1 | 2 | 3 | 4 | Total |
| No. of pages: | 211 | 90 | 19 | 5 | 0 | 325 |
- Fit a Poisson distribution.
- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
- 1) The average idle time
 - 2) The average time a customer has to remain in the shop.

Q.6 Solve any three of the following questions.

09

- a) Find fourier series for $f(x) = \frac{x(\pi^2 - x^2)}{12}$ in $(-\pi, \pi)$
- b) from the following data find the line of regression y on x

	y	x
Mean	508.4	26.7
SD	36.8	4.6

 $r=0.52$

- c) Calculate the coefficient of correlation from the following data.
- | | | | | | | | |
|-------|----|----|----|----|----|----|----|
| x : | 42 | 44 | 58 | 55 | 89 | 98 | 66 |
| y : | 56 | 59 | 53 | 58 | 65 | 78 | 58 |
- d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is 0.752 ± 0.004
 (Given: for a SNV z area between $z=0$ and $z=1.75$ is 0.4599 and that between $z=0$ and $z=2.25$ is 0.4878)
- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be $M|M|1|\infty$ system.
- 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
 - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

x :	91	97	108	121	67	124	51	73	111	57
y :	71	75	69	97	70	91	39	61	80	47

b) Find the fourier series for $f(x)$ in $(0,2\pi)$

$$f(x) = \begin{cases} x & , 0 < x \leq \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.

- 1) Find the expected number of patients at the clinic and in the queue?
- 2) Find the percentage of patients who are not required to wait?
- 3) Find the percentage of patients who have to wait?
- 4) Find Average time spent by a patient at the clinic?

Seat No.	
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Set **Q**

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In $M|M|1|\infty$ system with $\lambda = 12$ hrs and $\mu = 16$ hrs the average number of customers in the system is _____.
 - a) 5
 - b) 4
 - c) 3
 - d) 2
- 2) The half range sine series of $f(x)$ defined in the interval $(0, 2)$ is _____.
 - a) $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$
 - b) $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$
 - c) $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$
 - d) $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$
- 3) Laplace transform of $\int_0^t u^3 du =$ _____.
 - a) $\frac{3}{s^5}$
 - b) $\frac{6}{s^5}$
 - c) $\frac{1}{s^5}$
 - d) $\frac{6}{s^4}$
- 4) The two regression equations of the variables are $x = 19.13 - 0.87y$ and $y = 11.64 - 0.5x$ then coefficient of correlation is _____.
 - a) 0.659
 - b) -0.649
 - c) 0.569
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- 5) $Lf(t) \delta(t - a) =$ _____.
 - a) $e^{-as} f(t)$
 - b) $e^{-as} f(a)$
 - c) $e^{as} f(a)$
 - d) $e^{-as} f(t - a)$
- 6) If $z\{f(k)\} = F(z)$, then $z\{a^k f(k)\} =$ _____.
 - a) $f\left(\frac{a}{z}\right)$
 - b) $f\left(\frac{z}{a}\right)$
 - c) $\frac{1}{a} f\left(\frac{z}{a}\right)$
 - d) None

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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Section - I

Q.2 Solve any three of the following questions. 09

- a) Solve $(D^3 + 2D^2 + D)y = x^2 + x$
 b) Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$
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 e) Find $z \{ k\alpha^k + k\beta^k \}, k \geq 0$

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Section – II

Q.5 Solve any three of the following questions. **09**

- a) Obtain half range cosine series for

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Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
- 1) The average idle time
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b) from the following data find the line of regression y on x

	y	x
Mean	508.4	26.7
SD	36.8	4.6

$r=0.52$

c) Calculate the coefficient of correlation from the following data.

$x:$	42	44	58	55	89	98	66
$y:$	56	59	53	58	65	78	58

d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is 0.752 ± 0.004
 (Given: for a SNV z area between $z=0$ and $z=1.75$ is 0.4599 and that between $z=0$ and $z=2.25$ is 0.4878)

- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be $M|M|1|\infty$ system.
- 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
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a) From the following data obtain the two lines of regression.

$x:$	91	97	108	121	67	124	51	73	111	57
$y:$	71	75	69	97	70	91	39	61	80	47

b) Find the fourier series for $f(x)$ in $(0,2\pi)$

$$f(x) = \begin{cases} x & , 0 < x \leq \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

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Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.
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 3) Use of non – programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Idle time of the queuing system is _____.

a) $\frac{\lambda}{\mu}$	b) $1 - \frac{\lambda}{\mu}$
c) $\frac{\mu}{\lambda}$	d) $1 - \frac{\mu}{\lambda}$

- 2) If mean of $x = 70$ mean of $y = 149$ and $b_{yx} = 0.7$ then the line of regression of y on x is _____.

a) $y = 0.8x + 120$	b) $y = 0.6x + 80$
c) $y = 0.5x + 60$	d) $y = 0.7x + 100$

- 3) The number of defective ballot papers follows a Poisson distribution with mean 2. The probability that there will be no defective ballot paper in a box is _____.

a) 0.101	b) 0.113
c) 0.124	d) 0.135

- 4) In $M|M|1|\infty$ system with $\lambda = 12$ hrs and $\mu = 16$ hrs the average number of customers in the system is _____.

a) 5	b) 4
c) 3	d) 2

- 5) The half range sine series of $f(x)$ defined in the interval $(0, 2)$ is _____.

a) $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$	b) $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$
c) $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$	d) $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$

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a) $\frac{3}{s^5}$	b) $\frac{6}{s^5}$
c) $\frac{1}{s^5}$	d) $\frac{6}{s^4}$

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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Section - I

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- a) Solve $\frac{d^3 y}{dt^3} + y = \cos 2t$
 b) If $f(t) = \begin{cases} 1 & 0 \leq t \leq 1 \\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that

$$L[f(t)] = \frac{1}{s(1 + e^{-s})}$$

 c) Find $L^{-1} \left[\frac{s+29}{(s+4)(s^2+9)} \right]$
 d) Find z-transform of $\left\{ \left(\frac{1}{3} \right)^{|k|} \right\}$
 e) Find $z\{k\alpha^k + k\beta^k\}, k \geq 0$

Q.4 Solve any two of the following questions. 10

- a) Solve $\frac{d^2 y}{dx^2} + y = \sin x \sin 2x + 3^x$
 b) Find inverse z-transform of

$$f(z) = \frac{z}{(z-2)(z-3)} \quad |z| < 2, \quad |z| > 3$$

 c) Use Laplace transform to solve

$$\frac{dy}{dt} + 3y(t) + 2 \int_0^t y(t) dt = t \quad y = 0 \text{ when } t = 0$$

Section – II

09

Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for

$$f(x) = (x - 1)^2, \quad 0 \leq x \leq 1$$
- b) For a certain data the regression equations are $3x + 2y - 26 = 0$ and $6x + y - 31 = 0$ find the following.
- 1) Mean of x & y
 - 2) Coefficient of correlation
 - 3) Most probable value of x when $y = 15$
- c) Assuming that 20% the population is literate so that the change of an individual being literate is $\frac{1}{5}$ and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you expect to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.
- | | | | | | | |
|------------------|-----|----|----|---|---|-------|
| No. of mistakes: | 0 | 1 | 2 | 3 | 4 | Total |
| No. of pages: | 211 | 90 | 19 | 5 | 0 | 325 |
- Fit a Poisson distribution.
- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
- 1) The average idle time
 - 2) The average time a customer has to remain in the shop.

09

Q.6 Solve any three of the following questions.

- a) Find fourier series for $f(x) = \frac{x(\pi^2 - x^2)}{12}$ in $(-\pi, \pi)$
- b) from the following data find the line of regression y on x
- | | | |
|------|-------|------|
| | y | x |
| Mean | 508.4 | 26.7 |
| SD | 36.8 | 4.6 |

$$r=0.52$$

- c) Calculate the coefficient of correlation from the following data.
- | | | | | | | | |
|-------|----|----|----|----|----|----|----|
| x : | 42 | 44 | 58 | 55 | 89 | 98 | 66 |
| y : | 56 | 59 | 53 | 58 | 65 | 78 | 58 |
- d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is 0.752 ± 0.004
 (Given: for a SNV z area between $z=0$ and $z=1.75$ is 0.4599 and that between $z=0$ and $z=2.25$ is 0.4878)
- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be $M|M|1|\infty$ system.
- 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
 - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

x :	91	97	108	121	67	124	51	73	111	57
y :	71	75	69	97	70	91	39	61	80	47

b) Find the fourier series for $f(x)$ in $(0,2\pi)$

$$f(x) = \begin{cases} x & , 0 < x \leq \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.

- 1) Find the expected number of patients at the clinic and in the queue?
- 2) Find the percentage of patients who are not required to wait?
- 3) Find the percentage of patients who have to wait?
- 4) Find Average time spent by a patient at the clinic?

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
APPLIED MATHEMATICS - I

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Use of calculator is allowed.

Section - I

Q.2 Solve any three of the following questions. 09

- a) Solve $(D^3 + 2D^2 + D)y = x^2 + x$
 b) Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$
 c) Find $z \left\{ 2^k \cos \left(\frac{k\pi}{3} + \alpha \right) \right\}, k \geq 0$
 d) Find $L \left[\int_0^t u e^{-2u} \sin 3u \, du \right]$
 e) Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$

Q.3 Solve any three of the following questions. 09

- a) Solve $\frac{d^3 y}{dt^3} + y = \cos 2t$
 b) If $f(t) = \begin{cases} 1 & 0 \leq t \leq 1 \\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that
 $L[f(t)] = \frac{1}{s(1 + e^{-s})}$
 c) Find $L^{-1} \left[\frac{s+29}{(s+4)(s^2+9)} \right]$
 d) Find z-transform of $\left\{ \left(\frac{1}{3} \right)^{|k|} \right\}$
 e) Find $z \{ k\alpha^k + k\beta^k \}, k \geq 0$

Q.4 Solve any two of the following questions. 10

- a) Solve $\frac{d^2 y}{dx^2} + y = \sin x \sin 2x + 3^x$
 b) Find inverse z-transform of
 $f(z) = \frac{z}{(z-2)(z-3)} \quad |z| < 2, \quad |z| > 3$
 c) Use Laplace transform to solve
 $\frac{dy}{dt} + 3y(t) + 2 \int_0^t y(t) dt = t \quad y = 0 \text{ when } t = 0$

Section – II

Q.5 Solve any three of the following questions.

09

- a) Obtain half range cosine series for $f(x) = (x - 1)^2, \quad 0 \leq x \leq 1$
- b) For a certain data the regression equations are $3x + 2y - 26 = 0$ and $6x + y - 31 = 0$ find the following.
 - 1) Mean of x & y
 - 2) Coefficient of correlation
 - 3) Most probable value of x when $y = 15$
- c) Assuming that 20% the population is literate so that the change of an individual being literate is $\frac{1}{5}$ and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you expect to report that three people or less were literate?

d) The following mistakes per page were observed in a book.

No. of mistakes:	0	1	2	3	4	Total
No. of pages:	211	90	19	5	0	325

Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
 - 1) The average idle time
 - 2) The average time a customer has to remain in the shop.

Q.6 Solve any three of the following questions.

09

- a) Find fourier series for $f(x) = \frac{x(\pi^2 - x^2)}{12}$ in $(-\pi, \pi)$
- b) from the following data find the line of regression y on x

	y	x
Mean	508.4	26.7
SD	36.8	4.6

$r=0.52$

- c) Calculate the coefficient of correlation from the following data.

$x:$	42	44	58	55	89	98	66
$y:$	56	59	53	58	65	78	58
- d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is 0.752 ± 0.004
(Given: for a SNV z area between $z=0$ and $z=1.75$ is 0.4599 and that between $z=0$ and $z=2.25$ is 0.4878)
- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be $M|M|1|\infty$ system.
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a) From the following data obtain the two lines of regression.

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b) Find the fourier series for $f(x)$ in $(0,2\pi)$

$$f(x) = \begin{cases} x & , 0 < x \leq \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.

- 1) Find the expected number of patients at the clinic and in the queue?
- 2) Find the percentage of patients who are not required to wait?
- 3) Find the percentage of patients who have to wait?
- 4) Find Average time spent by a patient at the clinic?

Seat
No.

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC MECHANICAL ENGINEERING

Day & Date: Friday, 13-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) During a cycle the heat transfer are given by: 120kJ, -60kJ, -48kJ, and 12kJ the net work transfer the cycle is _____.

a) 60000Nm	b) 24000Nm
c) 12000Nm	d) 4400Nm
- 2) PMM-I is impossible according to _____ law.
 - a) Zeroth law of thermodynamics
 - b) First law of thermodynamics
 - c) Second law of thermodynamics
 - d) Boyle's law
- 3) Heat engine is used _____.

a) to heat space	b) to cool the space
c) to convert heat into work	d) None
- 4) Coefficient of performance of refrigeration system is always _____.

a) equal to one	b) less than one
c) greater than one	d) None
- 5) When a gas is heated at constant volume, its _____.
 - a) temperature increase
 - b) pressure increase
 - c) both temperature and pressure increases
 - d) temperature and pressure remains constant
- 6) The internal energy of perfect gas depend on _____.
 - a) temperature, pressure and specific heats
 - b) temperature, enthalpy and specific heats
 - c) temperature, entropy and specific heats
 - d) temperature only
- 7) In steam power plants, condenser is used to _____.
 - a) reduce back pressure
 - b) consume heat of exhaust steam
 - c) condense feed water
 - d) all above
- 8) For impulse water turbine which turbine is used _____.

a) pelton turbine	b) francis turbine
c) Kaplan turbine	d) None

- 9) The nozzle is used _____.
- a) to increase pressure energy of water leaving to tailrace
 - b) to decrease pressure energy of water leaving to tail race
 - c) to increase kinetic energy of water striking to turbine
 - d) None
- 10) For the flue gas flow, tick the correct sequence _____.
- a) Boiler-Air preheater- economizer- ID fan- Chimney
 - b) Boiler- ID fan -Air preheater- Economizer- Chimney
 - c) Boiler- Economizer- Air preheater- ID fan- Chimney
 - d) None of the above
- 11) Term scavenging is generally related with _____.
- a) two stroke engines
 - b) vertical engines
 - c) air cooled engines
 - d) high speed engines
- 12) Centrifugal tension in belt depends upon _____.
- a) velocity of the belt
 - b) mass per unit length of the belt
 - c) both a and b above
 - d) none of the above
- 13) Which of the following operations can be performed by a drilling machine?
- a) spot facing
 - b) Reaming
 - c) tapping
 - d) all of these
- 14) A welding process definitely needs following input _____.
- a) heat
 - b) Pressure
 - c) Filler material
 - d) none of the above

Seat No.	
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F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC MECHANICAL ENGINEERING

Day & Date: Friday, 13-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) Q.No.2 and Q.No.4 are short answer type question.
 2) Q.No.3 and Q.5 are long answer types question
 3) Figures to the right indicate fill marks.
 4) Use of log tables and non-programmable single memory calculator is allowed.
 5) Neat diagrams must be drawn whenever necessary.
 6) Make suitable assumptions, is necessary and mention them clearly.

Section – I

- Q.2 Attempt any five of the following** **15**
- a) Explain types of thermodynamic systems and give one example of each.
 - b) State and explain second law of thermodynamics.
 - c) Derive an expression of work done for adiabatic process.
 - d) Draw neat sketch of window air conditioner. How it differ from split air conditioner?
 - e) State the function of following units in Steam power plant.
 - 1) Condenser
 - 2) Economiser
 - 3) Cooling tower
 - f) Compare BWR and PWR.
 - g) Explain in brief working of double acting reciprocating pump.
- Q.3 Solve any one out of a) and b) and solve any two out of c) to f).** **13**
- a) Explain with neat sketch the working of Hydro power plant. State its advantages and disadvantages. **05**
 - b) A nozzle is used for increasing the velocity of steam. The enthalpy and velocity of steam entering the nozzle are 3000 kJ/kg and 60 m/s respectively. The enthalpy at the exit of the nozzle 2800 kJ/kg. Inlet area is 0.12 m^2 , specific volume at inlet is $0.2 \text{ m}^3/\text{kg}$ and specific volume at outlet is $0.5 \text{ m}^3/\text{kg}$. The heat losses from horizontal nozzle are negligible. Find. **05**
 - 1) Velocity and the area at the exit from the nozzle
 - 2) Mass flow rate
 - 3) The ratio of inlet to exit diameter of nozzle
 - c) What is Hydraulic Impulse Turbine? Explain the working of Pelton wheel. **04**
 - d) 0.8 kg air is compressed adiabatically from 200 KPa pressure and 70°C temperature to 0.9 Mpa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and gross work transfer. **04**
 Assume $C_p = 1.005$ and $C_v = 0.718 \text{ KJ/Kg } ^\circ\text{K}$. **04**
 - e) Draw neat sketch of vane blower. Explain in brief its construction and working. **04**

- f) A closed system undergoes a thermodynamic cycle consisting of 5 processes. The following data gives the work and heat transfer for each of the process.

04

Process	Heat transfer in KJ/min	Work transfer in KJ/min
1-2	Nil	-8000
2-3	6000	Nil
3-4	2000	4000
4-5	Nil	8000
5-1	-4000	Nil

Show that the data is consistent with First law of thermodynamics and determine.

- 1) Net rate of work out put
- 2) Efficiency of cycle
- 3) Change in internal energy for cycle

Section – II

Q.4 Solve any five out of seven

15

- a) Compare two stroke engine and four stroke engine.
- b) A diesel engine has a compression ratio of 18 and cut off ratio 2.7. Calculate efficiency of engine.
- c) Write a short note on chain drives giving its advantages and disadvantages.
- d) Write a short note on gas welding.
- e) What are different steps involved in design process?
- f) Differentiate between Brazing and Soldering.
- g) Define the terms - ductility, malleability, hardness.

Q.5 Solve any one out of (a) and (b) and solve any two out of (c) to (f)

13

- a) Following data refers to an open belt drive:

05

Distance between two parallel shaft	= 4m
Diameter of Pulley (larger)	= 1.5m
Diameter of smaller Pulley	= 1m
Initial tension in belt	= 2.8kN
Mass of belt material	= 1.4kg/m
Co-efficient of friction between the belt & pulley	= 0.3
Speed of smaller Pulley	= 400rpm

- b) Draw block diagram of pillar drilling machine and explain functions of basic elements. **05**
- c) An engine working on an Otto has a compression ratio of 8. The compression begins at 100 KPa and 15°C. The heat supplied per cycle is 1800KJ/Kg of air. Determine : **04**
 - 1) Thermal Efficiency
 - 2) Maximum cycle temperature
- d) Draw neat sketch of Horizontal milling machine. What are three motions available on it? **04**
- e) Explain Aesthetic considerations in design. **04**
- f) Explain in brief construction of a Lathe machine with a block diagram. **04**

Seat No.	
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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC MECHANICAL ENGINEERING**

Day & Date: Friday, 13-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) For impulse water turbine which turbine is used _____.
 - a) pelton turbine
 - b) francis turbine
 - c) Kaplan turbine
 - d) None
- 2) The nozzle is used _____.
 - a) to increase pressure energy of water leaving to tailrace
 - b) to decrease pressure energy of water leaving to tail race
 - c) to increase kinetic energy of water striking to turbine
 - d) None
- 3) For the flue gas flow, tick the correct sequence _____.
 - a) Boiler-Air preheater- economizer- ID fan- Chimney
 - b) Boiler- ID fan -Air preheater- Economizer- Chimney
 - c) Boiler- Economizer- Air preheater- ID fan- Chimney
 - d) None of the above
- 4) Term scavenging is generally related with _____.
 - a) two stroke engines
 - b) vertical engines
 - c) air cooled engines
 - d) high speed engines
- 5) Centrifugal tension in belt depends upon _____.
 - a) velocity of the belt
 - b) mass per unit length of the belt
 - c) both a and b above
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- 6) Which of the following operations can be performed by a drilling machine?
 - a) spot facing
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- 7) A welding process definitely needs following input _____.
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Seat No.	
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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC MECHANICAL ENGINEERING**

Day & Date: Friday, 13-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:**
- 1) Q.No.2 and Q.No.4 are short answer type question.
 - 2) Q.No.3 and Q.5 are long answer types question
 - 3) Figures to the right indicate fill marks.
 - 4) Use of log tables and non-programmable single memory calculator is allowed.
 - 5) Neat diagrams must be drawn whenever necessary.
 - 6) Make suitable assumptions, is necessary and mention them clearly.

Section – I

- Q.2 Attempt any five of the following 15**
- a) Explain types of thermodynamic systems and give one example of each.
 - b) State and explain second law of thermodynamics.
 - c) Derive an expression of work done for adiabatic process.
 - d) Draw neat sketch of window air conditioner. How it differ from split air conditioner?
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 - f) Compare BWR and PWR.
 - g) Explain in brief working of double acting reciprocating pump.
- Q.3 Solve any one out of a) and b) and solve any two out of c) to f). 13**
- a) Explain with neat sketch the working of Hydro power plant. State its advantages and disadvantages. 05
 - b) A nozzle is used for increasing the velocity of steam. The enthalpy and velocity of steam entering the nozzle are 3000 kJ/kg and 60 m/s respectively. The enthalpy at the exit of the nozzle 2800 kJ/kg. Inlet area is 0.12 m^2 , specific volume at inlet is $0.2 \text{ m}^3/\text{kg}$ and specific volume at outlet is $0.5 \text{ m}^3/\text{kg}$. The heat losses from horizontal nozzle are negligible. Find. 05
 - 1) Velocity and the area at the exit from the nozzle
 - 2) Mass flow rate
 - 3) The ratio of inlet to exit diameter of nozzle
 - c) What is Hydraulic Impulse Turbine? Explain the working of Pelton wheel. 04
 - d) 0.8 kg air is compressed adiabatically from 200 KPa pressure and 70°C temperature to 0.9 Mpa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and gross work transfer. 04
Assume $C_p = 1.005$ and $C_v = 0.718 \text{ KJ/Kg } ^\circ\text{K}$.
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Section – II

Q.4 Solve any five out of seven

15

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 - 1) Thermal Efficiency
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- e) Explain Aesthetic considerations in design. **04**
- f) Explain in brief construction of a Lathe machine with a block diagram. **04**

Seat No.	
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F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC MECHANICAL ENGINEERING

Day & Date: Friday, 13-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) When a gas is heated at constant volume, its _____.
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 - b) pressure increase
 - c) both temperature and pressure increases
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 - c) Boiler- Economizer- Air preheater- ID fan- Chimney
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- 7) Term scavenging is generally related with _____.

a) two stroke engines	b) vertical engines
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- 8) Centrifugal tension in belt depends upon _____.
 - a) velocity of the belt
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 - c) both a and b above
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Seat No.	
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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC MECHANICAL ENGINEERING**

Day & Date: Friday, 13-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:**
- 1) Q.No.2 and Q.No.4 are short answer type question.
 - 2) Q.No.3 and Q.5 are long answer types question
 - 3) Figures to the right indicate fill marks.
 - 4) Use of log tables and non-programmable single memory calculator is allowed.
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Section – I

- Q.2 Attempt any five of the following** **15**
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 - b) State and explain second law of thermodynamics.
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- Q.3 Solve any one out of a) and b) and solve any two out of c) to f).** **13**
- a) Explain with neat sketch the working of Hydro power plant. State its advantages and disadvantages. **05**
 - b) A nozzle is used for increasing the velocity of steam. The enthalpy and velocity of steam entering the nozzle are 3000 kJ/kg and 60 m/s respectively. The enthalpy at the exit of the nozzle 2800 kJ/kg. Inlet area is 0.12 m^2 , specific volume at inlet is $0.2 \text{ m}^3/\text{kg}$ and specific volume at outlet is $0.5 \text{ m}^3/\text{kg}$. The heat losses from horizontal nozzle are negligible. Find. **05**
 - 1) Velocity and the area at the exit from the nozzle
 - 2) Mass flow rate
 - 3) The ratio of inlet to exit diameter of nozzle
 - c) What is Hydraulic Impulse Turbine? Explain the working of Pelton wheel. **04**
 - d) 0.8 kg air is compressed adiabatically from 200 KPa pressure and 70°C temperature to 0.9 Mpa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and gross work transfer. **04**
Assume $C_p = 1.005$ and $C_v = 0.718 \text{ KJ/Kg } ^\circ\text{K}$. **04**
 - e) Draw neat sketch of vane blower. Explain in brief its construction and working. **04**

- f) A closed system undergoes a thermodynamic cycle consisting of 5 processes. The following data gives the work and heat transfer for each of the process. 04

Process	Heat transfer in KJ/min	Work transfer in KJ/min
1-2	Nil	-8000
2-3	6000	Nil
3-4	2000	4000
4-5	Nil	8000
5-1	-4000	Nil

Show that the data is consistent with First law of thermodynamics and determine.

- 1) Net rate of work out put
- 2) Efficiency of cycle
- 3) Change in internal energy for cycle

Section – II

Q.4 Solve any five out of seven 15

- a) Compare two stroke engine and four stroke engine.
- b) A diesel engine has a compression ratio of 18 and cut off ratio 2.7. Calculate efficiency of engine.
- c) Write a short note on chain drives giving its advantages and disadvantages.
- d) Write a short note on gas welding.
- e) What are different steps involved in design process?
- f) Differentiate between Brazing and Soldering.
- g) Define the terms - ductility, malleability, hardness.

Q.5 Solve any one out of (a) and (b) and solve any two out of (c) to (f) 13

- a) Following data refers to an open belt drive: 05
- | | |
|--|-----------|
| Distance between two parallel shaft | = 4m |
| Diameter of Pulley (larger) | = 1.5m |
| Diameter of smaller Pulley | = 1m |
| Initial tension in belt | = 2.8kN |
| Mass of belt material | = 1.4kg/m |
| Co-efficient of friction between the belt & pulley | = 0.3 |
| Speed of smaller Pulley | = 400rpm |
- Calculate power transmitted
- b) Draw block diagram of pillar drilling machine and explain functions of basic elements. 05
 - c) An engine working on an Otto has a compression ratio of 8. The compression begins at 100 KPa and 15°C. The heat supplied per cycle is 1800KJ/Kg of air. Determine : 04
 - 1) Thermal Efficiency
 - 2) Maximum cycle temperature
 - d) Draw neat sketch of Horizontal milling machine. What are three motions available on it? 04
 - e) Explain Aesthetic considerations in design. 04
 - f) Explain in brief construction of a Lathe machine with a block diagram. 04

Seat
No.

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC MECHANICAL ENGINEERING

Day & Date: Friday, 13-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) For the flue gas flow, tick the correct sequence _____.
 - a) Boiler-Air preheater- economizer- ID fan- Chimney
 - b) Boiler- ID fan -Air preheater- Economizer- Chimney
 - c) Boiler- Economizer- Air preheater- ID fan- Chimney
 - d) None of the above
- 2) Term scavenging is generally related with _____.
 - a) two stroke engines
 - b) vertical engines
 - c) air cooled engines
 - d) high speed engines
- 3) Centrifugal tension in belt depends upon _____.
 - a) velocity of the belt
 - b) mass per unit length of the belt
 - c) both a and b above
 - d) none of the above
- 4) Which of the following operations can be performed by a drilling machine?
 - a) spot facing
 - b) Reaming
 - c) tapping
 - d) all of these
- 5) A welding process definitely needs following input _____.
 - a) heat
 - b) Pressure
 - c) Filler material
 - d) none of the above
- 6) During a cycle the heat transfer are given by: 120kJ, -60kJ, -48kJ, and 12kJ the net work transfer the cycle is _____.
 - a) 60000Nm
 - b) 24000Nm
 - c) 12000Nm
 - d) 4400Nm
- 7) PMM-I is impossible according to _____ law.
 - a) Zeroth law of thermodynamics
 - b) First law of thermodynamics
 - c) Second law of thermodynamics
 - d) Boyle's law
- 8) Heat engine is used _____.
 - a) to heat space
 - b) to cool the space
 - c) to convert heat into work
 - d) None
- 9) Coefficient of performance of refrigeration system is always _____.
 - a) equal to one
 - b) less than one
 - c) greater than one
 - d) None

- 10) When a gas is heated at constant volume, its _____.
- a) temperature increase
 - b) pressure increase
 - c) both temperature and pressure increases
 - d) temperature and pressure remains constant
- 11) The internal energy of perfect gas depend on _____.
- a) temperature, pressure and specific heats
 - b) temperature, enthalpy and specific heats
 - c) temperature, entropy and specific heats
 - d) temperature only
- 12) In steam power plants, condenser is used to _____.
- a) reduce back pressure
 - b) consume heat of exhaust steam
 - c) condense feed water
 - d) all above
- 13) For impulse water turbine which turbine is used _____.
- a) pelton turbine
 - b) francis turbine
 - c) Kaplan turbine
 - d) None
- 14) The nozzle is used _____.
- a) to increase pressure energy of water leaving to tailrace
 - b) to decrease pressure energy of water leaving to tail race
 - c) to increase kinetic energy of water striking to turbine
 - d) None

Seat No.	
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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
BASIC MECHANICAL ENGINEERING**

Day & Date: Friday, 13-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:**
- 1) Q.No.2 and Q.No.4 are short answer type question.
 - 2) Q.No.3 and Q.5 are long answer types question
 - 3) Figures to the right indicate fill marks.
 - 4) Use of log tables and non-programmable single memory calculator is allowed.
 - 5) Neat diagrams must be drawn whenever necessary.
 - 6) Make suitable assumptions, is necessary and mention them clearly.

Section – I

- Q.2 Attempt any five of the following 15**
- a) Explain types of thermodynamic systems and give one example of each.
 - b) State and explain second law of thermodynamics.
 - c) Derive an expression of work done for adiabatic process.
 - d) Draw neat sketch of window air conditioner. How it differ from split air conditioner?
 - e) State the function of following units in Steam power plant.
 - 1) Condenser
 - 2) Economiser
 - 3) Cooling tower
 - f) Compare BWR and PWR.
 - g) Explain in brief working of double acting reciprocating pump.
- Q.3 Solve any one out of a) and b) and solve any two out of c) to f). 13**
- a) Explain with neat sketch the working of Hydro power plant. State its advantages and disadvantages. 05
 - b) A nozzle is used for increasing the velocity of steam. The enthalpy and velocity of steam entering the nozzle are 3000 kJ/kg and 60 m/s respectively. The enthalpy at the exit of the nozzle 2800 kJ/kg. Inlet area is 0.12 m^2 , specific volume at inlet is $0.2 \text{ m}^3/\text{kg}$ and specific volume at outlet is $0.5 \text{ m}^3/\text{kg}$. The heat losses from horizontal nozzle are negligible. Find. 05
 - 1) Velocity and the area at the exit from the nozzle
 - 2) Mass flow rate
 - 3) The ratio of inlet to exit diameter of nozzle
 - c) What is Hydraulic Impulse Turbine? Explain the working of Pelton wheel. 04
 - d) 0.8 kg air is compressed adiabatically from 200 KPa pressure and 70°C temperature to 0.9 Mpa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and gross work transfer. 04
Assume $C_p = 1.005$ and $C_v = 0.718 \text{ KJ/Kg } ^\circ\text{K}$.
 - e) Draw neat sketch of vane blower. Explain in brief its construction and working. 04

- f) A closed system undergoes a thermodynamic cycle consisting of 5 processes. The following data gives the work and neat transfer for each of the process.

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3-4	2000	4000
4-5	Nil	8000
5-1	-4000	Nil

Show that the data is consistent with First law of thermodynamics and determine.

- 1) Net rate of work out put
- 2) Efficiency of cycle
- 3) Change in internal energy for cycle

Section – II

Q.4 Solve any five out of seven **15**

- a) Compare two stroke engine and four stroke engine.
- b) A diesel engine has a compression ratio of 18 and cut off ratio 2.7. Calculate efficiency of engine.
- c) Write a short note on chain drives giving its advantages and disadvantages.
- d) Write a short note on gas welding.
- e) What are different steps involved in design process?
- f) Differentiate between Brazing and Soldering.
- g) Define the terms - ductility, malleability, hardness.

Q.5 Solve any one out of (a) and (b) and solve any two out of (c) to (f) **13**

- a) Following data refers to an open belt drive: **05**
- | | |
|--|-----------|
| Distance between two parallel shaft | = 4m |
| Diameter of Pulley (larger) | = 1.5m |
| Diameter of smaller Pulley | = 1m |
| Initial tension in belt | = 2.8kN |
| Mass of belt material | = 1.4kg/m |
| Co-efficient of friction between the belt & pulley | = 0.3 |
| Speed of smaller Pulley | = 400rpm |
- Calculate power transmitted
- b) Draw block diagram of pillar drilling machine and explain functions of basic elements. **05**
 - c) An engine working on an Otto has a compression ratio of 8. The compression begins at 100 KPa and 15°C. The heat supplied per cycle is 1800KJ/Kg of air. Determine : **04**
 - 1) Thermal Efficiency
 - 2) Maximum cycle temperature
 - d) Draw neat sketch of Horizontal milling machine. What are three motions available on it? **04**
 - e) Explain Aesthetic considerations in design. **04**
 - f) Explain in brief construction of a Lathe machine with a block diagram. **04**

Seat
No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Information Technology

DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes and Each question carries one mark.

2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Domain of a function is _____.
 - a) the maximal set of numbers for which a function is defined
 - b) the maximal set of numbers which a function can take values
 - c) it is set of natural numbers for which a function is defined
 - d) none of the mentioned
- 2) Ordered collection of objects is _____.
 - a) Relation
 - b) Set
 - c) proposition
 - d) Function
- 3) The Cartesian Product $B \times A$ is equal to the Cartesian product $A \times B$. Is it True or False?
 - a) True
 - b) False
- 4) Let $m =$ "Mira like maths" $c =$ "Mira like computer science," $g =$ "Mira's friend like literature" $h =$ "Mira's friend has read Hamlet," and $t =$ "Mira's friend has read The Tempest." Which of the following expresses the statement "Mira like computer science and math, but her friend like literature who hasn't read both The Tempest and Hamlet."?
 - a) $c \wedge m \wedge (g \vee (\sim h \vee \sim t))$
 - b) $c \wedge m \wedge g \wedge (\sim h \wedge \sim t)$
 - c) $c \wedge m \wedge g \wedge (\sim h \vee \sim t)$
 - d) $c \wedge m \wedge (g \vee (\sim h \wedge \sim t))$
- 5) Which of the following two sets are equal?
 - a) $A = \{1,2\}$ and $B = \{1\}$
 - b) $A = \{1,2\}$ and $B = \{1,2,3\}$
 - c) $A = \{1,2,3\}$ and $B = \{2,1,3\}$
 - d) $A = \{1,2,4\}$ and $B = \{1,2, 3\}$
- 6) A relation R on a set A is called an equivalence relation iff it is _____.
 - a) Reflexive and symmetric
 - b) Transitive
 - c) Both
 - d) None
- 7) Which one is the contrapositive of $q \rightarrow p$?
 - a) $p \rightarrow q$
 - b) $\neg p \rightarrow \neg q$
 - c) $\neg q \rightarrow \neg p$
 - d) none of these

- 8) Each of the following defines a relation on the positive integers \mathbb{N} :
- i) "x is greater than y."
 - iii) $x + y = 10$
 - ii) "xy is the square of an integer."
 - iv) $x + 4y = 10$
- Determine, which of the relations are symmetric.
- a) i) & ii)
 - b) ii) & iii)
 - c) iii) & iv)
 - d) none
- 9) Let R and S be relations on a set A. Assuming A has at least three elements, state whether each of the following statements is true _____.
- a) If R and S are symmetric then $R \cap S$ is symmetric.
 - b) If R and S are transitive then $R \cup S$ is transitive
 - c) If R and S are ant symmetric then $R \cup S$ is antisymmetric
 - d) None
- 10) A relation R on a set A is called an equivalence relation iff it is _____.
- a) Reflexive and symmetric
 - b) Transitive
 - c) Transitive, Reflexive and symmetric
 - d) None
- 11) Consider $f : \mathbb{Z}^+ \rightarrow \mathbb{Z}^+$ defined by $f(a) = a^2$. f is _____.
- a) one to one
 - b) onto
 - c) bijective
 - d) all above
- 12) Each of the following defines a relation on the positive integers \mathbb{N} :
- i) "x is greater than y."
 - iii) $x + y = 10$
 - ii) "xy is the square of an integer."
 - iv) $x + 4y = 10$
- Determine which of the relations are: reflexive.
- a) i)
 - b) ii) & iii)
 - c) iv)
 - d) None
- 13) Let $A = \mathbb{Z}^+$ the set of positive integers. Define the relation R on A by aRb if and only if $a|b$. R is _____.
- a) transitive
 - b) asymmetric
 - c) both
 - d) none
- 14) Integral domain in _____ have property with no zero diviser.
- a) ring
 - b) field
 - c) chain
 - d) none

Seat No.	
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figure to the right indicates full marks.

Section I

Q.2 Attempt any three of the following questions. 12

- a) Explain Partition and covering with example $S=\{a,b,c\}$
- b) Explain PDNF and PCNF with example.
- c) What are the different set operations?
- d) In the given ordered pair (4,6); (8,4); (4,4); (9,11); (6,3); (3,0); (2,3) find the following relations. Also, find the domain and range.
 - 1) Is two less than
 - 2) Is less than
 - 3) Is greater than
 - 4) Is equal to

Q.3 Attempt any two of the following questions. 16

- a) Give the power set of the following.
 - 1) $\{a,\{b\}\}$
 - 2) $\{1, \}$
 - 3) $\{X, Y, Z\}$
- b) Let $A = B = \{a, b, c\}$. Consider the relation $g = \{(a, b), (b, c), (c, c)\}$. Is g one-to-one? Is g onto? Why? With example explain?
- c) Write algorithm to convert infix expression to polish Notation with example.

Section II

Q.4 Attempt any three of the following questions. 12

- a) Definition lattice, LUB & GLB and give example.
- b) Let $A = B = \{a, b, c\}$. Consider the relation $g = \{(a,b), (b,c), (c,c)\}$. Is g one-to-one? Is g onto? Why? With example explain?
- c) Consider the relation $R = \{(1, 3), (1, 4), (3, 2), (3, 3), (3, 4)\}$ on $A = \{1, 2, 3, 4\}$
 - 1) Find the matrix MR of R
 - 2) Find the domain and range of R
 - 3) Find R^{-1}
 - 4) Draw the directed graph of R
 - 5) Find the composition relation $R \circ R$
 - 6) Find $R \circ R^{-1}$ and $R^{-1} \circ R$
- d) Describe Polish expressions and their compilation.

Q.5 Attempt the following questions. 16

- a) What is Partially Ordered Set? Let $S = \{c,b,a\}$ and $A = P(S)$. Draw the Hasse diagram of the poset A with the partial order \subseteq (set inclusion)
- b) Define and explain Boolean functions for $(B, *, +, ', 0, 1)$.

Seat No.	
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Each of the following defines a relation on the positive integers N :
- i) "x is greater than y."
 - ii) $x + y = 10$
 - iii) "xy is the square of an integer."
 - iv) $x + 4y = 10$
- Determine, which of the relations are symmetric.
- a) i) & ii)
 - b) ii) & iii)
 - c) iii) & iv)
 - d) none
- 2) Let R and S be relations on a set A . Assuming A has at least three elements, state whether each of the following statements is true _____.
- a) If R and S are symmetric then $R \cap S$ is symmetric.
 - b) If R and S are transitive then $R \cup S$ is transitive
 - c) If R and S are ant symmetric then $R \cup S$ is antisymmetric
 - d) None
- 3) A relation R on a set A is called an equivalence relation iff it is _____.
- a) Reflexive and symmetric
 - b) Transitive
 - c) Transitive, Reflexive and symmetric
 - d) None
- 4) Consider $f : Z^+ \rightarrow Z^+$ defined by $f(a) = a^2$. f is _____.
- a) one to one
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- 5) Each of the following defines a relation on the positive integers N :
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- 6) Let $A = Z^+$ the set of positive integers. Define the relation R on A by aRb if and only if $a|b$. R is _____.
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
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Section I

Q.2 Attempt any three of the following questions. 12

- Explain Partition and covering with example $S=\{a,b,c\}$
- Explain PDNF and PCNF with example.
- What are the different set operations?
- In the given ordered pair $(4,6); (8,4); (4,4); (9,11); (6,3); (3,0); (2,3)$ find the following relations. Also, find the domain and range.
 - Is two less than
 - Is less than
 - Is greater than
 - Is equal to

Q.3 Attempt any two of the following questions. 16

- Give the power set of the following.
 - $\{a,\{b\}\}$
 - $\{1, \}$
 - $\{X, Y, Z\}$
- Let $A = B = \{a, b, c\}$. Consider the relation $g = \{(a, b), (b, c), (c, c)\}$. Is g one-to-one? Is g onto? Why? With example explain?
- Write algorithm to convert infix expression to polish Notation with example.

Section II

Q.4 Attempt any three of the following questions. 12

- Definition lattice, LUB & GLB and give example.
- Let $A = B = \{a, b, c\}$. Consider the relation $g = \{(a,b), (b,c), (c,c)\}$. Is g one-to-one? Is g onto? Why? With example explain?
- Consider the relation $R = \{(1, 3), (1, 4), (3, 2), (3, 3), (3, 4)\}$ on $A = \{1, 2, 3, 4\}$
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Q.5 Attempt the following questions. 16

- What is Partially Ordered Set? Let $S = \{c,b,a\}$ and $A = P(S)$. Draw the Hasse diagram of the poset A with the partial order \subseteq (set inclusion)
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
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c) $A = \{1,2,3\}$ and $B = \{2,1,3\}$	d) $A = \{1,2,4\}$ and $B = \{1,2, 3\}$
- 2) A relation R on a set A is called an equivalence relation iff it is _____.

a) Reflexive and symmetric	b) Transitive
c) Both	d) None
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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes and Each question carries one mark.
 2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) A relation R on a set A is called an equivalence relation iff it is _____.
 a) Reflexive and symmetric
 b) Transitive
 c) Transitive, Reflexive and symmetric
 d) None
- 2) Consider $f : Z^+ \rightarrow Z^+$ defined by $f(a) = a^2$. f is _____.
 a) one to one
 b) onto
 c) bijective
 d) all above
- 3) Each of the following defines a relation on the positive integers N:
 i) "x is greater than y."
 ii) $x + y = 10$
 iii) "xy is the square of an integer."
 iv) $x + 4y = 10$
 Determine which of the relations are: reflexive.
 a) i)
 b) ii) & iii)
 c) iv)
 d) None
- 4) Let $A = Z^+$ the set of positive integers. Define the relation R on A by aRb if and only if $a|b$. R is _____.
 a) transitive
 b) asymmetric
 c) both
 d) none
- 5) Integral domain in _____ have property with no zero divisor.
 a) ring
 b) field
 c) chain
 d) none
- 6) Domain of a function is _____.
 a) the maximal set of numbers for which a function is defined
 b) the maximal set of numbers which a function can take values
 c) it is set of natural numbers for which a function is defined
 d) none of the mentioned
- 7) Ordered collection of objects is _____.
 a) Relation
 b) Set
 c) proposition
 d) Function

- 8) The Cartesian Product $B \times A$ is equal to the Cartesian product $A \times B$. Is it True or False?
a) True b) False
- 9) Let $m =$ "Mira like maths" $c =$ "Mira like computer science," $g =$ "Mira's friend like literature" $h =$ "Mira's friend has read Hamlet," and $t =$ "Mira's friend has read The Tempest." Which of the following expresses the statement "Mira like computer science and math, but her friend like literature who hasn't read both The Tempest and Hamlet."?
a) $c \wedge m \wedge (g \vee (\sim h \vee \sim t))$ b) $c \wedge m \wedge g \wedge (\sim h \wedge \sim t)$
c) $c \wedge m \wedge g \wedge (\sim h \vee \sim t)$ d) $c \wedge m \wedge (g \vee (\sim h \wedge \sim t))$
- 10) Which of the following two sets are equal?
a) $A = \{1,2\}$ and $B = \{1\}$ b) $A = \{1,2\}$ and $B = \{1,2,3\}$
c) $A = \{1,2,3\}$ and $B = \{2,1,3\}$ d) $A = \{1,2,4\}$ and $B = \{1,2, 3\}$
- 11) A relation R on a set A is called an equivalence relation iff it is _____.
a) Reflexive and symmetric b) Transitive
c) Both d) None
- 12) Which one is the contrapositive of $q \rightarrow p$?
a) $p \rightarrow q$ b) $\sim p \rightarrow \sim q$
c) $\sim q \rightarrow \sim p$ d) none of these
- 13) Each of the following defines a relation on the positive integers \mathbb{N} :
i) "x is greater than y."
iii) $x + y = 10$
ii) "xy is the square of an integer."
iv) $x + 4y = 10$
Determine, which of the relations are symmetric.
a) i) & ii) b) ii) & iii)
c) iii) & iv) d) none
- 14) Let R and S be relations on a set A . Assuming A has at least three elements, state whether each of the following statements is true _____.
a) If R and S are symmetric then $R \cap S$ is symmetric.
b) If R and S are transitive then $R \cup S$ is transitive
c) If R and S are antisymmetric then $R \cup S$ is antisymmetric
d) None

Seat No.	
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Information Technology
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Section I

Q.2 Attempt any three of the following questions. 12

- Explain Partition and covering with example $S=\{a,b,c\}$
- Explain PDNF and PCNF with example.
- What are the different set operations?
- In the given ordered pair $(4,6); (8,4); (4,4); (9,11); (6,3); (3,0); (2,3)$ find the following relations. Also, find the domain and range.
 - Is two less than
 - Is less than
 - Is greater than
 - Is equal to

Q.3 Attempt any two of the following questions. 16

- Give the power set of the following.
 - $\{a,\{b\}\}$
 - $\{1, \}$
 - $\{X, Y, Z\}$
- Let $A = B = \{a, b, c\}$. Consider the relation $g = \{(a, b), (b, c), (c, c)\}$. Is g one-to-one? Is g onto? Why? With example explain?
- Write algorithm to convert infix expression to polish Notation with example.

Section II

Q.4 Attempt any three of the following questions. 12

- Definition lattice, LUB & GLB and give example.
- Let $A = B = \{a, b, c\}$. Consider the relation $g = \{(a,b), (b,c), (c,c)\}$. Is g one-to-one? Is g onto? Why? With example explain?
- Consider the relation $R = \{(1, 3), (1, 4), (3, 2), (3, 3), (3, 4)\}$ on $A = \{1, 2, 3, 4\}$
 - Find the matrix MR of R
 - Find the domain and range of R
 - Find R^{-1}
 - Draw the directed graph of R
 - Find the composition relation $R \circ R$
 - Find $R \circ R^{-1}$ and $R^{-1} \circ R$
- Describe Polish expressions and their compilation.

Q.5 Attempt the following questions. 16

- What is Partially Ordered Set? Let $S = \{c,b,a\}$ and $A = P(S)$. Draw the Hasse diagram of the poset A with the partial order \subseteq (set inclusion)
- Define and explain Boolean functions for $(B, *, +, ', 0, 1)$.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) _____ is a type of transmission impairment in which the signal loses strength due to the resistance of the transmission medium.
 - a) Distortion
 - b) Attenuation
 - c) Noise
 - d) Decibel
- 2) A television broadcast is an example of _____ transmission.
 - a) Half-duplex
 - b) Simplex
 - c) Full-duplex
 - d) Automatic
- 3) In case of _____, there are still no connections used, but each frame sent is individually acknowledged.
 - a) Unacknowledged connectionless service
 - b) Acknowledged connectionless service
 - c) Acknowledged connection oriented service
 - d) Unacknowledged connection oriented service
- 4) The core for an optical fiber has _____.
 - a) Lower index of refraction than air
 - b) Lower index of refraction than the cladding
 - c) A higher index of refraction than the cladding
 - d) None of these
- 5) Repeater operates at which layer of the OSI model?
 - a) Application layer
 - b) Presentation layer
 - c) Physical layer
 - d) Transport layer
- 6) The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called _____.
 - a) Piggybacking
 - b) Cyclic redundancy check
 - c) Fletcher's checksum
 - d) None of the mentioned
- 7) In the _____ protocol we avoid unnecessary transmission (of all outstanding frames) by resending only frames which are corrupted or lost.
 - a) Go-Back-N ARQ
 - b) Selective Repeat ARQ
 - c) Stop-and-Wait ARQ
 - d) All of the above

- 8) Which of the following routing algorithms can be used for network layer design?
- a) Shortest path algorithm
 - b) Distance vector algorithm
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 - d) All of the mentioned
- 9) Which one of the following tasks is not done by data link layer?
- a) Framing
 - b) Error control
 - c) Flow control
 - d) Channel coding
- 10) In _____, the chance of collision can be reduced if a station senses the medium before trying to use it.
- a) CSMA
 - b) MA
 - c) CDMA
 - d) FDMA
- 11) IEEE 802.5 standard represents _____.
- a) Overview and Architecture
 - b) Token bus
 - c) Token Ring
 - d) Virtual LAN and Security
- 12) When a host on network A sends a message to a host on network B, which address does the router look at?
- a) Logical
 - b) Physical
 - c) Port
 - d) None of the above
- 13) A _____ routing table contains information entered manually.
- a) static
 - b) Dynamic
 - c) hierarchical
 - d) none of the above
- 14) In the _____ CSMA, a station that has a frame to send senses the line. If the line is idle, it sends immediately. If the line is not idle, it waits a random amount of time and then senses the line again.
- a) 1-persistent
 - b) Non-persistent
 - c) P-persistent
 - d) None of the above

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
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Section – I

- Q.2 Attempt Any three** **12**
 a) Explain the functions of Physical Layer and Data Link Layer.
 b) Describe A Simplex Stop-and-Wait Protocol.
 c) Write a short note on Transmission Impairments.
 d) Describe transmission characteristics of Twisted Pair Cable.
- Q.3 Attempt any one** **08**
 a) Explain OSI Reference Model with neat diagram.
 b) What is Framing? Explain framing techniques with example?
- Q.4 Attempt the following.** **08**
 Explain Go-Back-N protocol with neat diagram.

Section – II

- Q.5 Attempt any three.** **12**
 a) Explain Distance Vector Routing algorithm with example.
 b) Write a short note on Router.
 c) Write a short note on Flow-Based Routing.
 d) Explain the working of Switch with diagram.
- Q.6 Attempt any one.** **08**
 a) Explain Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD in detail.
 b) Explain IEEE Std. 802.3 in detail with its Frame Format.
- Q.7 Attempt the following.** **08**
 Explain Shortest Path Routing Algorithm in detail with example.

Seat No.	
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Set **Q**

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019
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Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Which of the following routing algorithms can be used for network layer design?
 - a) Shortest path algorithm
 - b) Distance vector algorithm
 - c) Link state algorithm
 - d) All of the mentioned
- 2) Which one of the following tasks is not done by data link layer?
 - a) Framing
 - b) Error control
 - c) Flow control
 - d) Channel coding
- 3) In _____, the chance of collision can be reduced if a station senses the medium before trying to use it.
 - a) CSMA
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- 4) IEEE 802.5 standard represents _____.
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- 8) _____ is a type of transmission impairment in which the signal loses strength due to the resistance of the transmission medium.
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- 11) The core for an optical fiber has _____
- a) Lower index of refraction than air
 - b) Lower index of refraction than the cladding
 - c) A higher index of refraction than the cladding
 - d) None of these
- 12) Repeater operates at which layer of the OSI model?
- a) Application layer
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 - c) Physical layer
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- 13) The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called _____.
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Information Technology
DATA COMMUNICATION

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 Time: 10:00 AM To 01:00 PM

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Section – I

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Information Technology
DATA COMMUNICATION

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 Time: 10:00 AM To 01:00 PM

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Section – I

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Information Technology
DATA COMMUNICATION

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019
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Section – I

- Q.2 Attempt Any three** **12**
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Section – II

- Q.5 Attempt any three.** **12**
 a) Explain Distance Vector Routing algorithm with example.
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 a) Explain Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD in detail.
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 Explain Shortest Path Routing Algorithm in detail with example.

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 4) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The Boolean expression $(A + B) \cdot (A + C)$ _____.
 - a) $A + B \cdot C$
 - b) $B + A \cdot C$
 - c) $\bar{A} + B \cdot C$
 - d) $\bar{B} + B \cdot C$
- 2) The Boolean expression $A + BC$ is equivalent to _____.
 - a) $AB + AC$
 - b) $A + C$
 - c) $(A + B)(A + C)$
 - d) none
- 3) Given Boolean theorem $AB + A'C + BC = AB + A'C$ which of the following is true?
 - a) $(A + B)(A' + C)(B + C) = (A + B)(A' + C)$
 - b) $AB + A'C + BC = AB + BC$
 - c) $AB + A'C + BC = (A + B)(A' + C)(B + C)$
 - d) $(A + B)(A' + C)(B + C) = AB + A'C$
- 4) De-Morgan's theorems states that _____.
 - a) $(A + B)' = A' \cdot B'$ and $(AB)' = A' \cdot B'$
 - b) $(A + B)' = A' + B'$ and $(AB)' = A' \cdot B'$
 - c) $(A + B)' = A' \cdot B'$ and $(AB)' = A' + B'$
 - d) $(A + B)' = A' + B'$ and $(AB)' = A' + B'$
- 5) If A, B and C are the inputs of a full adder then the sum is given by _____.
 - a) A AND B AND C
 - b) A OR B AND C
 - c) A XOR B XOR C
 - d) A OR B OR C
- 6) If the number of n selected input lines to 2^m then it requires _____ select lines.
 - a) 2
 - b) M
 - c) n
 - d) 2^n
- 7) Which of the following statements accurately represents the two BEST methods of logic circuit simplification?
 - a) Actual circuit trial and error evaluation and waveform analysis
 - b) Karnaugh mapping and circuit waveform analysis
 - c) Boolean algebra and Karnaugh mapping
 - d) Boolean algebra and actual circuit trial and error evaluation

- 8) The input is equal to output, in _____.
a) J-K F/F b) R-S F/F
c) T F/F d) D F/F
- 9) The flip-flop which is free from race around problem _____.
a) R-S flip-flop b) Master- Slave JK flip-flop
c) J-K flip-flop d) None
- 10) If a counter is connected using six flip-flops, then the maximum number of states that the counter can count are _____.
a) 64 b) 32
c) 16 d) 8
- 11) Verilog code describes a positive edge trigger, negative edge trigger and positive edge trigger with reset (CLR) uses a keywords _____.
a) posedge and negedge b) posedge and always
c) always and posedge d) none of the above
- 12) Verilog supports predefined gate level primitives such as _____.
a) xnor b) Or
c) nor d) all of these
- 13) Verilog define two intermediate variables and_op1 and and_op2 representing two AND gate outputs through keyword _____.
a) always b) Wire
c) assign d) None
- 14) The use of keyword assign in the form of: $assign X = S ? A : B;$ the statement does following assignment.
a) If $S = 1, X = B$ and If $S = 0, X = B$
b) If $S = 1, X = A$ and If $S = 0, X = A$
c) If $S = 1, X = A$ and If $S = 0, X = B$
d) None

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I**Q.2 Attempt any three.** **12**

- a) Convert the following octal number into Hexa-decimal number.
 1) $(626)_8$
 2) $(2571)_8$
- b) Describe function of full subtractor circuit with its truth table, K-map simplification and logic diagram.
- c) Define Digital Comparator? Describe 2 bit digital comparator with example.
- d) Implement the expression using multiplexer.

$$F(A, B, C, D) = \sum m(0,1,2,4,5,8,10,14)$$

Q.3 Attempt any two. **16**

- a) What is SOP Expression? Minimize the following expressions using K-map and realize using NAND gates. $f(A, B, C, D) = \sum m(1,3,5,7,9,10,11,14)$
- b) 1) Convert the following binary numbers to their equivalent hex numbers.
 i) 10100110101111
 ii) 0.00011110101101
- 2) Convert the following binary numbers to their equivalent octal numbers.
 i) 11001110001.000101111001
 ii) 1011011110.11001010011
- c) Give the function of the following terminals of IC 7447.
 1) LT
 2) RBI
 3) BI
 4) RBO

Section – II**Q.4 Attempt any three.** **12**

- a) Describe the Excitation Tables for Flip flops in detail.
- b) Draw symbol and write the truth table of JK flip flop.
- c) Design a 4 to 1 multiplexer using Verilog HDL.
- d) Write Verilog code for modulo-8 up counter design.

Q.5 Attempt any two. **16**

- a) What is shift register? Explain 5 bit shift register.
- b) Describe the operation of 3 bit synchronous up counter with Truth Table and Logic diagram.
- c) Describe Behavioral Modeling with a verilog keyword always.

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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DIGITAL TECHNIQUES**

Day & Date: Saturday, 14-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
4) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The input is equal to output, in _____.
 - a) J-K F/F
 - b) R-S F/F
 - c) T F/F
 - d) D F/F
- 2) The flip-flop which is free from race around problem _____.
 - a) R-S flip-flop
 - b) Master- Slave JK flip-flop
 - c) J-K flip-flop
 - d) None
- 3) If a counter is connected using six flip-flops, then the maximum number of states that the counter can count are _____.
 - a) 64
 - b) 32
 - c) 16
 - d) 8
- 4) Verilog code describes a positive edge trigger, negative edge trigger and positive edge trigger with reset (CLR) uses a keywords _____.
 - a) posedge and negedge
 - b) posedge and always
 - c) always and posedge
 - d) none of the above
- 5) Verilog supports predefined gate level primitives such as _____.
 - a) xnor
 - b) Or
 - c) nor
 - d) all of these
- 6) Verilog define two intermediate variables and_op1 and and_op2 representing two AND gate outputs through keyword _____.
 - a) always
 - b) Wire
 - c) assign
 - d) None
- 7) The use of keyword assign in the form of: assign X = S ? A : B; the statement does following assignment.
 - a) If S = 1, X = B and If S = 0, X = B
 - b) If S = 1, X = A and If S = 0, X = A
 - c) If S = 1, X = A and If S = 0, X = B
 - d) None
- 8) The Boolean expression $(A + B) \cdot (A + C)$ _____.
 - a) $A + B \cdot C$
 - b) $B + A \cdot C$
 - c) $\bar{A} + B \cdot C$
 - d) $\bar{B} + B \cdot C$

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Set **Q**

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I**Q.2 Attempt any three.** **12**

- a) Convert the following octal number into Hexa-decimal number.
 1) $(626)_8$
 2) $(2571)_8$
- b) Describe function of full subtractor circuit with its truth table, K-map simplification and logic diagram.
- c) Define Digital Comparator? Describe 2 bit digital comparator with example.
- d) Implement the expression using multiplexer.

$$F(A, B, C, D) = \sum m(0,1,2,4,5,8,10,14)$$

Q.3 Attempt any two. **16**

- a) What is SOP Expression? Minimize the following expressions using K-map and realize using NAND gates. $f(A, B, C, D) = \sum m(1,3,5,7,9,10,11,14)$
- b) 1) Convert the following binary numbers to their equivalent hex numbers.
 i) 10100110101111
 ii) 0.00011110101101
- 2) Convert the following binary numbers to their equivalent octal numbers.
 i) 11001110001.000101111001
 ii) 1011011110.11001010011
- c) Give the function of the following terminals of IC 7447.
 1) LT
 2) RBI
 3) BI
 4) RBO

Section – II**Q.4 Attempt any three.** **12**

- a) Describe the Excitation Tables for Flip flops in detail.
- b) Draw symbol and write the truth table of JK flip flop.
- c) Design a 4 to 1 multiplexer using Verilog HDL.
- d) Write Verilog code for modulo-8 up counter design.

Q.5 Attempt any two. **16**

- a) What is shift register? Explain 5 bit shift register.
- b) Describe the operation of 3 bit synchronous up counter with Truth Table and Logic diagram.
- c) Describe Behavioral Modeling with a verilog keyword always.

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
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Max. Marks: 70

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 4) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If A, B and C are the inputs of a full adder then the sum is given by _____.
 - a) A AND B AND C
 - b) A OR B AND C
 - c) A XOR B XOR C
 - d) A OR B OR C
- 2) If the number of n selected input lines to 2^m then it requires ____ select lines.
 - a) 2
 - b) M
 - c) n
 - d) 2^n
- 3) Which of the following statements accurately represents the two BEST methods of logic circuit simplification?
 - a) Actual circuit trial and error evaluation and waveform analysis
 - b) Karnaugh mapping and circuit waveform analysis
 - c) Boolean algebra and Karnaugh mapping
 - d) Boolean algebra and actual circuit trial and error evaluation
- 4) The input is equal to output, in _____.
 - a) J-K F/F
 - b) R-S F/F
 - c) T F/F
 - d) D F/F
- 5) The flip-flop which is free from race around problem _____.
 - a) R-S flip-flop
 - b) Master- Slave JK flip-flop
 - c) J-K flip-flop
 - d) None
- 6) If a counter is connected using six flip-flops, then the maximum number of states that the counter can count are _____.
 - a) 64
 - b) 32
 - c) 16
 - d) 8
- 7) Verilog code describes a positive edge trigger, negative edge trigger and positive edge trigger with reset (CLR) uses a keywords _____.
 - a) posedge and negedge
 - b) posedge and always
 - c) always and posedge
 - d) none of the above
- 8) Verilog supports predefined gate level primitives such as _____.
 - a) xnor
 - b) Or
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- 9) Verilog define two intermediate variables and_op1 and and_op2 representing two AND gate outputs through keyword _____.
- a) always b) Wire
c) assign d) None
- 10) The use of keyword assign in the form of: assign X = S ? A : B; the statement does following assignment.
- a) If S = 1, X = B and If S = 0, X = B
b) If S = 1, X = A and If S = 0, X = A
c) If S = 1, X = A and If S = 0, X = B
d) None
- 11) The Boolean expression (A + B). (A + C) _____.
- a) A + B.C b) B + A.C
c) $\bar{A} + B.C$ d) $\bar{B} + B.C$
- 12) The Boolean expression A + BC is equivalent to _____.
- a) AB + AC b) A + C
c) (A + B) (A + C) d) none
- 13) Given Boolean theorem $AB + A'C + BC = AB + A'C$ which of the following is true?
- a) $(A + B) (A' + C) (B + C) = (A + B) (A' + C)$
b) $AB + A'C + BC = AB + BC$
c) $AB + A'C + BC = (A + B) (A' + C) (B + C)$
d) $(A + B)(A' + C)(B + C) = AB + A'C$
- 14) De-Morgan's theorems states that _____.
- a) $(A + B)' = A'. B'$ and $(AB)' = A'. B'$
b) $(A + B)' = A' + B'$ and $(AB)' = A'. B'$
c) $(A + B)' = A'. B'$ and $(AB)' = A' + B'$
d) $(A + B)' = A' + B'$ and $(AB)' = A' + B'$

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any three. **12**

- a) Convert the following octal number into Hexa-decimal number.
 - 1) $(626)_8$
 - 2) $(2571)_8$
- b) Describe function of full subtractor circuit with its truth table, K-map simplification and logic diagram.
- c) Define Digital Comparator? Describe 2 bit digital comparator with example.
- d) Implement the expression using multiplexer.

$$F(A, B, C, D) = \sum m(0,1,2,4,5,8,10,14)$$

Q.3 Attempt any two. **16**

- a) What is SOP Expression? Minimize the following expressions using K-map and realize using NAND gates. $f(A, B, C, D) = \sum m(1,3,5,7,9,10,11,14)$
- b) 1) Convert the following binary numbers to their equivalent hex numbers.
 - i) 10100110101111
 - ii) 0.00011110101101
 2) Convert the following binary numbers to their equivalent octal numbers.
 - i) 11001110001.000101111001
 - ii) 1011011110.11001010011
- c) Give the function of the following terminals of IC 7447.
 - 1) LT
 - 2) RBI
 - 3) BI
 - 4) RBO

Section – II

Q.4 Attempt any three. **12**

- a) Describe the Excitation Tables for Flip flops in detail.
- b) Draw symbol and write the truth table of JK flip flop.
- c) Design a 4 to 1 multiplexer using Verilog HDL.
- d) Write Verilog code for modulo-8 up counter design.

Q.5 Attempt any two. **16**

- a) What is shift register? Explain 5 bit shift register.
- b) Describe the operation of 3 bit synchronous up counter with Truth Table and Logic diagram.
- c) Describe Behavioral Modeling with a verilog keyword always.

- 9) De-Morgan's theorems states that _____.
- a) $(A + B)' = A'.B'$ and $(AB)' = A'.B'$
 - b) $(A + B)' = A' + B'$ and $(AB)' = A'.B'$
 - c) $(A + B)' = A'.B'$ and $(AB)' = A' + B'$
 - d) $(A + B)' = A' + B'$ and $(AB)' = A' + B'$
- 10) If A, B and C are the inputs of a full adder then the sum is given by _____.
- a) A AND B AND C
 - b) A OR B AND C
 - c) A XOR B XOR C
 - d) A OR B OR C
- 11) If the number of n selected input lines to 2^m then it requires _____ select lines.
- a) 2
 - b) M
 - c) n
 - d) 2^n
- 12) Which of the following statements accurately represents the two BEST methods of logic circuit simplification?
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 - c) Boolean algebra and Karnaugh mapping
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- 13) The input is equal to output, in _____.
- a) J-K F/F
 - b) R-S F/F
 - c) T F/F
 - d) D F/F
- 14) The flip-flop which is free from race around problem _____.
- a) R-S flip-flop
 - b) Master- Slave JK flip-flop
 - c) J-K flip-flop
 - d) None

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any three. **12**

- a) Convert the following octal number into Hexa-decimal number.
 - 1) $(626)_8$
 - 2) $(2571)_8$
- b) Describe function of full subtractor circuit with its truth table, K-map simplification and logic diagram.
- c) Define Digital Comparator? Describe 2 bit digital comparator with example.
- d) Implement the expression using multiplexer.

$$F(A, B, C, D) = \sum m(0,1,2,4,5,8,10,14)$$

Q.3 Attempt any two. **16**

- a) What is SOP Expression? Minimize the following expressions using K-map and realize using NAND gates. $f(A, B, C, D) = \sum m(1,3,5,7,9,10,11,14)$
- b) 1) Convert the following binary numbers to their equivalent hex numbers.
 - i) 10100110101111
 - ii) 0.00011110101101
 2) Convert the following binary numbers to their equivalent octal numbers.
 - i) 11001110001.000101111001
 - ii) 1011011110.11001010011
- c) Give the function of the following terminals of IC 7447.
 - 1) LT
 - 2) RBI
 - 3) BI
 - 4) RBO

Section – II

Q.4 Attempt any three. **12**

- a) Describe the Excitation Tables for Flip flops in detail.
- b) Draw symbol and write the truth table of JK flip flop.
- c) Design a 4 to 1 multiplexer using Verilog HDL.
- d) Write Verilog code for modulo-8 up counter design.

Q.5 Attempt any two. **16**

- a) What is shift register? Explain 5 bit shift register.
- b) Describe the operation of 3 bit synchronous up counter with Truth Table and Logic diagram.
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No.

S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) The maximum number of points that can be displayed without overlap on a CRT _____.
 - a) Aspect Ratio
 - b) Resolution
 - c) Brightness
 - d) Pixel
- 2) Brightness of a display is controlled by varying the voltage on the _____.
 - a) Focusing anode
 - b) Connection pins
 - c) Control grid
 - d) Power supply
- 3) Which of the following is not a rigid body transformation?
 - a) Translation
 - b) Rotation
 - c) Shearing
 - d) Reflection
- 4) In seed fill algorithm filling of polygon starts from _____ in polygon.
 - a) Seed pixel
 - b) Root pixels
 - c) Both a and b
 - d) None
- 5) The transformation in which an object is moved from one position to another in circular path around a specified pivot point is called _____.
 - a) Rotation
 - b) Shearing
 - c) Translation
 - d) Scaling
- 6) The purpose of flood gun in DVST is _____.
 - a) To store the picture pattern
 - b) To slow down the flood electrons
 - c) To enable color pixels
 - d) To focus the electron beam
- 7) If an object is rotated through an angle A in clockwise direction, the rotation matrix R = _____.
 - a) $\begin{matrix} \cos A & \sin A \\ -\sin A & \cos A \end{matrix}$
 - b) $\begin{matrix} \cos A & -\sin A \\ \sin A & \cos A \end{matrix}$
 - c) $\begin{matrix} \sin A & \cos A \\ \cos A & \sin A \end{matrix}$
 - d) None
- 8) The line segment is, visible if both end points codes are _____.
 - a) 0000
 - b) 1111
 - c) 0101
 - d) 1010

- 9) The Bezier curve is contained with the _____ hull of defining polygon.
- a) Concave
 - b) Convex
 - c) Elliptical
 - d) All
- 10) In parametric curve each co-ordinate of a point on a curve is represented as _____ of a single parameter.
- a) precision
 - b) Method
 - c) procedure
 - d) Function
- 11) The window co-ordinates are called as _____ Co-ordinates.
- a) World
 - b) Screen
 - c) Normal
 - d) Scalar
- 12) _____ is a unit of display file.
- a) Segment
 - b) Byte
 - c) LOC
 - d) None of these
- 13) _____ algorithm is used for clipping the line.
- a) Sutherland-Cohen
 - b) DDA
 - c) Bresenham's
 - d) Iran-Sutherland
- 14) Z-Buffer algorithm consists of frame buffer & _____.
- a) pixel buffer
 - b) depth buffer
 - c) image buffer
 - d) none of these

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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

- Q.2 Solve any three. 12**
- a) What is RLE? Explain in detail with advantages.
 - b) Describe the 2D shearing with example.
 - c) Explain 3D rotation with example.
 - d) Explain Bresenham's line generation algorithm.
- Q.3 Solve any two. 16**
- a) Explain Bresenham's Circle Generation algo. With the help of Example.
 - b) What is mean by Polygon filling? Explain Seed fill algorithm in detail.
 - c) Describe 3D translation and 3D reflection.

Section – II

- Q.4 Attempt any three. 12**
- a) State advantages and disadvantages of Z-Buffer.
 - b) Explain parametric curves in detail.
 - c) Explain midpoint sub division algo in detail.
 - d) Explain display file compilation in detail.
- Q.5 Explain antialiasing & half toning techniques in detail. 08**

OR

What is segment? Explain segmented display files in detail with all its functions.

- Q.6 Write note. 08**
- a) Back face removal algorithm
 - b) Painter's algorithm

- 11) In seed fill algorithm filling of polygon starts from _____ in polygon.
- a) Seed pixel
 - b) Root pixels
 - c) Both a and b
 - d) None
- 12) The transformation in which an object is moved from one position to another in circular path around a specified pivot point is called _____.
- a) Rotation
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 - d) Scaling
- 13) The purpose of flood gun in DVST is _____.
- a) To store the picture pattern
 - b) To slow down the flood electrons
 - c) To enable color pixels
 - d) To focus the electron beam
- 14) If an object is rotated through an angle A in clockwise direction, the rotation matrix $R =$ _____.
- a) $\begin{bmatrix} \cos A & \sin A \\ -\sin A & \cos A \end{bmatrix}$
 - b) $\begin{bmatrix} \cos A & -\sin A \\ \sin A & \cos A \end{bmatrix}$
 - c) $\begin{bmatrix} \sin A & \cos A \\ \cos A & \sin A \end{bmatrix}$
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Seat No.	
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Set	Q
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
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- a) What is RLE? Explain in detail with advantages.
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 - b) What is mean by Polygon filling? Explain Seed fill algorithm in detail.
 - c) Describe 3D translation and 3D reflection.

Section – II

- Q.4 Attempt any three. 12**
- a) State advantages and disadvantages of Z-Buffer.
 - b) Explain parametric curves in detail.
 - c) Explain midpoint sub division algo in detail.
 - d) Explain display file compilation in detail.
- Q.5 Explain antialiasing & half toning techniques in detail. 08**

OR

What is segment? Explain segmented display files in detail with all its functions.

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 - b) Painter's algorithm

Seat
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

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 - c) $\begin{matrix} \sin A & \cos A \\ \cos A & \sin A \end{matrix}$
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 - a) 0000
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- 6) In parametric curve each co-ordinate of a point on a curve is represented as _____ of a single parameter.
 - a) precision
 - b) Method
 - c) procedure
 - d) Function
- 7) The window co-ordinates are called as _____ Co-ordinates.
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 - b) Screen
 - c) Normal
 - d) Scalar
- 8) _____ is a unit of display file.
 - a) Segment
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 - c) LOC
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Seat No.	
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Information Technology
COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate fill marks.

Section – I

- Q.2 Solve any three. 12**
- What is RLE? Explain in detail with advantages.
 - Describe the 2D shearing with example.
 - Explain 3D rotation with example.
 - Explain Bresenham's line generation algorithm.
- Q.3 Solve any two. 16**
- Explain Bresenham's Circle Generation algo. With the help of Example.
 - What is mean by Polygon filling? Explain Seed fill algorithm in detail.
 - Describe 3D translation and 3D reflection.

Section – II

- Q.4 Attempt any three. 12**
- State advantages and disadvantages of Z-Buffer.
 - Explain parametric curves in detail.
 - Explain midpoint sub division algo in detail.
 - Explain display file compilation in detail.
- Q.5 Explain antialiasing & half toning techniques in detail. 08**

OR

What is segment? Explain segmented display files in detail with all its functions.

- Q.6 Write note. 08**
- Back face removal algorithm
 - Painter's algorithm

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Max. Marks: 70

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) In parametric curve each co-ordinate of a point on a curve is represented as _____ of a single parameter.
 - a) precision
 - b) Method
 - c) procedure
 - d) Function
- 2) The window co-ordinates are called as _____ Co-ordinates.
 - a) World
 - b) Screen
 - c) Normal
 - d) Scalar
- 3) _____ is a unit of display file.
 - a) Segment
 - b) Byte
 - c) LOC
 - d) None of these
- 4) _____ algorithm is used for clipping the line.
 - a) Sutherland-Cohen
 - b) DDA
 - c) Bresenham's
 - d) Iran-Sutherland
- 5) Z-Buffer algorithm consists of frame buffer & _____.
 - a) pixel buffer
 - b) depth buffer
 - c) image buffer
 - d) none of these
- 6) The maximum number of points that can be displayed without overlap on a CRT _____.
 - a) Aspect Ratio
 - b) Resolution
 - c) Brightness
 - d) Pixel
- 7) Brightness of a display is controlled by varying the voltage on the _____.
 - a) Focusing anode
 - b) Connection pins
 - c) Control grid
 - d) Power supply
- 8) Which of the following is not a rigid body transformation?
 - a) Translation
 - b) Rotation
 - c) Shearing
 - d) Reflection
- 9) In seed fill algorithm filling of polygon starts from _____ in polygon.
 - a) Seed pixel
 - b) Root pixels
 - c) Both a and b
 - d) None
- 10) The transformation in which an object is moved from one position to another in circular path around a specified pivot point is called _____.
 - a) Rotation
 - b) Shearing
 - c) Translation
 - d) Scaling

- 11) The purpose of flood gun in DVST is _____.
- a) To store the picture pattern
 - b) To slow down the flood electrons
 - c) To enable color pixels
 - d) To focus the electron beam
- 12) If an object is rotated through an angle A in clockwise direction, the rotation matrix $R =$ _____.
- | | |
|--|--|
| a) $\begin{matrix} \cos A & \sin A \\ -\sin A & \cos A \end{matrix}$ | b) $\begin{matrix} \cos A & -\sin A \\ \sin A & \cos A \end{matrix}$ |
| c) $\begin{matrix} \sin A & \cos A \\ \cos A & \sin A \end{matrix}$ | d) None |
- 13) The line segment is, visible if both end points codes are _____.
- | | |
|---------|---------|
| a) 0000 | b) 1111 |
| c) 0101 | d) 1010 |
- 14) The Bezier curve is contained with the _____ hull of defining polygon.
- | | |
|---------------|-----------|
| a) Concave | b) Convex |
| c) Elliptical | d) All |

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S. Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING MATHEMATICS - III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The complete solution of $(D^2 + 1)y = 0$ is _____.
 a) $y = c_1 e^x + c_2 e^{-x}$ b) $y = c_1 \cos x + c_2 \sin x$
 c) $y = (c_1 + c_2 x)e^x$ d) $y = (c_1 + c_2)e^x$
- The P.I of $(D^4 - m^4)y = \sin mx$ is _____.
 a) $\frac{x}{4m^3} \cos mx$ b) $\frac{-x}{4m^3} \cos mx$
 c) $\frac{x}{4m^3} \sin mx$ d) $\frac{-x}{4m^3} \sin mx$
- If $D = \frac{d}{dz}$ and $z = \log x$, then the diff. equation $x \frac{d^2 y}{dx^2} + 2 \frac{dy}{dx} = 6x$ becomes _____.
 a) $D(D - 1)y = 6e^z$ b) $D(D - 1)y = 6e^{2z}$
 c) $D(D + 1)y = 6e^{2z}$ d) $D(D + 1)y = 6e^z$
- The solution of $\sqrt{p} + \sqrt{q} = 1$
 a) $z = ax + (1 - \sqrt{a})^2 + c$ b) $z = ax + by + c$
 c) $z = ax + (1 + \sqrt{a})^2 + c$ d) None of these
- The general solution of $(xD^2 - D + \frac{1}{x})y = 0$ is _____.
 a) $(c_1 + c_2 \log x)x$ b) $(c_1 + c_2 x)e^x$
 c) $(c_1 + c_2 x) \log x$ d) None of the above
- The solution of $p^2 - q^2 = 1$ is _____.
 a) $z = ax + \sqrt{a^2 - 1}y + c$ b) $z = ax + \sqrt{a^2 + 1}y + c$
 c) $z = ax + (a^2 - 1).y + c$ d) None of these
- The solution of $p + q = z$ is _____.
 a) $f(x + y, y + \log z)$ b) $f(xy, y \log z)$
 c) $f(x - y, y - \log z)$ d) None of these
- The value of $\int_c \frac{3z+4}{z(2z+1)} dz = \dots$ where c is the circle $|z| = 1$.
 a) 3π b) $2\pi i$
 c) 4 d) -4

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Electrical Engineering
ENGINEERING MATHEMATICS-III

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Max. Marks: 56

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Section – I

Q.2 Attempt any three questions from the following. 09

- a) Solve $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 4y = \cos \log x$.
 b) Solve $(D^4 - 1)y = \cos x \cosh x$.
 c) Solve $(D^3 - 3D^2 + 3D - 1)y = x^{1/2} e^x$
 d) Find the laplace transform of $\int_0^t te^{-3t} \sin(4t) dt$
 e) Solve $(3x + 1)^2 \frac{d^2y}{dx^2} - 3(3x + 1) \frac{dy}{dx} - 12y = 9x$

Q.3 Attempt any three questions from the following 09

- a) Find the inverse laplace transform of $\frac{1}{s^2(s+1)^2}$
 b) Solve $(D^4 + 5D^2 + 4)y = \cos\left(\frac{x}{2}\right) \cos\left(\frac{3x}{2}\right)$
 c) Solve $(D^3 - 7D + 6)y = x^2$.
 d) Evaluate by using laplace transform $\int_0^\infty \left(\frac{e^{-t} - e^{-3t}}{t}\right) dt$
 e) Solve $(x^2 D^2 + xD - 1)y = x^3$

Q.4 Attempt any two questions from the following. 10

- a) In an $L - C$ circuit the charge q on a plate of a condenser is given by

$$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L} \cos nt.$$
 If $w^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$
 prove that charge at any time t is given by

$$q = q_0 \cos wt + \frac{i_0}{w} \sin wt + \frac{E_0 - 0}{2Lw} t \sin wt.$$
 b) Solve $(D^3 + D)y = \cos t + t^2 + 3$.
 c) Find the inverse laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+2)(s^2+2s+5)}$

Section – II

Q.5 Attempt any three questions from the following. 09

- a) Find the value of $\int_c \frac{z-1}{(z+1)^2(z-2)} dz$ where c is the circle $|z - i| = 2$.
 b) Solve $(p^3 + q^3) = 27z$.
 c) Find the inverse z-transform of $\frac{z}{(z+a)}$, $|z| < a$.
 d) Solve $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \left(\frac{1}{y} - \frac{1}{x}\right)$
 e) Find the Poles and Residues of $f(z) = \cot z$

Q.6 Attempt any three questions from the following.

- a) Solve $pq = xy^2z^4$
- b) Evaluate $\int_{(0,0)}^{1,1} (3x^2 + 4xy + 3y^2)dx + 2(x^2 + 3xy + 4y^2)dy$ along $y = x$
- c) Find $Z \{x_k\}$, where $\{x_k\} = k^2, k \geq 0$.
- d) Find $Z^{-1} \left\{ \frac{1}{(z-a)^2} \right\}$, $|z| > |a|$.
- e) Solve $p(bz - cy) + q(cx - ay) = ay - bx$

Q.7 Attempt any two questions from the following.

- a) Evaluate the following integral using residue theorem $\int_c \frac{4-3z}{z(z-1)(z-2)} dz$
Where c is $|z| = \frac{3}{2}$
- b) Solve the P.D.E. $\frac{\partial u}{\partial x} - 2 \frac{\partial u}{\partial t} = u$, by the method of separation of variables.
- c) Find $Z \{x_k\}$, where $\{x_k\} = c^k \cos \alpha k, k \geq 0$.

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Electrical Engineering
ENGINEERING MATHEMATICS - III

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The value of $\int_c \frac{3z+4}{z(2z+1)} dz = \dots$ where c is the circle $|z| = 1$.

a) 3π	b) $2\pi i$
c) 4	d) -4

- 2) $L\left\{\int_0^t \sin 2u du\right\} = \dots$

a) $\frac{2}{s^2+4}$	b) $\frac{2}{s(s^2+4)}$
c) $\frac{2}{s(s^2-4)}$	d) $\frac{2s}{s^2+4}$

- 3) $\int_0^\infty \frac{\sin t}{t} dt = \dots$

a) π	b) $\pi/2$
c) $\pi/4$	d) $\pi/3$

- 4) $L^{-1}\left\{\frac{1}{(s-4)^3}\right\}$ is

a) $e^{4t} \frac{t^2}{2}$	b) $e^{-4t} \frac{t^2}{2}$
c) $e^{4t} \frac{t^3}{6}$	d) $e^{-4t} \frac{t^3}{6}$

- 5) The value of $\int_c \frac{3z^2+7z+1}{z(z+1)} dz = \dots$ where c is the circle $|z| = 1/2$.

a) 3π	b) 0
c) πi	d) -4

- 6) If $Z\{x_k\} = F(z)$ then $Z\{a^{-k}x_k\} = ?$

a) $F(az)$	b) $\frac{1}{a}F(az)$
c) $aF\left(\frac{z}{a}\right)$	d) $F(z/a)$

- 7) If $x_k = 1, k \geq 0$ then $Z\{x_k\} = ?$

a) $\frac{z}{z-1}$	b) $\frac{1}{z-1}$
c) $\frac{1}{(z-1)^2}$	d) $\frac{1}{1-z}$

- 8) The complete solution of $(D^2 + 1)y = 0$ is _____.
- a) $y = c_1 e^x + c_2 e^{-x}$ b) $y = c_1 \cos x + c_2 \sin x$
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Section – II

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- 6) $\int_0^\infty \frac{\sin t}{t} dt =$ _____.
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ENGINEERING MATHEMATICS-III

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Section – II

Q.5 Attempt any three questions from the following. 09

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 b) Solve $(p^3 + q^3) = 27z$.
 c) Find the inverse z-transform of $\frac{z}{(z+a)}$, $|z| < a$.
 d) Solve $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \left(\frac{1}{y} - \frac{1}{x}\right)$
 e) Find the Poles and Residues of $f(z) = \cot z$

Q.6 Attempt any three questions from the following.

- a) Solve $pq = xy^2z^4$
- b) Evaluate $\int_{(0,0)}^{1,1} (3x^2 + 4xy + 3y^2)dx + 2(x^2 + 3xy + 4y^2)dy$ along $y = x$
- c) Find $Z \{x_k\}$, where $\{x_k\} = k^2, k \geq 0$.
- d) Find $Z^{-1} \left\{ \frac{1}{(z-a)^2} \right\}$, $|z| > |a|$.
- e) Solve $p(bz - cy) + q(cx - ay) = ay - bx$

Q.7 Attempt any two questions from the following.

- a) Evaluate the following integral using residue theorem $\int_c \frac{4-3z}{z(z-1)(z-2)} dz$
Where c is $|z| = \frac{3}{2}$
- b) Solve the P.D.E. $\frac{\partial u}{\partial x} - 2 \frac{\partial u}{\partial t} = u$, by the method of separation of variables.
- c) Find $Z \{x_k\}$, where $\{x_k\} = c^k \cos \alpha k, k \geq 0$.

- 8) If $D = \frac{d}{dz}$ and $z = \log x$, then the diff. equation $x \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} = 6x$ becomes ____.
- a) $D(D - 1)y = 6e^z$ b) $D(D - 1)y = 6e^{2z}$
 c) $D(D + 1)y = 6e^{2z}$ d) $D(D + 1)y = 6e^z$
- 9) The solution of $\sqrt{p} + \sqrt{q} = 1$
- a) $z = ax + (1 - \sqrt{a})^2 + c$ b) $z = ax + by + c$
 c) $z = ax + (1 + \sqrt{a})^2 + c$ d) None of these
- 10) The general solution of $(xD^2 - D + \frac{1}{x})y = 0$ is ____.
- a) $(c_1 + c_2 \log x)x$ b) $(c_1 + c_2x)e^x$
 c) $(c_1 + c_2x) \log x$ d) None of the above
- 11) The solution of $p^2 - q^2 = 1$ is ____.
- a) $z = ax + \sqrt{a^2 - 1}y + c$ b) $z = ax + \sqrt{a^2 + 1}y + c$
 c) $z = ax + (a^2 - 1).y + c$ d) None of these
- 12) The solution of $p + q = z$ is ____.
- a) $f(x + y, y + \log z)$ b) $f(xy, y \log z)$
 c) $f(x - y, y - \log z)$ d) None of these
- 13) The value of $\int_c \frac{3z+4}{z(2z+1)} dz = \dots$ where c is the circle $|z| = 1$.
- a) 3π b) $2\pi i$
 c) 4 d) -4
- 14) $L \left\{ \int_0^t \sin 2u \, du \right\} = \dots$ ____.
- a) $\frac{2}{s^2+4}$ b) $\frac{2}{s(s^2+4)}$
 c) $\frac{2}{s(s^2-4)}$ d) $\frac{2s}{s^2+4}$

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S. Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING MATHEMATICS-III

Day & Date: Saturday, 07-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicates full marks.
 3) Use of Non programmable calculator is allowed.

Section – I

Q.2 Attempt any three questions from the following. 09

- a) Solve $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 4y = \cos \log x$.
 b) Solve $(D^4 - 1)y = \cos x \cosh x$.
 c) Solve $(D^3 - 3D^2 + 3D - 1)y = x^{1/2} e^x$
 d) Find the laplace transform of $\int_0^t te^{-3t} \sin(4t) dt$
 e) Solve $(3x + 1)^2 \frac{d^2y}{dx^2} - 3(3x + 1) \frac{dy}{dx} - 12y = 9x$

Q.3 Attempt any three questions from the following 09

- a) Find the inverse laplace transform of $\frac{1}{s^2(s+1)^2}$
 b) Solve $(D^4 + 5D^2 + 4)y = \cos\left(\frac{x}{2}\right) \cos\left(\frac{3x}{2}\right)$
 c) Solve $(D^3 - 7D + 6)y = x^2$.
 d) Evaluate by using laplace transform $\int_0^\infty \left(\frac{e^{-t} - e^{-3t}}{t}\right) dt$
 e) Solve $(x^2 D^2 + xD - 1)y = x^3$

Q.4 Attempt any two questions from the following. 10

- a) In an $L - C$ circuit the charge q on a plate of a condenser is given by

$$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L} \cos nt.$$
 If $w^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$
 prove that charge at any time t is given by

$$q = q_0 \cos wt + \frac{i_0}{w} \sin wt + \frac{E_0 - 0}{2Lw} t \sin wt.$$
 b) Solve $(D^3 + D)y = \cos t + t^2 + 3$.
 c) Find the inverse laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+2)(s^2+2s+5)}$

Section – II

Q.5 Attempt any three questions from the following. 09

- a) Find the value of $\int_c \frac{z-1}{(z+1)^2(z-2)} dz$ where c is the circle $|z - i| = 2$.
 b) Solve $(p^3 + q^3) = 27z$.
 c) Find the inverse z-transform of $\frac{z}{(z+a)}$, $|z| < a$.
 d) Solve $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \left(\frac{1}{y} - \frac{1}{x}\right)$
 e) Find the Poles and Residues of $f(z) = \cot z$

Q.6 Attempt any three questions from the following.

- a) Solve $pq = xy^2z^4$
- b) Evaluate $\int_{(0,0)}^{1,1} (3x^2 + 4xy + 3y^2)dx + 2(x^2 + 3xy + 4y^2)dy$ along $y = x$
- c) Find $Z \{x_k\}$, where $\{x_k\} = k^2, k \geq 0$.
- d) Find $Z^{-1} \left\{ \frac{1}{(z-a)^2} \right\}$, $|z| > |a|$.
- e) Solve $p(bz - cy) + q(cx - ay) = ay - bx$

Q.7 Attempt any two questions from the following.

- a) Evaluate the following integral using residue theorem $\int_c \frac{4-3z}{z(z-1)(z-2)} dz$
Where c is $|z| = \frac{3}{2}$
- b) Solve the P.D.E. $\frac{\partial u}{\partial x} - 2 \frac{\partial u}{\partial t} = u$, by the method of separation of variables.
- c) Find $Z \{x_k\}$, where $\{x_k\} = c^k \cos \alpha k, k \geq 0$.

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S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

**Electrical Engineering
ELECTRICAL MACHINES – I**

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

- Instructions:**
- 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 - 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary.
 - 4) Draw neat diagrams whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The armature of DC machine is made up of laminated sheets to _____.
 - a) Reduce hysteresis loss
 - b) Reduce the eddy-current loss
 - c) Reduce armature copper loss
 - d) Increase dissipation of heat from the armature surface
- 2) Equalizer rings are required in case armature is _____.
 - a) wave wound
 - b) lap wound
 - c) delta wound
 - d) duplex wound
- 3) In a D.C. generator the critical resistance refers to the resistance of _____.
 - a) brushes
 - b) field
 - c) armature
 - d) load
- 4) Two generators A and B have 6-poles each. Generator A has wave wound armature while generator B has lap wound armature. The ratio of the induced e.m.f. is generator A and B will be _____.
 - a) 2 : 3
 - b) 3 : 1
 - c) 3 : 2
 - d) 1 : 3
- 5) Speed control by Ward Leonard method gives uniform speed variation _____.
 - a) in one direction
 - b) in both directions
 - c) below normal speed only
 - d) above normal speed only
- 6) Hopkinson's test on D.C. machines is conducted at _____.
 - a) no-load
 - b) part load
 - c) full-load
 - d) overload
- 7) In a D.C. series motor, if the armature current is reduced by 50%, the torque of the motor will be equal to _____.
 - a) 100% of the previous value
 - b) 50% of the previous value
 - c) 25% of the previous value
 - d) 10% of the previous value
 - e) none of the above

- 8) The no-load current drawn by transformer is usually what per cent of the full-load current?
- a) 0.2 to 0.5 per cent b) 2 to 5 per cent
c) 12 to 15 per cent d) 20 to 30 per cent
- 9) What is the thickness of laminations used in a transformer?
- a) 0.1 mm to 0.5 mm b) 4 mm to 5 mm
c) 14 mm to 15 mm d) 25 mm to 40 mm
- 10) Delta/star transformer works satisfactorily when _____.
- a) load is balanced only
b) load is unbalanced only
c) on balanced as well as unbalanced loads
d) none of the above
- 11) Which type of winding is used in 3phase shell-type transformer?
- a) Circular type b) Sandwich type
c) Cylindrical type d) Rectangular type
- 12) Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is _____.
- a) approximately equal to one b) less than one
c) great than one d) none of the above
- 13) The average power factor at which V-V bank is operating is less than that with the load. The power factor is _____.
- a) 57.7% of the balanced load power factor
b) 66.7% of the balanced load power factor
c) 86.6% of the balanced load power factor
d) None of these
- 14) Which of the following protection is normally not provided on small distribution transformers?
- a) Over fluxing protection b) Buchholz relay
c) Overcurrent protection d) All of the above

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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 4) Draw neat diagrams whenever necessary.

Section – I

Q.2 Attempt any four of the following.

16

- a) Derive an emf equation of DC generator.
- b) Why DC series motor is not started without load? Explain with the help of equations and its characteristics.
- c) With neat sketch explain three-point starters for DC motor.
- d) With a neat sketch explain the Hopkinson's test for de motor.
- e) A DC Shunt motor designed to operate on 500 V supply takes full load current of 42 A and runs at 800 rpm. The flux per pole is reduced to 75% of its normal value. Calculate the speed of the motor if the total torque exerted on the armature is.
 - 1) unchanged
 - 2) reduced by 20%. The armature resistance is 0.6Ω and the total voltage loss at the brushes is 2V.
- f) A 4 pole, long shunt lap -wound generator supplies 25 KW at a terminal voltage of 500 V. The armature resistance is 0.03Ω , series field resistance is 0.04Ω , and shunt field resistance is 200Ω . The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Calculate also the No. of conductors if speed is 1200 rpm. and flux per pole is 0.02 weber. Neglect armature reaction.

Q.3 Attempt any two of the following.

12

- a) With neat sketch explain the armature reaction, its effect and remedies to overcome it.
- b) A DC shunt machine when run as a motor on no load takes 440W and run at 1000 r.p.m. The field current and armature resistance are 1A and 0.5 respectively. Calculate the efficiency of the machine when.
 - 1) Running as a generator delivering 40A at 220V
 - 2) As a motor taking 40A from 220V supply
- c) The brake test on a DC shunt motor gave the following results : tensions on two sides of the brake were 2.9 kg and 0.17 kg, radius of pully 7 cm, speed 1500 rpm, Input current was 2 A at 230V, line current = 2.8 A. Find:
 - 1) Output torque
 - 2) Output power
 - 3) Horse power
 - 4) Efficiency

Section – II

Q.4 Attempt any four of the following.

16

- a) How the mutual flux in transformer remains constant for any desired load changes.
- b) What are the losses which occur in transformer, how they varied with load and how it can be minimized?
- c) The no load current of a transformer is 5 A at 0.3 power factor when supplied at 230 V, 50 Hz. The number of turns of the primary winding is 200. Calculate:
 - 1) Secondary current and power factor
 - 2) The core loss
 - 3) The magnetizing current
- d) A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, calculate.
 - 1) Full load efficiency
 - 2) The kVA
- e) Write short note on autotransformer.
- f) A 3-phase, 50 Hz transformer has a delta-connected primary and star-connected secondary, the line voltages being 22000 V and 400 V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?

Q.5 Attempt any two of the following:

12

- a) The following data for 10 KVA, 450/120 V, 50 Hz transformer were obtained from OC and SC test
OC Test: $V_1 = 120$ V, $I_1 = 4.2$ A, $W_1 = 80$ W
SC Test: $V_1 = 9.65$ V, $I_1 = 22.2$ A, $W_1 = 120$ W
Calculate
 - 1) Equivalent circuit constants
 - 2) Efficiency at full load 0.8 lagging power factor
 - 3) Efficiency at half load 0.8 lagging power factor
- b) With the help of neat diagram explain Scott connection of three phasetransformer.
- c) Two single phase transformers with equal voltage ratio have impedance of $(0.5+3i)$ and $(0.6+1 i)$ with respect to secondary, If they operate in parallel, determine how they share a total load of 100KW, at 0.8 lag pf.

Seat No.	
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Set **Q**

S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 4) Draw neat diagrams whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The no-load current drawn by transformer is usually what per cent of the full-load current?

a) 0.2 to 0.5 per cent	b) 2 to 5 per cent
c) 12 to 15 per cent	d) 20 to 30 per cent
- 2) What is the thickness of laminations used in a transformer?

a) 0.1 mm to 0.5 mm	b) 4 mm to 5 mm
c) 14 mm to 15 mm	d) 25 mm to 40 mm
- 3) Delta/star transformer works satisfactorily when _____.
 - a) load is balanced only
 - b) load is unbalanced only
 - c) on balanced as well as unbalanced loads
 - d) none of the above
- 4) Which type of winding is used in 3phase shell-type transformer?

a) Circular type	b) Sandwich type
c) Cylindrical type	d) Rectangular type
- 5) Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is _____.

a) approximately equal to one	b) less than one
c) great than one	d) none of the above
- 6) The average power factor at which V-V bank is operating is less than that with the load. The power factor is _____.
 - a) 57.7% of the balanced load power factor
 - b) 66.7% of the balanced load power factor
 - c) 86.6% of the balanced load power factor
 - d) None of these
- 7) Which of the following protection is normally not provided on small distribution transformers?

a) Over fluxing protection	b) Buchholz relay
c) Overcurrent protection	d) All of the above

- 8) The armature of DC machine is made up of laminated sheets to _____.
- a) Reduce hysteresis loss
 - b) Reduce the eddy-current loss
 - c) Reduce armature copper loss
 - d) Increase dissipation of heat from the armature surface
- 9) Equalizer rings are required in case armature is _____.
- a) wave wound
 - b) lap wound
 - c) delta wound
 - d) duplex wound
- 10) In a D.C. generator the critical resistance refers to the resistance of _____.
- a) brushes
 - b) field
 - c) armature
 - d) load
- 11) Two generators A and B have 6-poles each. Generator A has wave wound armature while generator B has lap wound armature. The ratio of the induced e.m.f. is generator A and B will be _____.
- a) 2 : 3
 - b) 3 : 1
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- 12) Speed control by Ward Leonard method gives uniform speed variation _____.
- a) in one direction
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- 13) Hopkinson's test on D.C. machines is conducted at _____.
- a) no-load
 - b) part load
 - c) full-load
 - d) overload
- 14) In a D.C. series motor, if the armature current is reduced by 50%, the torque of the motor will be equal to _____.
- a) 100% of the previous value
 - b) 50% of the previous value
 - c) 25% of the previous value
 - d) 10% of the previous value
 - e) none of the above

Seat No.	
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 4) Draw neat diagrams whenever necessary.

Section – I

Q.2 Attempt any four of the following.

16

- a) Derive an emf equation of DC generator.
- b) Why DC series motor is not started without load? Explain with the help of equations and its characteristics.
- c) With neat sketch explain three-point starters for DC motor.
- d) With a neat sketch explain the Hopkinson's test for DC motor.
- e) A DC Shunt motor designed to operate on 500 V supply takes full load current of 42 A and runs at 800 rpm. The flux per pole is reduced to 75% of its normal value. Calculate the speed of the motor if the total torque exerted on the armature is.
 - 1) unchanged
 - 2) reduced by 20%. The armature resistance is 0.6Ω and the total voltage loss at the brushes is 2V.
- f) A 4 pole, long shunt lap -wound generator supplies 25 KW at a terminal voltage of 500 V. The armature resistance is 0.03Ω , series field resistance is 0.04Ω , and shunt field resistance is 200Ω . The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Calculate also the No. of conductors if speed is 1200 rpm. and flux per pole is 0.02 weber. Neglect armature reaction.

Q.3 Attempt any two of the following.

12

- a) With neat sketch explain the armature reaction, its effect and remedies to overcome it.
- b) A DC shunt machine when run as a motor on no load takes 440W and run at 1000 r.p.m. The field current and armature resistance are 1A and 0.5 respectively. Calculate the efficiency of the machine when.
 - 1) Running as a generator delivering 40A at 220V
 - 2) As a motor taking 40A from 220V supply
- c) The brake test on a DC shunt motor gave the following results : tensions on two sides of the brake were 2.9 kg and 0.17 kg, radius of pulley 7 cm, speed 1500 rpm, Input current was 2 A at 230V, line current = 2.8 A. Find:
 - 1) Output torque
 - 2) Output power
 - 3) Horse power
 - 4) Efficiency

Section – II

Q.4 Attempt any four of the following.

16

- a) How the mutual flux in transformer remains constant for any desired load changes.
- b) What are the losses which occur in transformer, how they varied with load and how it can be minimized?
- c) The no load current of a transformer is 5 A at 0.3 power factor when supplied at 230 V, 50 Hz. The number of turns of the primary winding is 200. Calculate:
 - 1) Secondary current and power factor
 - 2) The core loss
 - 3) The magnetizing current
- d) A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, calculate.
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- e) Write short note on autotransformer.
- f) A 3-phase, 50 Hz transformer has a delta-connected primary and star-connected secondary, the line voltages being 22000 V and 400 V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?

Q.5 Attempt any two of the following:

12

- a) The following data for 10 KVA, 450/120 V, 50 Hz transformer were obtained from OC and SC test
OC Test: $V_1 = 120$ V, $I_1 = 4.2$ A, $W_1 = 80$ W
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- b) With the help of neat diagram explain Scott connection of three phasetransformer.
- c) Two single phase transformers with equal voltage ratio have impedance of $(0.5+3i)$ and $(0.6+1 i)$ with respect to secondary, If they operate in parallel, determine how they share a total load of 100KW, at 0.8 lag pf.

Seat
No.**S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019****Electrical Engineering
ELECTRICAL MACHINES – I**

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 4) Draw neat diagrams whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Speed control by Ward Leonard method gives uniform speed variation _____.
 - a) in one direction
 - b) in both directions
 - c) below normal speed only
 - d) above normal speed only
- 2) Hopkinson's test on D.C. machines is conducted at _____.
 - a) no-load
 - b) part load
 - c) full-load
 - d) overload
- 3) In a D.C. series motor, if the armature current is reduced by 50%, the torque of the motor will be equal to _____.
 - a) 100% of the previous value
 - b) 50% of the previous value
 - c) 25% of the previous value
 - d) 10% of the previous value
 - e) none of the above
- 4) The no-load current drawn by transformer is usually what per cent of the full-load current?
 - a) 0.2 to 0.5 per cent
 - b) 2 to 5 per cent
 - c) 12 to 15 per cent
 - d) 20 to 30 per cent
- 5) What is the thickness of laminations used in a transformer?
 - a) 0.1 mm to 0.5 mm
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 - c) 14 mm to 15 mm
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- 8) Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is _____.
a) approximately equal to one b) less than one
c) great than one d) none of the above
- 9) The average power factor at which V-V bank is operating is less than that with the load. The power factor is _____.
a) 57.7% of the balanced load power factor
b) 66.7% of the balanced load power factor
c) 86.6% of the balanced load power factor
d) None of these
- 10) Which of the following protection is normally not provided on small distribution transformers?
a) Over fluxing protection b) Buchholz relay
c) Overcurrent protection d) All of the above
- 11) The armature of DC machine is made up of laminated sheets to _____.
a) Reduce hysteresis loss
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c) Reduce armature copper loss
d) Increase dissipation of heat from the armature surface
- 12) Equalizer rings are required in case armature is _____.
a) wave wound b) lap wound
c) delta wound d) duplex wound
- 13) In a D.C. generator the critical resistance refers to the resistance of _____.
a) brushes b) field
c) armature d) load
- 14) Two generators A and B have 6-poles each. Generator A has wave wound armature while generator B has lap wound armature. The ratio of the induced e.m.f. is generator A and B will be _____.
a) 2 : 3 b) 3 : 1
c) 3 : 2 d) 1 : 3

Seat No.	
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.
 4) Draw neat diagrams whenever necessary.

Section – I

Q.2 Attempt any four of the following.

16

- Derive an emf equation of DC generator.
- Why DC series motor is not started without load? Explain with the help of equations and its characteristics.
- With neat sketch explain three-point starters for DC motor.
- With a neat sketch explain the Hopkinson's test for de motor.
- A DC Shunt motor designed to operate on 500 V supply takes full load current of 42 A and runs at 800 rpm. The flux per pole is reduced to 75% of its normal value. Calculate the speed of the motor if the total torque exerted on the armature is.
 - unchanged
 - reduced by 20%. The armature resistance is 0.6Ω and the total voltage loss at the brushes is 2V.
- A 4 pole, long shunt lap -wound generator supplies 25 KW at a terminal voltage of 500 V. The armature resistance is 0.03Ω , series field resistance is 0.04Ω , and shunt field resistance is 200Ω . The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Calculate also the No. of conductors if speed is 1200 rpm. and flux per pole is 0.02 weber. Neglect armature reaction.

Q.3 Attempt any two of the following.

12

- With neat sketch explain the armature reaction, its effect and remedies to overcome it.
- A DC shunt machine when run as a motor on no load takes 440W and run at 1000 r.p.m. The field current and armature resistance are 1A and 0.5 respectively. Calculate the efficiency of the machine when.
 - Running as a generator delivering 40A at 220V
 - As a motor taking 40A from 220V supply
- The brake test on a DC shunt motor gave the following results : tensions on two sides of the brake were 2.9 kg and 0.17 kg, radius of pully 7 cm, speed 1500 rpm, Input current was 2 A at 230V, line current = 2.8 A. Find:
 - Output torque
 - Output power
 - Horse power
 - Efficiency

Section – II

Q.4 Attempt any four of the following.

16

- a) How the mutual flux in transformer remains constant for any desired load changes.
- b) What are the losses which occur in transformer, how they varied with load and how it can be minimized?
- c) The no load current of a transformer is 5 A at 0.3 power factor when supplied at 230 V, 50 Hz. The number of turns of the primary winding is 200. Calculate:
 - 1) Secondary current and power factor
 - 2) The core loss
 - 3) The magnetizing current
- d) A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, calculate.
 - 1) Full load efficiency
 - 2) The kVA
- e) Write short note on autotransformer.
- f) A 3-phase, 50 Hz transformer has a delta-connected primary and star-connected secondary, the line voltages being 22000 V and 400 V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?

Q.5 Attempt any two of the following:

12

- a) The following data for 10 KVA, 450/120 V, 50 Hz transformer were obtained from OC and SC test
 OC Test: $V_1 = 120$ V, $I_1 = 4.2$ A, $W_1 = 80$ W
 SC Test: $V_1 = 9.65$ V, $I_1 = 22.2$ A, $W_1 = 120$ W
 Calculate
 - 1) Equivalent circuit constants
 - 2) Efficiency at full load 0.8 lagging power factor
 - 3) Efficiency at half load 0.8 lagging power factor
- b) With the help of neat diagram explain Scott connection of three phasetransformer.
- c) Two single phase transformers with equal voltage ratio have impedance of $(0.5+3i)$ and $(0.6+1 i)$ with respect to secondary, If they operate in parallel, determine how they share a total load of 100KW, at 0.8 lag pf.

Seat
No.**S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019****Electrical Engineering
ELECTRICAL MACHINES – I**

Day & Date: Tuesday, 10-12-2019

Max. Marks: 70

Time: 10:00 AM To 01:00 PM

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Draw neat diagrams whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Delta/star transformer works satisfactorily when _____.
 - a) load is balanced only
 - b) load is unbalanced only
 - c) on balanced as well as unbalanced loads
 - d) none of the above
- 2) Which type of winding is used in 3phase shell-type transformer?
 - a) Circular type
 - b) Sandwich type
 - c) Cylindrical type
 - d) Rectangular type
- 3) Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is _____.
 - a) approximately equal to one
 - b) less than one
 - c) great than one
 - d) none of the above
- 4) The average power factor at which V-V bank is operating is less than that with the load. The power factor is _____.
 - a) 57.7% of the balanced load power factor
 - b) 66.7% of the balanced load power factor
 - c) 86.6% of the balanced load power factor
 - d) None of these
- 5) Which of the following protection is normally not provided on small distribution transformers?
 - a) Over fluxing protection
 - b) Buchholz relay
 - c) Overcurrent protection
 - d) All of the above
- 6) The armature of DC machine is made up of laminated sheets to _____.
 - a) Reduce hysteresis loss
 - b) Reduce the eddy-current loss
 - c) Reduce armature copper loss
 - d) Increase dissipation of heat from the armature surface
- 7) Equalizer rings are required in case armature is _____.
 - a) wave wound
 - b) lap wound
 - c) delta wound
 - d) duplex wound

- 8) In a D.C. generator the critical resistance refers to the resistance of _____.
a) brushes
b) field
c) armature
d) load
- 9) Two generators A and B have 6-poles each. Generator A has wave wound armature while generator B has lap wound armature. The ratio of the induced e.m.f. is generator A and B will be _____.
a) 2 : 3
b) 3 : 1
c) 3 : 2
d) 1 : 3
- 10) Speed control by Ward Leonard method gives uniform speed variation _____.
a) in one direction
b) in both directions
c) below normal speed only
d) above normal speed only
- 11) Hopkinson's test on D.C. machines is conducted at _____.
a) no-load
b) part load
c) full-load
d) overload
- 12) In a D.C. series motor, if the armature current is reduced by 50%, the torque of the motor will be equal to _____.
a) 100% of the previous value
b) 50% of the previous value
c) 25% of the previous value
d) 10% of the previous value
e) none of the above
- 13) The no-load current drawn by transformer is usually what per cent of the full-load current?
a) 0.2 to 0.5 per cent
b) 2 to 5 per cent
c) 12 to 15 per cent
d) 20 to 30 per cent
- 14) What is the thickness of laminations used in a transformer?
a) 0.1 mm to 0.5 mm
b) 4 mm to 5 mm
c) 14 mm to 15 mm
d) 25 mm to 40 mm

Seat No.	
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S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
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 4) Draw neat diagrams whenever necessary.

Section – I

Q.2 Attempt any four of the following. **16**

- a) Derive an emf equation of DC generator.
- b) Why DC series motor is not started without load? Explain with the help of equations and its characteristics.
- c) With neat sketch explain three-point starters for DC motor.
- d) With a neat sketch explain the Hopkinson's test for de motor.
- e) A DC Shunt motor designed to operate on 500 V supply takes full load current of 42 A and runs at 800 rpm. The flux per pole is reduced to 75% of its normal value. Calculate the speed of the motor if the total torque exerted on the armature is.
 - 1) unchanged
 - 2) reduced by 20%. The armature resistance is 0.6Ω and the total voltage loss at the brushes is 2V.
- f) A 4 pole, long shunt lap -wound generator supplies 25 KW at a terminal voltage of 500 V. The armature resistance is 0.03Ω , series field resistance is 0.04Ω , and shunt field resistance is 200Ω . The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Calculate also the No. of conductors if speed is 1200 rpm. and flux per pole is 0.02 weber. Neglect armature reaction.

Q.3 Attempt any two of the following. **12**

- a) With neat sketch explain the armature reaction, its effect and remedies to overcome it.
- b) A DC shunt machine when run as a motor on no load takes 440W and run at 1000 r.p.m. The field current and armature resistance are 1A and 0.5 respectively. Calculate the efficiency of the machine when.
 - 1) Running as a generator delivering 40A at 220V
 - 2) As a motor taking 40A from 220V supply
- c) The brake test on a DC shunt motor gave the following results : tensions on two sides of the brake were 2.9 kg and 0.17 kg, radius of pully 7 cm, speed 1500 rpm, Input current was 2 A at 230V, line current = 2.8 A. Find:
 - 1) Output torque
 - 2) Output power
 - 3) Horse power
 - 4) Efficiency

Section – II

Q.4 Attempt any four of the following.

16

- a) How the mutual flux in transformer remains constant for any desired load changes.
- b) What are the losses which occur in transformer, how they varied with load and how it can be minimized?
- c) The no load current of a transformer is 5 A at 0.3 power factor when supplied at 230 V, 50 Hz. The number of turns of the primary winding is 200. Calculate:
 - 1) Secondary current and power factor
 - 2) The core loss
 - 3) The magnetizing current
- d) A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, calculate.
 - 1) Full load efficiency
 - 2) The kVA
- e) Write short note on autotransformer.
- f) A 3-phase, 50 Hz transformer has a delta-connected primary and star-connected secondary, the line voltages being 22000 V and 400 V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?

Q.5 Attempt any two of the following:

12

- a) The following data for 10 KVA, 450/120 V, 50 Hz transformer were obtained from OC and SC test
OC Test: $V_1 = 120$ V, $I_1 = 4.2$ A, $W_1 = 80$ W
SC Test: $V_1 = 9.65$ V, $I_1 = 22.2$ A, $W_1 = 120$ W
Calculate
 - 1) Equivalent circuit constants
 - 2) Efficiency at full load 0.8 lagging power factor
 - 3) Efficiency at half load 0.8 lagging power factor
- b) With the help of neat diagram explain Scott connection of three phasetransformer.
- c) Two single phase transformers with equal voltage ratio have impedance of $(0.5+3i)$ and $(0.6+1 i)$ with respect to secondary, If they operate in parallel, determine how they share a total load of 100KW, at 0.8 lag pf.

- 7) The two pressure coils of a single phase power factor meter have _____.
a) The same dimensions and the same number of turns
b) The same dimension but different number of turns
c) The same number of turns but different dimensions
d) None of the above
- 8) Which of following represent active transducer?
a) Strain gauge
b) Thermistor
c) LVDT
d) Thermocouple
- 9) Electronic voltmeters can be designed to measure _____.
a) Only very small voltages
b) Only very high voltages
c) Both very small and very high voltages
d) None of these
- 10) An oscilloscope indicates _____.
a) Peak to peak value of voltage
b) DC value of voltage
c) RMS value
d) Average value
- 11) Q meter is used to measure the properties of _____.
a) Inductive coils
b) Non inductive coils
c) Capacitive coils
d) Both (a) and (c)
- 12) For handling greater currents induction Wattcmeters are used in conjunction with _____.
a) Potential T/F
b) Current T/F
c) Power T/F
d) Either of the above
- 13) Digital multimeter is used for _____.
a) Measuring a.c. and d.c. current, voltage and resistance
b) Measuring a.c. current and voltage
c) Measuring d.c. current and resistance
d) Measuring a.c. voltage and resistance
- 14) In a CRT focusing anode is located _____.
a) Between pre-accelerating and accelerating anode
b) After accelerating anode
c) Before pre-accelerating anode
d) None of the above

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

Q.2 Solve any Four. **16**

- With neat sketch explain spring control method.
- What is mean by standard? Explain types of standard.
- The inductance of moving iron instrument is given by

$$L = (10 + 5\Theta - \Theta^2) \mu H$$
 Where Θ is deflection in radian from zero position? The spring constant is 12×10^{-6} Nm/rad. Calculate deflection for current of 5A.
- With neat sketch explain PMMC instrument.
- Explain drysdale ac potentiometer with neat diagram.

Q.3 Attempt any two. **12**

- With neat sketch explain ammeter shunt & voltage multiplier.
- Explain Schering Bridge for measurement of unknown capacitance with phasor diagram.
- A bridge consist of the following
 Arm ab: - A choke coil having resistance R_1 & inductance L_1
 Arm bc: - A non-inductive resistance R_3
 Arm cd: - A mica condenser C_4 in series with non-inductive resistance R_4
 Arm da: - A non-inductive resistance R_2
 When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

$$R_2 = 2410\Omega, R_3 = 750\Omega, C_4 = 0.35\mu F, R_4 = 64.5\Omega$$
 The series resistance of capacitor is 0.4Ω . Calculate resistance and inductance (R_1, L_1) of choke coil. The supply is connected between a & c and detector is between b & d.

Q.4 Attempt any four **16**

- Explain detail classification of transducers.
- With help of block diagram explain digital multimeter.
- Define the following terms
 - Transformation ratio
 - Nominal ratio
 - Turns ratio
 - Ratio error
- Explain electronic energy meter with block diagram.
- Write features of cathode ray tube.

Q.5 Attempt any two.

- a) Explain current transformer for measurement of current with equivalent circuit & phasor diagram.
- b) Explain ramp type DVM with neat diagram.
- c) Explain in detail block diagram of CRO.

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Set **Q**

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Which of following represent active transducer?
 - a) Strain gauge
 - b) Thermistor
 - c) LVDT
 - d) Thermocouple
- 2) Electronic voltmeters can be designed to measure _____.
 - a) Only very small voltages
 - b) Only very high voltages
 - c) Both very small and very high voltages
 - d) None of these
- 3) An oscilloscope indicates _____.
 - a) Peak to peak value of voltage
 - b) DC value of voltage
 - c) RMS value
 - d) Average value
- 4) Q meter is used to measure the properties of _____.
 - a) Inductive coils
 - b) Non inductive coils
 - c) Capacitive coils
 - d) Both (a) and (c)
- 5) For handling greater currents induction Wattcmeters are used in conjunction with _____.
 - a) Potential T/F
 - b) Current T/F
 - c) Power T/F
 - d) Either of the above
- 6) Digital multimeter is used for _____.
 - a) Measuring a.c. and d.c. current, voltage and resistance
 - b) Measuring a.c. current and voltage
 - c) Measuring d.c. current and resistance
 - d) Measuring a.c. voltage and resistance
- 7) In a CRT focusing anode is located _____.
 - a) Between pre-accelerating and accelerating anode
 - b) After accelerating anode
 - c) Before pre-accelerating anode
 - d) None of the above
- 8) If the instrument is used in wrong manner while application, then it will results in _____.
 - a) Systematic error
 - b) Instrument error
 - c) Random error
 - d) Environmental error

- 9) _____ instruments are those which measure the total quantity of electricity delivered in a particular time.
- | | |
|--------------|----------------|
| a) Absolute | b) Indicating |
| c) Recording | d) Integrating |
- 10) Potentiometer is used for the measurement of _____.
- a) Linear displacement
 - b) Angular displacement
 - c) Non - linear displacement
 - d) Only (a) and (b)
- 11) The largest change in the measured variable which produces no instrument response is known as _____.
- | | |
|--------------|------------------|
| a) Threshold | b) Dynamic error |
| c) Dead zone | d) None of these |
- 12) The spring material used in a spring control device should have the following property _____.
- a) Should be non-magnetic
 - b) Must be of low temperature co-efficient
 - c) Should have low specific resistance
 - d) All of the above
- 13) For the measurement of low resistances, Kelvin's double bridge has high accuracy because _____.
- a) It has two set of ratio arms which eliminates effect of resistance of connecting lead
 - b) It has a null indicating galvanometer
 - c) It has two null indicator
 - d) It has four sets of ratio arms which eliminates the effect of resistance of connecting lead
- 14) The two pressure coils of a single phase power factor meter have _____.
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 - b) The same dimension but different number of turns
 - c) The same number of turns but different dimensions
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
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Q.2 Solve any Four. **16**

- With neat sketch explain spring control method.
- What is mean by standard? Explain types of standard.
- The inductance of moving iron instrument is given by

$$L = (10 + 5\Theta - \Theta^2) \mu H$$
 Where Θ is deflection in radian from zero position? The spring constant is 12×10^{-6} Nm/rad. Calculate deflection for current of 5A.
- With neat sketch explain PMMC instrument.
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 Arm cd: - A mica condenser C_4 in series with non-inductive resistance R_4
 Arm da: - A non-inductive resistance R_2
 When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

$$R_2 = 2410\Omega, R_3 = 750\Omega, C_4 = 0.35\mu F, R_4 = 64.5\Omega$$
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- a) Explain current transformer for measurement of current with equivalent circuit & phasor diagram.
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**S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering**

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The spring material used in a spring control device should have the following property _____.
 - a) Should be non-magnetic
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- 2) For the measurement of low resistances, Kelvin's double bridge has high accuracy because _____.
 - a) It has two set of ratio arms which eliminates effect of resistance of connecting lead
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- 3) The two pressure coils of a single phase power factor meter have _____.
 - a) The same dimensions and the same number of turns
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 - d) None of the above
- 4) Which of following represent active transducer?

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|------------------|------------------------|
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- | |
|--|
| a) Measuring a.c. and d.c. current, voltage and resistance |
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- 10) In a CRT focusing anode is located _____.
- | |
|--|
| a) Between pre-accelerating and accelerating anode |
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- 11) If the instrument is used in wrong manner while application, then it will results in _____.
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| a) Systematic error | b) Instrument error |
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- 12) _____ instruments are those which measure the total quantity of electricity delivered in a particular time.
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019
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Max. Marks: 56

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Seat
No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) An oscilloscope indicates _____.
 a) Peak to peak value of voltage b) DC value of voltage
 c) RMS value d) Average value
- 2) Q meter is used to measure the properties of _____.
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 c) Capacitive coils d) Both (a) and (c)
- 3) For handling greater currents induction Wattcmeters are used in conjunction with _____.
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- 5) In a CRT focusing anode is located _____.
 a) Between pre-accelerating and accelerating anode
 b) After accelerating anode
 c) Before pre-accelerating anode
 d) None of the above
- 6) If the instrument is used in wrong manner while application, then it will results in _____.
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 c) Random error d) Environmental error
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- 8) Potentiometer is used for the measurement of _____.
a) Linear displacement
b) Angular displacement
c) Non - linear displacement
d) Only (a) and (b)
- 9) The largest change in the measured variable which produces no instrument response is known as _____.
a) Threshold
b) Dynamic error
c) Dead zone
d) None of these
- 10) The spring material used in a spring control device should have the following property _____.
a) Should be non-magnetic
b) Most be of low temperature co-efficient
c) Should have low specific resistance
d) All of the above
- 11) For the measurement of low resistances, Kelvin's double bridge has high accuracy because _____.
a) It has two set of ratio arms which eliminates effect of resistance of connecting lead
b) It has a null indicating galvanometer
c) It has two null indicator
d) It has four sets of ratio arms which eliminates the effect of resistance of connecting lead
- 12) The two pressure coils of a single phase power factor meter have _____.
a) The same dimensions and the same number of turns
b) The same dimension but different number of turns
c) The same number of turns but different dimensions
d) None of the above
- 13) Which of following represent active transducer?
a) Strain gauge
b) Thermistor
c) LVDT
d) Thermocouple
- 14) Electronic voltmeters can be designed to measure _____.
a) Only very small voltages
b) Only very high voltages
c) Both very small and very high voltages
d) None of these

Seat No.	
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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Assume suitable data if necessary.

Q.2 Solve any Four. **16**

- With neat sketch explain spring control method.
- What is mean by standard? Explain types of standard.
- The inductance of moving iron instrument is given by

$$L = (10 + 5\Theta - \Theta^2) \mu H$$
 Where Θ is deflection in radian from zero position? The spring constant is 12×10^{-6} Nm/rad. Calculate deflection for current of 5A.
- With neat sketch explain PMMC instrument.
- Explain drysdale ac potentiometer with neat diagram.

Q.3 Attempt any two. **12**

- With neat sketch explain ammeter shunt & voltage multiplier.
- Explain Schering Bridge for measurement of unknown capacitance with phasor diagram.
- A bridge consist of the following
 Arm ab: - A choke coil having resistance R_1 & inductance L_1
 Arm bc: - A non-inductive resistance R_3
 Arm cd: - A mica condenser C_4 in series with non-inductive resistance R_4
 Arm da: - A non-inductive resistance R_2
 When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

$$R_2 = 2410\Omega, R_3 = 750\Omega, C_4 = 0.35\mu F, R_4 = 64.5\Omega$$
 The series resistance of capacitor is 0.4Ω . Calculate resistance and inductance (R_1, L_1) of choke coil. The supply is connected between a & c and detector is between b & d.

Q.4 Attempt any four **16**

- Explain detail classification of transducers.
- With help of block diagram explain digital multimeter.
- Define the following terms
 - Transformation ratio
 - Nominal ratio
 - Turns ratio
 - Ratio error
- Explain electronic energy meter with block diagram.
- Write features of cathode ray tube.

Q.5 Attempt any two.

- a) Explain current transformer for measurement of current with equivalent circuit & phasor diagram.
- b) Explain ramp type DVM with neat diagram.
- c) Explain in detail block diagram of CRO.

Seat No.	
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S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM- I

Day & Date: Saturday,14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Out of the following which is conventional source of energy _____.
 - a) Tidal power
 - b) Geothermal energy
 - c) Nuclear energy
 - d) Wind power
- 2) Diversity factor is always _____.
 - a) Less than one
 - b) Equal to one
 - c) Above one
 - d) none of them
- 3) A graphical representation between discharge and time is known as _____.
 - a) Hydrograph
 - b) Hectograph
 - c) Topograph
 - d) Monograph
- 4) In hydro power plants _____.
 - a) Initial cost is low and operating cost is high
 - b) Initial cost as well as operating costs are high
 - c) Initial cost is high and operating cost is low
 - d) Initial cost as well as operating cost is low
- 5) Capacity factor of power station is _____.
 - a) Maximum demand / average demand
 - b) Average demand on station / maximum demand on station
 - c) Maximum installed capacity of station / average demand of station
 - d) Average demand of station / Maximum installed capacity of station
- 6) Live storage of coal in a power plant means _____.
 - a) Coal ready for combustion
 - b) Preheated coal
 - c) Storage of coal sufficient to meet 24 hour demand of the plant
 - d) Coal in transit
- 7) The material used for the manufacture of ground wire is _____.
 - a) Aluminium
 - b) Galvanized steel
 - c) Cast iron
 - d) stainless steel
- 8) Maximum permissible span for wooden poles is _____.
 - a) upto 80 m
 - b) 100-200m
 - c) 200-300 m
 - d) 300 above

- 9) The string efficiency of insulators can be increased by _____.
a) reducing the number of insulators
b) increasing number of insulators
c) correct grading of insulators of various capacitance
d) changing the orientation of string
- 10) In overhead lines for transmitting power we generally use: _____.
a) Copper Conductors b) Aluminum Conductors
c) ACSR conductors d) Galvanized Steel Conductors
- 11) Transmitted power remaining the same, if supply voltage of a D.C. 2-wire feeder is increased 100 percent, saving in copper is _____.
a) 25 percent b) 50 percent
c) 75 percent d) 100 percent
- 12) Which of the following material can be used as a moderator?
a) Graphite b) Heavy water
c) Beryllium d) Any of the above
- 13) Transmission and distribution of electric power by underground system is superior to overhead system in respect of _____.
a) Appearance and public safety
b) Maintenance cost
c) Frequency of faults, power failure and accidents
d) All of the above
- 14) Pin type insulators are generally not used for voltages beyond _____.
a) 1 kV b) 11 Kv
c) 22 kV d) 33 Kv

Seat No.	
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Set

P

S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM- I

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section- I

Q.2 Solve any four **16**

- a) Define the following terms;
 - 1) Peak load
 - 2) load factor
 - 3) Diversity factor
 - 4) Plant utility factor
- b) Discuss factors governing the choice of site for Hydro power plant.
- c) With the help of neat sketch explain Gas turbine power plant.
- d) A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum
 Calculate:
 - 1) the demand factor
 - 2) load factor
- e) Draw the layout of solar thermal power plant with neat diagram & explain the operation of main components.

Q.3 Solve any two **12**

- a) What is tariff? Explain different types of tariff.
- b) What is function of nuclear reactor? Explain different component in nuclear reactor.
- c) Describe with neat sketch schematic arrangement of thermal power station.

Section-II

Q.4 Solve any four **16**

- a) Differentiate between overhead and underground system.
- b) What are the methods of improving string efficiency?
- c) What are the properties of conductor used in transmission and distribution line? Describe about ACSR conductor.
- d) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- e) Each line of 3-ph system is suspended by a string of 3 identical insulator of self-capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of lowest insulator to 0.3C

Q.5 Solve any two

- a) State and explain kelvin's law to determine the economic size of transmission conductor.
- b) Derive equation for conductor material required in single phase 2-wire AC with midpoint earthed compare with 2 wire DC system.
- c) In five insulator disc string capacitance between each insulator unit and earth is $\frac{1}{6}$ of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency.

Seat No.	
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S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM- I

Day & Date: Saturday,14-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Maximum permissible span for wooden poles is _____.
 - a) upto 80 m
 - b) 100-200m
 - c) 200-300 m
 - d) 300 above
- 2) The string efficiency of insulators can be increased by _____.
 - a) reducing the number of insulators
 - b) increasing number of insulators
 - c) correct grading of insulators of various capacitance
 - d) changing the orientation of string
- 3) In overhead lines for transmitting power we generally use: _____.
 - a) Copper Conductors
 - b) Aluminum Conductors
 - c) ACSR conductors
 - d) Galvanized Steel Conductors
- 4) Transmitted power remaining the same, if supply voltage of a D.C. 2-wire feeder is increased 100 percent, saving in copper is _____.
 - a) 25 percent
 - b) 50 percent
 - c) 75 percent
 - d) 100 percent
- 5) Which of the following material can be used as a moderator?
 - a) Graphite
 - b) Heavy water
 - c) Beryllium
 - d) Any of the above
- 6) Transmission and distribution of electric power by underground system is superior to overhead system in respect of _____.
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 - b) Maintenance cost
 - c) Frequency of faults, power failure and accidents
 - d) All of the above
- 7) Pin type insulators are generally not used for voltages beyond _____.
 - a) 1 kV
 - b) 11 Kv
 - c) 22 kV
 - d) 33 Kv
- 8) Out of the following which is conventional source of energy _____.
 - a) Tidal power
 - b) Geothermal energy
 - c) Nuclear energy
 - d) Wind power
- 9) Diversity factor is always _____.
 - a) Less than one
 - b) Equal to one
 - c) Above one
 - d) none of them

- 10) A graphical representation between discharge and time is known as ____.
- a) Hydrograph
 - b) Hectograph
 - c) Topograph
 - d) Monograph
- 11) In hydro power plants ____.
- a) Initial cost is low and operating cost is high
 - b) Initial cost as well as operating costs are high
 - c) Initial cost is high and operating cost is low
 - d) Initial cost as well as operating cost is low
- 12) Capacity factor of power station is ____.
- a) Maximum demand / average demand
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 - c) Maximum installed capacity of station / average demand of station
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- 13) Live storage of coal in a power plant means ____.
- a) Coal ready for combustion
 - b) Preheated coal
 - c) Storage of coal sufficient to meet 24 hour demand of the plant
 - d) Coal in transit
- 14) The material used for the manufacture of ground wire is ____.
- a) Aluminium
 - b) Galvanized steel
 - c) Cast iron
 - d) stainless steel

Seat No.	
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Set **Q**

S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM- I

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section- I

Q.2 Solve any four **16**

- a) Define the following terms;
 1) Peak load
 2) load factor
 3) Diversity factor
 4) Plant utility factor
- b) Discuss factors governing the choice of site for Hydro power plant.
- c) With the help of neat sketch explain Gas turbine power plant.
- d) A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum
 Calculate:
 1) the demand factor
 2) load factor
- e) Draw the layout of solar thermal power plant with neat diagram & explain the operation of main components.

Q.3 Solve any two **12**

- a) What is tariff? Explain different types of tariff.
- b) What is function of nuclear reactor? Explain different component in nuclear reactor.
- c) Describe with neat sketch schematic arrangement of thermal power station.

Section-II

Q.4 Solve any four **16**

- a) Differentiate between overhead and underground system.
- b) What are the methods of improving string efficiency?
- c) What are the properties of conductor used in transmission and distribution line? Describe about ACSR conductor.
- d) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- e) Each line of 3-ph system is suspended by a string of 3 identical insulator of self-capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of lowest insulator to 0.3C

Q.5 Solve any two

- a) State and explain kelvin's law to determine the economic size of transmission conductor.
- b) Derive equation for conductor material required in single phase 2-wire AC with midpoint earthed compare with 2 wire DC system.
- c) In five insulator disc string capacitance between each insulator unit and earth is $\frac{1}{6}$ of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency.

Seat No.	
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S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM- I

Day & Date: Saturday,14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Capacity factor of power station is _____.
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 - c) Cast iron
 - d) stainless steel
- 4) Maximum permissible span for wooden poles is _____.
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- 6) In overhead lines for transmitting power we generally use: _____.
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 - b) Aluminum Conductors
 - c) ACSR conductors
 - d) Galvanized Steel Conductors
- 7) Transmitted power remaining the same, if supply voltage of a D.C. 2-wire feeder is increased 100 percent, saving in copper is _____.
 - a) 25 percent
 - b) 50 percent
 - c) 75 percent
 - d) 100 percent
- 8) Which of the following material can be used as a moderator?
 - a) Graphite
 - b) Heavy water
 - c) Beryllium
 - d) Any of the above

- 9) Transmission and distribution of electric power by underground system is superior to overhead system in respect of _____.
a) Appearance and public safety
b) Maintenance cost
c) Frequency of faults, power failure and accidents
d) All of the above
- 10) Pin type insulators are generally not used for voltages beyond _____.
a) 1 kV
b) 11 Kv
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- 11) Out of the following which is conventional source of energy _____.
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- 13) A graphical representation between discharge and time is known as _____.
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b) Hectograph
c) Topograph
d) Monograph
- 14) In hydro power plants _____.
a) Initial cost is low and operating cost is high
b) Initial cost as well as operating costs are high
c) Initial cost is high and operating cost is low
d) Initial cost as well as operating cost is low

Seat No.	
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Set

R

S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM- I

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section- I

Q.2 Solve any four **16**

- a) Define the following terms;
- 1) Peak load
 - 2) load factor
 - 3) Diversity factor
 - 4) Plant utility factor
- b) Discuss factors governing the choice of site for Hydro power plant.
- c) With the help of neat sketch explain Gas turbine power plant.
- d) A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum
 Calculate:
- 1) the demand factor
 - 2) load factor
- e) Draw the layout of solar thermal power plant with neat diagram & explain the operation of main components.

Q.3 Solve any two **12**

- a) What is tariff? Explain different types of tariff.
- b) What is function of nuclear reactor? Explain different component in nuclear reactor.
- c) Describe with neat sketch schematic arrangement of thermal power station.

Section-II

Q.4 Solve any four **16**

- a) Differentiate between overhead and underground system.
- b) What are the methods of improving string efficiency?
- c) What are the properties of conductor used in transmission and distribution line? Describe about ACSR conductor.
- d) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- e) Each line of 3-ph system is suspended by a string of 3 identical insulator of self-capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of lowest insulator to 0.3C

Q.5 Solve any two

- a) State and explain kelvin's law to determine the economic size of transmission conductor.
- b) Derive equation for conductor material required in single phase 2-wire AC with midpoint earthed compare with 2 wire DC system.
- c) In five insulator disc string capacitance between each insulator unit and earth is $\frac{1}{6}$ of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency.

Seat No.	
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S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM- I

Day & Date: Saturday,14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In overhead lines for transmitting power we generally use: _____.
 a) Copper Conductors b) Aluminum Conductors
 c) ACSR conductors d) Galvanized Steel Conductors
- 2) Transmitted power remaining the same, if supply voltage of a D.C. 2-wire feeder is increased 100 percent, saving in copper is _____.
 a) 25 percent b) 50 percent
 c) 75 percent d) 100 percent
- 3) Which of the following material can be used as a moderator?
 a) Graphite b) Heavy water
 c) Beryllium d) Any of the above
- 4) Transmission and distribution of electric power by underground system is superior to overhead system in respect of _____.
 a) Appearance and public safety
 b) Maintenance cost
 c) Frequency of faults, power failure and accidents
 d) All of the above
- 5) Pin type insulators are generally not used for voltages beyond _____.
 a) 1 kV b) 11 Kv
 c) 22 kV d) 33 Kv
- 6) Out of the following which is conventional source of energy _____.
 a) Tidal power b) Geothermal energy
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 a) Less than one b) Equal to one
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- 8) A graphical representation between discharge and time is known as _____.
 a) Hydrograph b) Hectograph
 c) Topograph d) Monograph
- 9) In hydro power plants _____.
 a) Initial cost is low and operating cost is high
 b) Initial cost as well as operating costs are high
 c) Initial cost is high and operating cost is low
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Seat No.	
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Set **S**

S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM- I

Day & Date: Saturday, 14-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section- I

Q.2 Solve any four **16**

- a) Define the following terms;
 - 1) Peak load
 - 2) load factor
 - 3) Diversity factor
 - 4) Plant utility factor
- b) Discuss factors governing the choice of site for Hydro power plant.
- c) With the help of neat sketch explain Gas turbine power plant.
- d) A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum
 Calculate:
 - 1) the demand factor
 - 2) load factor
- e) Draw the layout of solar thermal power plant with neat diagram & explain the operation of main components.

Q.3 Solve any two **12**

- a) What is tariff? Explain different types of tariff.
- b) What is function of nuclear reactor? Explain different component in nuclear reactor.
- c) Describe with neat sketch schematic arrangement of thermal power station.

Section-II

Q.4 Solve any four **16**

- a) Differentiate between overhead and underground system.
- b) What are the methods of improving string efficiency?
- c) What are the properties of conductor used in transmission and distribution line? Describe about ACSR conductor.
- d) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- e) Each line of 3-ph system is suspended by a string of 3 identical insulator of self-capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of lowest insulator to 0.3C

Q.5 Solve any two

- a) State and explain kelvin's law to determine the economic size of transmission conductor.
- b) Derive equation for conductor material required in single phase 2-wire AC with midpoint earthed compare with 2 wire DC system.
- c) In five insulator disc string capacitance between each insulator unit and earth is $\frac{1}{6}$ of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency.

Seat No.	
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) A Transistor is said in quiescent condition when _____.
 - a) It is unbiased
 - b) No current flowing through it
 - c) No signal is given
 - d) None of these
- 2) The JFET is _____ device.
 - a) Bipolar
 - b) Unipolar
 - c) Unijunction
 - d) None of above
- 3) DC load line is nothing but _____.
 - a) collection of all possible 'Q' points
 - b) a line drawn on CE O/P characteristic
 - c) a line whose slope depend on R_C
 - d) all of the above
- 4) The parameter h_{je} is called _____ in CE.
 - a) Forward voltage gain
 - b) Forward current gain
 - c) Forward trans conductance
 - d) Forward power gain
- 5) High frequency response of transistorized amplifiers get affected by _____.
 - a) C_c
 - b) C_c & L_E
 - c) Junction Capacitance
 - d) C_E
- 6) In JFET operating above pinch-off voltage
 - a) Drain current remains practically constant
 - b) Drain current starts decreasing
 - c) Drain current increases rapidly
 - d) Depletion region becomes smaller
- 7) Which of following filter circuit is having ripple independent of load?
 - a) L
 - b) C
 - c) LC
 - d) CLC
- 8) The effect of negative feedback on gain is that it _____.
 - a) gain increased
 - b) Decreases
 - c) same
 - d) none of above
- 9) The IC 7915 is _____.
 - a) Transistor
 - b) MOSFET
 - c) Positive 15 V regulator
 - d) Negative 15 V regulator

Seat No.	
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Set **P**

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRONIC DEVICES AND CIRCUITS

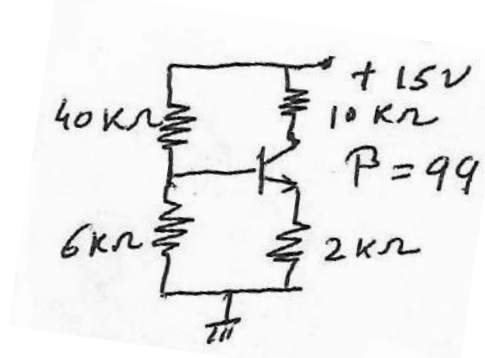
Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I

- Q.2 Solve any four.** **16**
- Draw and explain AC & DC equivalent circuit of CE amplifier.
 - Explain on which factors frequency response of amplifier depends.
 - How the h parameters is determined using graphical method.
 - Differentiate between depletion & enhancement type MOSFET.
 - Explain any one compensation techniques for I_{c_0} .
- Q.3 Solve any two.** **12**
- Determine Q point and 'S' for following circuit.



- Derive the A_v, A_i, R_o, R_i in h - parameters for CE amplifier.
- What do you understand by Biasing? Why different Biasing circuits are employed? How do you determine the best biasing circuit?

Section – II

- Q.4 Solve any four.** **16**
- Compare L, C, Π , LC filter?
 - Compare fixed & variable voltage regulator IC
 - Discuss Advantage & Disadvantage of Negative feedback
 - Differentiate Low signal & larger signal amplifier
 - Draw UJT construction & characteristic
- Q.5 Solve any two.** **12**
- Compare voltage series, current series, current shunt feedback circuits.
 - Determine efficiency of class 'A' power Amplifier & class 'B' power amplifier.
 - Explain various sinusoidal & non sinusoidal oscillators with circuit and waveforms.

- 11) The parameter h_{je} is called _____ in CE.
- a) Forward voltage gain b) Forward current gain
c) Forward trans conductance d) Forward power gain
- 12) High frequency response of transistorized amplifiers get affected by _____.
- a) C_c b) C_c & L_E
c) Junction Capacitance d) C_E
- 13) In JFET operating above pinch- off voltage
- a) Drain current remains practically constant
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c) Drain current increases rapidly
d) Depletion region becomes smaller
- 14) Which of following filter circuit is having ripple independent of load?
- a) L b) C
c) LC d) CLC

Seat
No.

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRONIC DEVICES AND CIRCUITS

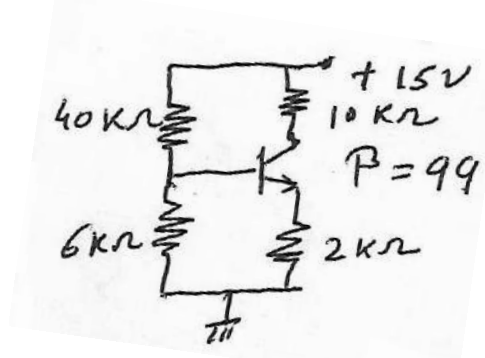
Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Section – I

- Q.2 Solve any four.** **16**
- Draw and explain AC & DC equivalent circuit of CE amplifier.
 - Explain on which factors frequency response of amplifier depends.
 - How the h parameters is determined using graphical method.
 - Differentiate between depletion & enhancement type MOSFET.
 - Explain any one compensation techniques for I_{c_0} .
- Q.3 Solve any two.** **12**
- Determine Q point and 'S' for following circuit.



- Derive the A_v, A_i, R_o, R_i in h - parameters for CE amplifier.
- What do you understand by Biasing? Why different Biasing circuits are employed? How do you determine the best biasing circuit?

Section – II

- Q.4 Solve any four.** **16**
- Compare L, C, Π , LC filter?
 - Compare fixed & variable voltage regulator IC
 - Discuss Advantage & Disadvantage of Negative feedback
 - Differentiate Low signal & larger signal amplifier
 - Draw UJT construction & characteristic
- Q.5 Solve any two.** **12**
- Compare voltage series, current series, current shunt feedback circuits.
 - Determine efficiency of class 'A' power Amplifier & class 'B' power amplifier.
 - Explain various sinusoidal & non sinusoidal oscillators with circuit and waveforms.

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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRONIC DEVICES AND CIRCUITS

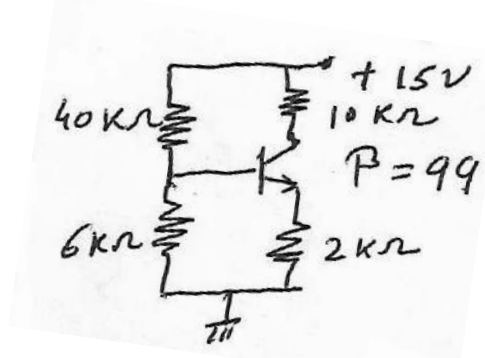
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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 2) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) The transformer coupled class A power amplifier has a efficiency of _____.
 a) 25% b) 50%
 c) 78.5% d) 90%
- 2) Cross over distortions occurs in _____.
 a) Class A b) Class B
 c) Class AB d) Class C
- 3) For sustained oscillation in an oscillator loop gain should be _____.
 a) zero b) less than unity
 c) greater than unity d) infinite
- 4) A transistor Hartley oscillator uses _____.
 a) Resistive feedback b) Inductive feedback
 c) Capacitive feedback d) None of the above
- 5) UJT relaxation is a _____ oscillator.
 a) Sinusoidal b) Square
 c) Non sinusoidal d) None of above
- 6) A Transistor is said in quiescent condition when _____.
 a) It is unbiased b) No current flowing through it
 c) No signal is given d) None of these
- 7) The JFET is _____ device.
 a) Bipolar b) Unipolar
 c) Unijunction d) None of above
- 8) DC load line is nothing but _____.
 a) collection of all possible 'Q' points
 b) a line drawn on CE O/P characteristic
 c) a line whose slope depend on R_C
 d) all of the above
- 9) The parameter h_{je} is called _____ in CE.
 a) Forward voltage gain b) Forward current gain
 c) Forward trans conductance d) Forward power gain
- 10) High frequency response of transistorized amplifiers get affected by _____.
 a) C_c b) C_c & L_E
 c) Junction Capacitance d) C_E

- 11) In JFET operating above pinch- off voltage
- a) Drain current remains practically constant
 - b) Drain current starts decreasing
 - c) Drain current increases rapidly
 - d) Depletion region becomes smaller
- 12) Which of following filter circuit is having ripple independent of load?
- a) L
 - b) C
 - c) LC
 - d) CLC
- 13) The effect of negative feedback on gain is that it _____.
- a) gain increased
 - b) Decreases
 - c) same
 - d) none of above
- 14) The IC 7915 is _____.
- a) Transistor
 - b) MOSFET
 - c) Positive 15 V regulator
 - d) Negative 15 V regulator

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S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRONIC DEVICES AND CIRCUITS

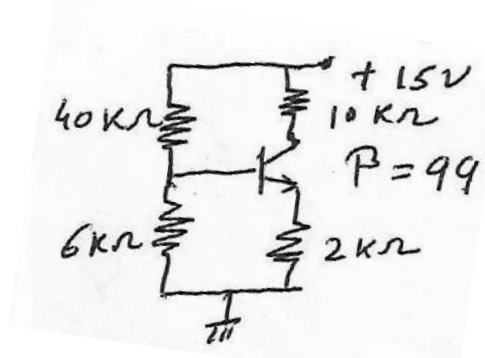
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**F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II**

Day & Date: Monday, 16-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Make suitable assumptions, if necessary.
2) Figures to the right indicate full marks.

Constants: 1) Avogadro's no., $N = 6.02 \times 10^{26}/\text{k.mol}$
2) Velocity of light, $c = 3 \times 10^8 \text{ m/sec.}$
3) Charge of electron, $e = 1.6 \times 10^{-19} \text{ C.}$

Section – I

Q.2 Attempt any six of the following :

18

- Explain effect of impurity on Fermi level in case of N type semiconductor.
- Explain classification of solids.
- Define co-ordination number. Obtain co- ordination number for SC and FCC.
- Define atomic packing factor. Calculate packing factor for BCC and FCC.
- Define the terms:
 - Reverberation
 - Reverberation Time
 - Absorption coefficient
- Deduce Einstein's expression for mass-energy equivalence.
- A movie theater has a total volume of $40 \times 20 \times 10 \text{ m}^3$. The acoustics of the theater needs to be designed to give reverberation time of 2 s. Calculate:
 - Total absorption
 - Average absorption within the theater
- A rod has length 100 cm. When the rod is in a satellite moving with a velocity that is one half of the velocity of light relative to laboratory. What is the length of the rod as determined by an observer?
 - in the satellite
 - in the laboratory

Q.3 Attempt any two of the following:

10

- In a Hall experiment, a current of 0.25 A is sent through a metal strip having thickness 0.2mm and width 5 mm. The Hall voltage is found to be 0.15 mV when a magnetic field of 0.2 Tesla is used. Given conductivity of metal is $\sigma = 5.8 \times 10^7/\text{ohm.m}$
Calculate:
 - Hall coefficient
 - Carrier concentration
 - Mobility of charge carrier
- Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
- State and explain the factors affecting the architectural acoustics and their remedies.
- Derive the expression for Lorentz transformation equations & its inverse.

Section – II

- Q.4 Attempt any six of the following :** **18**
- a) Explain positive and negative crystals.
 - b) Write different properties of lasers.
 - c) Give applications of LASER in different fields.
 - d) Write advantages of optical fiber cables.
 - e) Explain De Broglie wavelength of matter waves and also express it in terms of kinetic energy.
 - f) Explain classification of carbon nano tubes.
 - g) Find the De Broglies Wavelength of a 0.5 kg object moving with a speed of 2 m/s. Given $h = 6.634 \times 10^{-34}$ J.s.
 - h) Calculate the rotation produced by plane of polarization, if specific rotation is 66° . Length of tube is 200 mm & concentration of sugar solution is 20%.
- Q.5 Attempt any two of the following :** **10**
- a) With neat diagram explain construction and working of Laurent's half shade.
 - b) Describe He-Ne laser with its construction and working.
 - c) A fiber cable has an acceptance angle of 30° and a core index of refraction 1.4. calculate:
 - 1) the refractive index of the cladding
 - 2) Numerical aperture
 - 3) Fractional refractive index change
 - d) Explain in detail Davisson Germer experiment.

Seat No.	
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**F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II**

Day & Date: Monday, 16-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Make suitable assumptions, if necessary.
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Constants: 1) Avogadro's no., $N = 6.02 \times 10^{26}/\text{k.mol}$
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- a) In a Hall experiment, a current of 0.25 A is sent through a metal strip having thickness 0.2mm and width 5 mm. The Hall voltage is found to be 0.15 mV when a magnetic field of 0.2 Tesla is used. Given conductivity of metal is $\sigma = 5.8 \times 10^7/\text{ohm.m}$
Calculate:
 - 1) Hall coefficient
 - 2) Carrier concentration
 - 3) Mobility of charge carrier
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
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- d) Derive the expression for Lorentz transformation equations & its inverse.

Section – II

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 - 3) Fractional refractive index change
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Seat
No.

**F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II**

Day & Date: Monday, 16-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book.

2) Figures to the right indicate full marks.

3) Make suitable assumptions, if necessary.

Constants: 1) Avogadro's no., $N = 6.02 \times 10^{26} / \text{k.mol}$

2) Velocity of light, $c = 3 \times 10^8 \text{ m/sec.}$

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) The sound waves with frequency less than 20 Hz are called _____.
 - a) Audible waves
 - b) Infrasonic waves
 - c) Ultrasonic waves
 - d) Above all
- 2) Time dilation equation is given by _____.
 - a) $t = t_0 / \sqrt{1 - v^2/c^2}$
 - b) $t = t_0 / \sqrt{1 + v^2/c^2}$
 - c) $t = t_0 / (1 - v^2/c^2)$
 - d) $t = t_0 / \sqrt{1 - c^2/v^2}$
- 3) The Einstein's mass energy relation is given by, _____.
 - a) $M = Ec^2$
 - b) $C = mE^2$
 - c) $E = mc^2$
 - d) $E = mc^2$
- 4) The grating constant is given by the equation _____.
 - a) No. of lines per cm
 - b) No. of lines per inch
 - c) $2.54 / \text{no. of lines per cm}$
 - d) $1 / \text{no. of lines per cm}$
- 5) For negative crystal _____.
 - a) $\mu_o > \mu_e$
 - b) $\mu_o = \mu_e$
 - c) $\mu_o < \mu_e$
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- 6) Stimulated emission process is represented by equation _____.
 - a) $A + h\gamma \rightarrow A^*$
 - b) $A^* + h\gamma \rightarrow A + 2h\gamma$
 - c) $A^* \rightarrow A + h\gamma$
 - d) $A^* + h\gamma \rightarrow A + h\gamma$
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 - a) electrical discharge
 - b) Lasing action
 - c) Pumping
 - d) Depumping
- 8) In graded index optical fibre the refractive index of core is _____.
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 - b) Increase towards the axis of core
 - c) Less than cladding refractive index
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a) $\sin^{-1}(n_1^2 - n_2^2)$ b) $\sin^{-1}(n_1^2 + n_2^2)$
c) $\sin^{-1}\sqrt{(n_1^2 - n_2^2)}$ d) $\sin(n_1^2 - n_2^2)$
- 10) The chirality of helical CNT is _____.
a) (a, b) b) (a, a)
c) (a, 0) d) (0, b)
- 11) The band gap energy of Si is approximately _____.
a) 0.3 eV b) 0.2 eV
c) 1.1 eV d) 1.3 eV
- 12) The packing density of a BCC structure is _____.
a) $\pi/6$ b) $\sqrt{3}\pi/8$
c) $\sqrt{2}\pi/6$ d) $8/\sqrt{3}\pi$
- 13) The relation between inter planner spacing (d) and edge length (a) is given as _____.
a) $d = a / (\sqrt{h^2 + k^2 + l^2})$ b) $a = d / (\sqrt{h^2 + k^2 + l^2})$
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- 14) Optimum reverberation time for speech is _____.
a) 0.5 to 1 second b) 0 to 1 second
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F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II

Day & Date: Monday, 16-12-2019
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**F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II**

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Time: 10:00 AM To 01:00 PM

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**F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019
ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II**

Day & Date: Monday, 16-12-2019
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 - 1) Total absorption
 - 2) Average absorption within the theater
- h) A rod has length 100 cm. When the rod is in a satellite moving with a velocity that is one half of the velocity of light relative to laboratory. What is the length of the rod as determined by an observer?
 - 1) in the satellite
 - 2) in the laboratory

Q.3 Attempt any two of the following:

10

- a) In a Hall experiment, a current of 0.25 A is sent through a metal strip having thickness 0.2mm and width 5 mm. The Hall voltage is found to be 0.15 mV when a magnetic field of 0.2 Tesla is used. Given conductivity of metal is $\sigma = 5.8 \times 10^7/\text{ohm.m}$
Calculate:
 - 1) Hall coefficient
 - 2) Carrier concentration
 - 3) Mobility of charge carrier
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
- c) State and explain the factors affecting the architectural acoustics and their remedies.
- d) Derive the expression for Lorentz transformation equations & its inverse.

Section – II

- Q.4 Attempt any six of the following :** **18**
- a) Explain positive and negative crystals.
 - b) Write different properties of lasers.
 - c) Give applications of LASER in different fields.
 - d) Write advantages of optical fiber cables.
 - e) Explain De Broglie wavelength of matter waves and also express it in terms of kinetic energy.
 - f) Explain classification of carbon nano tubes.
 - g) Find the De Broglies Wavelength of a 0.5 kg object moving with a speed of 2 m/s. Given $h = 6.634 \times 10^{-34}$ J.s.
 - h) Calculate the rotation produced by plane of polarization, if specific rotation is 66° . Length of tube is 200 mm & concentration of sugar solution is 20%.
- Q.5 Attempt any two of the following :** **10**
- a) With neat diagram explain construction and working of Laurent's half shade.
 - b) Describe He-Ne laser with its construction and working.
 - c) A fiber cable has an acceptance angle of 30° and a core index of refraction 1.4. calculate:
 - 1) the refractive index of the cladding
 - 2) Numerical aperture
 - 3) Fractional refractive index change
 - d) Explain in detail Davisson Germer experiment.

Seat No.	
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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Day & Date: Wednesday, 18-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) For corrosion of iron to take place _____.
 - a) Presence of moisture is sufficient
 - b) Presence of both moisture and Oxygen is essential
 - c) Hydrogen is required
 - d) Strong acid is necessary
- 2) When a buried pipeline is protected from corrosion by connecting to magnesium block it is called _____.
 - a) Unsuppressed voltage protection
 - b) Sacrificial anodic protection
 - c) Sacrificial cathodic protection
 - d) None of these
- 3) A lubricant is used primarily to prevent _____.
 - a) Corrosion of meta
 - b) Oxidation of metal
 - c) wearing out of metallic surface
 - d) reduction of metals
- 4) Lubricant used in a machine working at low temperature should possess _____.

a) high pour point	b) low flash point
c) high cloud point	d) low pour point
- 5) Hard water may be softened by passing it through _____.

a) sodium silicate	b) ion-exchange resin
c) cologulants	d) rock salt
- 6) pH of natural water is _____.

a) 0	b) 14
c) 7	d) 10-7
- 7) When two molecules combine to form one product molecule, it is called _____.

a) addition reaction	b) substitution reaction
c) elimination reaction	d) rearrangement reaction

- 8) Carbon in cast iron _____.
a) increases its hardness b) decreases its hardness
c) imparts softness d) decreases fluidity
- 9) Annealing of glass is _____.
a) cooling glass articles rapidly
b) passing molten glass between rollers
c) allowing glass articles to cool gradually
d) plunging glass articles suddenly into water
- 10) A good fuel should possess _____.
a) low calorific value b) high ignition temperature
c) high calorific value d) high ash content
- 11) In bomb calorimeter the ignition of fuel is made with the help of _____.
a) Cu fuse wire b) Mg fuse wire
c) Al fuse wire d) Zn fuse wire
- 12) Structural units of high polymers, are called _____.
a) fibres b) thermo units
c) monomers d) Fabrics
- 13) A plastic which can be softened on heating and hardened on cooling is called _____.
a) thermo-elastic b) thermosoftening plastic
c) thermosetting d) Thermite
- 14) The technique by which a mixture is separated into its constituents by a moving gas phase passing over a stationary adsorbent, is called _____.
a) column chromatography b) gas chromatography
c) spectroscopy d) ion-exchange chromatography

Seat No.	
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Set **P**

**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Day & Date: Wednesday, 18-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram whenever necessary.

Section-I

Q.2 Attempt any Four

16

- a) A sample of water on analysis was found to contain the following impurities in mg/lit, Calculate temporary, permanent and total hardness of water in mg/lit.

Impurities	Amount	Mol. Wt.
Ca(HCO ₃) ₂	75	162
Mg(HCO ₃) ₂	34	146
CaSO ₄	22	136
MgSO ₄	13	120

- b) Explain Ion Exchange process for softening the hard water.
c) Explain with examples the addition and substitution type of reactions.
d) Define Lubricant. Explain the solid lubricant.
e) Describe the mechanism of oxidation corrosion.
f) Explain the factors influencing the rate of corrosion.

Q.3 Attempt any Four.

12

- a) Define
1) Alkalinity
2) BOD
3) Dissolved oxygen
b) Explain the disinfection of water by Chlorine.
c) Explain the synthesis of Ibuprofen.
d) Numerical Saponification value 11.4 grams of oil after saponification with 50 ml of N/2 alkaline KOH solution and on subsequent titration with N/2 HCl gave a titre value of 16 ml to the phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave titre value 50 ml. Calculate the saponification value the oil. (Mol. wt. of KOH =56)
e) Define
1) Viscosity
2) Viscosity index
3) Flash point & Fire point
f) Explain the prevention of corrosion by -Metal cladding.

Section-II

Q.4 Attempt any Four

16

- a) Define alloy. Explain purpose of alloying.
- b) A sample of coal containing 5% H, when tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained.

Weight of coal burnt	= 0.8 g
Weight of water taken	= 2000 g
Water equivalent of bomb and calorimeter	= 600 g
Rise in temperature	= 2.38 ⁰ C
Cooling correction	= 0.04 ⁰ C
Fuse wire correction	= 10 cal.
Acid correction	= 50 cal

Calculate the gross and net calorific value of the coal in cal/ g. (Take latent heat of condensation of steam = 587 cal/g)

- c) Explain construction and working of Boy's calorimeter.
- d) What is rubber? Explain isolation and processing of natural rubber.
- e) Explain extrusion and injection molding of plastics into articles.
- f) Explain construction and working of Gas liquid chromatography.

Q.5 Attempt any Four

12

- a) Explain any three types of glass.
- b) Define Ceramics. Explain properties of ceramics.
- c) Define fuel. Explain classification of fuel.
- d) Explain composition and classification of petroleum.
- e) Calculate Molecular weight of polyvinyl chloride having degree of polymerization 300. (Mol. Wt. of vinyl chloride = 62.5)
- f) What weight of Na₂CO₃ is required to prepare 0.3 N 400 ml solution and 0.2 M 500 ml solution. (Mol. Wt. of Na₂CO₃ = 106)

Seat No.	
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Set **Q**

**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Day & Date: Wednesday, 18-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) Carbon in cast iron _____.
 - a) increases its hardness
 - b) decreases its hardness
 - c) imparts softness
 - d) decreases fluidity
- 2) Annealing of glass is _____.
 - a) cooling glass articles rapidly
 - b) passing molten glass between rollers
 - c) allowing glass articles to cool gradually
 - d) plunging glass articles suddenly into water
- 3) A good fuel should possess _____.
 - a) low calorific value
 - b) high ignition temperature
 - c) high calorific value
 - d) high ash content
- 4) In bomb calorimeter the ignition of fuel is made with the help of _____.
 - a) Cu fuse wire
 - b) Mg fuse wire
 - c) Al fuse wire
 - d) Zn fuse wire
- 5) Structural units of high polymers, are called _____.
 - a) fibres
 - b) thermo units
 - c) monomers
 - d) Fabrics
- 6) A plastic which can be softened on heating and hardened on cooling is called _____.
 - a) thermo-elastic
 - b) thermosoftening plastic
 - c) thermosetting
 - d) Thermite
- 7) The technique by which a mixture is separated into its constituents by a moving gas phase passing over a stationary adsorbent, is called _____.
 - a) column chromatography
 - b) gas chromatography
 - c) spectroscopy
 - d) ion-exchange chromatography
- 8) For corrosion of iron to take place _____.
 - a) Presence of moisture is sufficient
 - b) Presence of both moisture and Oxygen is essential
 - c) Hydrogen is required
 - d) Strong acid is necessary

- 9) When a buried pipeline is protected from corrosion by connecting to magnesium block it is called _____.
- a) Unsuppressed voltage protection
 - b) Sacrificial anodic protection
 - c) Sacrificial cathodic protection
 - d) None of these
- 10) A lubricant is used primarily to prevent _____.
- a) Corrosion of meta
 - b) Oxidation of metal
 - c) wearing out of metallic surface
 - d) reduction of metals
- 11) Lubricant used in a machine working at low temperature should possess _____.
- a) high pour point
 - b) low flash point
 - c) high cloud point
 - d) low pour point
- 12) Hard water may be softened by passing it through _____.
- a) sodium silicate
 - b) ion-exchange resin
 - c) cologulants
 - d) rock salt
- 13) pH of natural water is _____.
- a) 0
 - b) 14
 - c) 7
 - d) 10-7
- 14) When two molecules combine to form one product molecule, it is called _____.
- a) addition reaction
 - b) substitution reaction
 - c) elimination reaction
 - d) rearrangement reaction

Seat No.	
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Set Q

**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Day & Date: Wednesday, 18-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram whenever necessary.

Section-I

Q.2 Attempt any Four

16

- a) A sample of water on analysis was found to contain the following impurities in mg/lit, Calculate temporary, permanent and total hardness of water in mg/lit.

Impurities	Amount	Mol. Wt.
Ca(HCO ₃) ₂	75	162
Mg(HCO ₃) ₂	34	146
CaSO ₄	22	136
MgSO ₄	13	120

- b) Explain Ion Exchange process for softening the hard water.
c) Explain with examples the addition and substitution type of reactions.
d) Define Lubricant. Explain the solid lubricant.
e) Describe the mechanism of oxidation corrosion.
f) Explain the factors influencing the rate of corrosion.

Q.3 Attempt any Four.

12

- a) Define
1) Alkalinity
2) BOD
3) Dissolved oxygen
b) Explain the disinfection of water by Chlorine.
c) Explain the synthesis of Ibuprofen.
d) Numerical Saponification value 11.4 grams of oil after saponification with 50 ml of N/2 alkaline KOH solution and on subsequent titration with N/2 HCl gave a titre value of 16 ml to the phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave titre value 50 ml. Calculate the saponification value the oil. (Mol. wt. of KOH =56)
e) Define
1) Viscosity
2) Viscosity index
3) Flash point & Fire point
f) Explain the prevention of corrosion by -Metal cladding.

Section-II

Q.4 Attempt any Four

16

- a) Define alloy. Explain purpose of alloying.
- b) A sample of coal containing 5% H, when tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained.

Weight of coal burnt	= 0.8 g
Weight of water taken	= 2000 g
Water equivalent of bomb and calorimeter	= 600 g
Rise in temperature	= 2.38°C
Cooling correction	= 0.04°C
Fuse wire correction	= 10 cal.
Acid correction	= 50 cal

Calculate the gross and net calorific value of the coal in cal/ g. (Take latent heat of condensation of steam = 587 cal/g)

- c) Explain construction and working of Boy's calorimeter.
- d) What is rubber? Explain isolation and processing of natural rubber.
- e) Explain extrusion and injection molding of plastics into articles.
- f) Explain construction and working of Gas liquid chromatography.

Q.5 Attempt any Four

12

- a) Explain any three types of glass.
- b) Define Ceramics. Explain properties of ceramics.
- c) Define fuel. Explain classification of fuel.
- d) Explain composition and classification of petroleum.
- e) Calculate Molecular weight of polyvinyl chloride having degree of polymerization 300. (Mol. Wt. of vinyl chloride = 62.5)
- f) What weight of Na_2CO_3 is required to prepare 0.3 N 400 ml solution and 0.2 M 500 ml solution. (Mol. Wt. of Na_2CO_3 = 106)

Seat No.	
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Set R

**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Day & Date: Wednesday, 18-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

- 1) Hard water may be softened by passing it through _____.
 - a) sodium silicate
 - b) ion-exchange resin
 - c) cologulants
 - d) rock salt
- 2) pH of natural water is _____.
 - a) 0
 - b) 14
 - c) 7
 - d) 10-7
- 3) When two molecules combine to form one product molecule, it is called _____.
 - a) addition reaction
 - b) substitution reaction
 - c) elimination reaction
 - d) rearrangement reaction
- 4) Carbon in cast iron _____.
 - a) increases its hardness
 - b) decreases its hardness
 - c) imparts softness
 - d) decreases fluidity
- 5) Annealing of glass is _____.
 - a) cooling glass articles rapidly
 - b) passing molten glass between rollers
 - c) allowing glass articles to cool gradually
 - d) plunging glass articles suddenly into water
- 6) A good fuel should possess _____.
 - a) low calorific value
 - b) high ignition temperature
 - c) high calorific value
 - d) high ash content
- 7) In bomb calorimeter the ignition of fuel is made with the help of _____.
 - a) Cu fuse wire
 - b) Mg fuse wire
 - c) Al fuse wire
 - d) Zn fuse wire
- 8) Structural units of high polymers, are called _____.
 - a) fibres
 - b) thermo units
 - c) monomers
 - d) Fabrics
- 9) A plastic which can be softened on heating and hardened on cooling is called _____.
 - a) thermo-elastic
 - b) thermosoftening plastic
 - c) thermosetting
 - d) Thermite

- 10) The technique by which a mixture is separated into its constituents by a moving gas phase passing over a stationary adsorbent, is called _____.
- a) column chromatography
 - b) gas chromatography
 - c) spectroscopy
 - d) ion-exchange chromatography
- 11) For corrosion of iron to take place _____.
- a) Presence of moisture is sufficient
 - b) Presence of both moisture and Oxygen is essential
 - c) Hydrogen is required
 - d) Strong acid is necessary
- 12) When a buried pipeline is protected from corrosion by connecting to magnesium block it is called _____.
- a) Unsuppressed voltage protection
 - b) Sacrificial anodic protection
 - c) Sacrificial cathodic protection
 - d) None of these
- 13) A lubricant is used primarily to prevent _____.
- a) Corrosion of meta
 - b) Oxidation of metal
 - c) wearing out of metallic surface
 - d) reduction of metals
- 14) Lubricant used in a machine working at low temperature should possess _____.
- a) high pour point
 - b) low flash point
 - c) high cloud point
 - d) low pour point

Seat No.	
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Set **R**

**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Day & Date: Wednesday, 18-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram whenever necessary.

Section-I

Q.2 Attempt any Four

16

- a) A sample of water on analysis was found to contain the following impurities in mg/lit, Calculate temporary, permanent and total hardness of water in mg/lit.

Impurities	Amount	Mol. Wt.
Ca(HCO ₃) ₂	75	162
Mg(HCO ₃) ₂	34	146
CaSO ₄	22	136
MgSO ₄	13	120

- b) Explain Ion Exchange process for softening the hard water.
c) Explain with examples the addition and substitution type of reactions.
d) Define Lubricant. Explain the solid lubricant.
e) Describe the mechanism of oxidation corrosion.
f) Explain the factors influencing the rate of corrosion.

Q.3 Attempt any Four.

12

- a) Define
1) Alkalinity
2) BOD
3) Dissolved oxygen
b) Explain the disinfection of water by Chlorine.
c) Explain the synthesis of Ibuprofen.
d) Numerical Saponification value 11.4 grams of oil after saponification with 50 ml of N/2 alkaline KOH solution and on subsequent titration with N/2 HCl gave a titre value of 16 ml to the phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave titre value 50 ml. Calculate the saponification value the oil. (Mol. wt. of KOH =56)
e) Define
1) Viscosity
2) Viscosity index
3) Flash point & Fire point
f) Explain the prevention of corrosion by -Metal cladding.

Section-II

Q.4 Attempt any Four

16

- a) Define alloy. Explain purpose of alloying.
- b) A sample of coal containing 5% H, when tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained.

Weight of coal burnt	= 0.8 g
Weight of water taken	= 2000 g
Water equivalent of bomb and calorimeter	= 600 g
Rise in temperature	= 2.38 ⁰ C
Cooling correction	= 0.04 ⁰ C
Fuse wire correction	= 10 cal.
Acid correction	= 50 cal

Calculate the gross and net calorific value of the coal in cal/ g. (Take latent heat of condensation of steam = 587 cal/g)

- c) Explain construction and working of Boy's calorimeter.
- d) What is rubber? Explain isolation and processing of natural rubber.
- e) Explain extrusion and injection molding of plastics into articles.
- f) Explain construction and working of Gas liquid chromatography.

Q.5 Attempt any Four

12

- a) Explain any three types of glass.
- b) Define Ceramics. Explain properties of ceramics.
- c) Define fuel. Explain classification of fuel.
- d) Explain composition and classification of petroleum.
- e) Calculate Molecular weight of polyvinyl chloride having degree of polymerization 300. (Mol. Wt. of vinyl chloride = 62.5)
- f) What weight of Na₂CO₃ is required to prepare 0.3 N 400 ml solution and 0.2 M 500 ml solution. (Mol. Wt. of Na₂CO₃ = 106)

Seat No.	
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**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Day & Date: Wednesday, 18-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram whenever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options.

14

- 1) A good fuel should possess _____.
a) low calorific value b) high ignition temperature
c) high calorific value d) high ash content
- 2) In bomb calorimeter the ignition of fuel is made with the help of _____.
a) Cu fuse wire b) Mg fuse wire
c) Al fuse wire d) Zn fuse wire
- 3) Structural units of high polymers, are called _____.
a) fibres b) thermo units
c) monomers d) Fabrics
- 4) A plastic which can be softened on heating and hardened on cooling is called _____.
a) thermo-elastic b) thermosoftening plastic
c) thermosetting d) Thermite
- 5) The technique by which a mixture is separated into its constituents by a moving gas phase passing over a stationary adsorbent, is called _____.
a) column chromatography b) gas chromatography
c) spectroscopy d) ion-exchange chromatography
- 6) For corrosion of iron to take place _____.
a) Presence of moisture is sufficient
b) Presence of both moisture and Oxygen is essential
c) Hydrogen is required
d) Strong acid is necessary
- 7) When a buried pipeline is protected from corrosion by connecting to magnesium block it is called _____.
a) Unsuppressed voltage protection
b) Sacrificial anodic protection
c) Sacrificial cathodic protection
d) None of these
- 8) A lubricant is used primarily to prevent _____.
a) Corrosion of meta
b) Oxidation of metal
c) wearing out of metallic surface
d) reduction of metals

- 9) Lubricant used in a machine working at low temperature should possess _____.
- a) high pour point
 - b) low flash point
 - c) high cloud point
 - d) low pour point
- 10) Hard water may be softened by passing it through _____.
- a) sodium silicate
 - b) ion-exchange resin
 - c) cologulants
 - d) rock salt
- 11) pH of natural water is _____.
- a) 0
 - b) 14
 - c) 7
 - d) 10-7
- 12) When two molecules combine to form one product molecule, it is called _____.
- a) addition reaction
 - b) substitution reaction
 - c) elimination reaction
 - d) rearrangement reaction
- 13) Carbon in cast iron _____.
- a) increases its hardness
 - b) decreases its hardness
 - c) imparts softness
 - d) decreases fluidity
- 14) Annealing of glass is _____.
- a) cooling glass articles rapidly
 - b) passing molten glass between rollers
 - c) allowing glass articles to cool gradually
 - d) plunging glass articles suddenly into water

Seat No.	
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Set **S**

**F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Day & Date: Wednesday, 18-12-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat and labeled diagram whenever necessary.

Section-I

Q.2 Attempt any Four

16

- a) A sample of water on analysis was found to contain the following impurities in mg/lit, Calculate temporary, permanent and total hardness of water in mg/lit.

Impurities	Amount	Mol. Wt.
Ca(HCO ₃) ₂	75	162
Mg(HCO ₃) ₂	34	146
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MgSO ₄	13	120

- b) Explain Ion Exchange process for softening the hard water.
c) Explain with examples the addition and substitution type of reactions.
d) Define Lubricant. Explain the solid lubricant.
e) Describe the mechanism of oxidation corrosion.
f) Explain the factors influencing the rate of corrosion.

Q.3 Attempt any Four.

12

- a) Define
1) Alkalinity
2) BOD
3) Dissolved oxygen
b) Explain the disinfection of water by Chlorine.
c) Explain the synthesis of Ibuprofen.
d) Numerical Saponification value 11.4 grams of oil after saponification with 50 ml of N/2 alkaline KOH solution and on subsequent titration with N/2 HCl gave a titre value of 16 ml to the phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave titre value 50 ml. Calculate the saponification value the oil. (Mol. wt. of KOH =56)
e) Define
1) Viscosity
2) Viscosity index
3) Flash point & Fire point
f) Explain the prevention of corrosion by -Metal cladding.

Section-II

Q.4 Attempt any Four

16

- a) Define alloy. Explain purpose of alloying.
- b) A sample of coal containing 5% H, when tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained.

Weight of coal burnt	= 0.8 g
Weight of water taken	= 2000 g
Water equivalent of bomb and calorimeter	= 600 g
Rise in temperature	= 2.38 ⁰ C
Cooling correction	= 0.04 ⁰ C
Fuse wire correction	= 10 cal.
Acid correction	= 50 cal

Calculate the gross and net calorific value of the coal in cal/ g. (Take latent heat of condensation of steam = 587 cal/g)

- c) Explain construction and working of Boy's calorimeter.
- d) What is rubber? Explain isolation and processing of natural rubber.
- e) Explain extrusion and injection molding of plastics into articles.
- f) Explain construction and working of Gas liquid chromatography.

Q.5 Attempt any Four

12

- a) Explain any three types of glass.
- b) Define Ceramics. Explain properties of ceramics.
- c) Define fuel. Explain classification of fuel.
- d) Explain composition and classification of petroleum.
- e) Calculate Molecular weight of polyvinyl chloride having degree of polymerization 300. (Mol. Wt. of vinyl chloride = 62.5)
- f) What weight of Na₂CO₃ is required to prepare 0.3 N 400 ml solution and 0.2 M 500 ml solution. (Mol. Wt. of Na₂CO₃ = 106)

Seat
No.

**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – II**

Day & Date: Friday, 22-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence.

14

- 1) The differential equation $\frac{dy}{dx} = \frac{a_1x+b_1y+c_1}{a_2x+b_2y+c_2}$ will be exact if _____.
 - a) $b_2 = -a_1$
 - b) $a_2 = -b_1$
 - c) $b_1 = a_2$
 - d) $a_1 = b_2$
- 2) Solution of $\frac{dy}{dx} = -\frac{x}{y}$ at $x = 1$ and $y = \sqrt{3}$ is _____.
 - a) $x - y^2 = 2$
 - b) $x + y^2 = 4$
 - c) $x^2 - y^2 = 2$
 - d) $x^2 + y^2 = 4$
- 3) The factorial series $\sum \frac{1}{n!}$ is _____.
 - a) Convergent
 - b) Divergent
 - c) Oscillatory
 - d) Absolutely convergent
- 4) The series $1^2 + 2^2 + 3^2 + \dots$ is _____.
 - a) Convergent
 - b) Divergent
 - c) Oscillatory
 - d) Absolutely convergent
- 5) If $x = \cos \theta + i \sin \theta$ then $x^5 - \frac{1}{x^5} =$ _____.
 - a) $2 \cos 5\theta$
 - b) $2i \cos 5\theta$
 - c) $2 \sin 5\theta$
 - d) $2i \sin 5\theta$
- 6) $\cos(x + iy) =$ _____.
 - a) $\cos x \cos y + \sin x \sin y$
 - b) $\cos x \cos hy + i \sin x \sin hy$
 - c) $\cos x \cos hy - i \sin x \sin hy$
 - d) $\cos hx \sin hy - i \sin hx \sin hy$
- 7) The sufficient conditions for $f(z)$ to be analytic is _____.
 - a) $u_x = -v_x, u_y = v_y$
 - b) $u_x = v_y, u_y = -v_x$
 - c) $u_x = v_y, u_y = v_x$
 - d) $u_x = -v_y, u_y = v_x$
- 8) The value of $B(1, n) + B(m, 1)$ is _____.
 - a) $\frac{m+n}{mn}$
 - b) $\frac{m-n}{mn}$
 - c) $\frac{m-n}{mn}$
 - d) $\frac{m+n}{mn}$

- 9) Which of the following is not true?
- a) $\sqrt{\frac{1}{2}} = \sqrt{\pi}$ b) $\sqrt{\frac{1}{4}} \sqrt{\frac{3}{4}} = \sqrt{2\pi}$
- c) $\sqrt{n+1} = n\sqrt{n}$ d) $\sqrt{-2} = \infty$
- 10) For the curve $r = a \sin 3\theta$ the equations of tangents at the pole are ____.
- a) $\theta = \frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}, \dots$ b) $\theta = \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}, \dots$
- c) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \dots$ d) $\theta = 0, \pi, 3\pi, \dots$
- 11) The curve $y = x(x^2 - 1)$ is symmetrical ____.
- a) About x-axis b) About y-axis
- c) About the line $y = x$ d) In opposite quadrants
- 12) Changing the order of the integration in the double integral
- $$I = \int_0^8 \int_{x/4}^2 f(x, y) dy dx \quad \text{leads to} \quad I = \int_r^s \int_p^q f(x, y) dx dy \quad \text{What is } q?$$
- a) $4y$ b) $16y^2$
- c) 8 d) x
- 13) The value of the integral $\int_0^1 \int_0^{\pi/4} 2r \sec^2 \theta dr d\theta$ is ____.
- a) -1 b) 1
- c) 0 d) 2
- 14) If the density at any point varies as the distance of the point from the x-axis, then ρ is equal to ____.
- a) Kx b) Kxy
- c) Ky d) $K(x^2 + y^2)$

Seat
No.

**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – II**

Day & Date: Friday, 22-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

Section – I

Q.2 Attempt any three of the following. **09**

- a) Solve $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} - 3y^2)dy = 0$
 b) Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$
 c) Solve $(1 + y^2)dx = (e^{\tan^{-1} y} - x)dy$.
 d) Find continued product of all values of $\left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{\frac{3}{4}}$.
 e) Examine the convergence of $\sum \sin^3\left(\frac{1}{n}\right)$.

Q.3 Attempt any three of the following. **09**

- a) Solve $y(1 + xy)dx - x(1 - xy)dy = 0$
 b) When a switch is closed, the current built up in an electric circuit is given by $E = Ri + L \frac{di}{dt}$. If $L = 640$, $R = 250$, $E = 500$ and $i = 0$ when $t = 0$, show that the current will approach 2 amp when $t \rightarrow \infty$.
 c) By cauchy's test examine the convergence of $\sum \left(1 + \frac{1}{n}\right)^{n^2}$.
 d) Find the analytic function whose real part is $x^4 - 6x^2y^2 + y^4$.
 e) Determine whether $\cos hz$ is analytic, if so find its derivative.

Q.4 Attempt any two of the following **10**

- a) Find orthogonal trajectories of,
 i) $r^2 = a^2 \sin 2\theta$.
 ii) $x^3 - 3xy^2 = a$.
 b) Define absolute and conditional convergence. Examine the convergence of the series $-\frac{1}{2} + \frac{2}{5} - \frac{3}{10} + \dots + (-1)^n \frac{n}{n^2+1} + \dots$
 c) Show that the function $u = e^x \cdot \cos y$ is harmonic. Also find its harmonic conjugate.

Section – II

Q.5 Attempt any three from the following **09**

- a) Evaluate $\int_0^{\infty} \sqrt{x} e^{-x^3} dx$
 b) Evaluate $\int_0^{\infty} \frac{\tan^{-1}\left(\frac{x}{a}\right) - \tan^{-1}\left(\frac{x}{b}\right)}{x} dx$
 c) Trace the curve $r = a \cos 2\theta$.

d) Evaluate $\int_0^4 \int_0^{2\sqrt{z}} \int_0^{\sqrt{4z-x^2}} dz dx dy$

e) Change to polar co-ordinate system and evaluate $\int_0^a \int_y^a \frac{x^2 dx dy}{(x^2 + y^2)^{\frac{3}{2}}}$

Q.6 Attempt any three from the following

09

a) Evaluate $\int_0^{\pi/6} \cos^6 3\theta \sin^2 6\theta d\theta$

b) Trace the curve $x = a(t + \sin t), y = a(1 + \cos t)$

c) Change the order of integration and evaluate $\int_0^{\frac{\pi}{2}} \int_x^{\frac{\pi}{2}} \frac{\cos y}{y} dy dx$

d) Find the mass of the wire in the shape of the cardioid $r = a(1 - \cos \theta)$, if the density at any point of the wire is K times its distance from the pole.

e) Evaluate $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx dy}{1 + x^2 + y^2}$

Q.7 Attempt any two from the following

10

a) Evaluate $\int_0^1 (1 - \sqrt{x})^{1/2} dx \int_0^{1/2} (2y - 4y^2)^{\frac{1}{2}} dy$

b) Trace the curve $ay^2 = x(a^2 - x^2)$ with full justification.

c) Find the area bounded by the parabola $y^2 = 4x$ and the line $2x - 3y + 4 = 0$

Seat No.	
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F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – II

Day & Date: Friday, 22-11-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Use of non-programmable calculator is allowed.
 - 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence.

14

- 1) The value of $B(1, n) + B(m, 1)$ is _____.

a) $m + n$	b) $m - n$
c) $\frac{m - n}{mn}$	d) $\frac{m + n}{mn}$

- 2) Which of the following is not true?

a) $\sqrt{\frac{1}{2}} = \sqrt{\pi}$	b) $\sqrt{\frac{1}{4}} \sqrt{\frac{3}{4}} = \sqrt{2\pi}$
c) $\sqrt{n + 1} = n\sqrt{n}$	d) $\sqrt{-2} = \infty$

- 3) For the curve $r = a \sin 3\theta$ the equations of tangents at the pole are _____.

a) $\theta = \frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}, \dots$	b) $\theta = \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}, \dots$
c) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \dots$	d) $\theta = 0, \pi, 3\pi, \dots$

- 4) The curve $y = x(x^2 - 1)$ is symmetrical _____.

a) About x-axis	b) About y-axis
c) About the line $y = x$	d) In opposite quadrants

- 5) Changing the order of the integration in the double integral

$$I = \int_0^8 \int_{x/4}^2 f(x, y) dy dx \quad \text{leads to} \quad I = \int_r^s \int_p^q f(x, y) dx dy \quad \text{What is } q?$$

a) $4y$	b) $16y^2$
c) 8	d) x

- 6) The value of the integral $\int_0^1 \int_0^{\pi/4} 2r \sec^2 \theta dr d\theta$ is _____.

a) -1	b) 1
c) 0	d) 2

- 7) If the density at any point varies as the distance of the point from the x-axis, then ρ is equal to _____.

a) Kx	b) Kxy
c) Ky	d) $K(x^2 + y^2)$

- 8) The differential equation $\frac{dy}{dx} = \frac{a_1x+b_1y+c_1}{a_2x+b_2y+c_2}$ will be exact if _____.
- | | |
|-----------------|-----------------|
| a) $b_2 = -a_1$ | b) $a_2 = -b_1$ |
| c) $b_1 = a_2$ | d) $a_1 = b_2$ |
- 9) Solution of $\frac{dy}{dx} = -\frac{x}{y}$ at $x = 1$ and $y = \sqrt{3}$ is _____.
- | | |
|--------------------|--------------------|
| a) $x - y^2 = 2$ | b) $x + y^2 = 4$ |
| c) $x^2 - y^2 = 2$ | d) $x^2 + y^2 = 4$ |
- 10) The factorial series $\sum \frac{1}{n!}$ is _____.
- | | |
|----------------|--------------------------|
| a) Convergent | b) Divergent |
| c) Oscillatory | d) Absolutely convergent |
- 11) The series $1^2 + 2^2 + 3^2 + \dots$ is _____.
- | | |
|----------------|--------------------------|
| a) Convergent | b) Divergent |
| c) Oscillatory | d) Absolutely convergent |
- 12) If $x = \cos \theta + i \sin \theta$ then $x^5 - \frac{1}{x^5} =$ _____.
- | | |
|---------------------|----------------------|
| a) $2 \cos 5\theta$ | b) $2i \cos 5\theta$ |
| c) $2 \sin 5\theta$ | d) $2i \sin 5\theta$ |
- 13) $\cos(x + iy) =$ _____.
- | | |
|--|--|
| a) $\cos x \cos y + \sin x \sin y$ | b) $\cos x \cos hy + i \sin x \sin hy$ |
| c) $\cos x \cos hy - i \sin x \sin hy$ | d) $\cos hx \sin hy - i \sin hx \sin hy$ |
- 14) The sufficient conditions for $f(z)$ to be analytic is _____.
- | | |
|----------------------------|----------------------------|
| a) $u_x = -v_x, u_y = v_y$ | b) $u_x = v_y, u_y = -v_x$ |
| c) $u_x = v_y, u_y = v_x$ | d) $u_x = -v_y, u_y = v_x$ |

Seat No.	
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**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – II**

Day & Date: Friday, 22-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

Section – I

Q.2 Attempt any three of the following. 09

- a) Solve $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} - 3y^2)dy = 0$
 b) Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$
 c) Solve $(1 + y^2)dx = (e^{\tan^{-1} y} - x)dy$.
 d) Find continued product of all values of $\left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{\frac{3}{4}}$.
 e) Examine the convergence of $\sum \sin^3\left(\frac{1}{n}\right)$.

Q.3 Attempt any three of the following. 09

- a) Solve $y(1 + xy)dx - x(1 - xy)dy = 0$
 b) When a switch is closed, the current built up in an electric circuit is given by $E = Ri + L \frac{di}{dt}$. If $L = 640$, $R = 250$, $E = 500$ and $i = 0$ when $t = 0$, show that the current will approach 2 amp when $t \rightarrow \infty$.
 c) By cauchy's test examine the convergence of $\sum \left(1 + \frac{1}{n}\right)^{n^2}$.
 d) Find the analytic function whose real part is $x^4 - 6x^2y^2 + y^4$.
 e) Determine whether $\cos hz$ is analytic, if so find its derivative.

Q.4 Attempt any two of the following 10

- a) Find orthogonal trajectories of,
 i) $r^2 = a^2 \sin 2\theta$.
 ii) $x^3 - 3xy^2 = a$.
 b) Define absolute and conditional convergence. Examine the convergence of the series $-\frac{1}{2} + \frac{2}{5} - \frac{3}{10} + \dots + (-1)^n \frac{n}{n^2+1} + \dots$
 c) Show that the function $u = e^x \cdot \cos y$ is harmonic. Also find its harmonic conjugate.

Section – II

Q.5 Attempt any three from the following 09

- a) Evaluate $\int_0^{\infty} \sqrt{x} e^{-x^3} dx$
 b) Evaluate $\int_0^{\infty} \frac{\tan^{-1}\left(\frac{x}{a}\right) - \tan^{-1}\left(\frac{x}{b}\right)}{x} dx$
 c) Trace the curve $r = a \cos 2\theta$.

d) Evaluate $\int_0^4 \int_0^{2\sqrt{z}} \int_0^{\sqrt{4z-x^2}} dz dx dy$

e) Change to polar co-ordinate system and evaluate $\int_0^a \int_y^a \frac{x^2 dx dy}{(x^2 + y^2)^{\frac{3}{2}}}$

Q.6 Attempt any three from the following

09

a) Evaluate $\int_0^{\pi/6} \cos^6 3\theta \sin^2 6\theta d\theta$

b) Trace the curve $x = a(t + \sin t), y = a(1 + \cos t)$

c) Change the order of integration and evaluate $\int_0^{\frac{\pi}{2}} \int_x^{\frac{\pi}{2}} \frac{\cos y}{y} dy dx$

d) Find the mass of the wire in the shape of the cardioid $r = a(1 - \cos \theta)$, if the density at any point of the wire is K times its distance from the pole.

e) Evaluate $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx dy}{1 + x^2 + y^2}$

Q.7 Attempt any two from the following

10

a) Evaluate $\int_0^1 (1 - \sqrt{x})^{1/2} dx \int_0^{1/2} (2y - 4y^2)^{\frac{1}{2}} dy$

b) Trace the curve $ay^2 = x(a^2 - x^2)$ with full justification.

c) Find the area bounded by the parabola $y^2 = 4x$ and the line $2x - 3y + 4 = 0$

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No.

**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – II**

Day & Date: Friday, 22-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence.

14

- 1) If $x = \cos \theta + i \sin \theta$ then $x^5 - \frac{1}{x^5} =$ _____.
 - a) $2 \cos 5\theta$
 - b) $2i \cos 5\theta$
 - c) $2 \sin 5\theta$
 - d) $2i \sin 5\theta$
- 2) $\cos(x + iy) =$ _____.
 - a) $\cos x \cos y + \sin x \sin y$
 - b) $\cos x \cos hy + i \sin x \sin hy$
 - c) $\cos x \cos hy - i \sin x \sin hy$
 - d) $\cos hx \sin hy - i \sin hx \sin hy$
- 3) The sufficient conditions for $f(z)$ to be analytic is _____.
 - a) $u_x = -v_x, u_y = v_y$
 - b) $u_x = v_y, u_y = -v_x$
 - c) $u_x = v_y, u_y = v_x$
 - d) $u_x = -v_y, u_y = v_x$
- 4) The value of $B(1, n) + B(m, 1)$ is _____.
 - a) $m + n$
 - b) $m - n$
 - c) $\frac{m - n}{mn}$
 - d) $\frac{m + n}{mn}$
- 5) Which of the following is not true?
 - a) $\sqrt{\frac{1}{2}} = \sqrt{\pi}$
 - b) $\sqrt{\frac{1}{4}} \sqrt{\frac{3}{4}} = \sqrt{2\pi}$
 - c) $\sqrt{n+1} = n\sqrt{n}$
 - d) $\sqrt{-2} = \infty$
- 6) For the curve $r = a \sin 3\theta$ the equations of tangents at the pole are _____.
 - a) $\theta = \frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}, \dots$
 - b) $\theta = \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}, \dots$
 - c) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \dots$
 - d) $\theta = 0, \pi, 3\pi, \dots$
- 7) The curve $y = x(x^2 - 1)$ is symmetrical _____.
 - a) About x-axis
 - b) About y-axis
 - c) About the line $y = x$
 - d) In opposite quadrants

- 8) Changing the order of the integration in the double integral

$$I = \int_0^8 \int_{x/4}^2 f(x, y) dy dx \quad \text{leads to} \quad I = \int_r^s \int_p^q f(x, y) dx dy \quad \text{What is } q?$$

- a) $4y$
c) 8

- b) $16y^2$
d) x

- 9) The value of the integral
- $\int_0^1 \int_0^{\pi/4} 2r \sec^2 \theta dr d\theta$
- is _____.

- a) -1
c) 0

- b) 1
d) 2

- 10) If the density at any point varies as the distance of the point from the x-axis, then
- ρ
- is equal to _____.

- a) Kx
c) Ky

- b) Kxy
d) $K(x^2 + y^2)$

- 11) The differential equation
- $\frac{dy}{dx} = \frac{a_1x + b_1y + c_1}{a_2x + b_2y + c_2}$
- will be exact if _____.

- a) $b_2 = -a_1$
c) $b_1 = a_2$

- b) $a_2 = -b_1$
d) $a_1 = b_2$

- 12) Solution of
- $\frac{dy}{dx} = -\frac{x}{y}$
- at
- $x = 1$
- and
- $y = \sqrt{3}$
- is _____.

- a) $x - y^2 = 2$
c) $x^2 - y^2 = 2$

- b) $x + y^2 = 4$
d) $x^2 + y^2 = 4$

- 13) The factorial series
- $\sum \frac{1}{n!}$
- is _____.

- a) Convergent
c) Oscillatory

- b) Divergent
d) Absolutely convergent

- 14) The series
- $1^2 + 2^2 + 3^2 + \dots$
- is _____.

- a) Convergent
c) Oscillatory

- b) Divergent
d) Absolutely convergent

Seat No.	
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**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – II**

Day & Date: Friday, 22-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

Section – I

Q.2 Attempt any three of the following. **09**

- Solve $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} - 3y^2)dy = 0$
- Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$
- Solve $(1 + y^2)dx = (e^{\tan^{-1} y} - x)dy$.
- Find continued product of all values of $\left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{\frac{3}{4}}$.
- Examine the convergence of $\sum \sin^3\left(\frac{1}{n}\right)$.

Q.3 Attempt any three of the following. **09**

- Solve $y(1 + xy)dx - x(1 - xy)dy = 0$
- When a switch is closed, the current built up in an electric circuit is given by $E = Ri + L \frac{di}{dt}$. If $L = 640$, $R = 250$, $E = 500$ and $i = 0$ when $t = 0$, show that the current will approach 2 amp when $t \rightarrow \infty$.
- By cauchy's test examine the convergence of $\sum \left(1 + \frac{1}{n}\right)^{n^2}$.
- Find the analytic function whose real part is $x^4 - 6x^2y^2 + y^4$.
- Determine whether $\cos hz$ is analytic, if so find its derivative.

Q.4 Attempt any two of the following **10**

- Find orthogonal trajectories of,
 - $r^2 = a^2 \sin 2\theta$.
 - $x^3 - 3xy^2 = a$.
- Define absolute and conditional convergence. Examine the convergence of the series $-\frac{1}{2} + \frac{2}{5} - \frac{3}{10} + \dots + (-1)^n \frac{n}{n^2+1} + \dots$
- Show that the function $u = e^x \cdot \cos y$ is harmonic. Also find its harmonic conjugate.

Section – II

Q.5 Attempt any three from the following **09**

- Evaluate $\int_0^{\infty} \sqrt{x} e^{-x^3} dx$
- Evaluate $\int_0^{\infty} \frac{\tan^{-1}\left(\frac{x}{a}\right) - \tan^{-1}\left(\frac{x}{b}\right)}{x} dx$
- Trace the curve $r = a \cos 2\theta$.

d) Evaluate $\int_0^4 \int_0^{2\sqrt{z}} \int_0^{\sqrt{4z-x^2}} dz dx dy$

e) Change to polar co-ordinate system and evaluate $\int_0^a \int_y^a \frac{x^2 dx dy}{(x^2 + y^2)^{\frac{3}{2}}}$

Q.6 Attempt any three from the following

09

a) Evaluate $\int_0^{\pi/6} \cos^6 3\theta \sin^2 6\theta d\theta$

b) Trace the curve $x = a(t + \sin t), y = a(1 + \cos t)$

c) Change the order of integration and evaluate $\int_0^{\frac{\pi}{2}} \int_x^{\frac{\pi}{2}} \frac{\cos y}{y} dy dx$

d) Find the mass of the wire in the shape of the cardioid $r = a(1 - \cos \theta)$, if the density at any point of the wire is K times its distance from the pole.

e) Evaluate $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx dy}{1 + x^2 + y^2}$

Q.7 Attempt any two from the following

10

a) Evaluate $\int_0^1 (1 - \sqrt{x})^{1/2} dx \int_0^{1/2} (2y - 4y^2)^{\frac{1}{2}} dy$

b) Trace the curve $ay^2 = x(a^2 - x^2)$ with full justification.

c) Find the area bounded by the parabola $y^2 = 4x$ and the line $2x - 3y + 4 = 0$

Seat No.	
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**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – II**

Day & Date: Friday, 22-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.
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4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) For the curve $r = a \sin 3\theta$ the equations of tangents at the pole are _____.

- | | |
|---|--|
| a) $\theta = \frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}, \dots$ | b) $\theta = \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}, \dots$ |
| c) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \dots$ | d) $\theta = 0, \pi, 3\pi, \dots$ |

2) The curve $y = x(x^2 - 1)$ is symmetrical _____.

- | | |
|---------------------------|--------------------------|
| a) About x-axis | b) About y-axis |
| c) About the line $y = x$ | d) In opposite quadrants |

3) Changing the order of the integration in the double integral

$$I = \int_0^8 \int_{x/4}^2 f(x, y) dy dx \quad \text{leads to} \quad I = \int_r^s \int_p^q f(x, y) dx dy \quad \text{What is } q?$$

a) $4y$	b) $16y^2$
c) 8	d) x

4) The value of the integral $\int_0^1 \int_0^{\pi/4} 2r \sec^2 \theta dr d\theta$ is _____.

- | | |
|-------|------|
| a) -1 | b) 1 |
| c) 0 | d) 2 |

5) If the density at any point varies as the distance of the point from the x-axis, then ρ is equal to _____.

- | | |
|---------|-------------------|
| a) Kx | b) Kxy |
| c) Ky | d) $K(x^2 + y^2)$ |

6) The differential equation $\frac{dy}{dx} = \frac{a_1x + b_1y + c_1}{a_2x + b_2y + c_2}$ will be exact if _____.

- | | |
|-----------------|-----------------|
| a) $b_2 = -a_1$ | b) $a_2 = -b_1$ |
| c) $b_1 = a_2$ | d) $a_1 = b_2$ |

7) Solution of $\frac{dy}{dx} = -\frac{x}{y}$ at $x = 1$ and $y = \sqrt{3}$ is _____.

- | | |
|--------------------|--------------------|
| a) $x - y^2 = 2$ | b) $x + y^2 = 4$ |
| c) $x^2 - y^2 = 2$ | d) $x^2 + y^2 = 4$ |

Seat
No.

**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING MATHEMATICS – II**

Day & Date: Friday, 22-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicates full marks.
3) Use of non-programmable calculator is allowed.
4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

Section – I

Q.2 Attempt any three of the following. 09

- a) Solve $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} - 3y^2)dy = 0$
 b) Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$
 c) Solve $(1 + y^2)dx = (e^{\tan^{-1} y} - x)dy$.
 d) Find continued product of all values of $\left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{\frac{3}{4}}$.
 e) Examine the convergence of $\sum \sin^3\left(\frac{1}{n}\right)$.

Q.3 Attempt any three of the following. 09

- a) Solve $y(1 + xy)dx - x(1 - xy)dy = 0$
 b) When a switch is closed, the current built up in an electric circuit is given by $E = Ri + L \frac{di}{dt}$. If $L = 640$, $R = 250$, $E = 500$ and $i = 0$ when $t = 0$, show that the current will approach 2 amp when $t \rightarrow \infty$.
 c) By cauchy's test examine the convergence of $\sum \left(1 + \frac{1}{n}\right)^{n^2}$.
 d) Find the analytic function whose real part is $x^4 - 6x^2y^2 + y^4$.
 e) Determine whether $\cos hz$ is analytic, if so find its derivative.

Q.4 Attempt any two of the following 10

- a) Find orthogonal trajectories of,
 i) $r^2 = a^2 \sin 2\theta$.
 ii) $x^3 - 3xy^2 = a$.
 b) Define absolute and conditional convergence. Examine the convergence of the series $-\frac{1}{2} + \frac{2}{5} - \frac{3}{10} + \dots + (-1)^n \frac{n}{n^2+1} + \dots$
 c) Show that the function $u = e^x \cdot \cos y$ is harmonic. Also find its harmonic conjugate.

Section – II

Q.5 Attempt any three from the following 09

- a) Evaluate $\int_0^{\infty} \sqrt{x} e^{-x^3} dx$
 b) Evaluate $\int_0^{\infty} \frac{\tan^{-1}\left(\frac{x}{a}\right) - \tan^{-1}\left(\frac{x}{b}\right)}{x} dx$
 c) Trace the curve $r = a \cos 2\theta$.

d) Evaluate $\int_0^4 \int_0^{2\sqrt{z}} \int_0^{\sqrt{4z-x^2}} dz dx dy$

e) Change to polar co-ordinate system and evaluate $\int_0^a \int_y^a \frac{x^2 dx dy}{(x^2 + y^2)^{\frac{3}{2}}}$

Q.6 Attempt any three from the following

09

a) Evaluate $\int_0^{\pi/6} \cos^6 3\theta \sin^2 6\theta d\theta$

b) Trace the curve $x = a(t + \sin t), y = a(1 + \cos t)$

c) Change the order of integration and evaluate $\int_0^{\frac{\pi}{2}} \int_x^{\frac{\pi}{2}} \frac{\cos y}{y} dy dx$

d) Find the mass of the wire in the shape of the cardioid $r = a(1 - \cos \theta)$, if the density at any point of the wire is K times its distance from the pole.

e) Evaluate $\int_0^1 \int_0^{\sqrt{1+x^2}} \frac{dx dy}{1 + x^2 + y^2}$

Q.7 Attempt any two from the following

10

a) Evaluate $\int_0^1 (1 - \sqrt{x})^{1/2} dx \int_0^{1/2} (2y - 4y^2)^{\frac{1}{2}} dy$

b) Trace the curve $ay^2 = x(a^2 - x^2)$ with full justification.

c) Find the area bounded by the parabola $y^2 = 4x$ and the line $2x - 3y + 4 = 0$

Seat
No.

**F.Y. (B. Tech.) (Semester - II) (New) (CBCS) Examination Nov/Dec-2019
ENGINEERING GRAPHICS & DESIGN**

Day & Date: Saturday, 23-11-2019
Time: 10:00 AM To 02:00 PM

Max. Marks: 70

- Instructions:** 1) All questions from each section are compulsory.
2) Figures to the right indicate full marks.
3) Retain all construction lines
4) Assume suitable dimensions, wherever required and mention it clearly.
5) All dimensions are in 'mm'.
6) Return all the answer-sheet supplied irrespective of their use.

***Note: Objectives type answer-sheet must be returned after first 40 minutes strictly.**

Section I

Q.1 Solve any FOUR: (Objective Type)

- a) Refer Fig. 1. Complete the projections of line AB 70mm long and makes 35° with HP and the front view length is 55mm. **03**
- b) Refer Fig. 2. Find the angle between intersecting lines PQ and QR. **03**
- c) Refer Fig. 3. Complete the projections of line CD perpendicular to line SK at point C. also find the TL of line CD **03**
- d) Refer Fig. 4. Complete the projections of line RS 45mm long and parallel to line MN. Also find the shortest distance between lines RS and MN. **04**
- e) Refer Fig. 5. Find the strike and dip of given triangle ABC. **04**
- f) Refer Fig. 6 Complete the top view of triangle PQR if it strikes $S50^{\circ}E$ and dips $45^{\circ}NE$. **03**

Q.2 Solve the following:

- a) Complete the projection of line AB and find its grade if **04**
1) Its TVL is 70 mm
2) Its inclination with VP is 40°
3) Its apparent inclination with HP is 50°
Consider the point A to be 15mm away from both the reference planes.
- b) Complete the projections of line PQ if **03**
1) It bears $S 60^{\circ} E$ W.R.T. P
2) Its grade is positive 60% W.R.T. P
3) True length is 60 mm
Consider the point P 10mm above HP and 15mm in front of VP.
- c) A rectangle ABCD of (50mm X 70mm) side is kept on VP on one of its smaller side in VP. Complete the projections if surface of plane is inclined to VP in such way that the front view appears as a square. **04**

Q.3 An isosceles triangular plate ABC having base, AB = 50 mm and height 70 mm is so placed on corner 'C' in V.P such that the altitude passing through resting corner makes 40° with VP and 35° with HP **07**

Q.4 A pentagonal prism of base side 35 mm and axis 70 mm, is resting on one of its base corner in HP, in such a way that the lateral edge passing through that corner makes 40° to HP and the plane containing that lateral edge and axis of prism is inclined to VP by 35° . Draw the projection of prism. **10**

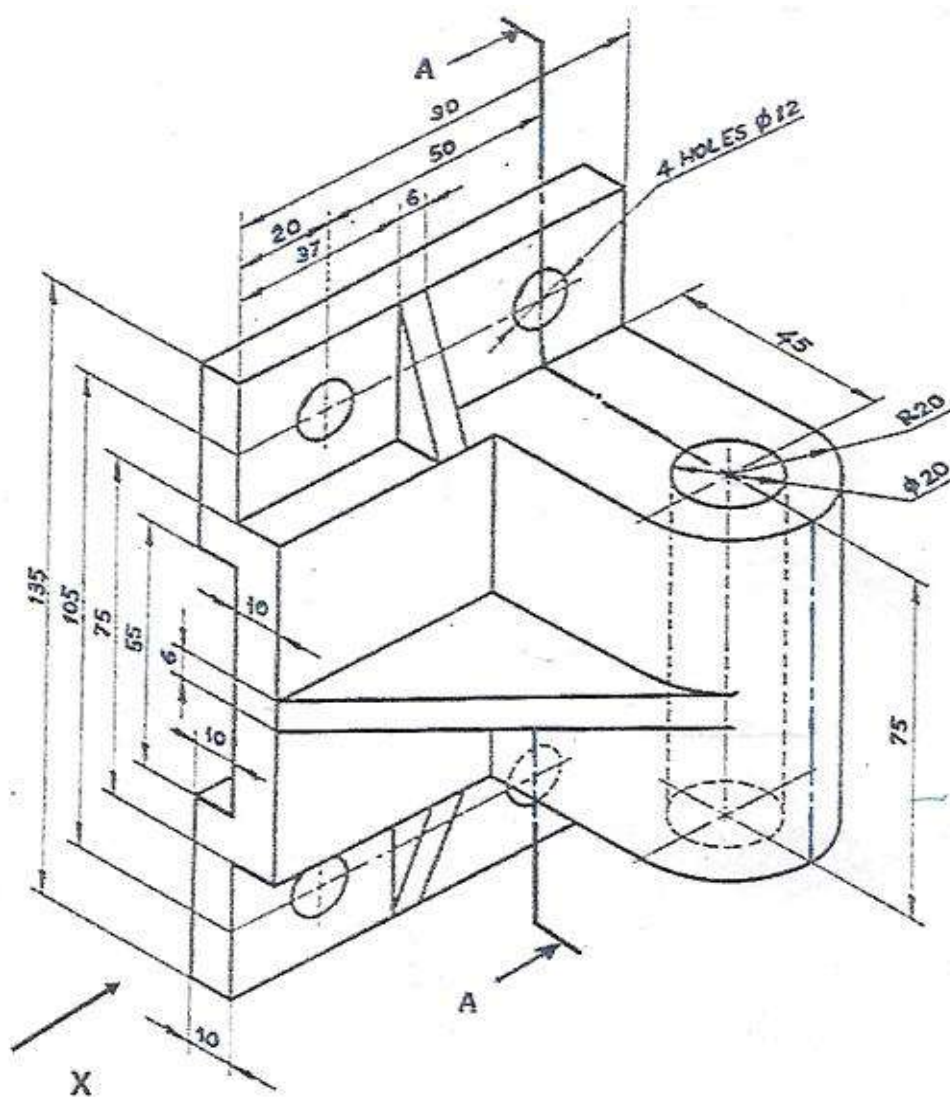
OR

A hexagonal pyramid (side of base 35 mm and height of axis 75 mm) rests on its edge of base on HRP. The face containing that edge makes 40° with HRP and resting edge of solid makes 35° to FRP. Draw projections. **10**

Section II

Q.5 Figure shows a pictorial view of an object. Draw the following views, by using first angle method of projection. **14**

- a) Sectional front view in X-direction along A-A;
- b) Top view; and
- c) Right hand side view

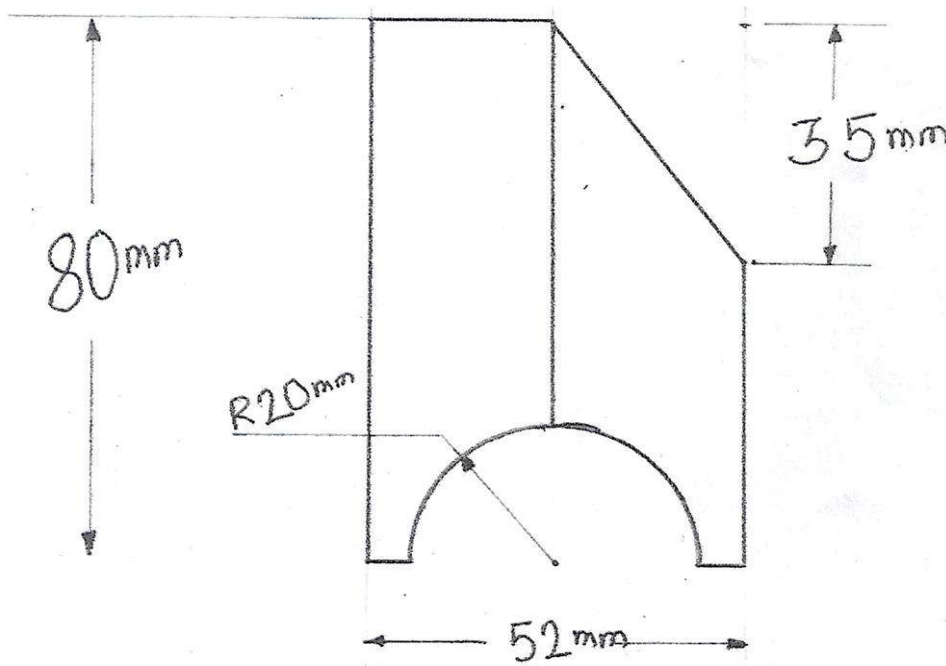


Q.6 A tetrahedron with all sides 70mm rest on one of its corner in HP and tilts to have axis 45° to HP and parallel to VP. It is cut by horizontal cutting plane and bisecting the axis. Complete the projection and draw FV and sectional TV. **07**

OR

A square pyramid base side 40mm and axis 70mm is lying on one of its triangular face on HP, with axis parallel to VP. It is cut by an AIP such that true shape is trapezium of parallel sides 40mm and 20mm, Draw FV, sectional TV and true shape of section. Also find angle made by cutting plane with HP.

Q.7 Draw the development of lateral surfaces of cut hexagonal prism.



OR

A Hexagonal pyramid side of base 40 mm and axis 70 mm long is resting on base in HRP with a side parallel to FRP. It is cut by an auxiliary inclined plane passing through extreme right hand corner of base and inclined at 40° to HRP. Draw front view, top view and development of lateral surfaces of cut hexagonal pyramid.

Seat No.	
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F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
BASIC CIVIL ENGINEERING

Day & Date: Monday, 25-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non programmable scientific calculator is allowed.
4) Assume suitable data if necessary and state it clearly.
5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Civil Engineering deals with the basic needs of life except _____.
a) Air b) Water
c) Shelter d) Electricity
- 2) Map is drawing where scale is _____.
a) Small b) Large
c) Medium d) Any of the above
- 3) The total number of brass tally in 30 meter metric chain are _____.
a) 2 b) 3
c) 4 d) 5
- 4) To mark perpendicular offset from fixed point on survey line following instrument is used _____.
a) Open Cross staff b) French cross staff
c) Optical square d) None of these
- 5) The most common coagulant is _____.
a) magnesium sulphate b) alum
c) chorine d) bleaching powder
- 6) Barrier constructed across the river is called as _____.
a) Storage reservoir b) Dam
c) Both a and b d) None of these
- 7) In broad gauge the inner distance between rails is _____.
a) 1.767 m b) 1.762 m
c) 0.762 m d) 1.676 m
- 8) The lowest part of a structure which transmits the load to the soil is known as _____.
a) Super -structure b) Plinth
c) Foundation d) Basement
- 9) Sequence of load transfer in framed structure is _____.
a) Beam, Column, Foundation and Slab
b) Column, Slab, Beam, Foundation
c) Foundation, Beam, Column, Slab
d) Slab, Beam, Column and Foundation

- 10) Following is not an element of super-structure of building _____.
- | | |
|-----------|------------|
| a) Lintel | b) Window |
| c) Plinth | d) Parapat |
- 11) Initial setting Time of Ordinary Portland Cement (OPC) is _____.
- | | |
|-----------|------------|
| a) 20 Min | b) 400 Min |
| c) 30 Min | d) 600 Min |
- 12) GIS stands for _____.
- | |
|-----------------------------------|
| a) Geographic Information System |
| b) Generic Information System |
| c) Geological Information System |
| d) Geographic Information Sharing |
- 13) The study of something without making actual contact with the object of study is _____.
- | | |
|-------------------|---------------|
| a) Remote sensing | b) Contouring |
| c) Triangulation | d) GPS |
- 14) Building bye-laws are laid _____.
- | |
|---|
| a) To prevent hapazard growth of city |
| b) To avoid air and noise pollution |
| c) To ensure proper light of ventilation, parking etc |
| d) All of above |

Seat
No.

**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
BASIC CIVIL ENGINEERING**

Day & Date: Monday, 25-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non programmable scientific calculator is allowed.
4) Assume suitable data if necessary and state it clearly.

Section – I

Q.2 Attempt any four of the following questions. 12

- a) With neat sketch of road in cutting explain its various functional components
- b) With example show that local attraction at station doesn't affect on included angle at that station.
- c) Enlist the sub domains of civil engineering and explain any two.
- d) Explain the chlorine treatment stating its advantages and requirement.
- e) With neat sketch explain different components of earthen dam.
- f) Enlist general principles of Surveying and explain them.
- g) What are the different works which are executed by civil engineer?

Q.3 Attempt any two of the following questions. 16

- a) 1) Enlist different methods of irrigation and explain border strip method with neat sketch stating its advantages and disadvantages.
2) With neat sketch explain Water Bound Macadam road structure.
- b) Following readings are taken in a closed compass traverse. Draw the rough traverse, Calculate the induced angles and check for the local attraction and angular error. Calculate the corrected bearings. Give the sample calculations.

Stations	A	B	C	D	E
F.B.	N 82° E	S 55° E	S 47° W	N 71° W	N 6° W
B.B	S 4° 38' E	S 83° W	N 53° 30' W	N 47° E	S 75° E

- c) In running fly levels from a bench mark at A the following readings were recorded.

Stations	A	B	C	D
BS	1.500	2.005	1.650	2.550
FS	0.800	1.760	2.365	

From the last position of instrument it is required to set five pegs at interval of 20 m on rising gradient of 1 in 50. If the Reduced Level of first peg is 250.500 m. Determine staff readings and Reduced Levels of those pegs. Also determine the Reduced Levels of stations A, B, and C if Reduced Level of station D is 250.230 m. Use height of instrument method.

Section – II

- Q.4 Attempt any four of the following questions. 16**
- a) A bungalow is to be constructed on a plot 20 m x 20 m with G+1 storey, permissible FSI is 1.2 and front margin is 3 m and side margin is 1.5 m each. If maximum construction is to be made on G.F. compute the area that can be construct on F.F.
 - b) Enlist Principles of planning. Discuss any two principles with neat sketches.
 - c) Differentiate between Sub-structure and Super structure.
 - d) Write note on Remote sensing.
 - e) Differentiate between PCC and RCC.
 - f) Write note on Energy Efficient Building.
- Q.5 Attempt any two of the following questions. 12**
- a) Draw the cross section of building showing various elements of building. Explain any four in brief.
 - b) Write note on:
 - 1) Global Positioning System
 - 2) Geographic Information System
 - c) Write Ideal Engineering Properties and uses of following building materials.
 - 1) Stone
 - 2) Brick
 - 3) Cement

Seat No.	
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**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
BASIC CIVIL ENGINEERING**

Day & Date: Monday, 25-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of non programmable scientific calculator is allowed.
4) Assume suitable data if necessary and state it clearly.

Section – I

Q.2 Attempt any four of the following questions. 12

- With neat sketch of road in cutting explain its various functional components
- With example show that local attraction at station doesn't affect on included angle at that station.
- Enlist the sub domains of civil engineering and explain any two.
- Explain the chlorine treatment stating its advantages and requirement.
- With neat sketch explain different components of earthen dam.
- Enlist general principles of Surveying and explain them.
- What are the different works which are executed by civil engineer?

Q.3 Attempt any two of the following questions. 16

- 1) Enlist different methods of irrigation and explain border strip method with neat sketch stating its advantages and disadvantages.
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- Following readings are taken in a closed compass traverse. Draw the rough traverse, Calculate the induced angles and check for the local attraction and angular error. Calculate the corrected bearings. Give the sample calculations.

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F.B.	N 82° E	S 55° E	S 47° W	N 71° W	N 6° W
B.B	S 4° 38' E	S 83° W	N 53° 30' W	N 47° E	S 75° E

- In running fly levels from a bench mark at A the following readings were recorded.

Stations	A	B	C	D
BS	1.500	2.005	1.650	2.550
FS	0.800	1.760	2.365	

From the last position of instrument it is required to set five pegs at interval of 20 m on rising gradient of 1 in 50. If the Reduced Level of first peg is 250.500 m. Determine staff readings and Reduced Levels of those pegs. Also determine the Reduced Levels of stations A, B, and C if Reduced Level of station D is 250.230 m. Use height of instrument method.

Section – II

- Q.4 Attempt any four of the following questions. 16**
- a) A bungalow is to be constructed on a plot 20 m x 20 m with G+1 storey, permissible FSI is 1.2 and front margin is 3 m and side margin is 1.5 m each. If maximum construction is to be made on G.F. compute the area that can be construct on F.F.
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Seat No.	
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**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
BASIC CIVIL ENGINEERING**

Day & Date: Monday, 25-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The most common coagulant is _____.
 a) magnesium sulphate b) alum
 c) chorine d) bleaching powder
- 2) Barrier constructed across the river is called as _____.
 a) Storage reservoir b) Dam
 c) Both a and b d) None of these
- 3) In broad gauge the inner distance between rails is _____.
 a) 1.767 m b) 1.762 m
 c) 0.762 m d) 1.676 m
- 4) The lowest part of a structure which transmits the load to the soil is known as _____.
 a) Super -structure b) Plinth
 c) Foundation d) Basement
- 5) Sequence of load transfer in framed structure is _____.
 a) Beam, Column, Foundation and Slab
 b) Column, Slab, Beam, Foundation
 c) Foundation, Beam, Column, Slab
 d) Slab, Beam, Column and Foundation
- 6) Following is not an element of super-structure of building _____.
 a) Lintel b) Window
 c) Plinth d) Parapat
- 7) Initial setting Time of Ordinary Portland Cement (OPC) is _____.
 a) 20 Min b) 400 Min
 c) 30 Min d) 600 Min
- 8) GIS stands for _____.
 a) Geographic Information System
 b) Generic Information System
 c) Geological Information System
 d) Geographic Information Sharing

Seat
No.

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
BASIC CIVIL ENGINEERING

Day & Date: Monday, 25-11-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Use of non programmable scientific calculator is allowed.
 4) Assume suitable data if necessary and state it clearly.

Section – I

Q.2 Attempt any four of the following questions. 12

- a) With neat sketch of road in cutting explain its various functional components
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- d) Explain the chlorine treatment stating its advantages and requirement.
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- c) In running fly levels from a bench mark at A the following readings were recorded.

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Section – II

- Q.4 Attempt any four of the following questions. 16**
- a) A bungalow is to be constructed on a plot 20 m x 20 m with G+1 storey, permissible FSI is 1.2 and front margin is 3 m and side margin is 1.5 m each. If maximum construction is to be made on G.F. compute the area that can be construct on F.F.
 - b) Enlist Principles of planning. Discuss any two principles with neat sketches.
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 - d) Write note on Remote sensing.
 - e) Differentiate between PCC and RCC.
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- Q.5 Attempt any two of the following questions. 12**
- a) Draw the cross section of building showing various elements of building. Explain any four in brief.
 - b) Write note on:
 - 1) Global Positioning System
 - 2) Geographic Information System
 - c) Write Ideal Engineering Properties and uses of following building materials.
 - 1) Stone
 - 2) Brick
 - 3) Cement

Seat No.	
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**F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
BASIC CIVIL ENGINEERING**

Day & Date: Monday, 25-11-2019
Time: 10:00 AM To 01:00 PM

Max. Marks: 70

- Instructions:**
- 1) All questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Use of non programmable scientific calculator is allowed.
 - 4) Assume suitable data if necessary and state it clearly.
 - 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Following is not an element of super-structure of building _____.
 - a) Lintel
 - b) Window
 - c) Plinth
 - d) Parapat
- 2) Initial setting Time of Ordinary Portland Cement (OPC) is _____.
 - a) 20 Min
 - b) 400 Min
 - c) 30 Min
 - d) 600 Min
- 3) GIS stands for _____.
 - a) Geographic Information System
 - b) Generic Information System
 - c) Geological Information System
 - d) Geographic Information Sharing
- 4) The study of something without making actual contact with the object of study is _____.
 - a) Remote sensing
 - b) Contouring
 - c) Triangulation
 - d) GPS
- 5) Building bye-laws are laid _____.
 - a) To prevent hapazard growth of city
 - b) To avoid air and noise pollution
 - c) To ensure proper light of ventilation, parking etc
 - d) All of above
- 6) Civil Engineering deals with the basic needs of life except _____.
 - a) Air
 - b) Water
 - c) Shelter
 - d) Electricity
- 7) Map is drawing where scale is _____.
 - a) Small
 - b) Large
 - c) Medium
 - d) Any of the above
- 8) The total number of brass tally in 30 meter metric chain are _____.
 - a) 2
 - b) 3
 - c) 4
 - d) 5

- 9) To mark perpendicular offset from fixed point on survey line following instrument is used _____.
- a) Open Cross staff b) French cross staff
c) Optical square d) None of these
- 10) The most common coagulant is _____.
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- a) Storage reservoir b) Dam
c) Both a and b d) None of these
- 12) In broad gauge the inner distance between rails is _____.
- a) 1.767 m b) 1.762 m
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- a) Super -structure b) Plinth
c) Foundation d) Basement
- 14) Sequence of load transfer in framed structure is _____.
- a) Beam, Column, Foundation and Slab
b) Column, Slab, Beam, Foundation
c) Foundation, Beam, Column, Slab
d) Slab, Beam, Column and Foundation

Seat
No.

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019
BASIC CIVIL ENGINEERING

Day & Date: Monday, 25-11-2019
 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

- Instructions:** 1) All questions are compulsory.
 2) Figures to the right indicate full marks.
 3) Use of non programmable scientific calculator is allowed.
 4) Assume suitable data if necessary and state it clearly.

Section – I

Q.2 Attempt any four of the following questions. 12

- With neat sketch of road in cutting explain its various functional components
- With example show that local attraction at station doesn't affect on included angle at that station.
- Enlist the sub domains of civil engineering and explain any two.
- Explain the chlorine treatment stating its advantages and requirement.
- With neat sketch explain different components of earthen dam.
- Enlist general principles of Surveying and explain them.
- What are the different works which are executed by civil engineer?

Q.3 Attempt any two of the following questions. 16

- Enlist different methods of irrigation and explain border strip method with neat sketch stating its advantages and disadvantages.
 - With neat sketch explain Water Bound Macadam road structure.
- Following readings are taken in a closed compass traverse. Draw the rough traverse, Calculate the induced angles and check for the local attraction and angular error. Calculate the corrected bearings. Give the sample calculations.

Stations	A	B	C	D	E
F.B.	N 82° E	S 55° E	S 47° W	N 71° W	N 6° W
B.B	S 4° 38' E	S 83° W	N 53° 30' W	N 47° E	S 75° E

- In running fly levels from a bench mark at A the following readings were recorded.

Stations	A	B	C	D
BS	1.500	2.005	1.650	2.550
FS	0.800	1.760	2.365	

From the last position of instrument it is required to set five pegs at interval of 20 m on rising gradient of 1 in 50. If the Reduced Level of first peg is 250.500 m. Determine staff readings and Reduced Levels of those pegs. Also determine the Reduced Levels of stations A, B, and C if Reduced Level of station D is 250.230 m. Use height of instrument method.

Section – II

- Q.4 Attempt any four of the following questions. 16**
- a) A bungalow is to be constructed on a plot 20 m x 20 m with G+1 storey, permissible FSI is 1.2 and front margin is 3 m and side margin is 1.5 m each. If maximum construction is to be made on G.F. compute the area that can be construct on F.F.
 - b) Enlist Principles of planning. Discuss any two principles with neat sketches.
 - c) Differentiate between Sub-structure and Super structure.
 - d) Write note on Remote sensing.
 - e) Differentiate between PCC and RCC.
 - f) Write note on Energy Efficient Building.
- Q.5 Attempt any two of the following questions. 12**
- a) Draw the cross section of building showing various elements of building. Explain any four in brief.
 - b) Write note on:
 - 1) Global Positioning System
 - 2) Geographic Information System
 - c) Write Ideal Engineering Properties and uses of following building materials.
 - 1) Stone
 - 2) Brick
 - 3) Cement