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**S.E. (E&TC) (Part – I) (New-CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

14

- 1) If $b_{yx} = \frac{5}{18}$ and $b_{xy} = \frac{8}{5}$, then the coefficient of correlation r equals to
a) $\frac{2}{5}$ b) $\frac{1}{2}$ c) $\frac{2}{3}$ d) $\frac{3}{2}$
- 2) If a Poisson distribution is such that $P(x = 2) = P(x = 3)$, then the mean is
a) 3 b) 4 c) 2 d) 9
- 3) The particular integral of $(D - 2)^2 y = e^{2x}$ is
a) $\frac{x^2}{2} e^{2x}$ b) $\frac{e^{2x}}{2}$ c) $\frac{x^3}{2} e^{2x}$ d) $\frac{x}{6} e^{2x}$
- 4) The general solution of the differential equation $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = 0$ is
a) $y = c_1 e^{-t} + c_2$ b) $y = c_1 e^{-t} + c_2 t e^{-t}$
c) $y = c_1 e^t + c_2 t e^t$ d) $y = c_1 e^{-t} + c_2 e^t$
- 5) The Laplace transform of $\sin^2(t)$ is
a) $\frac{4}{s(s^2 + 4)}$ b) $\frac{6}{s(s^2 + 4)}$ c) $\frac{1}{s(s^2 + 4)}$ d) $\frac{2}{s(s^2 + 4)}$
- 6) If $L\{f(t)\} = F(s)$, then $L\{e^{at} f(t)\}$ is equals to
a) $F(s + a)$ b) $F(s - a)$ c) $\frac{1}{a} F(s)$ d) $F(s/a)$



$$7) \mathcal{L}^{-1} \left\{ \frac{(s-1)}{(s-1)^2 + 4} \right\} =$$

- a) $e^{-t} \cos(2t)$ b) $e^{-t} \sin(t)$ c) $e^t \cos(2t)$ d) $e^t \sin(2t)$

8) The Fourier cosine integral form of $f(x)$ is

a) $\int_0^{\infty} f(s) \cos(\omega s) ds$

b) $\int_0^{\infty} \cos(\omega x) \left(\int_0^{\infty} f(s) \cos(\omega s) ds \right) d\omega$

c) $\frac{2}{\pi} \int_0^{\infty} \cos(\omega x) \left(\int_0^{\infty} f(s) \cos(\omega s) ds \right) d\omega$

d) None of these

9) If $z \{f(k)\} = F(z)$, then $z \{f(k-n)\} =$

- a) $z^{-k} F(z)$ b) $z^k F(z)$ c) $z^{-n} F(z)$ d) $z^n F(z)$

10) If $z \{f(k)\} = \bar{f}(z)$, then $z \{k^r f(k)\} =$

- a) $\left(z \frac{d}{dz} \right)^r \bar{f}(z)$ b) $\left(-z \frac{d}{dz} \right)^r \bar{f}(z)$ c) $\left(z \frac{d}{dz} \right)^r f(k)$ d) $\left(-z \frac{d}{dz} \right)^r f(k)$

11) In the interval $(0, \pi)$ the constant term in the cosine series of $f(x) = x$ is

- a) 0 b) π c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

12) The conditions for expansion of a function in a Fourier series are known as

- a) Harmonic b) Riemann c) Periodic d) Dirichets

13) In solving algebraic and transcendental equation, the Newton's Raphson method fails when

- a) $f'(x)$ is negative b) $f'(x)$ is too large
c) $f'(x)$ is zero d) none of these

14) In solving set of linear algebraic equations, which of the following method is said to be direct method ?

- a) Gauss Elimination b) Newton's Raphson method
c) Gauss-Seidal d) Gauss Jacobi



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**S.E. (E&TC) (Part – I) (New-CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any three** of the following : **(3×3=9)**
- a) Solve : $(D^2 - 4D + 4)y = e^{2t} + \cos(2t)$.
 - b) Solve : $(D^2 + 3D + 2)y = x^2 + 1$.
 - c) Find $L \left\{ e^{-2t} \sqrt{1 + \sin(2t)} \right\}$.
 - d) Find $L^{-1} \left\{ \frac{s + 29}{(s + 4)(s^2 + 9)} \right\}$.
 - e) The probability that a student in an evening college will graduate is 0.4. Determine the probability that out of 5 students
 - i) one
 - ii) at least one
 - iii) at most one student will graduate.
3. Attempt **any three** of the following : **(3×3=9)**
- a) Solve : $(D^2 + 9)y = x \cos(2x)$
 - b) Find $L \left\{ e^{-2t} \int_0^t t \sin(3t) dt \right\}$.
 - c) The life time of certain type of battery has mean life of 400 hours and a standard deviation of 50 hours. Assuming the distribution of life time to be normal. Find
 - i) The percentage of batteries which have life time of more than 350 hours
 - ii) The percentage of batteries which have life time between 300 and 500 hours.(Given : for S.N.V. z area between $z = 0$ and $z = 1$ is 0.3413, between $z = 0$ and $z = 2$ is 0.4772).

Set P



d) Find $L^{-1} \left\{ \log \left(\frac{s^2 - 4}{s(s-3)^2} \right) \right\}$.

e) Using convolution theorem find inverse Laplace transform of $\frac{1}{s^2(s+1)^2}$.

4. Attempt **any two** of the following : **(2×5=10)**

a) A condenser of capacity C is discharged through an inductance L and resistance R in series and charge q at a time satisfies the equation

$$L \frac{d^2q}{dt^2} + R \frac{dq}{dt} + \frac{q}{C} = 0.$$

Given that L = 0.25 henries, R = 250 ohms, C = 2×10^{-6} farads and initially q = 0.002 coulombs, i = 0. Obtain the charge q in terms of t.

b) Find the equations of the lines of regression and also coefficient of correlation from the following data :

$$x : 10 \quad 14 \quad 18 \quad 22 \quad 26 \quad 30$$

$$y : 18 \quad 12 \quad 24 \quad 26 \quad 30 \quad 36$$

c) Use Laplace transform to solve $\frac{d^2y}{dt^2} - 3 \frac{dy}{dt} + 2y = 12e^{-2t}$ given that $y(0)=0, y'(0) = 1$.

SECTION – II

5. Attempt **any three** :

9

a) Solve the following set of equations by Gauss-Seidal method (perform three iterations).

$$x + y + 54z = 110, 27x + 6y - z = 85, 6x + 15y + 2z = 72.$$

b) Find z $\{k 2^k\}, k \geq 0$.

c) By Newton Raphson method find a positive real root of the equation $x \log x - 1.2 = 0$ correct upto three decimal places.

d) Obtain half range sine series of $f(x) = \begin{cases} 1, & 0 < x < \frac{1}{2} \\ 0, & \frac{1}{2} < x < 1 \end{cases}$

e) Find the Fourier cosine transform for $f(x) = 2x, 0 < x < 4$.

Set P



6. Attempt **any three** :

9

a) Find the Fourier sine transform of $f(x)$ if $f(x) = \begin{cases} \sin kx, & 0 \leq x < a \\ 0, & x > a \end{cases}$.

b) Find the Fourier transform of $f(x) = \begin{cases} x^2, & |x| < a \\ 0, & |x| > a \end{cases}$.

c) Find a real positive root of the equation $e^x - 4x = 0$ by false position method correct to three places of decimals.

d) Find $z^{-1} \left\{ \frac{z}{z-3} \right\}$, for $|z| < 3$.

e) Find the Fourier expansion of $f(x) = x^2$, $-\pi \leq x \leq \pi$ and hence prove that

$$\frac{\pi^2}{12} = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2}.$$

7. Attempt **any two** :

10

a) Determine the largest eigen value and the corresponding eigen vector of matrix A by power method where

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

b) Prove that for $0 < x < \pi$

$$x(\pi - x) = \frac{\pi^2}{6} - \left[\frac{\cos 2x}{1^2} + \frac{\cos 4x}{2^2} + \frac{\cos 6x}{3^2} + \dots \right]$$

c) Find $z \{c^k \sin (ak + 6)\}$, $k \geq 0$.



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MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

14

1) The Fourier cosine integral form of $f(x)$ is

a) $\int_0^{\infty} f(s) \cos(\omega s) ds$

b) $\int_0^{\infty} \cos(\omega x) \left(\int_0^{\infty} f(s) \cos(\omega s) ds \right) d\omega$

c) $\frac{2}{\pi} \int_0^{\infty} \cos(\omega x) \left(\int_0^{\infty} f(s) \cos(\omega s) ds \right) d\omega$

d) None of these

2) If $z \{f(k)\} = F(z)$, then $z \{f(k - n)\} =$

a) $z^{-k} F(z)$

b) $z^k F(z)$

c) $z^{-n} F(z)$

d) $z^n F(z)$

3) If $z \{f(k)\} = \bar{f}(z)$, then $z \{k^r f(k)\} =$

a) $\left(z \frac{d}{dz} \right)^r \bar{f}(z)$

b) $\left(-z \frac{d}{dz} \right)^r \bar{f}(z)$

c) $\left(z \frac{d}{dz} \right)^r f(k)$

d) $\left(-z \frac{d}{dz} \right)^r f(k)$

4) In the interval $(0, \pi)$ the constant term in the cosine series of $f(x) = x$ is

a) 0

b) π

c) $\frac{\pi}{2}$

d) $\frac{\pi}{4}$



- 5) The conditions for expansion of a function in a Fourier series are known as
 a) Harmonic b) Riemann c) Periodic d) Dirichets
- 6) In solving algebraic and transcendental equation, the Newton's Raphson method fails when
 a) $f'(x)$ is negative b) $f'(x)$ is too large
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- 7) In solving set of linear algebraic equations, which of the following method is said to be direct method ?
 a) Gauss Elimination b) Newton's Raphson method
 c) Gauss-Seidal d) Gauss Jocobi
- 8) If $b_{yx} = \frac{5}{18}$ and $b_{xy} = \frac{8}{5}$, then the coefficient of correlation r equals to
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- 14) $L^{-1}\left\{\frac{(s - 1)}{(s - 1)^2 + 4}\right\} =$
 a) $e^{-t} \cos(2t)$ b) $e^{-t} \sin(t)$ c) $e^t \cos(2t)$ d) $e^t \sin(2t)$



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**S.E. (E&TC) (Part – I) (New-CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III**

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Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

2. Attempt **any three** of the following : **(3×3=9)**

a) Solve : $(D^2 - 4D + 4)y = e^{2t} + \cos(2t)$.

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d) Find $L^{-1} \left\{ \log \left(\frac{s^2 - 4}{s(s-3)^2} \right) \right\}$.

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c) Use Laplace transform to solve $\frac{d^2y}{dt^2} - 3 \frac{dy}{dt} + 2y = 12e^{-2t}$ given that $y(0)=0, y'(0) = 1$.

SECTION – II

5. Attempt **any three** :

9

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e) Find the Fourier cosine transform for $f(x) = 2x, 0 < x < 4$.

Set Q



6. Attempt **any three** :

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d) Find $z^{-1} \left\{ \frac{z}{z-3} \right\}$, for $|z| < 3$.

e) Find the Fourier expansion of $f(x) = x^2$, $-\pi \leq x \leq \pi$ and hence prove that

$$\frac{\pi^2}{12} = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2}.$$

7. Attempt **any two** :

10

a) Determine the largest eigen value and the corresponding eigen vector of matrix A by power method where

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

b) Prove that for $0 < x < \pi$

$$x(\pi - x) = \frac{\pi^2}{6} - \left[\frac{\cos 2x}{1^2} + \frac{\cos 4x}{2^2} + \frac{\cos 6x}{3^2} + \dots \right]$$

c) Find $z \{c^k \sin (ak + 6)\}$, $k \geq 0$.



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Set **R**

**S.E. (E&TC) (Part – I) (New-CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III**

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MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

141) The Laplace transform of $\sin^2(t)$ is

- a) $\frac{4}{s(s^2 + 4)}$ b) $\frac{6}{s(s^2 + 4)}$ c) $\frac{1}{s(s^2 + 4)}$ d) $\frac{2}{s(s^2 + 4)}$

2) If $L\{f(t)\} = F(s)$, then $L\{e^{at} f(t)\}$ is equals to

- a) $F(s + a)$ b) $F(s - a)$ c) $\frac{1}{a}F(s)$ d) $F(s/a)$

3) $L^{-1}\left\{\frac{(s-1)}{(s-1)^2 + 4}\right\} =$

- a) $e^{-t} \cos(2t)$ b) $e^{-t} \sin(t)$ c) $e^t \cos(2t)$ d) $e^t \sin(2t)$

4) The Fourier cosine integral form of $f(x)$ is

- a) $\int_0^{\infty} f(s) \cos(\omega s) ds$
b) $\int_0^{\infty} \cos(\omega x) \left(\int_0^{\infty} f(s) \cos(\omega s) ds \right) d\omega$
c) $\frac{2}{\pi} \int_0^{\infty} \cos(\omega x) \left(\int_0^{\infty} f(s) \cos(\omega s) ds \right) d\omega$
d) None of these



- 5) If $z \{f(k)\} = F(z)$, then $z \{f(k - n)\} =$
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 a) $\left(z \frac{d}{dz}\right)^r \bar{f}(z)$ b) $\left(-z \frac{d}{dz}\right)^r \bar{f}(z)$ c) $\left(z \frac{d}{dz}\right)^r f(k)$ d) $\left(-z \frac{d}{dz}\right)^r f(k)$
- 7) In the interval $(0, \pi)$ the constant term in the cosine series of $f(x) = x$ is
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b) Find z $\{k 2^k\}, k \geq 0$.

c) By Newton Raphson method find a positive real root of the equation $x \log x - 1.2 = 0$ correct upto three decimal places.

d) Obtain half range sine series of $f(x) = \begin{cases} 1, & 0 < x < \frac{1}{2} \\ 0, & \frac{1}{2} < x < 1 \end{cases}$

e) Find the Fourier cosine transform for $f(x) = 2x, 0 < x < 4$.

Set R



6. Attempt **any three** :

9

a) Find the Fourier sine transform of $f(x)$ if $f(x) = \begin{cases} \sin kx, & 0 \leq x < a \\ 0, & x > a \end{cases}$.

b) Find the Fourier transform of $f(x) = \begin{cases} x^2, & |x| < a \\ 0, & |x| > a \end{cases}$.

c) Find a real positive root of the equation $e^x - 4x = 0$ by false position method correct to three places of decimals.

d) Find $z^{-1} \left\{ \frac{z}{z-3} \right\}$, for $|z| < 3$.

e) Find the Fourier expansion of $f(x) = x^2$, $-\pi \leq x \leq \pi$ and hence prove that

$$\frac{\pi^2}{12} = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2}.$$

7. Attempt **any two** :

10

a) Determine the largest eigen value and the corresponding eigen vector of matrix A by power method where

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

b) Prove that for $0 < x < \pi$

$$x(\pi - x) = \frac{\pi^2}{6} - \left[\frac{\cos 2x}{1^2} + \frac{\cos 4x}{2^2} + \frac{\cos 6x}{3^2} + \dots \right]$$

c) Find $z \{c^k \sin (ak + 6)\}$, $k \geq 0$.



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**S.E. (E&TC) (Part – I) (New-CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**
2) Figures to **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.
5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

14

1) If $z\{f(k)\} = \bar{f}(z)$, then $z\{k^r f(k)\} =$

a) $\left(z \frac{d}{dz}\right)^r \bar{f}(z)$ b) $\left(-z \frac{d}{dz}\right)^r \bar{f}(z)$ c) $\left(z \frac{d}{dz}\right)^r f(k)$ d) $\left(-z \frac{d}{dz}\right)^r f(k)$

2) In the interval $(0, \pi)$ the constant term in the cosine series of $f(x) = x$ is

a) 0 b) π c) $\frac{\pi}{2}$ d) $\frac{\pi}{4}$

3) The conditions for expansion of a function in a Fourier series are known as

a) Harmonic b) Riemann c) Periodic d) Dirichets

4) In solving algebraic and transcendental equation, the Newton's Raphson method fails when

a) $f'(x)$ is negative b) $f'(x)$ is too large
c) $f'(x)$ is zero d) none of these

5) In solving set of linear algebraic equations, which of the following method is said to be direct method ?

a) Gauss Elimination b) Newton's Raphson method
c) Gauss-Seidal d) Gauss Jacobi



- 6) If $b_{yx} = \frac{5}{18}$ and $b_{xy} = \frac{8}{5}$, then the coefficient of correlation r equals to
- a) $\frac{2}{5}$ b) $\frac{1}{2}$ c) $\frac{2}{3}$ d) $\frac{3}{2}$
- 7) If a Poisson distribution is such that $P(x = 2) = P(x = 3)$, then the mean is
- a) 3 b) 4 c) 2 d) 9
- 8) The particular integral of $(D - 2)^2 y = e^{2x}$ is
- a) $\frac{x^2}{2} e^{2x}$ b) $\frac{e^{2x}}{2}$ c) $\frac{x^3}{2} e^{2x}$ d) $\frac{x}{6} e^{2x}$
- 9) The general solution of the differential equation $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = 0$ is
- a) $y = c_1 e^{-t} + c_2$ b) $y = c_1 e^{-t} + c_2 t e^{-t}$
c) $y = c_1 e^t + c_2 t e^t$ d) $y = c_1 e^{-t} + c_2 e^t$
- 10) The Laplace transform of $\sin^2(t)$ is
- a) $\frac{4}{s(s^2 + 4)}$ b) $\frac{6}{s(s^2 + 4)}$ c) $\frac{1}{s(s^2 + 4)}$ d) $\frac{2}{s(s^2 + 4)}$
- 11) If $L\{f(t)\} = F(s)$, then $L\{e^{at} f(t)\}$ is equals to
- a) $F(s + a)$ b) $F(s - a)$ c) $\frac{1}{a} F(s)$ d) $F(s/a)$
- 12) $L^{-1}\left\{\frac{(s-1)}{(s-1)^2 + 4}\right\} =$
- a) $e^{-t} \cos(2t)$ b) $e^{-t} \sin(t)$ c) $e^t \cos(2t)$ d) $e^t \sin(2t)$
- 13) The Fourier cosine integral form of $f(x)$ is
- a) $\int_0^{\infty} f(s) \cos(\omega s) ds$
b) $\int_0^{\infty} \cos(\omega x) \left(\int_0^{\infty} f(s) \cos(\omega s) ds \right) d\omega$
c) $\frac{2}{\pi} \int_0^{\infty} \cos(\omega x) \left(\int_0^{\infty} f(s) \cos(\omega s) ds \right) d\omega$
d) None of these
- 14) If $z\{f(k)\} = F(z)$, then $z\{f(k-n)\} =$
- a) $z^{-k} F(z)$ b) $z^k F(z)$ c) $z^{-n} F(z)$ d) $z^n F(z)$



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**S.E. (E&TC) (Part – I) (New-CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any three** of the following : **(3×3=9)**
- a) Solve : $(D^2 - 4D + 4)y = e^{2t} + \cos(2t)$.
 - b) Solve : $(D^2 + 3D + 2)y = x^2 + 1$.
 - c) Find $L \left\{ e^{-2t} \sqrt{1 + \sin(2t)} \right\}$.
 - d) Find $L^{-1} \left\{ \frac{s + 29}{(s + 4)(s^2 + 9)} \right\}$.
 - e) The probability that a student in an evening college will graduate is 0.4. Determine the probability that out of 5 students
 - i) one
 - ii) at least one
 - iii) at most one student will graduate.
3. Attempt **any three** of the following : **(3×3=9)**
- a) Solve : $(D^2 + 9)y = x \cos(2x)$
 - b) Find $L \left\{ e^{-2t} \int_0^t t \sin(3t) dt \right\}$.
 - c) The life time of certain type of battery has mean life of 400 hours and a standard deviation of 50 hours. Assuming the distribution of life time to be normal. Find
 - i) The percentage of batteries which have life time of more than 350 hours
 - ii) The percentage of batteries which have life time between 300 and 500 hours.(Given : for S.N.V. z area between $z = 0$ and $z = 1$ is 0.3413, between $z = 0$ and $z = 2$ is 0.4772).



d) Find $L^{-1} \left\{ \log \left(\frac{s^2 - 4}{s(s-3)^2} \right) \right\}$.

e) Using convolution theorem find inverse Laplace transform of $\frac{1}{s^2(s+1)^2}$.

4. Attempt **any two** of the following : **(2×5=10)**

a) A condenser of capacity C is discharged through an inductance L and resistance R in series and charge q at a time satisfies the equation

$$L \frac{d^2q}{dt^2} + R \frac{dq}{dt} + \frac{q}{C} = 0.$$

Given that L = 0.25 henries, R = 250 ohms, C = 2×10^{-6} farads and initially q = 0.002 coulombs, i = 0. Obtain the charge q in terms of t.

b) Find the equations of the lines of regression and also coefficient of correlation from the following data :

$$x : 10 \quad 14 \quad 18 \quad 22 \quad 26 \quad 30$$

$$y : 18 \quad 12 \quad 24 \quad 26 \quad 30 \quad 36$$

c) Use Laplace transform to solve $\frac{d^2y}{dt^2} - 3 \frac{dy}{dt} + 2y = 12e^{-2t}$ given that $y(0)=0, y'(0) = 1$.

SECTION – II

5. Attempt **any three** :

9

a) Solve the following set of equations by Gauss-Seidal method (perform three iterations).

$$x + y + 54z = 110, 27x + 6y - z = 85, 6x + 15y + 2z = 72.$$

b) Find z $\{k 2^k\}, k \geq 0$.

c) By Newton Raphson method find a positive real root of the equation $x \log x - 1.2 = 0$ correct upto three decimal places.

d) Obtain half range sine series of $f(x) = \begin{cases} 1, & 0 < x < \frac{1}{2} \\ 0, & \frac{1}{2} < x < 1 \end{cases}$

e) Find the Fourier cosine transform for $f(x) = 2x, 0 < x < 4$.

Set S



6. Attempt **any three** :

9

a) Find the Fourier sine transform of $f(x)$ if $f(x) = \begin{cases} \sin kx, & 0 \leq x < a \\ 0, & x > a \end{cases}$.

b) Find the Fourier transform of $f(x) = \begin{cases} x^2, & |x| < a \\ 0, & |x| > a \end{cases}$.

c) Find a real positive root of the equation $e^x - 4x = 0$ by false position method correct to three places of decimals.

d) Find $z^{-1} \left\{ \frac{z}{z-3} \right\}$, for $|z| < 3$.

e) Find the Fourier expansion of $f(x) = x^2$, $-\pi \leq x \leq \pi$ and hence prove that

$$\frac{\pi^2}{12} = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2}.$$

7. Attempt **any two** :

10

a) Determine the largest eigen value and the corresponding eigen vector of matrix A by power method where

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

b) Prove that for $0 < x < \pi$

$$x(\pi - x) = \frac{\pi^2}{6} - \left[\frac{\cos 2x}{1^2} + \frac{\cos 4x}{2^2} + \frac{\cos 6x}{3^2} + \dots \right]$$

c) Find $z \{c^k \sin (ak + 6)\}$, $k \geq 0$.



SLR-TJ – 184

Seat No.	
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**S.E. (E&TC) (Part – I) (New CBCS) Examination, 2017
ELECTRONICS CIRCUIT ANALYSIS AND DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

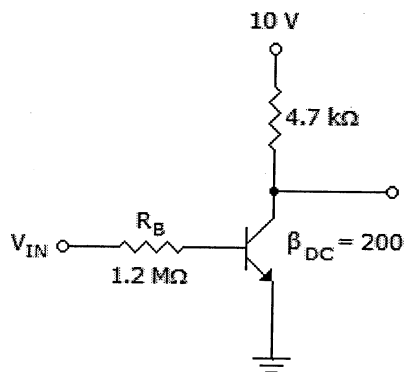
1. Choose the correct answer :

- 1) If the Zener diode in a Zener regulator is connected with the wrong polarity, the load voltage will be closest to
a) 0.7 V b) 2 V c) 10 V d) 5 V
- 2) The diffusion capacitance of a forward biased P+N junction diode with a steady current I, depends on
a) Width of the depleted region
b) Mean life-time of the holes
c) Mean life-time of the electrons
d) Junction area (A P+N junction diode is a diode with very heavily doped P region)
- 3) The depletion region within a PN junction is reduced when the junction has
a) Zero bias b) Forward bias c) Reverse bias d) All of these
- 4) When a reverse bias is applied to a diode, it will
a) Raise the potential barrier b) Lower the potential barrier
c) No effect on potential barrier d) None
- 5) Which of the following is not an essential element of a dc power supply ?
a) Rectifier b) Filter
c) Voltage regulator d) Voltage amplifier
- 6) Consider the following statements :
A clamper circuit
1) Adds or subtracts a dc voltage to a waveform
2) Does not change the waveform
3) Amplifies the waveform
Which are correct ?
a) 1, 2 b) 1, 3 c) 1, 2, 3 d) 2, 3

P.T.O.



- 7) In a LC filter, the ripple factor,
- Increases with the load current
 - Increases with the load resistance
 - Remains constant with the load current
 - Has the lowest value
- 8) What is the current gain for a common-base configuration where $I_E = 4.2 \text{ mA}$ and $I_C = 4.0 \text{ mA}$?
- 0.20
 - 1.05
 - 16.80
 - 0.95
- 9) D-MOSFETs are sometimes used in series to construct a cascade high-frequency amplifier to overcome the loss of _____
- Inductive reactance
 - Capacitive reactance
 - High input impedance
 - Low output impedance
- 10) Thermal run away is related with _____
- Uncontrolled IC due to temperature
 - High voltage across device
 - Low power dissipation
 - None
- 11) Stability factor for _____ bias is $(1 + \beta)$.
- Voltage divider
 - Fixed
 - Emitter bias
 - None
- 12) Refer to this figure. If $V_{CE} = 0.2 \text{ V}$, $I_{C(\text{sat})}$ is _____



- 0.05 mA
 - 2.085 mA
 - 1.065 mA
 - 7.4 mA
- 13) When the JFET is no longer able to control the current, this point is called the _____
- Pinch-off region
 - Saturation point
 - Depletion region
 - Breakdown region
- 14) A D MOSFET can be operated in the _____
- Depletion mode only
 - Enhancement mode only
 - Depletion or enhancement mode
 - Low impedance mode



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**S.E. (E&TC) (Part – I) (New CBCS) Examination, 2017
ELECTRONICS CIRCUIT ANALYSIS AND DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

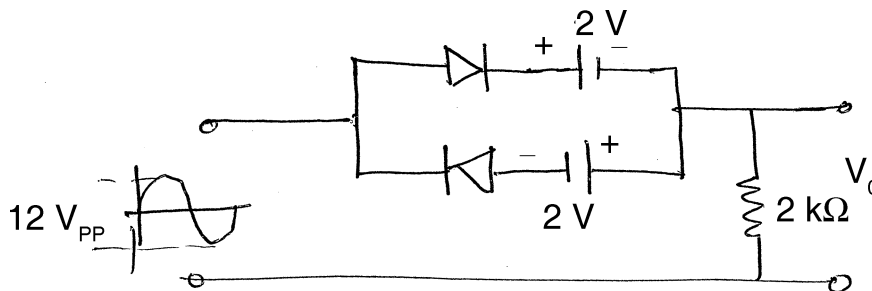
SECTION – I

2. Solve **any four** : (3.5×4=14)

- 1) Why filter circuit is required ? Compare C, L, LC and π filter.
- 2) Draw and explain voltage doubler circuit with its application.
- 3) Explain effect of variation in temperature on PN junction diode characteristics.
- 4) Design zener diode voltage regulator for $V_0 = 5V$, for input voltage of 10 V with $I_L = 50$ mA, $I_z = 3$ mA.
- 5) Classify different types of clamper. Explain positive clamper with transfer characteristics.

3. Solve **any two** : (7×2=14)

- 1) Explain operation of Half wave rectifier. Give detailed analysis of following parameters : V_{orms} , I_{orms} , V_{oavg} , I_{oavg} , ripple factor, efficiency, TUF, PIV.
- 2) Design a full wave rectifier with an LC-filter to supply 9 V dc at 50 mA with a maximum ripple content of 2%.
- 3) For circuit shown in Fig. (a) explain the working of circuit draw o/p waveform for i/p signal. Also draw transfer characteristics.





SECTION – II

4. Solve **any four** : **(3.5×4=14)**
- a) Draw h-model transistor and explain hybrid parameter in amplifier analysis.
 - b) Explain effect of i/p and o/p coupling capacitors on frequency response of BJT amplifier.
 - c) Explain early effect in BJT amplifier.
 - d) Derive equation for stability factor for self bias circuit.
 - e) Explain JFET as VVR and list its applications.
5. Solve **any two** : **(7×2=14)**
- a) Design single stage voltage CE amplifier with voltage divider bias for voltage gain of 4 stability factor of 5 and operating point at (7 v, 4 ma) and frequency range of 20 Hz to 20 kHz for transistor BC 547, $P_{dmax} = 250$ mv, $h_{fe} = 250$, $h_{ie} = 4.5$ kohm, $1/h_{oe} = 1$ mega ohm.
 - b) Compare the common base, common emitter, common collector configuration in details for following parameter :
 - 1) i/p resistance
 - 2) o/p resistance
 - 3) voltage gain
 - 4) current gain
 - 5) power gain
 - 6) application
 - 7) i/p characteristics.
 - c) Explain n-channel enhancement MOSFET experimental setup and explain drain and transfer characteristics.
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**S.E. (E&TC) (Part – I) (New CBCS) Examination, 2017
ELECTRONICS CIRCUIT ANALYSIS AND DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

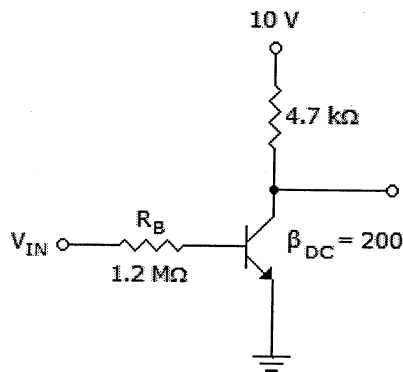
MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

- 1) What is the current gain for a common-base configuration where $I_E = 4.2 \text{ mA}$ and $I_C = 4.0 \text{ mA}$?
a) 0.20 b) 1.05 c) 16.80 d) 0.95
- 2) D-MOSFETs are sometimes used in series to construct a cascade high-frequency amplifier to overcome the loss of _____
a) Inductive reactance b) Capacitive reactance
c) High input impedance d) Low output impedance
- 3) Thermal run away is related with _____
a) Uncontrolled I_C due to temperature b) High voltage across device
c) Low power dissipation d) None
- 4) Stability factor for _____ bias is $(1 + \beta)$.
a) Voltage divider b) Fixed c) Emitter bias d) None
- 5) Refer to this figure. If $V_{CE} = 0.2 \text{ V}$, $I_{C(\text{sat})}$ is _____



- a) 0.05 mA b) 2.085 mA c) 1.065 mA d) 7.4 mA

P.T.O.



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**S.E. (E&TC) (Part – I) (New CBCS) Examination, 2017
ELECTRONICS CIRCUIT ANALYSIS AND DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

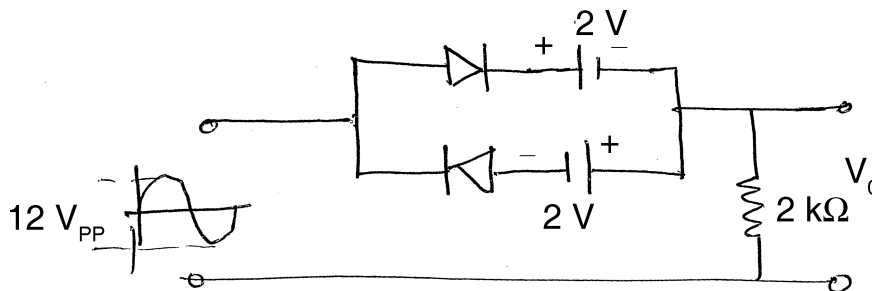
SECTION – I

2. Solve **any four** : (3.5×4=14)

- 1) Why filter circuit is required ? Compare C, L, LC and π filter.
- 2) Draw and explain voltage doubler circuit with its application.
- 3) Explain effect of variation in temperature on PN junction diode characteristics.
- 4) Design zener diode voltage regulator for $V_0 = 5V$, for input voltage of 10 V with $I_L = 50$ mA, $I_z = 3$ mA.
- 5) Classify different types of clamper. Explain positive clamper with transfer characteristics.

3. Solve **any two** : (7×2=14)

- 1) Explain operation of Half wave rectifier. Give detailed analysis of following parameters : V_{orms} , I_{orms} , V_{oavg} , I_{oavg} , ripple factor, efficiency, TUF, PIV.
- 2) Design a full wave rectifier with an LC-filter to supply 9 V dc at 50 mA with a maximum ripple content of 2%.
- 3) For circuit shown in Fig. (a) explain the working of circuit draw o/p waveform for i/p signal. Also draw transfer characteristics.





SECTION – II

4. Solve **any four** : **(3.5×4=14)**
- a) Draw h-model transistor and explain hybrid parameter in amplifier analysis.
 - b) Explain effect of i/p and o/p coupling capacitors on frequency response of BJT amplifier.
 - c) Explain early effect in BJT amplifier.
 - d) Derive equation for stability factor for self bias circuit.
 - e) Explain JFET as VVR and list its applications.
5. Solve **any two** : **(7×2=14)**
- a) Design single stage voltage CE amplifier with voltage divider bias for voltage gain of 4 stability factor of 5 and operating point at (7 v, 4 ma) and frequency range of 20 Hz to 20 kHz for transistor BC 547, $P_{dmax} = 250$ mv, $h_{fe} = 250$, $h_{ie} = 4.5$ kohm, $1/h_{oe} = 1$ mega ohm.
 - b) Compare the common base, common emitter, common collector configuration in details for following parameter :
 - 1) i/p resistance
 - 2) o/p resistance
 - 3) voltage gain
 - 4) current gain
 - 5) power gain
 - 6) application
 - 7) i/p characteristics.
 - c) Explain n-channel enhancement MOSFET experimental setup and explain drain and transfer characteristics.
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Seat No.	
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**S.E. (E&TC) (Part – I) (New CBCS) Examination, 2017
ELECTRONICS CIRCUIT ANALYSIS AND DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

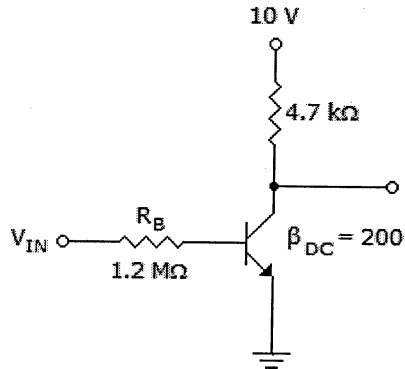
1. Choose the correct answer :

- 1) Which of the following is not an essential element of a dc power supply ?
 - a) Rectifier
 - b) Filter
 - c) Voltage regulator
 - d) Voltage amplifier
- 2) Consider the following statements :
A clamper circuit
 - 1) Adds or subtracts a dc voltage to a waveform
 - 2) Does not change the waveform
 - 3) Amplifies the waveformWhich are correct ?
 - a) 1, 2
 - b) 1, 3
 - c) 1, 2, 3
 - d) 2, 3
- 3) 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
- 4) What is the current gain for a common-base configuration where $I_E = 4.2 \text{ mA}$ and $I_C = 4.0 \text{ mA}$?
 - a) 0.20
 - b) 1.05
 - c) 16.80
 - d) 0.95
- 5) D-MOSFETs are sometimes used in series to construct a cascade high-frequency amplifier to overcome the loss of _____
 - a) Inductive reactance
 - b) Capacitive reactance
 - c) High input impedance
 - d) Low output impedance
- 6) Thermal run away is related with _____
 - a) Uncontrolled I_C due to temperature
 - b) High voltage across device
 - c) Low power dissipation
 - d) None

P.T.O.



- 7) Stability factor for _____ bias is $(1 + \beta)$.
 a) Voltage divider b) Fixed c) Emitter bias d) None
- 8) Refer to this figure. If $V_{CE} = 0.2 \text{ V}$, $I_{C(\text{sat})}$ is _____



- a) 0.05 mA b) 2.085 mA c) 1.065 mA d) 7.4 mA
- 9) When the JFET is no longer able to control the current, this point is called the _____
 a) Pinch-off region b) Saturation point
 c) Depletion region d) Breakdown region
- 10) A D MOSFET can be operated in the _____
 a) Depletion mode only b) Enhancement mode only
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- 11) If the Zener diode in a Zener regulator is connected with the wrong polarity, the load voltage will be closest to
 a) 0.7 V b) 2 V c) 10 V d) 5 V
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 a) Width of the depleted region
 b) Mean life-time of the holes
 c) Mean life-time of the electrons
 d) Junction area (A P+N junction diode is a diode with very heavily doped P region)
- 13) The depletion region within a PN junction is reduced when the junction has
 a) Zero bias b) Forward bias c) Reverse bias d) All of these
- 14) When a reverse bias is applied to a diode, it will
 a) Raise the potential barrier b) Lower the potential barrier
 c) No effect on potential barrier d) None



Seat No.	
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**S.E. (E&TC) (Part – I) (New CBCS) Examination, 2017
ELECTRONICS CIRCUIT ANALYSIS AND DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

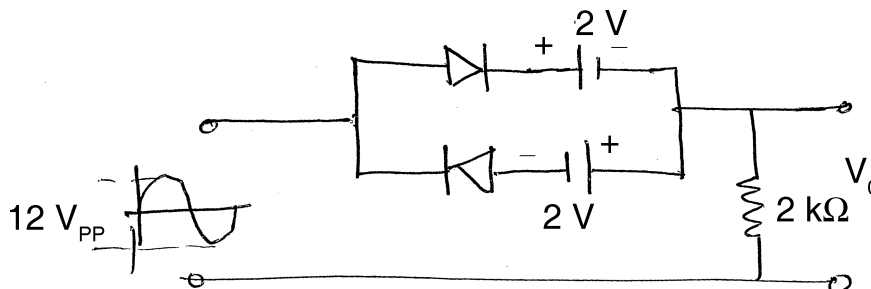
SECTION – I

2. Solve **any four** : (3.5×4=14)

- 1) Why filter circuit is required ? Compare C, L, LC and π filter.
- 2) Draw and explain voltage doubler circuit with its application.
- 3) Explain effect of variation in temperature on PN junction diode characteristics.
- 4) Design zener diode voltage regulator for $V_0 = 5V$, for input voltage of 10 V with $I_L = 50$ mA, $I_z = 3$ mA.
- 5) Classify different types of clamper. Explain positive clamper with transfer characteristics.

3. Solve **any two** : (7×2=14)

- 1) Explain operation of Half wave rectifier. Give detailed analysis of following parameters : V_{orms} , I_{orms} , V_{oavg} , I_{oavg} , ripple factor, efficiency, TUF, PIV.
- 2) Design a full wave rectifier with an LC-filter to supply 9 V dc at 50 mA with a maximum ripple content of 2%.
- 3) For circuit shown in Fig. (a) explain the working of circuit draw o/p waveform for i/p signal. Also draw transfer characteristics.





SECTION – II

4. Solve **any four** : **(3.5×4=14)**
- a) Draw h-model transistor and explain hybrid parameter in amplifier analysis.
 - b) Explain effect of i/p and o/p coupling capacitors on frequency response of BJT amplifier.
 - c) Explain early effect in BJT amplifier.
 - d) Derive equation for stability factor for self bias circuit.
 - e) Explain JFET as VVR and list its applications.
5. Solve **any two** : **(7×2=14)**
- a) Design single stage voltage CE amplifier with voltage divider bias for voltage gain of 4 stability factor of 5 and operating point at (7 v, 4 ma) and frequency range of 20 Hz to 20 kHz for transistor BC 547, $P_{dmax} = 250$ mv, $h_{fe} = 250$, $h_{ie} = 4.5$ kohm, $1/h_{oe} = 1$ mega ohm.
 - b) Compare the common base, common emitter, common collector configuration in details for following parameter :
 - 1) i/p resistance
 - 2) o/p resistance
 - 3) voltage gain
 - 4) current gain
 - 5) power gain
 - 6) application
 - 7) i/p characteristics.
 - c) Explain n-channel enhancement MOSFET experimental setup and explain drain and transfer characteristics.
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Seat No.	
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Set	S
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**S.E. (E&TC) (Part – I) (New CBCS) Examination, 2017
ELECTRONICS CIRCUIT ANALYSIS AND DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

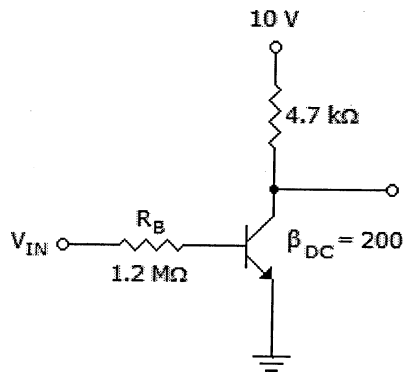
MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

- 1) Thermal run away is related with _____
a) Uncontrolled IC due to temperature b) High voltage across device
c) Low power dissipation d) None
- 2) Stability factor for _____ bias is $(1 + \beta)$.
a) Voltage divider b) Fixed c) Emitter bias d) None
- 3) Refer to this figure. If $V_{CE} = 0.2 V$, $I_{C(sat)}$ is _____



- a) 0.05 mA b) 2.085 mA c) 1.065 mA d) 7.4 mA
- 4) When the JFET is no longer able to control the current, this point is called the _____
a) Pinch-off region b) Saturation point
c) Depletion region d) Breakdown region
- 5) A D MOSFET can be operated in the _____
a) Depletion mode only b) Enhancement mode only
c) Depletion or enhancement mode d) Low impedance mode



- 6) If the Zener diode in a Zener regulator is connected with the wrong polarity, the load voltage will be closest to
a) 0.7 V b) 2 V c) 10 V d) 5 V
- 7) The diffusion capacitance of a forward biased P+N junction diode with a steady current I , depends on
a) Width of the depleted region
b) Mean life-time of the holes
c) Mean life-time of the electrons
d) Junction area (A P+N junction diode is a diode with very heavily doped P region)
- 8) The depletion region within a PN junction is reduced when the junction has
a) Zero bias b) Forward bias c) Reverse bias d) All of these
- 9) When a reverse bias is applied to a diode, it will
a) Raise the potential barrier b) Lower the potential barrier
c) No effect on potential barrier d) None
- 10) Which of the following is not an essential element of a dc power supply ?
a) Rectifier b) Filter
c) Voltage regulator d) Voltage amplifier
- 11) Consider the following statements :
A clamper circuit
1) Adds or subtracts a dc voltage to a waveform
2) Does not change the waveform
3) Amplifies the waveform
Which are correct ?
a) 1, 2 b) 1, 3 c) 1, 2, 3 d) 2, 3
- 12) 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
- 13) What is the current gain for a common-base configuration where $I_E = 4.2$ mA and $I_C = 4.0$ mA ?
a) 0.20 b) 1.05 c) 16.80 d) 0.95
- 14) D-MOSFETs are sometimes used in series to construct a cascade high-frequency amplifier to overcome the loss of _____
a) Inductive reactance b) Capacitive reactance
c) High input impedance d) Low output impedance
-



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**S.E. (E&TC) (Part – I) (New CBCS) Examination, 2017
ELECTRONICS CIRCUIT ANALYSIS AND DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

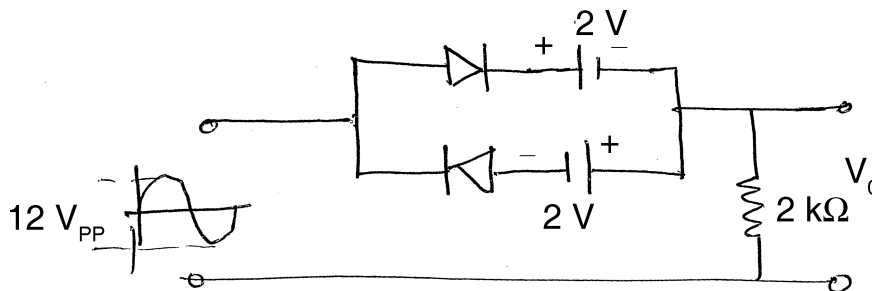
SECTION – I

2. Solve **any four** : (3.5×4=14)

- 1) Why filter circuit is required ? Compare C, L, LC and π filter.
- 2) Draw and explain voltage doubler circuit with its application.
- 3) Explain effect of variation in temperature on PN junction diode characteristics.
- 4) Design zener diode voltage regulator for $V_0 = 5V$, for input voltage of 10 V with $I_L = 50$ mA, $I_z = 3$ mA.
- 5) Classify different types of clamper. Explain positive clamper with transfer characteristics.

3. Solve **any two** : (7×2=14)

- 1) Explain operation of Half wave rectifier. Give detailed analysis of following parameters : V_{orms} , I_{orms} , V_{oavg} , I_{oavg} , ripple factor, efficiency, TUF, PIV.
- 2) Design a full wave rectifier with an LC-filter to supply 9 V dc at 50 mA with a maximum ripple content of 2%.
- 3) For circuit shown in Fig. (a) explain the working of circuit draw o/p waveform for i/p signal. Also draw transfer characteristics.





SECTION – II

4. Solve **any four** : **(3.5×4=14)**
- a) Draw h-model transistor and explain hybrid parameter in amplifier analysis.
 - b) Explain effect of i/p and o/p coupling capacitors on frequency response of BJT amplifier.
 - c) Explain early effect in BJT amplifier.
 - d) Derive equation for stability factor for self bias circuit.
 - e) Explain JFET as VVR and list its applications.
5. Solve **any two** : **(7×2=14)**
- a) Design single stage voltage CE amplifier with voltage divider bias for voltage gain of 4 stability factor of 5 and operating point at (7 v, 4 ma) and frequency range of 20 Hz to 20 kHz for transistor BC 547, $P_{dmax} = 250$ mv, $h_{fe} = 250$, $h_{ie} = 4.5$ kohm, $1/h_{oe} = 1$ mega ohm.
 - b) Compare the common base, common emitter, common collector configuration in details for following parameter :
 - 1) i/p resistance
 - 2) o/p resistance
 - 3) voltage gain
 - 4) current gain
 - 5) power gain
 - 6) application
 - 7) i/p characteristics.
 - c) Explain n-channel enhancement MOSFET experimental setup and explain drain and transfer characteristics.
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Seat No.	
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Set	P
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**S.E. (E & TC) (Part – I) (New – CBCS) Examination, 2017
NETWORK THEORY AND ANALYSIS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

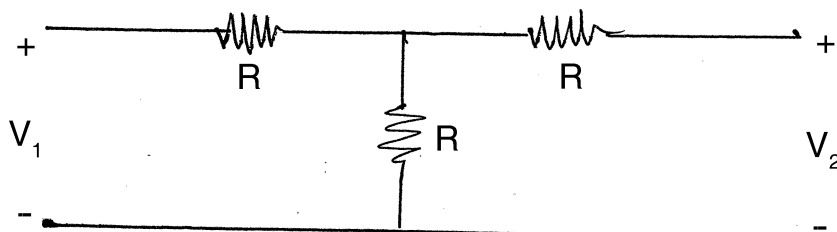
MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(14×1=14)**

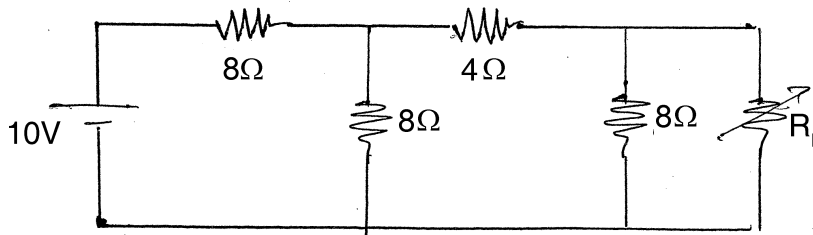
- 1) Superposition theorem is applicable for
 - a) Current
 - b) Voltage
 - c) Power
 - d) a) and b)
- 2) Which of the following is active element ?
 - a) Inductor
 - b) Dependent voltage source
 - c) Capacitor
 - d) None
- 3) In series resonant circuit $V_C = 150V$, $V_L = 150V$, and $V_R = 50 V$. What is the value of source voltage ?
 - a) Zero
 - b) 50 V
 - c) 150 V
 - d) 200 V
- 4) What is the phase angle of series RLC circuit at resonance ?
 - a) 90°
 - b) 45°
 - c) 30°
 - d) 0°
- 5) For a two port network to be reciprocal
 - a) $Z_{11} = Z_{22}$
 - b) $AD - BC = 0$
 - c) $h_{12} = -h_{21}$
 - d) $Y_{22} = Y_{12}$
- 6) For the network shown h_{21} is given by



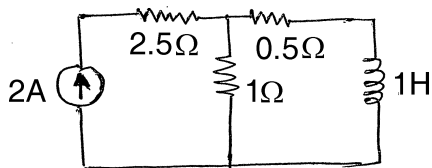
- a) $-1/2$
- b) $1/2$
- c) $-3/2$
- d) $3/2$



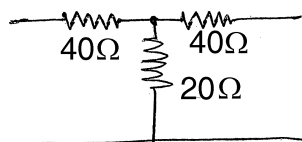
- 7) The value of load resistance R_L for Maximum power transfer to R_L .



- a) 2Ω b) 3.5Ω c) 4Ω d) 5.5Ω
- 8) Time constant in seconds for the given RL circuit is



- a) 0.33 b) 0.66 c) 1.1 d) none
- 9) For the given circuit characteristic resistance R_o in ohms is



- a) 13.50 b) 12.24 c) 18 d) none
- 10) m derived high pass filter is given with $m = 0.6$ and cutoff frequency = 1KHz, the frequency of infinite attenuation in KHz is
- a) 1.1 b) 12 c) 0.8 d) none
- 11) Characteristic Impedance (Z_o) is _____ in pass band and _____ in stop band respectively.
- a) Imaginary, Real b) Real, Real
c) Imaginary, imaginary d) Real, imaginary
- 12) In a steady state, inductors and capacitors are respectively replaced by _____ circuit and _____ circuit.
- a) short, open b) open, short c) short, short d) open, open
- 13) Out of the following which is (are) the correct statement (statements)
- a) 'R' is passive element
b) R, L, C are passive elements irrespective of state of the circuit
c) L and C are passive only in steady state
d) Both a) and c)
- 14) For constant K Low Pass Filter with cutoff frequency, 2 KHz and Design Impedance, $R_k = 100\Omega$, the values of L and C respectively are
- a) $L = 3.98 \text{ mH}$ $C = 0.39 \mu\text{F}$ b) $L = 2\text{mH}$ $C = 0.39 \mu\text{F}$
c) $L = 15.91 \text{ mH}$, $C = 1.59 \mu\text{F}$ d) None



Seat No.	
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**S.E. (E & TC) (Part – I) (New – CBCS) Examination, 2017
NETWORK THEORY AND ANALYSIS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

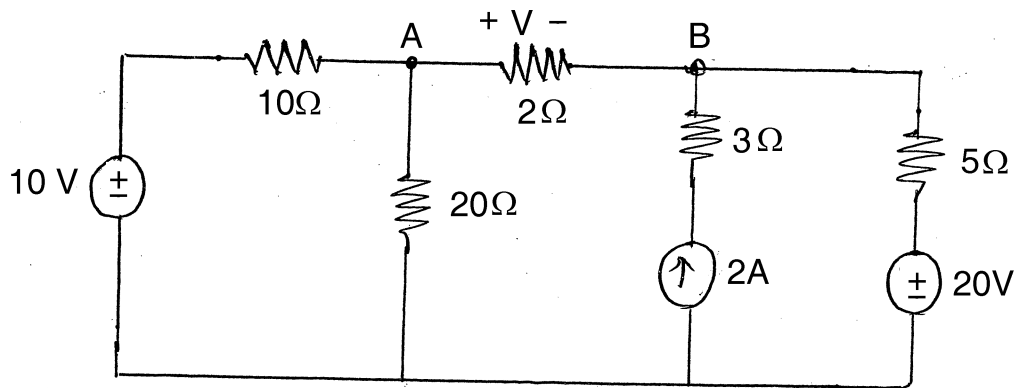
Marks : 56

SECTION – I

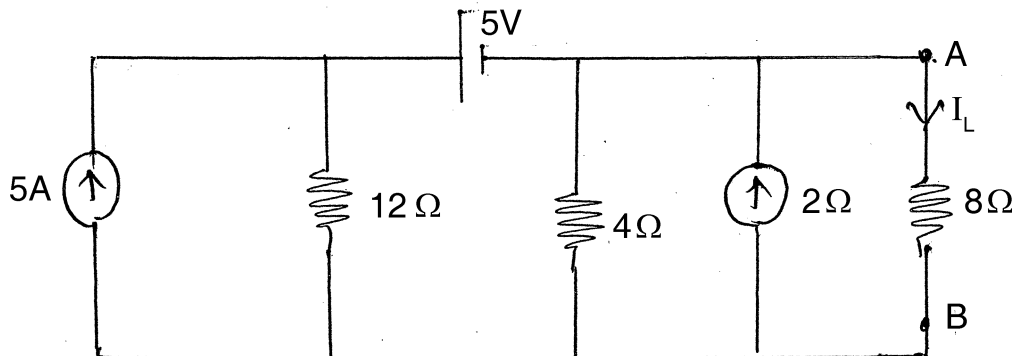
2. Answer **any four** of the following :

(4×4=16)

- 1) Find the voltage across the 2Ω resistor in the circuit shown using Superposition Theorem.

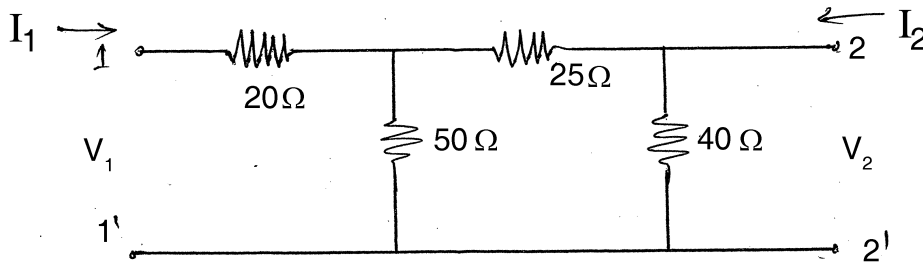


- 2) Find the current through $R_L = 8\Omega$ resistor using Norton's Theorem in the circuit shown.





- 3) Derive the expression for Maximum voltage across inductor in series RLC circuit.
- 4) Determine the short circuit admittance parameters for the network shown below :

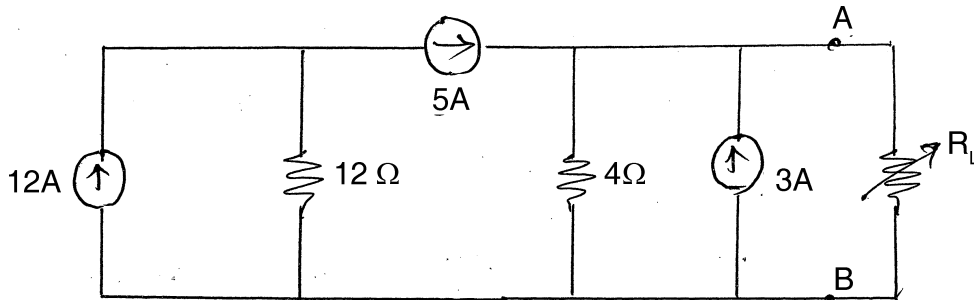


- 5) Convert ABCD parameter in terms of h-parameter.

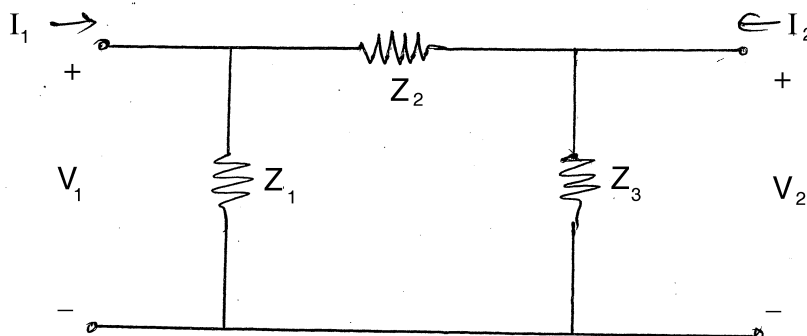
3. Answer **any two** of the following :

(6×2=12)

- 1) Derive the condition for maximum power transfer theorem for DC circuit and hence calculate maximum power delivered to load in the circuit shown.



- 2) A series connected RLC circuit has $R = 15\Omega$, $L = 40\text{ mH}$ and $C = 40\ \mu\text{F}$. Determine the resonant frequency, also under resonate condition, calculate the current, power, the voltage drop across various elements, if the applied voltage is 75 volts.
- 3) Determine the Hybrid parameters for the π -network in the circuit shown and draw its equivalent circuit.





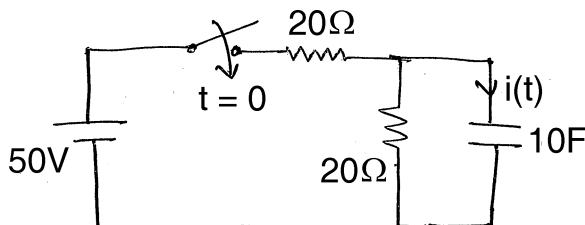
SECTION – II

4. Solve **any four** : **(4×4=16)**

- a) Define transition state and steady states. Explain with waveform, step voltage response of series RL circuit.
- b) Design m derived Low Pass Filter T-section for the given data-cutoff frequency 10 KHz, frequency of infinite attenuation 10.1 KHz having design impedance $100\ \Omega$.
- c) Design Lattice Attenuator for attenuation 60 db with $R_o = 500\ \Omega$.
- d) List out the restrictions on location of Poles and Zeros for Driving Point Functions. State whether $Z(s)$ given by the equation represents passive one port network.

$$Z(s) = (s^4 + s^2 + 1)/(s^3 + s^2)$$

- e) Find current flowing through and voltage across capacitor for $t > 0$ for the given circuit.



5. Solve **any two** : **(2×6=12)**

- a) Design constant K band pass filter (both T and π sections) for pass band frequencies 500 Hz to 2 KHz having design impedance $500\ \Omega$.
- b) What is Complex Frequency ? Define poles and zeros of Network Function. Plot Pole-Zero diagram for the following Network Function :
 $N(s) = (s^2 + 2s + 2)/(s + 3) (s + 4)$.
- c) Find equation of current $i(t)$ and current at $t = 0.5$ sec for a given Series RLC circuit with supply voltage $V = 30V$, $R = 10\ \Omega$, $L = 2H$ and $C = 0.1F$ (Switch is closed at $t = 0$).



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**S.E. (E & TC) (Part – I) (New – CBCS) Examination, 2017
NETWORK THEORY AND ANALYSIS**

Day and Date : Saturday, 16-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

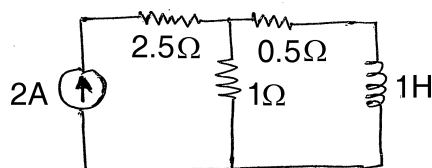
Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

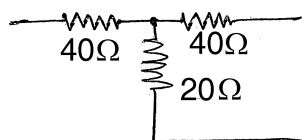
(14×1=14)

1) Time constant in seconds for the given RL circuit is



- a) 0.33 b) 0.66 c) 1.1 d) none

2) For the given circuit characteristic resistance R_o in ohms is



- a) 13.50 b) 12.24 c) 18 d) none

3) m derived high pass filter is given with $m = 0.6$ and cutoff frequency = 1KHz, the frequency of infinite attenuation in KHz is

- a) 1.1 b) 12 c) 0.8 d) none

4) Characteristic Impedance (Z_o) is _____ in pass band and _____ in stop band respectively.

- a) Imaginary, Real b) Real, Real
c) Imaginary, imaginary d) Real, imaginary

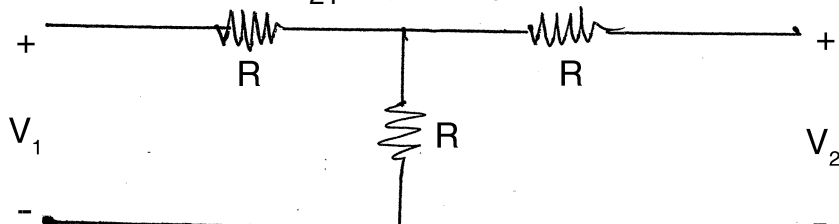
5) In a steady state, inductors and capacitors are respectively replaced by _____ circuit and _____ circuit.

- a) short, open b) open, short c) short, short d) open, open

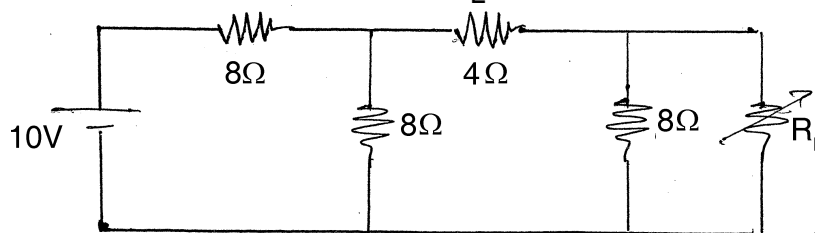
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- 6) Out of the following which is (are) the correct statement (statements)
- 'R' is passive element
 - R, L, C are passive elements irrespective of state of the circuit
 - L and C are passive only in steady state
 - Both a) and c)
- 7) For constant K Low Pass Filter with cutoff frequency, 2 KHz and Design Impedance, $R_k = 100\Omega$, the values of L and C respectively are
- $L = 3.98 \text{ mH}$ $C = 0.39 \mu\text{F}$
 - $L = 2\text{mH}$ $C = 0.39 \mu\text{F}$
 - $L = 15.91 \text{ mH}$, $C = 1.59 \mu\text{F}$
 - None
- 8) Superposition theorem is applicable for
- Current
 - Voltage
 - Power
 - a) and b)
- 9) Which of the following is active element ?
- Inductor
 - Dependent voltage source
 - Capacitor
 - None
- 10) In series resonant circuit $V_C = 150\text{V}$, $V_L = 150\text{V}$, and $V_R = 50 \text{ V}$. What is the value of source voltage ?
- Zero
 - 50 V
 - 150 V
 - 200 V
- 11) What is the phase angle of series RLC circuit at resonance ?
- 90°
 - 45°
 - 30°
 - 0°
- 12) For a two port network to be reciprocal
- $Z_{11} = Z_{22}$
 - $AD - BC = 0$
 - $h_{12} = -h_{21}$
 - $Y_{22} = Y_{12}$
- 13) For the network shown h_{21} is given by



- $-1/2$
 - $1/2$
 - $-3/2$
 - $3/2$
- 14) The value of load resistance R_L for Maximum power transfer to R_L .



- 2Ω
- 3.5Ω
- 4Ω
- 5.5Ω



Seat No.	
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**S.E. (E & TC) (Part – I) (New – CBCS) Examination, 2017
NETWORK THEORY AND ANALYSIS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

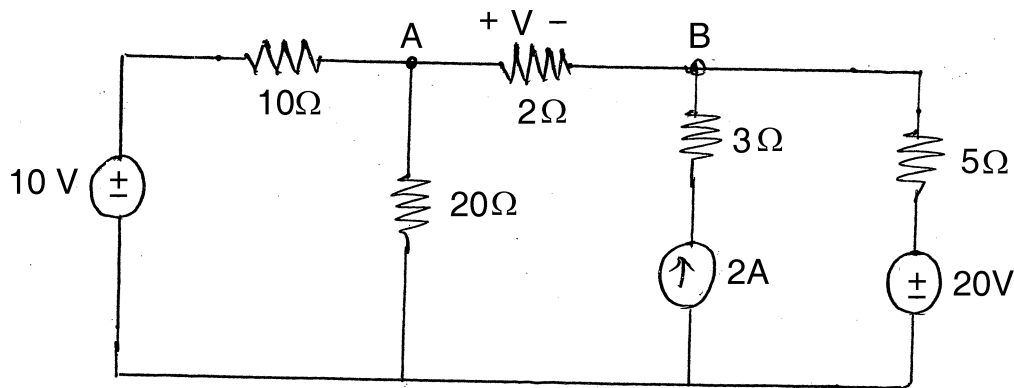
Marks : 56

SECTION – I

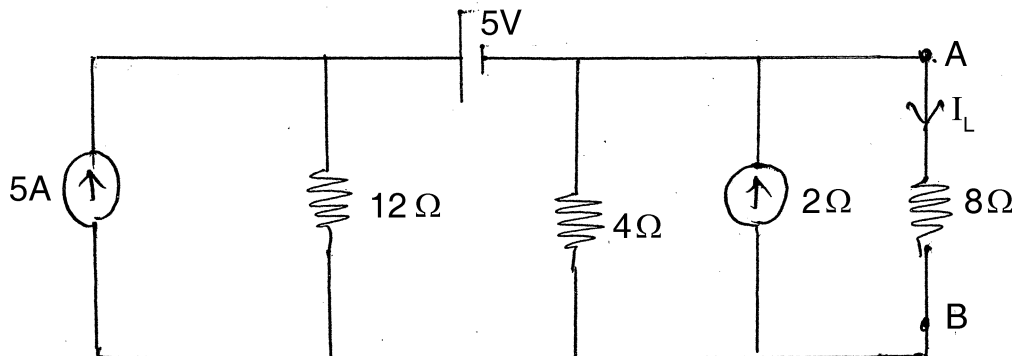
2. Answer **any four** of the following :

(4×4=16)

- 1) Find the voltage across the 2Ω resistor in the circuit shown using Superposition Theorem.

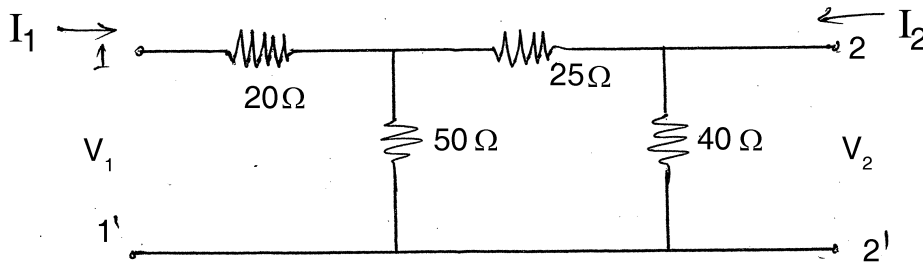


- 2) Find the current through $R_L = 8\Omega$ resistor using Norton's Theorem in the circuit shown.





- 3) Derive the expression for Maximum voltage across inductor in series RLC circuit.
- 4) Determine the short circuit admittance parameters for the network shown below :

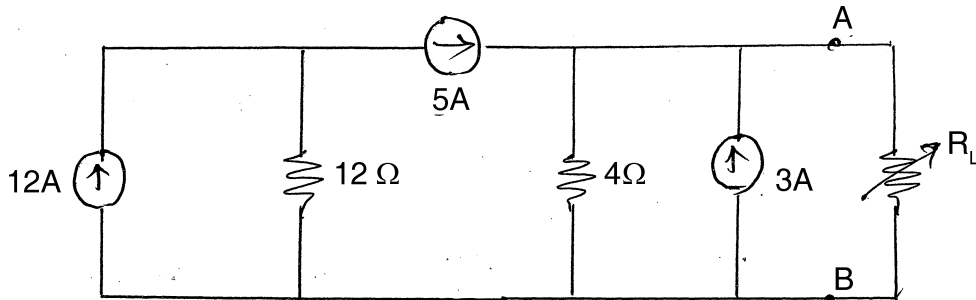


- 5) Convert ABCD parameter in terms of h-parameter.

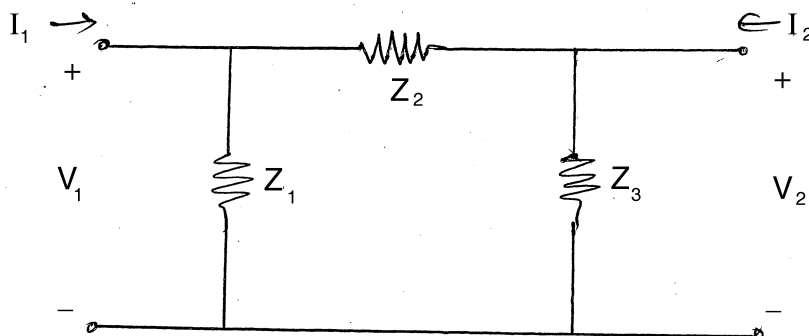
3. Answer **any two** of the following :

(6×2=12)

- 1) Derive the condition for maximum power transfer theorem for DC circuit and hence calculate maximum power delivered to load in the circuit shown.



- 2) A series connected RLC circuit has $R = 15\Omega$, $L = 40\text{ mH}$ and $C = 40\ \mu\text{F}$. Determine the resonant frequency, also under resonate condition, calculate the current, power, the voltage drop across various elements, if the applied voltage is 75 volts.
- 3) Determine the Hybrid parameters for the π -network in the circuit shown and draw its equivalent circuit.





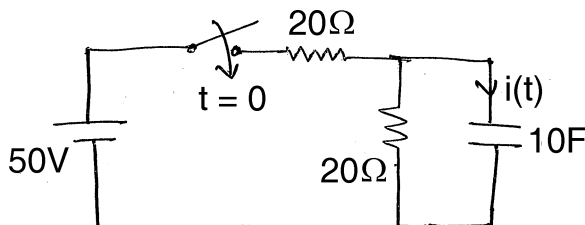
SECTION – II

4. Solve **any four** : **(4×4=16)**

- a) Define transition state and steady states. Explain with waveform, step voltage response of series RL circuit.
- b) Design m derived Low Pass Filter T-section for the given data-cutoff frequency 10 KHz, frequency of infinite attenuation 10.1 KHz having design impedance $100\ \Omega$.
- c) Design Lattice Attenuator for attenuation 60 db with $R_o = 500\ \Omega$.
- d) List out the restrictions on location of Poles and Zeros for Driving Point Functions. State whether $Z(s)$ given by the equation represents passive one port network.

$$Z(s) = (s^4 + s^2 + 1)/(s^3 + s^2)$$

- e) Find current flowing through and voltage across capacitor for $t > 0$ for the given circuit.



5. Solve **any two** : **(2×6=12)**

- a) Design constant K band pass filter (both T and π sections) for pass band frequencies 500 Hz to 2 KHz having design impedance $500\ \Omega$.
- b) What is Complex Frequency ? Define poles and zeros of Network Function. Plot Pole-Zero diagram for the following Network Function :
$$N(s) = (s^2 + 2s + 2)/(s + 3) (s + 4).$$
- c) Find equation of current $i(t)$ and current at $t = 0.5$ sec for a given Series RLC circuit with supply voltage $V = 30V$, $R = 10\ \Omega$, $L = 2H$ and $C = 0.1F$ (Switch is closed at $t = 0$).



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**S.E. (E & TC) (Part – I) (New – CBCS) Examination, 2017
NETWORK THEORY AND ANALYSIS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. Each question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.** Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

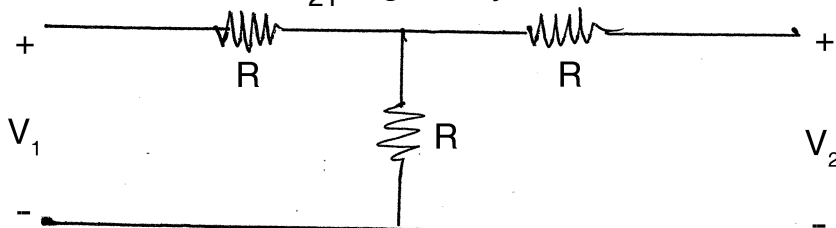
1. Choose the correct answer :

(14x1=14)

1) For a two port network to be reciprocal

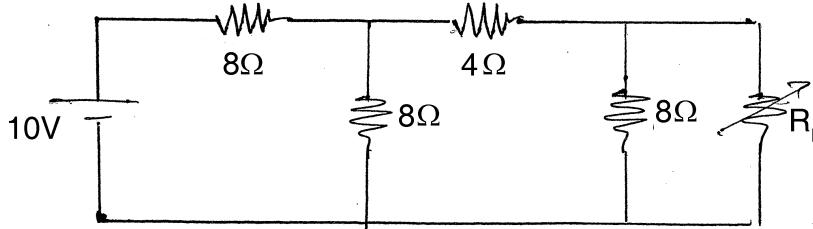
- a) $Z_{11} = Z_{22}$ b) $AD - BC = 0$ c) $h_{12} = -h_{21}$ d) $Y_{22} = Y_{12}$

2) For the network shown h_{21} is given by



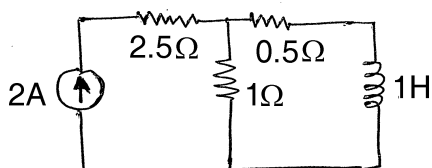
- a) $-1/2$ b) $1/2$ c) $-3/2$ d) $3/2$

3) The value of load resistance R_L for Maximum power transfer to R_L .



- a) 2Ω b) 3.5Ω c) 4Ω d) 5.5Ω

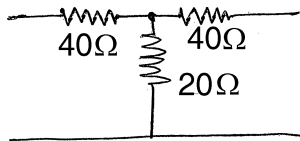
4) Time constant in seconds for the given RL circuit is



- a) 0.33 b) 0.66 c) 1.1 d) none



- 5) For the given circuit characteristic resistance R_o in ohms is



- a) 13.50 b) 12.24 c) 18 d) none
- 6) m derived high pass filter is given with $m = 0.6$ and cutoff frequency = 1KHz, the frequency of infinite attenuation in KHz is
 a) 1.1 b) 12 c) 0.8 d) none
- 7) Characteristic Impedance (Z_o) is _____ in pass band and _____ in stop band respectively.
 a) Imaginary, Real b) Real, Real
 c) Imaginary, imaginary d) Real, imaginary
- 8) In a steady state, inductors and capacitors are respectively replaced by _____ circuit and _____ circuit.
 a) short, open b) open, short c) short, short d) open, open
- 9) Out of the following which is (are) the correct statement (statements)
 a) 'R' is passive element
 b) R, L, C are passive elements irrespective of state of the circuit
 c) L and C are passive only in steady state
 d) Both a) and c)
- 10) For constant K Low Pass Filter with cutoff frequency, 2 KHz and Design Impedance, $R_k = 100\Omega$, the values of L and C respectively are
 a) $L = 3.98 \text{ mH}$ $C = 0.39 \mu\text{F}$ b) $L = 2\text{mH}$ $C = 0.39 \mu\text{F}$
 c) $L = 15.91 \text{ mH}$, $C = 1.59 \mu\text{F}$ d) None
- 11) Superposition theorem is applicable for
 a) Current b) Voltage c) Power d) a) and b)
- 12) Which of the following is active element ?
 a) Inductor b) Dependent voltage source
 c) Capacitor d) None
- 13) In series resonant circuit $V_C = 150\text{V}$, $V_L = 150\text{V}$, and $V_R = 50 \text{ V}$. What is the value of source voltage ?
 a) Zero b) 50 V c) 150 V d) 200 V
- 14) What is the phase angle of series RLC circuit at resonance ?
 a) 90° b) 45° c) 30° d) 0°



Seat No.	
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**S.E. (E & TC) (Part – I) (New – CBCS) Examination, 2017
NETWORK THEORY AND ANALYSIS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

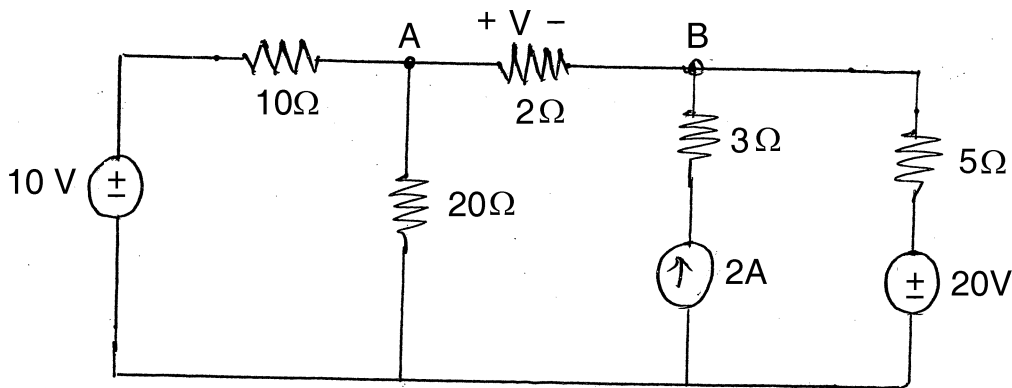
Marks : 56

SECTION – I

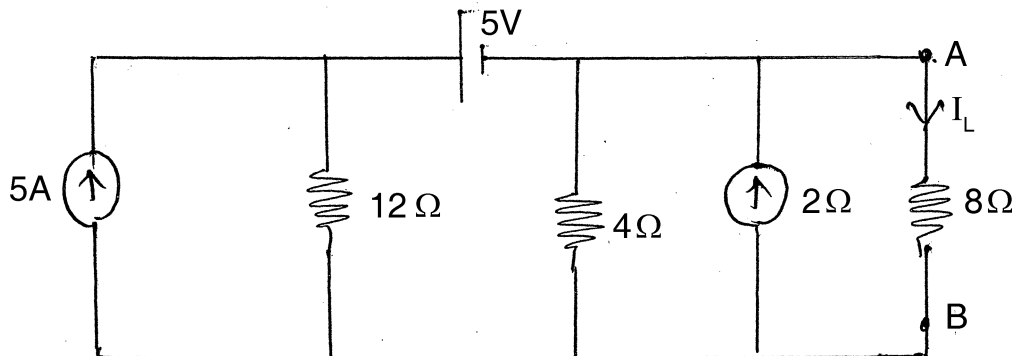
2. Answer **any four** of the following :

(4×4=16)

- 1) Find the voltage across the 2Ω resistor in the circuit shown using Superposition Theorem.

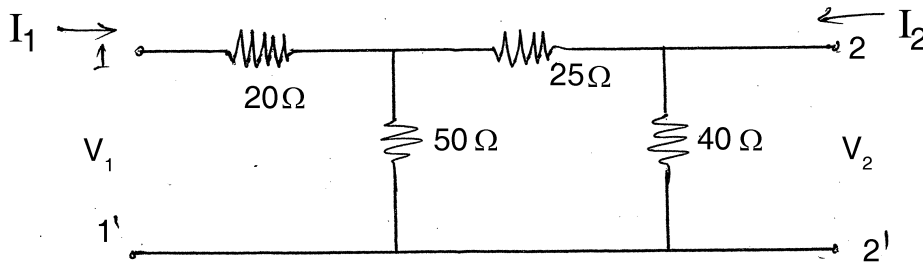


- 2) Find the current through $R_L = 8\Omega$ resistor using Norton's Theorem in the circuit shown.





- 3) Derive the expression for Maximum voltage across inductor in series RLC circuit.
- 4) Determine the short circuit admittance parameters for the network shown below :

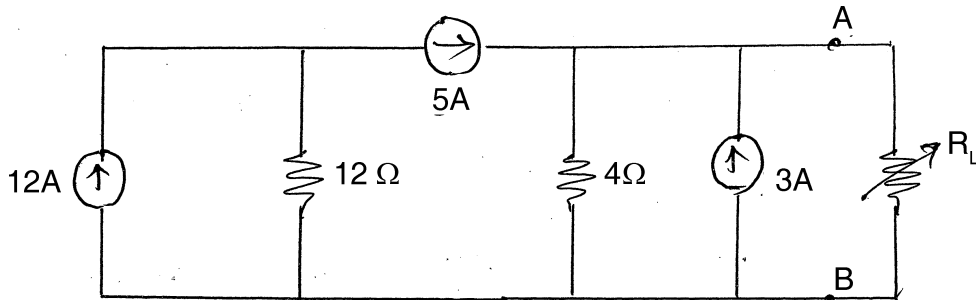


- 5) Convert ABCD parameter in terms of h-parameter.

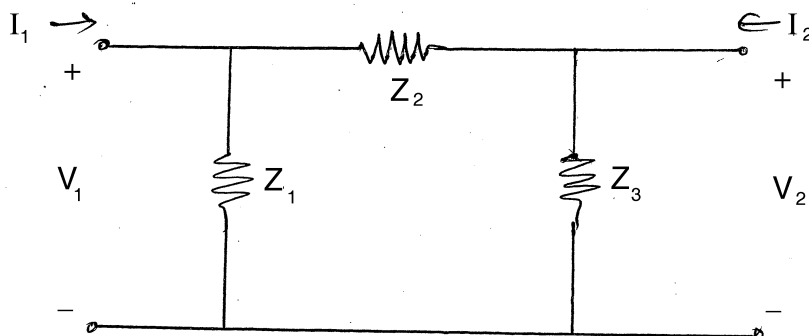
3. Answer **any two** of the following :

(6×2=12)

- 1) Derive the condition for maximum power transfer theorem for DC circuit and hence calculate maximum power delivered to load in the circuit shown.



- 2) A series connected RLC circuit has $R = 15\Omega$, $L = 40\text{ mH}$ and $C = 40\ \mu\text{F}$. Determine the resonant frequency, also under resonate condition, calculate the current, power, the voltage drop across various elements, if the applied voltage is 75 volts.
- 3) Determine the Hybrid parameters for the π -network in the circuit shown and draw its equivalent circuit.





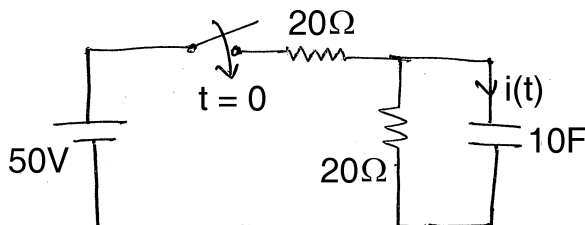
SECTION – II

4. Solve **any four** : **(4×4=16)**

- a) Define transition state and steady states. Explain with waveform, step voltage response of series RL circuit.
- b) Design m derived Low Pass Filter T-section for the given data-cutoff frequency 10 KHz, frequency of infinite attenuation 10.1 KHz having design impedance $100\ \Omega$.
- c) Design Lattice Attenuator for attenuation 60 db with $R_o = 500\ \Omega$.
- d) List out the restrictions on location of Poles and Zeros for Driving Point Functions. State whether $Z(s)$ given by the equation represents passive one port network.

$$Z(s) = (s^4 + s^2 + 1)/(s^3 + s^2)$$

- e) Find current flowing through and voltage across capacitor for $t > 0$ for the given circuit.



5. Solve **any two** : **(2×6=12)**

- a) Design constant K band pass filter (both T and π sections) for pass band frequencies 500 Hz to 2 KHz having design impedance $500\ \Omega$.
- b) What is Complex Frequency ? Define poles and zeros of Network Function. Plot Pole-Zero diagram for the following Network Function :
 $N(s) = (s^2 + 2s + 2)/(s + 3) (s + 4)$.
- c) Find equation of current $i(t)$ and current at $t = 0.5$ sec for a given Series RLC circuit with supply voltage $V = 30V$, $R = 10\ \Omega$, $L = 2H$ and $C = 0.1F$ (Switch is closed at $t = 0$).



SLR-TJ – 185

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Set	S
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**S.E. (E & TC) (Part – I) (New – CBCS) Examination, 2017
NETWORK THEORY AND ANALYSIS**

Day and Date : Saturday, 16-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(14×1=14)**

- 1) m derived high pass filter is given with $m = 0.6$ and cutoff frequency = 1KHz, the frequency of infinite attenuation in KHz is
a) 1.1 b) 12 c) 0.8 d) none
- 2) Characteristic Impedance (Z_0) is _____ in pass band and _____ in stop band respectively.
a) Imaginary, Real b) Real, Real
c) Imaginary, imaginary d) Real, imaginary
- 3) In a steady state, inductors and capacitors are respectively replaced by _____ circuit and _____ circuit.
a) short, open b) open, short c) short, short d) open, open
- 4) Out of the following which is (are) the correct statement (statements)
a) 'R' is passive element
b) R, L, C are passive elements irrespective of state of the circuit
c) L and C are passive only in steady state
d) Both a) and c)
- 5) For constant K Low Pass Filter with cutoff frequency, 2 KHz and Design Impedance, $R_k = 100\Omega$, the values of L and C respectively are
a) $L = 3.98 \text{ mH}$ $C = 0.39 \mu\text{F}$ b) $L = 2\text{mH}$ $C = 0.39 \mu\text{F}$
c) $L = 15.91 \text{ mH}$, $C = 1.59 \mu\text{F}$ d) None
- 6) Superposition theorem is applicable for
a) Current b) Voltage c) Power d) a) and b)

P.T.O.



Seat No.	
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**S.E. (E & TC) (Part – I) (New – CBCS) Examination, 2017
NETWORK THEORY AND ANALYSIS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

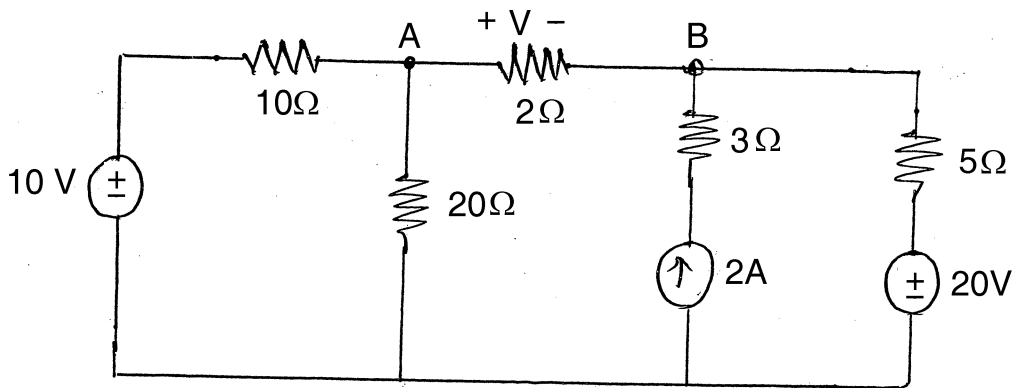
Marks : 56

SECTION – I

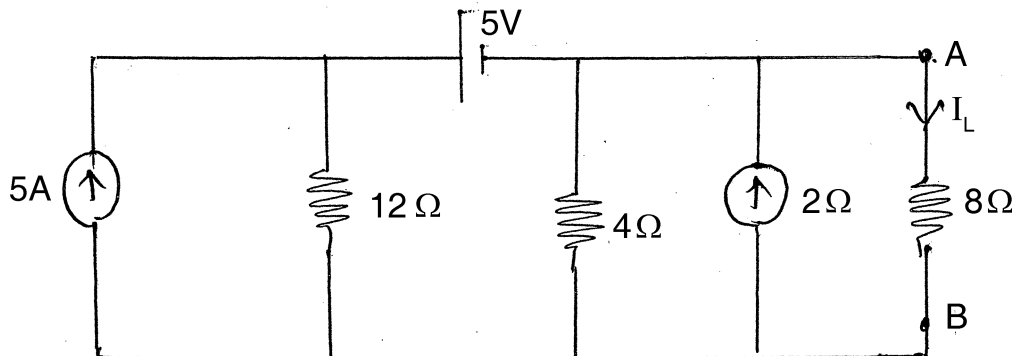
2. Answer **any four** of the following :

(4×4=16)

- 1) Find the voltage across the 2Ω resistor in the circuit shown using Superposition Theorem.

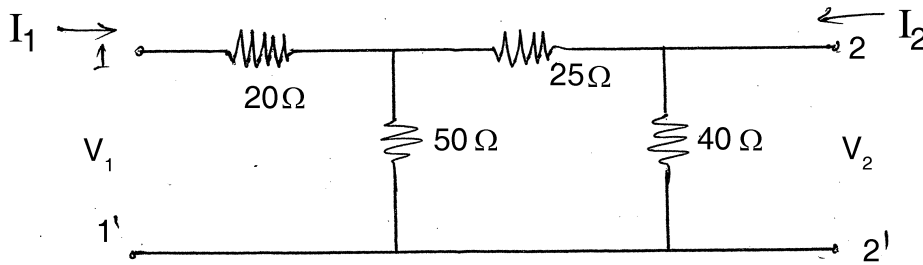


- 2) Find the current through $R_L = 8\Omega$ resistor using Norton's Theorem in the circuit shown.





- 3) Derive the expression for Maximum voltage across inductor in series RLC circuit.
- 4) Determine the short circuit admittance parameters for the network shown below :

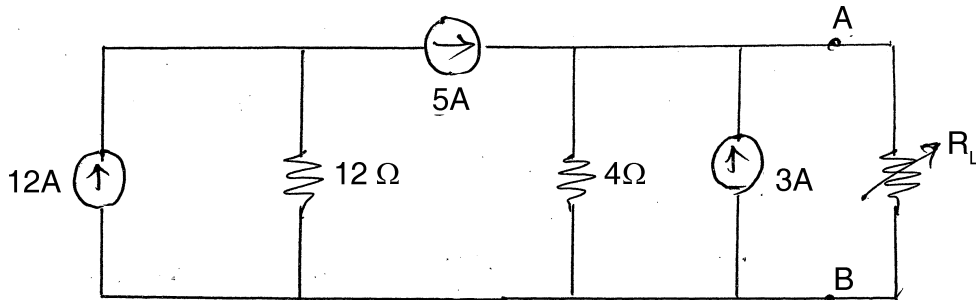


- 5) Convert ABCD parameter in terms of h-parameter.

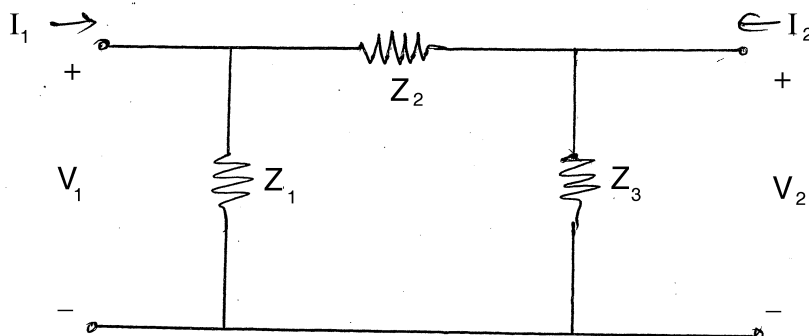
3. Answer **any two** of the following :

(6×2=12)

- 1) Derive the condition for maximum power transfer theorem for DC circuit and hence calculate maximum power delivered to load in the circuit shown.



- 2) A series connected RLC circuit has $R = 15\Omega$, $L = 40\text{ mH}$ and $C = 40\ \mu\text{F}$. Determine the resonant frequency, also under resonate condition, calculate the current, power, the voltage drop across various elements, if the applied voltage is 75 volts.
- 3) Determine the Hybrid parameters for the π -network in the circuit shown and draw its equivalent circuit.





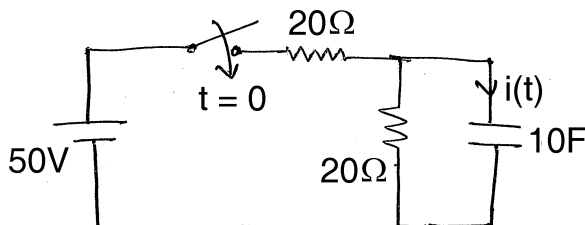
SECTION – II

4. Solve **any four** : **(4×4=16)**

- a) Define transition state and steady states. Explain with waveform, step voltage response of series RL circuit.
- b) Design m derived Low Pass Filter T-section for the given data-cutoff frequency 10 KHz, frequency of infinite attenuation 10.1 KHz having design impedance $100\ \Omega$.
- c) Design Lattice Attenuator for attenuation 60 db with $R_o = 500\ \Omega$.
- d) List out the restrictions on location of Poles and Zeros for Driving Point Functions. State whether $Z(s)$ given by the equation represents passive one port network.

$$Z(s) = (s^4 + s^2 + 1)/(s^3 + s^2)$$

- e) Find current flowing through and voltage across capacitor for $t > 0$ for the given circuit.



5. Solve **any two** : **(2×6=12)**

- a) Design constant K band pass filter (both T and π sections) for pass band frequencies 500 Hz to 2 KHz having design impedance $500\ \Omega$.
- b) What is Complex Frequency ? Define poles and zeros of Network Function. Plot Pole-Zero diagram for the following Network Function :
$$N(s) = (s^2 + 2s + 2)/(s + 3) (s + 4).$$
- c) Find equation of current $i(t)$ and current at $t = 0.5$ sec for a given Series RLC circuit with supply voltage $V = 30V$, $R = 10\ \Omega$, $L = 2H$ and $C = 0.1F$ (Switch is closed at $t = 0$).



SLR-TJ – 186

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Set	P
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**S.E. (E & TC) (Part – I) (New CBCS) Examination, 2017
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) The following number system is used for K-map representation
 - a) Binary
 - b) BCD
 - c) Gray
 - d) Hexadecimal
- 2) Which table shows output for every possible combination of input variables ?
 - a) Function table
 - b) Truth table
 - c) Routing table
 - d) ASCII table
- 3) A comparison between serial and parallel adder is that a serial adder
 - a) is slower
 - b) is faster
 - c) has same speed as parallel adder
 - d) is more complicated
- 4) By placing an inverter between both input of an S-R flip flop, it becomes
 - a) J-K flip flop
 - b) D flip flop
 - c) T flip flop
 - d) Master-slave J-K flip flop
- 5) A sequential circuit is one whose output depends on
 - a) present state
 - b) present input
 - c) both a) and b)
 - d) none
- 6) Which of the following are asynchronous inputs ?
 - a) preset
 - b) clear
 - c) both a) and b)
 - d) none

P.T.O.



- 7) Multiplexer is represented by
a) $2^n \times 1$ b) $2^n \times n$ c) $n \times 2^n$ d) 1×2^n
- 8) A binary divider uses
a) Right shift register b) Left shift register
c) Counter d) None of these
- 9) A binary multiplier uses
a) Right shift register b) Left shift register
c) Counter d) None of these
- 10) A 4-bit asynchronous counter uses flip-flop with propagation delay time of 25 ns each. The max. Possible time required for change of state will be
a) 25 ns b) 50 ns c) 75 ns d) 100 ns
- 11) The MOD number of counter is
a) The max. Possible number of states
b) The actual number of states in a sequence
c) The number of flip flops
d) None of these
- 12) The output of the Mealy machine is the function of
a) Next state b) Present inputs
c) Present state and Present inputs d) Present state
- 13) A PAL has
a) Programmable AND array and programmable OR array
b) Programmable AND array and fixed OR array
c) Fixed AND array and programmable OR array
d) Fixed AND array and OR array
- 14) Which of the following is an invalid name in VHDL ?
a) DECODE8 b) _What_4 c) Invalid d) All are valid
-



Seat No.	
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**S.E. (E & TC) (Part – I) (New CBCS) Examination, 2017
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **(4×4=16)**

- 1) Design and explain 1-bit magnitude comparator.
- 2) Explain S-R latch.
- 3) Explain the concept of Totem-pole TTL configuration.
- 4) Design Parity checker for three bit input including parity bit.
- 5) Implement the following using NAND gate

$$f(A, B, C, D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 10, 11)$$

3. Solve **any two** : **(6×2=12)**

- 1) Explain and design 4 inputs priority encoder.
- 2) Reduce the following equation and implement it using.
 - i) NAND gate
 - ii) NOR gate

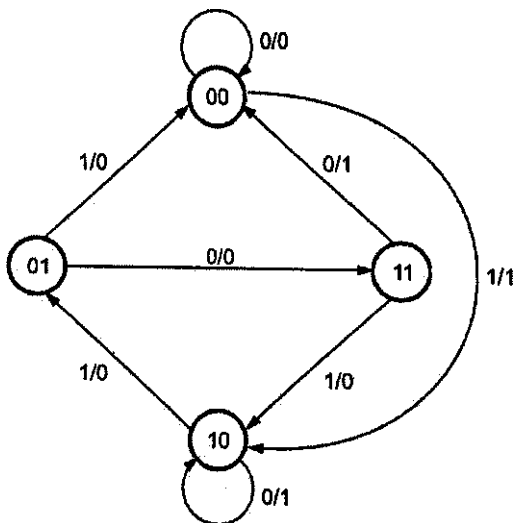
$$Y(A, B, C, D) = \pi M(1, 3, 4, 6, 12, 14).d(9, 11)$$

- 3) Write characteristic table, characteristic equation and excitation table of J-K flip flop.



SECTION – II

4. Solve **any four** : (4×4=16)
- Draw and explain serial in serial out shift register with waveform.
 - Design MOD-7 counter using IC 74191.
 - State design procedure of sequence detector.
 - Implement a full adder circuit using PLA having 3 inputs, 8 product terms and 2 outputs.
 - Write VHDL code for full adder.
5. Solve **any two** : (2×6=12)
- Draw the waveforms to shift data 1101 to left in serial out shift register.
 - Design 4-bit asynchronous up-down counter and draw waveform.
 - Design sequential circuit for state diagram shown in figure. Use T flip-flop.





SLR-TJ – 186

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Set	Q
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**S.E. (E & TC) (Part – I) (New CBCS) Examination, 2017
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) A binary divider uses
 - a) Right shift register
 - b) Left shift register
 - c) Counter
 - d) None of these
- 2) A binary multiplier uses
 - a) Right shift register
 - b) Left shift register
 - c) Counter
 - d) None of these
- 3) A 4-bit asynchronous counter uses flip-flop with propagation delay time of 25 ns each. The max. Possible time required for change of state will be
 - a) 25 ns
 - b) 50 ns
 - c) 75 ns
 - d) 100 ns
- 4) The MOD number of counter is
 - a) The max. Possible number of states
 - b) The actual number of states in a sequence
 - c) The number of flip flops
 - d) None of these
- 5) The output of the Mealey machine is the function of
 - a) Next state
 - b) Present inputs
 - c) Present state and Present inputs
 - d) Present state

P.T.O.



- 6) A PAL has
- a) Programmable AND array and programmable OR array
 - b) Programmable AND array and fixed OR array
 - c) Fixed AND array and programmable OR array
 - d) Fixed AND array and OR array
- 7) Which of the following is an invalid name in VHDL ?
- a) DECODE8
 - b) _What_4
 - c) Invalid
 - d) All are valid
- 8) The following number system is used for K-map representation
- a) Binary
 - b) BCD
 - c) Gray
 - d) Hexadecimal
- 9) Which table shows output for every possible combination of input variables ?
- a) Function table
 - b) Truth table
 - c) Routing table
 - d) ASCII table
- 10) A comparison between serial and parallel adder is that a serial adder
- a) is slower
 - b) is faster
 - c) has same speed as parallel adder
 - d) is more complicated
- 11) By placing an inverter between both input of an S-R flip flop, it becomes
- a) J-K flip flop
 - b) D flip flop
 - c) T flip flop
 - d) Master-slave J-K flip flop
- 12) A sequential circuit is one whose output depends on
- a) present state
 - b) present input
 - c) both a) and b)
 - d) none
- 13) Which of the following are asynchronous inputs ?
- a) preset
 - b) clear
 - c) both a) and b)
 - d) none
- 14) Multiplexer is represented by
- a) $2^n \times 1$
 - b) $2^n \times n$
 - c) $n \times 2^n$
 - d) 1×2^n
-



Seat No.	
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**S.E. (E & TC) (Part – I) (New CBCS) Examination, 2017
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **(4×4=16)**

- 1) Design and explain 1-bit magnitude comparator.
- 2) Explain S-R latch.
- 3) Explain the concept of Totem-pole TTL configuration.
- 4) Design Parity checker for three bit input including parity bit.
- 5) Implement the following using NAND gate

$$f(A, B, C, D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 10, 11)$$

3. Solve **any two** : **(6×2=12)**

- 1) Explain and design 4 inputs priority encoder.
- 2) Reduce the following equation and implement it using.
 - i) NAND gate
 - ii) NOR gate

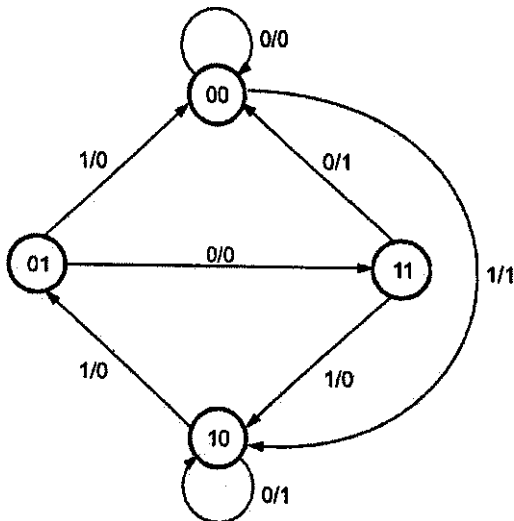
$$Y(A, B, C, D) = \pi M(1, 3, 4, 6, 12, 14).d(9, 11)$$

- 3) Write characteristic table, characteristic equation and excitation table of J-K flip flop.



SECTION – II

4. Solve **any four** : (4×4=16)
- Draw and explain serial in serial out shift register with waveform.
 - Design MOD-7 counter using IC 74191.
 - State design procedure of sequence detector.
 - Implement a full adder circuit using PLA having 3 inputs, 8 product terms and 2 outputs.
 - Write VHDL code for full adder.
5. Solve **any two** : (2×6=12)
- Draw the waveforms to shift data 1101 to left in serial out shift register.
 - Design 4-bit asynchronous up-down counter and draw waveform.
 - Design sequential circuit for state diagram shown in figure. Use T flip-flop.





SLR-TJ – 186

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Set	R
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**S.E. (E & TC) (Part – I) (New CBCS) Examination, 2017
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) A sequential circuit is one whose output depends on
 - a) present state
 - b) present input
 - c) both a) and b)
 - d) none
- 2) Which of the following are asynchronous inputs ?
 - a) preset
 - b) clear
 - c) both a) and b)
 - d) none
- 3) Multiplexer is represented by
 - a) $2^n \times 1$
 - b) $2^n \times n$
 - c) $n \times 2^n$
 - d) 1×2^n
- 4) A binary divider uses
 - a) Right shift register
 - b) Left shift register
 - c) Counter
 - d) None of these
- 5) A binary multiplier uses
 - a) Right shift register
 - b) Left shift register
 - c) Counter
 - d) None of these
- 6) A 4-bit asynchronous counter uses flip-flop with propagation delay time of 25 ns each. The max. Possible time required for change of state will be
 - a) 25 ns
 - b) 50 ns
 - c) 75 ns
 - d) 100 ns

P.T.O.



- 7) The MOD number of counter is
 - a) The max. Possible number of states
 - b) The actual number of states in a sequence
 - c) The number of flip flops
 - d) None of these
 - 8) The output of the Mealy machine is the function of
 - a) Next state
 - b) Present inputs
 - c) Present state and Present inputs
 - d) Present state
 - 9) A PAL has
 - a) Programmable AND array and programmable OR array
 - b) Programmable AND array and fixed OR array
 - c) Fixed AND array and programmable OR array
 - d) Fixed AND array and OR array
 - 10) Which of the following is an invalid name in VHDL ?
 - a) DECODE8
 - b) _What_4
 - c) Invalid
 - d) All are valid
 - 11) The following number system is used for K-map representation
 - a) Binary
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 - 12) Which table shows output for every possible combination of input variables ?
 - a) Function table
 - b) Truth table
 - c) Routing table
 - d) ASCII table
 - 13) A comparison between serial and parallel adder is that a serial adder
 - a) is slower
 - b) is faster
 - c) has same speed as parallel adder
 - d) is more complicated
 - 14) By placing an inverter between both input of an S-R flip flop, it becomes
 - a) J-K flip flop
 - b) D flip flop
 - c) T flip flop
 - d) Master-slave J-K flip flop
-



Seat No.	
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**S.E. (E & TC) (Part – I) (New CBCS) Examination, 2017
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **(4×4=16)**

- 1) Design and explain I-bit magnitude comparator.
- 2) Explain S-R latch.
- 3) Explain the concept of Totem-pole TTL configuration.
- 4) Design Parity checker for three bit input including parity bit.
- 5) Implement the following using NAND gate

$$f(A, B, C, D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 10, 11)$$

3. Solve **any two** : **(6×2=12)**

- 1) Explain and design 4 inputs priority encoder.
- 2) Reduce the following equation and implement it using.
 - i) NAND gate
 - ii) NOR gate

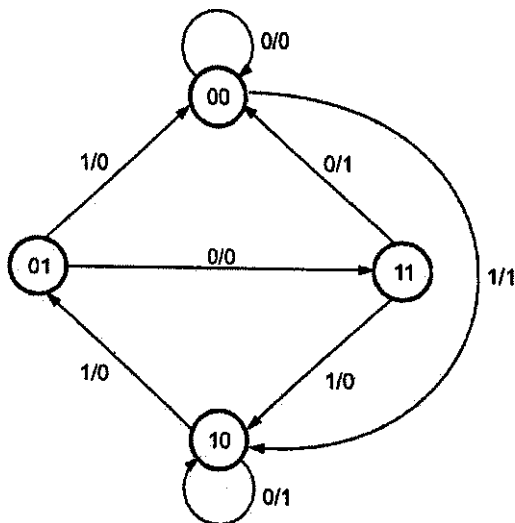
$$Y(A, B, C, D) = \pi M(1, 3, 4, 6, 12, 14).d(9, 11)$$

- 3) Write characteristic table, characteristic equation and excitation table of J-K flip flop.



SECTION – II

4. Solve **any four** : (4×4=16)
- Draw and explain serial in serial out shift register with waveform.
 - Design MOD-7 counter using IC 74191.
 - State design procedure of sequence detector.
 - Implement a full adder circuit using PLA having 3 inputs, 8 product terms and 2 outputs.
 - Write VHDL code for full adder.
5. Solve **any two** : (2×6=12)
- Draw the waveforms to shift data 1101 to left in serial out shift register.
 - Design 4-bit asynchronous up-down counter and draw waveform.
 - Design sequential circuit for state diagram shown in figure. Use T flip-flop.





SLR-TJ – 186

Seat No.	
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Set	S
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**S.E. (E & TC) (Part – I) (New CBCS) Examination, 2017
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) A 4-bit asynchronous counter uses flip-flop with propagation delay time of 25 ns each. The max. Possible time required for change of state will be
 - a) 25 ns
 - b) 50 ns
 - c) 75 ns
 - d) 100 ns
- 2) The MOD number of counter is
 - a) The max. Possible number of states
 - b) The actual number of states in a sequence
 - c) The number of flip flops
 - d) None of these
- 3) The output of the Mealy machine is the function of
 - a) Next state
 - b) Present inputs
 - c) Present state and Present inputs
 - d) Present state
- 4) A PAL has
 - a) Programmable AND array and programmable OR array
 - b) Programmable AND array and fixed OR array
 - c) Fixed AND array and programmable OR array
 - d) Fixed AND array and OR array
- 5) Which of the following is an invalid name in VHDL ?
 - a) DECODE8
 - b) _What_4
 - c) Invalid
 - d) All are valid

P.T.O.



- 6) The following number system is used for K-map representation
a) Binary b) BCD c) Gray d) Hexadecimal
- 7) Which table shows output for every possible combination of input variables ?
a) Function table b) Truth table
c) Routing table d) ASCII table
- 8) A comparison between serial and parallel adder is that a serial adder
a) is slower
b) is faster
c) has same speed as parallel adder
d) is more complicated
- 9) By placing an inverter between both input of an S-R flip flop, it becomes
a) J-K flip flop b) D flip flop
c) T flip flop d) Master-slave J-K flip flop
- 10) A sequential circuit is one whose output depends on
a) present state b) present input
c) both a) and b) d) none
- 11) Which of the following are asynchronous inputs ?
a) preset b) clear c) both a) and b) d) none
- 12) Multiplexer is represented by
a) $2^n \times 1$ b) $2^n \times n$ c) $n \times 2^n$ d) 1×2^n
- 13) A binary divider uses
a) Right shift register b) Left shift register
c) Counter d) None of these
- 14) A binary multiplier uses
a) Right shift register b) Left shift register
c) Counter d) None of these
-



Seat No.	
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**S.E. (E & TC) (Part – I) (New CBCS) Examination, 2017
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **(4×4=16)**

- 1) Design and explain 1-bit magnitude comparator.
- 2) Explain S-R latch.
- 3) Explain the concept of Totem-pole TTL configuration.
- 4) Design Parity checker for three bit input including parity bit.
- 5) Implement the following using NAND gate

$$f(A, B, C, D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 10, 11)$$

3. Solve **any two** : **(6×2=12)**

- 1) Explain and design 4 inputs priority encoder.
- 2) Reduce the following equation and implement it using.
 - i) NAND gate
 - ii) NOR gate

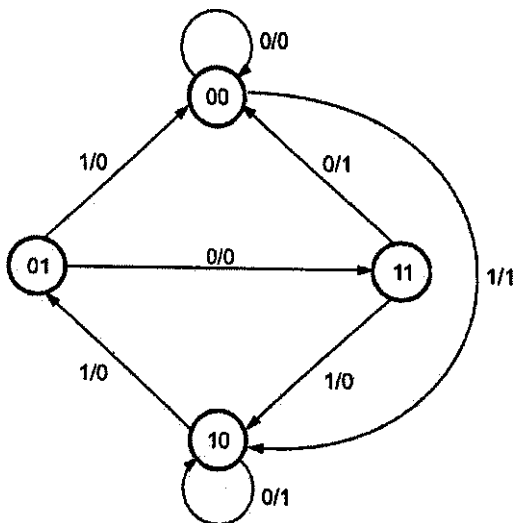
$$Y(A, B, C, D) = \pi M(1, 3, 4, 6, 12, 14).d(9, 11)$$

- 3) Write characteristic table, characteristic equation and excitation table of J-K flip flop.



SECTION – II

4. Solve **any four** : (4×4=16)
- Draw and explain serial in serial out shift register with waveform.
 - Design MOD-7 counter using IC 74191.
 - State design procedure of sequence detector.
 - Implement a full adder circuit using PLA having 3 inputs, 8 product terms and 2 outputs.
 - Write VHDL code for full adder.
5. Solve **any two** : (2×6=12)
- Draw the waveforms to shift data 1101 to left in serial out shift register.
 - Design 4-bit asynchronous up-down counter and draw waveform.
 - Design sequential circuit for state diagram shown in figure. Use T flip-flop.





SLR-TJ – 187

Seat No.	
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Set **P**

**S.E. (Electronics & Telecommunication Engg.) (Part – I) (New CBCS)
Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) 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) $M^2 P_c/16$
- 2) In a communication receiver the noise is most likely affect the signal
 - a) At the transmitter
 - b) At the receiver
 - c) In the information source
 - d) At the destination
- 3) Bandwidth required by an amplitude modulated signal is
 - a) Half the modulating signal frequency
 - b) Equal to carrier frequency
 - c) Twice the modulating signal frequency
 - d) Equal to modulating signal frequency
- 4) Vestigial sideband modulation is most commonly used in
 - a) Radio transmission
 - b) Television transmission
 - c) Telegraph
 - d) All of the above
- 5) The audio frequency range is
 - a) 10 Hz to 1 kHz
 - b) 80 MHz to 108 MHz
 - c) 20 Hz to 20 kHz
 - d) 1 kHz to 1 MHz

P.T.O.



- 6) When E_1, E_2, E_3, E_4 are simultaneous modulating voltages, then total modulating voltage will be
- a) $E_1 + E_2 + E_3 + E_4$ b) $(E_1 + E_2 + E_3 + E_4)/4$
- c) $\sqrt{E_1 + E_2 + E_3 + E_4}$ d) $\sqrt{E_1^2 + E_2^2 + E_3^2 + E_4^2}$
- 7) Noise occurs at low frequency
- a) Shot Noise b) Flicker Noise
- c) White Noise d) Thermal Noise
- 8) To boost high frequencies _____ circuit is used.
- a) Amplifier b) De-emphasis
- c) Pre-emphasis d) Filters
- 9) Which of the following antennas is best excited from a waveguide ?
- a) Biconical b) Horn c) Helical d) Discone
- 10) If modulation signal frequency is doubled, the maximum frequency deviation is
- a) Doubled b) Halved
- c) Remains same d) None
- 11) FM signal can be detected by using
- a) An LPF b) A PLL
- c) A discriminator d) An average detector
- 12) The amplitudes of sidebands in FM signal are dependent on
- a) Gaussian Function b) Fourier Function
- c) Shannon's Theorem d) Bessel Function
- 13) Data transmission rate of MODEM is measured in
- a) Bytes per second b) Baud rate
- c) Bits per second d) MHz
- 14) Radiation pattern of half wave dipole antenna is
- a) Omni directional b) Uni-directional
- c) Pattern of eight d) None
-



Seat No.	
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**S.E. (Electronics & Telecommunication Engg.) (Part – I) (New CBCS)
Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*
3) *Figures to **right** indicates **full** marks.*

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**

- 1) What are various SSB generation techniques ? Explain phase shift method.
- 2) Define modulation and modulation index. Why modulation is necessary ?
- 3) Derive an expression for total power in AM wave in terms of carrier power.
- 4) Draw and explain super heterodyne receiver.
- 5) A receiver connected to an antenna whose resistance is $50\ \Omega$ has an equivalent noise resistance of $30\ \Omega$. Calculate receiver's noise figure in decibels and its equivalent noise temperature.

3. Solve **any two** of the following : **(6×2=12)**

- 1) Derive an expression for noise equivalent resistance due to cascading of many amplifiers.
- 2) Draw and explain two stage IF amplifier. State the factors consider in choice of IF.
- 3) Define noise. What are the types of noise ? Explain white noise.

Set P



SECTION – II

4. Solve **any four** of the following : **(4×4=16)**
- 1) Compare sky-wave and space-wave propagation.
 - 2) Explain the working principle of slope detector.
 - 3) What is Nyquist rate ? Explain sampling theorem.
 - 4) What is basic principle of frequency modulation ?
 - 5) What is natural sampling and flat top sampling ?
5. Solve **any two** of the following : **(6×2=12)**
- 1) With the help of circuit diagram explain the working of foster seelay discriminator.
 - 2) Explain indirect method of FM generation with its block diagram and vector diagram.
 - 3) Define and explain the terms: Beamwidth, Radiation Resistance and Antenna Gain.
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SLR-TJ – 187

Seat No.	
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Set

Q

**S.E. (Electronics & Telecommunication Engg.) (Part – I) (New CBCS)
Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) To boost high frequencies _____ circuit is used.
 - a) Amplifier
 - b) De-emphasis
 - c) Pre-emphasis
 - d) Filters
- 2) Which of the following antennas is best excited from a waveguide ?
 - a) Biconical
 - b) Horn
 - c) Helical
 - d) Discone
- 3) If modulation signal frequency is doubled, the maximum frequency deviation is
 - a) Doubled
 - b) Halved
 - c) Remains same
 - d) None
- 4) FM signal can be detected by using
 - a) An LPF
 - b) A PLL
 - c) A discriminator
 - d) An average detector
- 5) The amplitudes of sidebands in FM signal are dependent on
 - a) Gaussian Function
 - b) Fourier Function
 - c) Shannon's Theorem
 - d) Bessel Function
- 6) Data transmission rate of MODEM is measured in
 - a) Bytes per second
 - b) Baud rate
 - c) Bits per second
 - d) MHz

P.T.O.



Seat No.	
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**S.E. (Electronics & Telecommunication Engg.) (Part – I) (New CBCS)
Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**
2) **Assume suitable data if necessary.**
3) **Figures to *right* indicates full marks.**

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**

- 1) What are various SSB generation techniques ? Explain phase shift method.
- 2) Define modulation and modulation index. Why modulation is necessary ?
- 3) Derive an expression for total power in AM wave in terms of carrier power.
- 4) Draw and explain super heterodyne receiver.
- 5) A receiver connected to an antenna whose resistance is $50\ \Omega$ has an equivalent noise resistance of $30\ \Omega$. Calculate receiver's noise figure in decibels and its equivalent noise temperature.

3. Solve **any two** of the following : **(6×2=12)**

- 1) Derive an expression for noise equivalent resistance due to cascading of many amplifiers.
- 2) Draw and explain two stage IF amplifier. State the factors consider in choice of IF.
- 3) Define noise. What are the types of noise ? Explain white noise.

Set Q



SECTION – II

4. Solve **any four** of the following : **(4×4=16)**
- 1) Compare sky-wave and space-wave propagation.
 - 2) Explain the working principle of slope detector.
 - 3) What is Nyquist rate ? Explain sampling theorem.
 - 4) What is basic principle of frequency modulation ?
 - 5) What is natural sampling and flat top sampling ?
5. Solve **any two** of the following : **(6×2=12)**
- 1) With the help of circuit diagram explain the working of foster seelay discriminator.
 - 2) Explain indirect method of FM generation with its block diagram and vector diagram.
 - 3) Define and explain the terms: Beamwidth, Radiation Resistance and Antenna Gain.
-



- 7) FM signal can be detected by using
- a) An LPF
 - b) A PLL
 - c) A discriminator
 - d) An average detector
- 8) The amplitudes of sidebands in FM signal are dependent on
- a) Gaussian Function
 - b) Fourier Function
 - c) Shannon's Theorem
 - d) Bessel Function
- 9) Data transmission rate of MODEM is measured in
- a) Bytes per second
 - b) Baud rate
 - c) Bits per second
 - d) MHz
- 10) Radiation pattern of half wave dipole antenna is
- a) Omni directional
 - b) Uni-directional
 - c) Pattern of eight
 - d) None
- 11) 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) $M^2 P_c/16$
- 12) In a communication receiver the noise is most likely affect the signal
- a) At the transmitter
 - b) At the receiver
 - c) In the information source
 - d) At the destination
- 13) Bandwidth required by an amplitude modulated signal is
- a) Half the modulating signal frequency
 - b) Equal to carrier frequency
 - c) Twice the modulating signal frequency
 - d) Equal to modulating signal frequency
- 14) Vestigial sideband modulation is most commonly used in
- a) Radio transmission
 - b) Television transmission
 - c) Telegraph
 - d) All of the above
-



Seat No.	
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**S.E. (Electronics & Telecommunication Engg.) (Part – I) (New CBCS)
Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**
2) **Assume suitable data if necessary.**
3) **Figures to *right* indicates full marks.**

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**

- 1) What are various SSB generation techniques ? Explain phase shift method.
- 2) Define modulation and modulation index. Why modulation is necessary ?
- 3) Derive an expression for total power in AM wave in terms of carrier power.
- 4) Draw and explain super heterodyne receiver.
- 5) A receiver connected to an antenna whose resistance is $50\ \Omega$ has an equivalent noise resistance of $30\ \Omega$. Calculate receiver's noise figure in decibels and its equivalent noise temperature.

3. Solve **any two** of the following : **(6×2=12)**

- 1) Derive an expression for noise equivalent resistance due to cascading of many amplifiers.
- 2) Draw and explain two stage IF amplifier. State the factors consider in choice of IF.
- 3) Define noise. What are the types of noise ? Explain white noise.

Set R



SECTION – II

4. Solve **any four** of the following : **(4×4=16)**
- 1) Compare sky-wave and space-wave propagation.
 - 2) Explain the working principle of slope detector.
 - 3) What is Nyquist rate ? Explain sampling theorem.
 - 4) What is basic principle of frequency modulation ?
 - 5) What is natural sampling and flat top sampling ?
5. Solve **any two** of the following : **(6×2=12)**
- 1) With the help of circuit diagram explain the working of foster seelay discriminator.
 - 2) Explain indirect method of FM generation with its block diagram and vector diagram.
 - 3) Define and explain the terms: Beamwidth, Radiation Resistance and Antenna Gain.
-



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Seat No.	
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Set **S**

**S.E. (Electronics & Telecommunication Engg.) (Part – I) (New CBCS)
Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) If modulation signal frequency is doubled, the maximum frequency deviation is
 - a) Doubled
 - b) Halved
 - c) Remains same
 - d) None
- 2) FM signal can be detected by using
 - a) An LPF
 - b) A PLL
 - c) A discriminator
 - d) An average detector
- 3) The amplitudes of sidebands in FM signal are dependent on
 - a) Gaussian Function
 - b) Fourier Function
 - c) Shannon's Theorem
 - d) Bessel Function
- 4) Data transmission rate of MODEM is measured in
 - a) Bytes per second
 - b) Baud rate
 - c) Bits per second
 - d) MHz
- 5) Radiation pattern of half wave dipole antenna is
 - a) Omni directional
 - b) Uni-directional
 - c) Pattern of eight
 - d) None
- 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) $M^2 P_c/16$

P.T.O.



- 7) In a communication receiver the noise is most likely affect the signal
- a) At the transmitter b) At the receiver
c) In the information source d) At the destination
- 8) Bandwidth required by an amplitude modulated signal is
- a) Half the modulating signal frequency
b) Equal to carrier frequency
c) Twice the modulating signal frequency
d) Equal to modulating signal frequency
- 9) Vestigial sideband modulation is most commonly used in
- a) Radio transmission b) Television transmission
c) Telegraph d) All of the above
- 10) The audio frequency range is
- a) 10 Hz to 1 kHz b) 80 MHz to 108 MHz
c) 20 Hz to 20 kHz d) 1 kHz to 1 MHz
- 11) When E_1, E_2, E_3, E_4 are simultaneous modulating voltages, then total modulating voltage will be
- a) $E_1 + E_2 + E_3 + E_4$ b) $(E_1 + E_2 + E_3 + E_4)/4$
c) $\sqrt{E_1 + E_2 + E_3 + E_4}$ d) $\sqrt{E_1^2 + E_2^2 + E_3^2 + E_4^2}$
- 12) Noise occurs at low frequency
- a) Shot Noise b) Flicker Noise
c) White Noise d) Thermal Noise
- 13) To boost high frequencies _____ circuit is used.
- a) Amplifier b) De-emphasis
c) Pre-emphasis d) Filters
- 14) Which of the following antennas is best excited from a waveguide ?
- a) Biconical b) Horn c) Helical d) Discone
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**S.E. (Electronics & Telecommunication Engg.) (Part – I) (New CBCS)
Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*
3) *Figures to **right** indicates **full** marks.*

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**

- 1) What are various SSB generation techniques ? Explain phase shift method.
- 2) Define modulation and modulation index. Why modulation is necessary ?
- 3) Derive an expression for total power in AM wave in terms of carrier power.
- 4) Draw and explain super heterodyne receiver.
- 5) A receiver connected to an antenna whose resistance is $50\ \Omega$ has an equivalent noise resistance of $30\ \Omega$. Calculate receiver's noise figure in decibels and its equivalent noise temperature.

3. Solve **any two** of the following : **(6×2=12)**

- 1) Derive an expression for noise equivalent resistance due to cascading of many amplifiers.
- 2) Draw and explain two stage IF amplifier. State the factors consider in choice of IF.
- 3) Define noise. What are the types of noise ? Explain white noise.

Set S



SECTION – II

4. Solve **any four** of the following : **(4×4=16)**
- 1) Compare sky-wave and space-wave propagation.
 - 2) Explain the working principle of slope detector.
 - 3) What is Nyquist rate ? Explain sampling theorem.
 - 4) What is basic principle of frequency modulation ?
 - 5) What is natural sampling and flat top sampling ?
5. Solve **any two** of the following : **(6×2=12)**
- 1) With the help of circuit diagram explain the working of foster seelay discriminator.
 - 2) Explain indirect method of FM generation with its block diagram and vector diagram.
 - 3) Define and explain the terms: Beamwidth, Radiation Resistance and Antenna Gain.
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S.E. (E&TC) (Part – I) (Old-CGPA) Examination, 2017
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N.B.** : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) Figures to **right** indicate **full** marks.
4) Use of calculator is **allowed**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

1) The particular integral of differential equation $(4D^2 - 1)y = e^{\frac{x}{2}}$ is

- a) $\frac{x}{2} e^{\frac{x}{2}}$ b) $\frac{x}{4} e^{\frac{x}{2}}$ c) $\frac{x}{8} e^{\frac{x}{2}}$ d) $\frac{1}{4} e^{\frac{x}{2}}$

2) The solution of partial differential equation $q = 2p^2$ is

- a) $z = ax + 2a^2y + c$ b) $z = 2ax + a^2y + c$
c) $z = 2a^2x + by$ d) $z = ax + \frac{a^2}{2}y + c$

3) The complementary function of the differential equation $(D^3 - D)y = 0$ is

- a) $y_c = c_1 + c_2 e^x$ b) $y_c = (c_1 + c_2x + c_3x^2) e^x$
c) $y_c = c_1 + c_2 e^x + c_3 e^{-x}$ d) $y_c = c_2 e^x + c_3 e^{-x}$

4) $L^{-1}\{1\} =$

- a) $\frac{1}{s}$ b) $u(t)$ c) $u(t-1)$ d) $\delta(t)$

5) $L^{-1}\left\{\frac{s}{4s^2 - 9}\right\} =$

- a) $\frac{1}{4} \cos(3t)$ b) $\frac{1}{4} \cosh\left(\frac{3t}{2}\right)$ c) $\frac{1}{4} \cos\left(\frac{3t}{2}\right)$ d) $\frac{1}{4} \cosh(3t)$

6) If $L\{f(t)\} = \frac{1}{\sqrt{s^2 + 1}}$, then $L\{f(3t)\} =$

- a) $\frac{3}{\sqrt{s^2 + 9}}$ b) $\frac{3}{\sqrt{s^2 + 1}}$ c) $\frac{1}{3\sqrt{s^2 + 9}}$ d) $\frac{1}{\sqrt{s^2 + 9}}$



7) $L \{e^{-t} t\} =$

- a) $\frac{1}{(s-1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{1}{(s+1)^2}$ d) $-\frac{1}{(s-1)^2}$

8) The unit tangent vector to the curve $x = t^2 + 1, y = 4t - 3, z = 3t^2 - 6t$ at $t = 1$ is

- a) $\frac{1}{\sqrt{3}}(i + j + k)$ b) $\frac{1}{\sqrt{6}}(i + 2j + k)$ c) $\frac{1}{\sqrt{5}}(i + 2j)$ d) $\frac{1}{\sqrt{5}}(i + 2k)$

9) If $\vec{r} = xi + yj + zk$ and $\vec{a} = \frac{\vec{r}}{3}$ then $\text{div}(\vec{a}) =$

- a) 0 b) 1 c) -1 d) 2

10) The inverse Z-transform of $\frac{z}{z-1}, |z| > 1$ is

- a) -1 b) 1 c) 0 d) k

11) The Fourier cosine transform of $f(x) = \begin{cases} 1, & 0 \leq x \leq 1 \\ 0, & x > 1 \end{cases}$ is

- a) $\sqrt{\frac{2}{\pi}} s$ b) $\sqrt{\frac{2}{\pi}} \sin s$
 c) $\sqrt{\frac{2}{\pi}} \frac{\sin s}{s}$ d) $\sqrt{\frac{2}{\pi}} \frac{\cos s}{s}$

12) The Fourier sine integral form of $f(x)$ is

- a) $\int_0^{\infty} f(s) \sin \omega s ds$ b) $\int_0^{\infty} \sin \omega x \left\{ \int_0^{\infty} f(\omega) \sin \omega s ds \right\} d\omega$
 c) $\frac{2}{\pi} \int_0^{\infty} \sin \omega x \left\{ \int_0^{\infty} f(s) \sin \omega s ds \right\} d\omega$ d) none of these

13) The conditions for expansion of a function in a Fourier series are known as

- a) Harmonic b) Riemann c) Periodic d) Dirichlet's

14) If $f(x) = x$ is represented by Fourier series in $(-\pi, \pi)$ then _____ is the constant term.

- a) $\frac{\pi}{2}$ b) π c) 0 d) 2π



Seat No.	
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**S.E. (E&TC) (Part – I) (Old-CGPA) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017

Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

- N.B. :** 1) Attempt **any three** questions from **each** Section.
 2) Figures to **right** indicate **full** marks.
 3) **Use** of calculator is **allowed**.

SECTION – I

2. Attempt the following :

a) Solve : $(D^3 - 2D^2 + 4D)y = e^{2x} + \sin(2x)$. 3

b) Solve : $(D^2 + 2D + 1)y = 4e^{-x} \log(x)$. 3

c) Solve : $(D^2 + D)y = x^2 + 2x$. 3

3. Solve **any three** from the following : 9

a) $p^3 + q^3 = 3pqz$

b) $x(1+y)p - y(1+x)q = 0$

c) $z^2(p^2x^2 + q^2) = 1$

d) $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \frac{1}{y} - \frac{1}{x}$

4. Attempt the following :

a) Find L $\{e^{-2t} + 4t^3 - \sin 2t \cdot \cos 3t\}$. 3

b) Find L $\{e^{-4t} \int_0^t t \sin 3t dt\}$. 3

c) Find the Laplace transform of periodic function f(t) given by

$f(t) = t ; 0 < t < \pi$

$= \pi - t ; \pi < t < 2\pi$

4

Where $f(t + 2\pi) = f(t)$.

OR

Set P



c) Evaluate the following integral by using Laplace transform method.

4

$$\int_0^{\infty} e^{-t} \left(\frac{\sin^2 t}{t} \right) dt$$

5. Attempt the following :

a) Find $L^{-1} \left\{ \frac{3s+1}{(s+1)(s^2+4)} \right\}$.

3

b) Using convolution theorem, find inverse Laplace transform of $\frac{s^2}{(s^2+4)^2}$.

3

c) Solve the following differential equation by Laplace transform

$$y'' + 4y = \delta(t)$$

with $y(0) = 0$, $y'(0) = 0$, where $\delta(t)$ is unit impulse function.

3

SECTION – II

6. Attempt **any three** of the following :

9

a) Find $z^{-1} \left\{ \frac{1}{(z-5)^3} \right\}$, $|z| < 5$.

b) Find $z \{ \cos \alpha k \}$, $k \geq 0$.

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

d) Find $z \left\{ \frac{\alpha^k}{k} \right\}$, $k \geq 1$.

7. a) Find the tangential and normal components of acceleration of particle moving on the curve $x = t^3 - 4t$, $y = t^2 + 4t$, $z = 8t^2 - 3t^3$ at $t = 2$.

4

b) Prove that $\nabla \frac{1}{r} = -\frac{\bar{r}}{r^3}$.

3

c) Determine the constant a , so that the vector $\bar{F} = (x+3y^2)\mathbf{i} + (2y+2z^2)\mathbf{j} + (x^2+az)\mathbf{k}$ is solenoidal.

3

Set P



8. a) Find the Fourier series for $f(x)$ in $(0, 2\pi)$ 5

$$f(x) = \begin{cases} x & ; 0 < x \leq \pi \\ 2\pi - x & ; \pi < x < 2\pi \end{cases}$$

- b) Obtain Fourier series for $f(x) = x^2 - 2$, $-2 \leq x \leq 2$ 4

OR

- b) Find half range sine series for $f(x) = \begin{cases} x & , 0 < x \leq \pi/2 \\ \pi - x & , \pi/2 < x < \pi \end{cases}$ 4

9. a) Using Fourier cosine integral ($x \geq 0$), prove that $e^{-x} = \frac{2}{\pi} \int_0^{\infty} \frac{\cos \omega x}{1 + \omega^2} d\omega$. 3

- b) Express the function $f(x) = \begin{cases} 1, & \text{for } |x| < 1 \\ 0, & \text{for } |x| > 1 \end{cases}$ as Fourier integral. Hence evaluate

$$\int_0^{\infty} \frac{\sin \omega \cos \omega x}{\omega} d\omega. \quad \text{3}$$

- c) Express the function $f(x) = \begin{cases} \sin x, & 0 \leq x < \pi \\ 0, & x > \pi \end{cases}$ as a Fourier sine integral and evaluate

$$\int_0^{\infty} \frac{\sin \omega x \sin \pi \omega}{1 - \omega^2} d\omega. \quad \text{3}$$



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**S.E. (E&TC) (Part – I) (Old-CGPA) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N.B.** : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) Figures to **right** indicate **full** marks.
4) Use of calculator is **allowed**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

1) The unit tangent vector to the curve $x = t^2 + 1, y = 4t - 3, z = 3t^2 - 6t$ at $t = 1$ is

- a) $\frac{1}{\sqrt{3}}(i + j + k)$ b) $\frac{1}{\sqrt{6}}(i + 2j + k)$ c) $\frac{1}{\sqrt{5}}(i + 2j)$ d) $\frac{1}{\sqrt{5}}(i + 2k)$

2) If $\vec{r} = xi + yj + zk$ and $\vec{a} = \frac{\vec{r}}{3}$ then $\text{div}(\vec{a}) =$

- a) 0 b) 1 c) -1 d) 2

3) The inverse Z-transform of $\frac{z}{z-1}, |z| > 1$ is

- a) -1 b) 1 c) 0 d) k

4) The Fourier cosine transform of $f(x) = \begin{cases} 1, & 0 \leq x \leq 1 \\ 0, & x > 1 \end{cases}$ is

- a) $\sqrt{\frac{2}{\pi}} s$ b) $\sqrt{\frac{2}{\pi}} \sin s$
c) $\sqrt{\frac{2}{\pi}} \frac{\sin s}{s}$ d) $\sqrt{\frac{2}{\pi}} \frac{\cos s}{s}$

5) The Fourier sine integral form of $f(x)$ is

- a) $\int_0^{\infty} f(s) \sin \omega s ds$ b) $\int_0^{\infty} \sin \omega x \left\{ \int_0^{\infty} f(\omega) \sin \omega s ds \right\} d\omega$
c) $\frac{2}{\pi} \int_0^{\infty} \sin \omega x \left\{ \int_0^{\infty} f(s) \sin \omega s ds \right\} d\omega$ d) none of these



- 6) The conditions for expansion of a function in a Fourier series are known as
 a) Harmonic b) Riemann c) Periodic d) Dirichlet's
- 7) If $f(x) = x$ is represented by Fourier series in $(-\pi, \pi)$ then _____ is the constant term.
 a) $\frac{\pi}{2}$ b) π c) 0 d) 2π
- 8) The particular integral of differential equation $(4D^2 - 1)y = e^{\frac{x}{2}}$ is
 a) $\frac{x}{2} e^{\frac{x}{2}}$ b) $\frac{x}{4} e^{\frac{x}{2}}$ c) $\frac{x}{8} e^{\frac{x}{2}}$ d) $\frac{1}{4} e^{\frac{x}{2}}$
- 9) The solution of partial differential equation $q = 2p^2$ is
 a) $z = ax + 2a^2y + c$ b) $z = 2ax + a^2y + c$
 c) $z = 2a^2x + by$ d) $z = ax + \frac{a^2}{2}y + c$
- 10) The complementary function of the differential equation $(D^3 - D)y = 0$ is
 a) $y_c = c_1 + c_2 e^x$ b) $y_c = (c_1 + c_2x + c_3x^2) e^x$
 c) $y_c = c_1 + c_2 e^x + c_3 e^{-x}$ d) $y_c = c_2 e^x + c_3 e^{-x}$
- 11) $L^{-1}\{1\} =$
 a) $\frac{1}{s}$ b) $u(t)$ c) $u(t - 1)$ d) $\delta(t)$
- 12) $L^{-1}\left\{\frac{s}{4s^2 - 9}\right\} =$
 a) $\frac{1}{4} \cos(3t)$ b) $\frac{1}{4} \cosh\left(\frac{3t}{2}\right)$ c) $\frac{1}{4} \cos\left(\frac{3t}{2}\right)$ d) $\frac{1}{4} \cosh(3t)$
- 13) If $L\{f(t)\} = \frac{1}{\sqrt{s^2 + 1}}$, then $L\{f(3t)\} =$
 a) $\frac{3}{\sqrt{s^2 + 9}}$ b) $\frac{3}{\sqrt{s^2 + 1}}$ c) $\frac{1}{3\sqrt{s^2 + 9}}$ d) $\frac{1}{\sqrt{s^2 + 9}}$
- 14) $L\{e^{-t} t\} =$
 a) $\frac{1}{(s-1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{1}{(s+1)^2}$ d) $-\frac{1}{(s-1)^2}$



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**S.E. (E&TC) (Part – I) (Old-CGPA) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017

Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

- N.B. :** 1) Attempt **any three** questions from **each** Section.
 2) Figures to **right** indicate **full** marks.
 3) **Use** of calculator is **allowed**.

SECTION – I

2. Attempt the following :

a) Solve : $(D^3 - 2D^2 + 4D)y = e^{2x} + \sin(2x)$. 3

b) Solve : $(D^2 + 2D + 1)y = 4e^{-x} \log(x)$. 3

c) Solve : $(D^2 + D)y = x^2 + 2x$. 3

3. Solve **any three** from the following : 9

a) $p^3 + q^3 = 3pqz$

b) $x(1+y)p - y(1+x)q = 0$

c) $z^2(p^2x^2 + q^2) = 1$

d) $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \frac{1}{y} - \frac{1}{x}$

4. Attempt the following :

a) Find L $\{e^{-2t} + 4t^3 - \sin 2t \cdot \cos 3t\}$. 3

b) Find L $\{e^{-4t} \int_0^t t \sin 3t dt\}$. 3

c) Find the Laplace transform of periodic function f(t) given by

$f(t) = t ; 0 < t < \pi$

$= \pi - t ; \pi < t < 2\pi$ 4

Where $f(t + 2\pi) = f(t)$.

OR



c) Evaluate the following integral by using Laplace transform method.

4

$$\int_0^{\infty} e^{-t} \left(\frac{\sin^2 t}{t} \right) dt$$

5. Attempt the following :

a) Find $L^{-1} \left\{ \frac{3s+1}{(s+1)(s^2+4)} \right\}$.

3

b) Using convolution theorem, find inverse Laplace transform of $\frac{s^2}{(s^2+4)^2}$.

3

c) Solve the following differential equation by Laplace transform

$$y'' + 4y = \delta(t)$$

with $y(0) = 0$, $y'(0) = 0$, where $\delta(t)$ is unit impulse function.

3

SECTION – II

6. Attempt **any three** of the following :

9

a) Find $z^{-1} \left\{ \frac{1}{(z-5)^3} \right\}$, $|z| < 5$.

b) Find $z \{ \cos \alpha k \}$, $k \geq 0$.

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

d) Find $z \left\{ \frac{\alpha^k}{k} \right\}$, $k \geq 1$.

7. a) Find the tangential and normal components of acceleration of particle moving on the curve $x = t^3 - 4t$, $y = t^2 + 4t$, $z = 8t^2 - 3t^3$ at $t = 2$.

4

b) Prove that $\nabla \frac{1}{r} = -\frac{\bar{r}}{r^3}$.

3

c) Determine the constant a , so that the vector $\bar{F} = (x+3y^2)\mathbf{i} + (2y+2z^2)\mathbf{j} + (x^2+az)\mathbf{k}$ is solenoidal.

3

Set Q



8. a) Find the Fourier series for $f(x)$ in $(0, 2\pi)$ 5

$$f(x) = \begin{cases} x & ; 0 < x \leq \pi \\ 2\pi - x & ; \pi < x < 2\pi \end{cases}$$

- b) Obtain Fourier series for $f(x) = x^2 - 2$, $-2 \leq x \leq 2$ 4

OR

- b) Find half range sine series for $f(x) = \begin{cases} x & , 0 < x \leq \pi/2 \\ \pi - x & , \pi/2 < x < \pi \end{cases}$ 4

9. a) Using Fourier cosine integral ($x \geq 0$), prove that $e^{-x} = \frac{2}{\pi} \int_0^{\infty} \frac{\cos \omega x}{1 + \omega^2} d\omega$. 3

- b) Express the function $f(x) = \begin{cases} 1, & \text{for } |x| < 1 \\ 0, & \text{for } |x| > 1 \end{cases}$ as Fourier integral. Hence evaluate

$$\int_0^{\infty} \frac{\sin \omega \cos \omega x}{\omega} d\omega. \quad \text{3}$$

- c) Express the function $f(x) = \begin{cases} \sin x, & 0 \leq x < \pi \\ 0, & x > \pi \end{cases}$ as a Fourier sine integral and evaluate

$$\int_0^{\infty} \frac{\sin \omega x \sin \pi \omega}{1 - \omega^2} d\omega. \quad \text{3}$$



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S.E. (E&TC) (Part – I) (Old-CGPA) Examination, 2017
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N.B.** : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) Figures to **right** indicate **full** marks.
4) Use of calculator is **allowed**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

1) $L^{-1} \left\{ \frac{s}{4s^2 - 9} \right\} =$

- a) $\frac{1}{4} \cos(3t)$ b) $\frac{1}{4} \cosh\left(\frac{3t}{2}\right)$ c) $\frac{1}{4} \cos\left(\frac{3t}{2}\right)$ d) $\frac{1}{4} \cosh(3t)$

2) If $L\{f(t)\} = \frac{1}{\sqrt{s^2 + 1}}$, then $L\{f(3t)\} =$

- a) $\frac{3}{\sqrt{s^2 + 9}}$ b) $\frac{3}{\sqrt{s^2 + 1}}$ c) $\frac{1}{3\sqrt{s^2 + 9}}$ d) $\frac{1}{\sqrt{s^2 + 9}}$

3) $L\{e^{-t}t\} =$

- a) $\frac{1}{(s-1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{1}{(s+1)^2}$ d) $-\frac{1}{(s-1)^2}$

4) The unit tangent vector to the curve $x = t^2 + 1$, $y = 4t - 3$, $z = 3t^2 - 6t$ at $t = 1$ is

- a) $\frac{1}{\sqrt{3}}(i + j + k)$ b) $\frac{1}{\sqrt{6}}(i + 2j + k)$ c) $\frac{1}{\sqrt{5}}(i + 2j)$ d) $\frac{1}{\sqrt{5}}(i + 2k)$

5) If $\vec{r} = xi + yj + zk$ and $\vec{a} = \frac{\vec{r}}{3}$ then $\text{div}(\vec{a}) =$

- a) 0 b) 1 c) -1 d) 2

6) The inverse Z-transform of $\frac{z}{z-1}$, $|z| > 1$ is

- a) -1 b) 1 c) 0 d) k



7) The Fourier cosine transform of $f(x) = \begin{cases} 1, & 0 \leq x \leq 1 \\ 0, & x > 1 \end{cases}$ is

a) $\sqrt{\frac{2}{\pi}} s$

b) $\sqrt{\frac{2}{\pi}} \sin s$

c) $\sqrt{\frac{2}{\pi}} \frac{\sin s}{s}$

d) $\sqrt{\frac{2}{\pi}} \frac{\cos s}{s}$

8) The Fourier sine integral form of $f(x)$ is

a) $\int_0^{\infty} f(s) \sin \omega s ds$

b) $\int_0^{\infty} \sin \omega x \left\{ \int_0^{\infty} f(\omega) \sin \omega s ds \right\} d\omega$

c) $\frac{2}{\pi} \int_0^{\infty} \sin \omega x \left\{ \int_0^{\infty} f(s) \sin \omega s ds \right\} d\omega$

d) none of these

9) The conditions for expansion of a function in a Fourier series are known as

- a) Harmonic b) Riemann c) Periodic d) Dirichlet's

10) If $f(x) = x$ is represented by Fourier series in $(-\pi, \pi)$ then _____ is the constant term.

a) $\frac{\pi}{2}$

b) π

c) 0

d) 2π

11) The particular integral of differential equation $(4D^2 - 1)y = e^{\frac{x}{2}}$ is

a) $\frac{x}{2} e^{\frac{x}{2}}$

b) $\frac{x}{4} e^{\frac{x}{2}}$

c) $\frac{x}{8} e^{\frac{x}{2}}$

d) $\frac{1}{4} e^{\frac{x}{2}}$

12) The solution of partial differential equation $q = 2p^2$ is

a) $z = ax + 2a^2y + c$

b) $z = 2ax + a^2y + c$

c) $z = 2a^2x + by$

d) $z = ax + \frac{a^2}{2}y + c$

13) The complementary function of the differential equation $(D^3 - D)y = 0$ is

a) $y_c = c_1 + c_2 e^x$

b) $y_c = (c_1 + c_2x + c_3x^2) e^x$

c) $y_c = c_1 + c_2 e^x + c_3 e^{-x}$

d) $y_c = c_2 e^x + c_3 e^{-x}$

14) $L^{-1} \{1\} =$

a) $\frac{1}{s}$

b) $u(t)$

c) $u(t-1)$

d) $\delta(t)$



Seat No.	
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**S.E. (E&TC) (Part – I) (Old-CGPA) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017

Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

- N.B. :** 1) Attempt **any three** questions from **each** Section.
 2) Figures to **right** indicate **full** marks.
 3) **Use** of calculator is **allowed**.

SECTION – I

2. Attempt the following :

a) Solve : $(D^3 - 2D^2 + 4D)y = e^{2x} + \sin(2x)$. **3**

b) Solve : $(D^2 + 2D + 1)y = 4e^{-x} \log(x)$. **3**

c) Solve : $(D^2 + D)y = x^2 + 2x$. **3**

3. Solve **any three** from the following : **9**

a) $p^3 + q^3 = 3pqz$

b) $x(1+y)p - y(1+x)q = 0$

c) $z^2(p^2x^2 + q^2) = 1$

d) $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \frac{1}{y} - \frac{1}{x}$

4. Attempt the following :

a) Find L $\{e^{-2t} + 4t^3 - \sin 2t \cdot \cos 3t\}$. **3**

b) Find L $\{e^{-4t} \int_0^t t \sin 3t dt\}$. **3**

c) Find the Laplace transform of periodic function f(t) given by
 $f(t) = t ; 0 < t < \pi$
 $= \pi - t ; \pi < t < 2\pi$ **4**

Where $f(t + 2\pi) = f(t)$.

OR

Set R



c) Evaluate the following integral by using Laplace transform method.

4

$$\int_0^{\infty} e^{-t} \left(\frac{\sin^2 t}{t} \right) dt$$

5. Attempt the following :

a) Find $L^{-1} \left\{ \frac{3s+1}{(s+1)(s^2+4)} \right\}$.

3

b) Using convolution theorem, find inverse Laplace transform of $\frac{s^2}{(s^2+4)^2}$.

3

c) Solve the following differential equation by Laplace transform

$$y'' + 4y = \delta(t)$$

with $y(0) = 0$, $y'(0) = 0$, where $\delta(t)$ is unit impulse function.

3

SECTION – II

6. Attempt **any three** of the following :

9

a) Find $z^{-1} \left\{ \frac{1}{(z-5)^3} \right\}$, $|z| < 5$.

b) Find $z \{ \cos \alpha k \}$, $k \geq 0$.

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

d) Find $z \left\{ \frac{\alpha^k}{k} \right\}$, $k \geq 1$.

7. a) Find the tangential and normal components of acceleration of particle moving on the curve $x = t^3 - 4t$, $y = t^2 + 4t$, $z = 8t^2 - 3t^3$ at $t = 2$.

4

b) Prove that $\nabla \frac{1}{r} = -\frac{\bar{r}}{r^3}$.

3

c) Determine the constant a , so that the vector $\bar{F} = (x+3y^2)\mathbf{i} + (2y+2z^2)\mathbf{j} + (x^2+az)\mathbf{k}$ is solenoidal.

3

Set R



8. a) Find the Fourier series for $f(x)$ in $(0, 2\pi)$ 5

$$f(x) = \begin{cases} x & ; 0 < x \leq \pi \\ 2\pi - x & ; \pi < x < 2\pi \end{cases}$$

b) Obtain Fourier series for $f(x) = x^2 - 2$, $-2 \leq x \leq 2$ 4

OR

b) Find half range sine series for $f(x) = \begin{cases} x & , 0 < x \leq \pi/2 \\ \pi - x & , \pi/2 < x < \pi \end{cases}$ 4

9. a) Using Fourier cosine integral ($x \geq 0$), prove that $e^{-x} = \frac{2}{\pi} \int_0^{\infty} \frac{\cos \omega x}{1 + \omega^2} d\omega$. 3

b) Express the function $f(x) = \begin{cases} 1, & \text{for } |x| < 1 \\ 0, & \text{for } |x| > 1 \end{cases}$ as Fourier integral. Hence evaluate

$$\int_0^{\infty} \frac{\sin \omega \cos \omega x}{\omega} d\omega. \quad \text{3}$$

c) Express the function $f(x) = \begin{cases} \sin x, & 0 \leq x < \pi \\ 0, & x > \pi \end{cases}$ as a Fourier sine integral and evaluate

$$\int_0^{\infty} \frac{\sin \omega x \sin \pi \omega}{1 - \omega^2} d\omega. \quad \text{3}$$



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**S.E. (E&TC) (Part – I) (Old-CGPA) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N.B.** : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3. **Each** question carries **one** mark.
 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 3) Figures to **right** indicate **full** marks.
 4) Use of calculator is **allowed**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

1) The inverse Z-transform of $\frac{z}{z-1}, |z| > 1$ is

- a) -1 b) 1 c) 0 d) k

2) The Fourier cosine transform of $f(x) = \begin{cases} 1, & 0 \leq x \leq 1 \\ 0, & x > 1 \end{cases}$ is

- a) $\sqrt{\frac{2}{\pi}} s$ b) $\sqrt{\frac{2}{\pi}} \sin s$
 c) $\sqrt{\frac{2}{\pi}} \frac{\sin s}{s}$ d) $\sqrt{\frac{2}{\pi}} \frac{\cos s}{s}$

3) The Fourier sine integral form of f(x) is

- a) $\int_0^{\infty} f(s) \sin \omega s ds$ b) $\int_0^{\infty} \sin \omega x \left\{ \int_0^{\infty} f(\omega) \sin \omega s ds \right\} d\omega$
 c) $\frac{2}{\pi} \int_0^{\infty} \sin \omega x \left\{ \int_0^{\infty} f(s) \sin \omega s ds \right\} d\omega$ d) none of these

4) The conditions for expansion of a function in a Fourier series are known as

- a) Harmonic b) Riemann c) Periodic d) Dirichlet's

5) If $f(x) = x$ is represented by Fourier series in $(-\pi, \pi)$ then _____ is the constant term.

- a) $\frac{\pi}{2}$ b) π c) 0 d) 2π



- 6) The particular integral of differential equation $(4D^2 - 1)y = e^{\frac{x}{2}}$ is
- a) $\frac{x}{2} e^{\frac{x}{2}}$ b) $\frac{x}{4} e^{\frac{x}{2}}$ c) $\frac{x}{8} e^{\frac{x}{2}}$ d) $\frac{1}{4} e^{\frac{x}{2}}$
- 7) The solution of partial differential equation $q = 2p^2$ is
- a) $z = ax + 2a^2y + c$ b) $z = 2ax + a^2y + c$
- c) $z = 2a^2x + by$ d) $z = ax + \frac{a^2}{2}y + c$
- 8) The complementary function of the differential equation $(D^3 - D)y = 0$ is
- a) $y_c = c_1 + c_2 e^x$ b) $y_c = (c_1 + c_2x + c_3x^2) e^x$
- c) $y_c = c_1 + c_2 e^x + c_3 e^{-x}$ d) $y_c = c_2 e^x + c_3 e^{-x}$
- 9) $L^{-1}\{1\} =$
- a) $\frac{1}{s}$ b) $u(t)$ c) $u(t-1)$ d) $\delta(t)$
- 10) $L^{-1}\left\{\frac{s}{4s^2 - 9}\right\} =$
- a) $\frac{1}{4} \cos(3t)$ b) $\frac{1}{4} \cosh\left(\frac{3t}{2}\right)$ c) $\frac{1}{4} \cos\left(\frac{3t}{2}\right)$ d) $\frac{1}{4} \cosh(3t)$
- 11) If $L\{f(t)\} = \frac{1}{\sqrt{s^2 + 1}}$, then $L\{f(3t)\} =$
- a) $\frac{3}{\sqrt{s^2 + 9}}$ b) $\frac{3}{\sqrt{s^2 + 1}}$ c) $\frac{1}{3\sqrt{s^2 + 9}}$ d) $\frac{1}{\sqrt{s^2 + 9}}$
- 12) $L\{e^{-t}t\} =$
- a) $\frac{1}{(s-1)^2}$ b) $-\frac{1}{(s+1)^2}$ c) $\frac{1}{(s+1)^2}$ d) $-\frac{1}{(s-1)^2}$
- 13) The unit tangent vector to the curve $x = t^2 + 1, y = 4t - 3, z = 3t^2 - 6t$ at $t = 1$ is
- a) $\frac{1}{\sqrt{3}}(i + j + k)$ b) $\frac{1}{\sqrt{6}}(i + 2j + k)$ c) $\frac{1}{\sqrt{5}}(i + 2j)$ d) $\frac{1}{\sqrt{5}}(i + 2k)$
- 14) If $\vec{r} = xi + yj + zk$ and $\vec{a} = \frac{\vec{r}}{3}$ then $\text{div}(\vec{a}) =$
- a) 0 b) 1 c) -1 d) 2



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**S.E. (E&TC) (Part – I) (Old-CGPA) Examination, 2017
ENGINEERING MATHEMATICS – III**

Day and Date : Tuesday, 12-12-2017

Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

- N.B. :** 1) Attempt **any three** questions from **each** Section.
 2) Figures to **right** indicate **full** marks.
 3) **Use** of calculator is **allowed**.

SECTION – I

2. Attempt the following :

a) Solve : $(D^3 - 2D^2 + 4D)y = e^{2x} + \sin(2x)$. 3

b) Solve : $(D^2 + 2D + 1)y = 4e^{-x} \log(x)$. 3

c) Solve : $(D^2 + D)y = x^2 + 2x$. 3

3. Solve **any three** from the following : 9

a) $p^3 + q^3 = 3pqz$

b) $x(1+y)p - y(1+x)q = 0$

c) $z^2(p^2x^2 + q^2) = 1$

d) $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \frac{1}{y} - \frac{1}{x}$

4. Attempt the following :

a) Find L $\{e^{-2t} + 4t^3 - \sin 2t \cdot \cos 3t\}$. 3

b) Find L $\{e^{-4t} \int_0^t t \sin 3t dt\}$. 3

c) Find the Laplace transform of periodic function f(t) given by
 $f(t) = t ; 0 < t < \pi$
 $= \pi - t ; \pi < t < 2\pi$ 4

Where $f(t + 2\pi) = f(t)$.

OR

Set S



c) Evaluate the following integral by using Laplace transform method.

4

$$\int_0^{\infty} e^{-t} \left(\frac{\sin^2 t}{t} \right) dt$$

5. Attempt the following :

a) Find $L^{-1} \left\{ \frac{3s+1}{(s+1)(s^2+4)} \right\}$.

3

b) Using convolution theorem, find inverse Laplace transform of $\frac{s^2}{(s^2+4)^2}$.

3

c) Solve the following differential equation by Laplace transform

$$y'' + 4y = \delta(t)$$

with $y(0) = 0$, $y'(0) = 0$, where $\delta(t)$ is unit impulse function.

3

SECTION – II

6. Attempt **any three** of the following :

9

a) Find $z^{-1} \left\{ \frac{1}{(z-5)^3} \right\}$, $|z| < 5$.

b) Find $z \{ \cos \alpha k \}$, $k \geq 0$.

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

d) Find $z \left\{ \frac{\alpha^k}{k} \right\}$, $k \geq 1$.

7. a) Find the tangential and normal components of acceleration of particle moving on the curve $x = t^3 - 4t$, $y = t^2 + 4t$, $z = 8t^2 - 3t^3$ at $t = 2$.

4

b) Prove that $\nabla \frac{1}{r} = -\frac{\bar{r}}{r^3}$.

3

c) Determine the constant a , so that the vector $\bar{F} = (x+3y^2)\mathbf{i} + (2y+2z^2)\mathbf{j} + (x^2+az)\mathbf{k}$ is solenoidal.

3

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8. a) Find the Fourier series for $f(x)$ in $(0, 2\pi)$ 5

$$f(x) = \begin{cases} x & ; 0 < x \leq \pi \\ 2\pi - x & ; \pi < x < 2\pi \end{cases}$$

b) Obtain Fourier series for $f(x) = x^2 - 2$, $-2 \leq x \leq 2$ 4

OR

b) Find half range sine series for $f(x) = \begin{cases} x & , 0 < x \leq \pi/2 \\ \pi - x & , \pi/2 < x < \pi \end{cases}$ 4

9. a) Using Fourier cosine integral ($x \geq 0$), prove that $e^{-x} = \frac{2}{\pi} \int_0^{\infty} \frac{\cos \omega x}{1 + \omega^2} d\omega$. 3

b) Express the function $f(x) = \begin{cases} 1, & \text{for } |x| < 1 \\ 0, & \text{for } |x| > 1 \end{cases}$ as Fourier integral. Hence evaluate

$$\int_0^{\infty} \frac{\sin \omega \cos \omega x}{\omega} d\omega. \quad \text{3}$$

c) Express the function $f(x) = \begin{cases} \sin x, & 0 \leq x < \pi \\ 0, & x > \pi \end{cases}$ as a Fourier sine integral and evaluate

$$\int_0^{\infty} \frac{\sin \omega x \sin \pi \omega}{1 - \omega^2} d\omega. \quad \text{3}$$



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**S.E. (E &TC) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) The dc load line of a transistor has
 - a) positive slope
 - b) negative slope
 - c) zero slope
 - d) none
- 2) The diode current equation for Germanium diode is
 - a) $I_0 e^{20v}$
 - b) $I_0 e^{30v}$
 - c) $I_0 e^{40v}$
 - d) none
- 3) The diffusion capacitance is directly proportional to
 - a) V_T
 - b) Reverse current
 - c) Mean life time of carrier
 - d) Forward current
- 4) Avalanche breakdown is primarily dependent on the phenomenon of
 - a) collision
 - b) doping
 - c) ionization
 - d) recombination
- 5) In the case of a BJT amplifier, bias stability is achieved by
 - a) keeping the base current constant
 - b) changing the base current in order to keep the I_C and V_{CB} constant
 - c) keeping the temperature constant
 - d) keeping the temperature and the base current constant
- 6) When a BJT operates in cut-off
 - a) $V_{CE} = 0$
 - b) $V_{CE} = V_{CC}$
 - c) V_{CE} has negative value
 - d) I_C is maximum

P.T.O.



- 7) When a transistor is fully switched ON, it is said to be
- a) shorted
 - b) saturated
 - c) open
 - d) cut-off
- 8) CE amplifier is characterized by
- a) low voltage gain
 - b) moderate power gain
 - c) signal phase reversal
 - d) very high output impedance
- 9) A JFET has the disadvantage of
- a) being noisy
 - b) having small gain-bandwidth product
 - c) possessing positive temperature coefficient
 - d) having low input impedance
- 10) A transconductance amplifier has
- a) high input impedance and low output impedance
 - b) low input impedance and high output impedance
 - c) high input and output impedances
 - d) low input and output impedances
- 11) For fixed Bias circuit $V_{CC} = 10\text{ V}$, $V_{BE} = 0.6\text{ V}$, $\beta = 100$, $I_C = 10\text{ mA}$, what will be the value of base resistance ?
- a) $9\text{ k}\Omega$
 - b) $9.4\text{ k}\Omega$
 - c) $94\text{ k}\Omega$
 - d) none of above
- 12) High frequency characteristic of CE amplifier depends on
- a) C_C
 - b) C_E
 - c) C_C and C_E
 - d) Transistor parasitic capacitance
- 13) Inductor filter is mostly used for rectifiers for
- a) light loads
 - b) high loads
 - c) only half wave rectifiers
 - d) only full wave rectifiers
- 14) The main reason why a bleeder resistor is used in a dc power supply is that it
- a) keeps the supply ON
 - b) improves voltage regulation
 - c) improves filtering action
 - d) both (b) and (c)
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**S.E. (E &TC) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN – I**

Day and Date : Thursday, 14-12-2017

Marks : 56

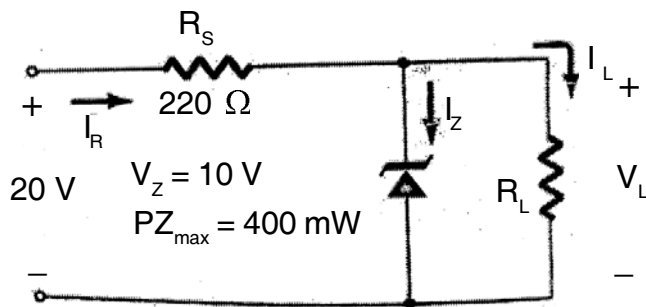
Time :3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** :

(4×3.5=14)

- a) Explain transition capacitance and diffusion capacitance.
- b) Draw the circuit of full wave bridge rectifier with capacitive filter and explain.
- c) Determine pn junction diode current when forward bias is of 0.22V at 25° C and reverse saturation current through diode is 1mA (take =1).
- d) Determine minimum value of R_L to ensure that Zener diode is in ON state.



e) Explain voltage doubler and tripler.

3. Attempt **two** of the following :

14

- a) A bridge rectifier is supplying load current 200mA at 30V. It uses π -filter with $L = 0.5$ H, $C_1 = C_2 = 80\mu$ F. Assume supply frequency of 50 Hz. Calculate.
 - i) rms voltage of secondary of transformer
 - ii) % of ripple in output.
- b) Draw inductor filter for full wave rectifier and Derive expression for its ripple factor.



- c) Design a shunt voltage regulator using Zener diode to provide 6V output from 15V unregulated power supply.

SECTION – II

4. Attempt **any four** : **(4×3.5=14)**

- a) Design collector to base bias circuit for $h_{fe} = 50$, $V_{cc} = 10$, $V_{ce} = 5V$ and $I_c = 1mA$.
- b) What is meant by stability factor ? Obtain stability factor of voltage divider bias.
- c) What is effect of coupling capacitor on low frequency response of single stage amplifier ?
- d) Explain FET as a voltage variable resistor amplifier. What is application of VVR ?
- e) Explain the following terms :
- i) Thermal runaway
 - ii) Power dissipation curve and its significance.

5. Attempt **any two** : **(2×7=14)**

- a) Design a single stage transistor amplifier for output voltage of 9V peak to peak with load resistance of $5K\Omega$ using transistor BC 147B.
- b) Draw hybrid parameter equivalent circuit of BJT amplifier and derive an expression for
- i) A_i
 - ii) R_i
 - iii) A_v
 - iv) R_o
- c) Draw and explain E – MOSFET and D – MOSFET. Compare their drain characteristics.
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**S.E. (E &TC) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3. Each question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) CE amplifier is characterized by
- a) low voltage gain
 - b) moderate power gain
 - c) signal phase reversal
 - d) very high output impedance
- 2) A JFET has the disadvantage of
- a) being noisy
 - b) having small gain-bandwidth product
 - c) possessing positive temperature coefficient
 - d) having low input impedance
- 3) A transconductance amplifier has
- a) high input impedance and low output impedance
 - b) low input impedance and high output impedance
 - c) high input and output impedances
 - d) low input and output impedances
- 4) For fixed Bias circuit $V_{CC} = 10\text{ V}$, $V_{BE} = 0.6\text{ V}$, $\beta = 100$, $I_C = 10\text{ mA}$, what will be the value of base resistance ?
- a) $9\text{ k}\Omega$
 - b) $9.4\text{ k}\Omega$
 - c) $94\text{ k}\Omega$
 - d) none of above



- 5) High frequency characteristic of CE amplifier depends on
- a) C_C
 - b) C_E
 - c) C_C and C_E
 - d) Transistor parasitic capacitance
- 6) Inductor filter is mostly used for rectifiers for
- a) light loads
 - b) high loads
 - c) only half wave rectifiers
 - d) only full wave rectifiers
- 7) The main reason why a bleeder resistor is used in a dc power supply is that it
- a) keeps the supply ON
 - b) improves voltage regulation
 - c) improves filtering action
 - d) both (b) and (c)
- 8) The dc load line of a transistor has
- a) positive slope
 - b) negative slope
 - c) zero slope
 - d) none
- 9) The diode current equation for Germanium diode is
- a) $I_0 e^{20v}$
 - b) $I_0 e^{30v}$
 - c) $I_0 e^{40v}$
 - d) none
- 10) The diffusion capacitance is directly proportional to
- a) V_T
 - b) Reverse current
 - c) Mean life time of carrier
 - d) Forward current
- 11) Avalanche breakdown is primarily dependent on the phenomenon of
- a) collision
 - b) doping
 - c) ionization
 - d) recombination
- 12) In the case of a BJT amplifier, bias stability is achieved by
- a) keeping the base current constant
 - b) changing the base current in order to keep the I_C and V_{CB} constant
 - c) keeping the temperature constant
 - d) keeping the temperature and the base current constant
- 13) When a BJT operates in cut-off
- a) $V_{CE} = 0$
 - b) $V_{CE} = V_{CC}$
 - c) V_{CE} has negative value
 - d) I_C is maximum
- 14) When a transistor is fully switched ON, it is said to be
- a) shorted
 - b) saturated
 - c) open
 - d) cut-off
-



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**S.E. (E &TC) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN – I**

Day and Date : Thursday, 14-12-2017

Marks : 56

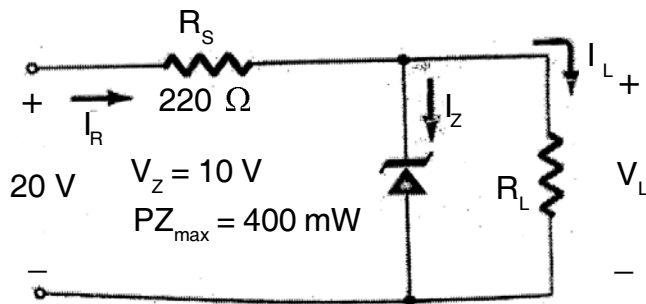
Time :3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** :

(4×3.5=14)

- a) Explain transition capacitance and diffusion capacitance.
- b) Draw the circuit of full wave bridge rectifier with capacitive filter and explain.
- c) Determine pn junction diode current when forward bias is of 0.22V at 25° C and reverse saturation current through diode is 1mA (take =1).
- d) Determine minimum value of R_L to ensure that Zener diode is in ON state.



e) Explain voltage doubler and tripler.

3. Attempt **two** of the following :

14

- a) A bridge rectifier is supplying load current 200mA at 30V. It uses π -filter with $L = 0.5$ H, $C_1 = C_2 = 80\mu$ F. Assume supply frequency of 50 Hz. Calculate.
 - i) rms voltage of secondary of transformer
 - ii) % of ripple in output.
- b) Draw inductor filter for full wave rectifier and Derive expression for its ripple factor.

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- c) Design a shunt voltage regulator using Zener diode to provide 6V output from 15V unregulated power supply.

SECTION – II

4. Attempt **any four** : **(4×3.5=14)**

- a) Design collector to base bias circuit for $h_{fe} = 50$, $V_{cc} = 10$, $V_{ce} = 5V$ and $I_c = 1mA$.
- b) What is meant by stability factor ? Obtain stability factor of voltage divider bias.
- c) What is effect of coupling capacitor on low frequency response of single stage amplifier ?
- d) Explain FET as a voltage variable resistor amplifier. What is application of VVR ?
- e) Explain the following terms :
- i) Thermal runaway
 - ii) Power dissipation curve and its significance.

5. Attempt **any two** : **(2×7=14)**

- a) Design a single stage transistor amplifier for output voltage of 9V peak to peak with load resistance of $5K\Omega$ using transistor BC 147B.
- b) Draw hybrid parameter equivalent circuit of BJT amplifier and derive an expression for
- i) A_i
 - ii) R_i
 - iii) A_v
 - iv) R_o
- c) Draw and explain E – MOSFET and D – MOSFET. Compare their drain characteristics.
-



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**S.E. (E &TC) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3. Each question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) In the case of a BJT amplifier, bias stability is achieved by
 - a) keeping the base current constant
 - b) changing the base current in order to keep the I_C and V_{CB} constant
 - c) keeping the temperature constant
 - d) keeping the temperature and the base current constant
- 2) When a BJT operates in cut-off
 - a) $V_{CE} = 0$
 - b) $V_{CE} = V_{CC}$
 - c) V_{CE} has negative value
 - d) I_C is maximum
- 3) When a transistor is fully switched ON, it is said to be
 - a) shorted
 - b) saturated
 - c) open
 - d) cut-off
- 4) CE amplifier is characterized by
 - a) low voltage gain
 - b) moderate power gain
 - c) signal phase reversal
 - d) very high output impedance
- 5) A JFET has the disadvantage of
 - a) being noisy
 - b) having small gain-bandwidth product
 - c) possessing positive temperature coefficient
 - d) having low input impedance



- 6) A transconductance amplifier has
- high input impedance and low output impedance
 - low input impedance and high output impedance
 - high input and output impedances
 - low input and output impedances
- 7) For fixed Bias circuit $V_{CC} = 10\text{ V}$, $V_{BE} = 0.6\text{ V}$, $\beta = 100$, $I_C = 10\text{mA}$, what will be the value of base resistance ?
- $9\text{k}\Omega$
 - $9.4\text{k}\Omega$
 - $94\text{k}\Omega$
 - none of above
- 8) High frequency characteristic of CE amplifier depends on
- C_C
 - C_E
 - C_C and C_E
 - Transistor parasitic capacitance
- 9) Inductor filter is mostly used for rectifiers for
- light loads
 - high loads
 - only half wave rectifiers
 - only full wave rectifiers
- 10) The main reason why a bleeder resistor is used in a dc power supply is that it
- keeps the supply ON
 - improves voltage regulation
 - improves filtering action
 - both (b) and (c)
- 11) The dc load line of a transistor has
- positive slope
 - negative slope
 - zero slope
 - none
- 12) The diode current equation for Germanium diode is
- $I_0 e^{20v}$
 - $I_0 e^{30v}$
 - $I_0 e^{40v}$
 - none
- 13) The diffusion capacitance is directly proportional to
- V_T
 - Reverse current
 - Mean life time of carrier
 - Forward current
- 14) Avalanche breakdown is primarily dependent on the phenomenon of
- collision
 - doping
 - ionization
 - recombination
-



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**S.E. (E &TC) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN – I**

Day and Date : Thursday, 14-12-2017

Marks : 56

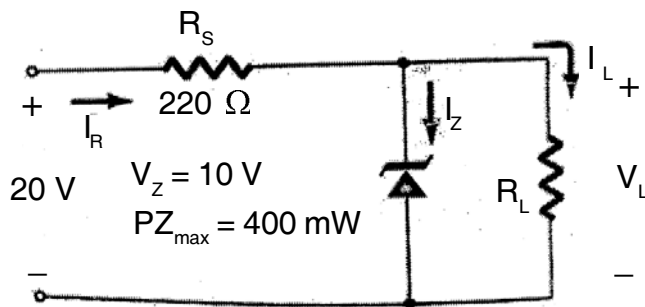
Time :3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** :

(4×3.5=14)

- a) Explain transition capacitance and diffusion capacitance.
- b) Draw the circuit of full wave bridge rectifier with capacitive filter and explain.
- c) Determine pn junction diode current when forward bias is of 0.22V at 25° C and reverse saturation current through diode is 1mA (take =1).
- d) Determine minimum value of R_L to ensure that Zener diode is in ON state.



e) Explain voltage doubler and tripler.

3. Attempt **two** of the following :

14

- a) A bridge rectifier is supplying load current 200mA at 30V. It uses π -filter with $L = 0.5$ H, $C_1 = C_2 = 80\mu$ F. Assume supply frequency of 50 Hz. Calculate.
 - i) rms voltage of secondary of transformer
 - ii) % of ripple in output.
- b) Draw inductor filter for full wave rectifier and Derive expression for its ripple factor.



- c) Design a shunt voltage regulator using Zener diode to provide 6V output from 15V unregulated power supply.

SECTION – II

4. Attempt **any four** : **(4×3.5=14)**

- a) Design collector to base bias circuit for $h_{fe} = 50$, $V_{cc} = 10$, $V_{ce} = 5V$ and $I_c = 1mA$.
- b) What is meant by stability factor ? Obtain stability factor of voltage divider bias.
- c) What is effect of coupling capacitor on low frequency response of single stage amplifier ?
- d) Explain FET as a voltage variable resistor amplifier. What is application of VVR ?
- e) Explain the following terms :
- i) Thermal runaway
 - ii) Power dissipation curve and its significance.

5. Attempt **any two** : **(2×7=14)**

- a) Design a single stage transistor amplifier for output voltage of 9V peak to peak with load resistance of $5K\Omega$ using transistor BC 147B.
- b) Draw hybrid parameter equivalent circuit of BJT amplifier and derive an expression for
- i) A_i
 - ii) R_i
 - iii) A_v
 - iv) R_o
- c) Draw and explain E – MOSFET and D – MOSFET. Compare their drain characteristics.
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**S.E. (E &TC) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN – I**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3. Each question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) A transconductance amplifier has
 - a) high input impedance and low output impedance
 - b) low input impedance and high output impedance
 - c) high input and output impedances
 - d) low input and output impedances
- 2) For fixed Bias circuit $V_{CC} = 10\text{ V}$, $V_{BE} = 0.6\text{ V}$, $\beta = 100$, $I_C = 10\text{ mA}$, what will be the value of base resistance ?
 - a) $9\text{ k}\Omega$
 - b) $9.4\text{ k}\Omega$
 - c) $94\text{ k}\Omega$
 - d) none of above
- 3) High frequency characteristic of CE amplifier depends on
 - a) C_C
 - b) C_E
 - c) C_C and C_E
 - d) Transistor parasitic capacitance
- 4) Inductor filter is mostly used for rectifiers for
 - a) light loads
 - b) high loads
 - c) only half wave rectifiers
 - d) only full wave rectifiers
- 5) The main reason why a bleeder resistor is used in a dc power supply is that it
 - a) keeps the supply ON
 - b) improves voltage regulation
 - c) improves filtering action
 - d) both (b) and (c)



- 6) The dc load line of a transistor has
- a) positive slope
 - b) negative slope
 - c) zero slope
 - d) none
- 7) The diode current equation for Germanium diode is
- a) $I_0 e^{20v}$
 - b) $I_0 e^{30v}$
 - c) $I_0 e^{40v}$
 - d) none
- 8) The diffusion capacitance is directly proportional to
- a) V_T
 - b) Reverse current
 - c) Mean life time of carrier
 - d) Forward current
- 9) Avalanche breakdown is primarily dependent on the phenomenon of
- a) collision
 - b) doping
 - c) ionization
 - d) recombination
- 10) In the case of a BJT amplifier, bias stability is achieved by
- a) keeping the base current constant
 - b) changing the base current in order to keep the I_C and V_{CB} constant
 - c) keeping the temperature constant
 - d) keeping the temperature and the base current constant
- 11) When a BJT operates in cut-off
- a) $V_{CE} = 0$
 - b) $V_{CE} = V_{CC}$
 - c) V_{CE} has negative value
 - d) I_C is maximum
- 12) When a transistor is fully switched ON, it is said to be
- a) shorted
 - b) saturated
 - c) open
 - d) cut-off
- 13) CE amplifier is characterized by
- a) low voltage gain
 - b) moderate power gain
 - c) signal phase reversal
 - d) very high output impedance
- 14) A JFET has the disadvantage of
- a) being noisy
 - b) having small gain-bandwidth product
 - c) possessing positive temperature coefficient
 - d) having low input impedance
-



Seat No.	
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**S.E. (E &TC) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRONIC CIRCUIT ANALYSIS & DESIGN – I**

Day and Date : Thursday, 14-12-2017

Marks : 56

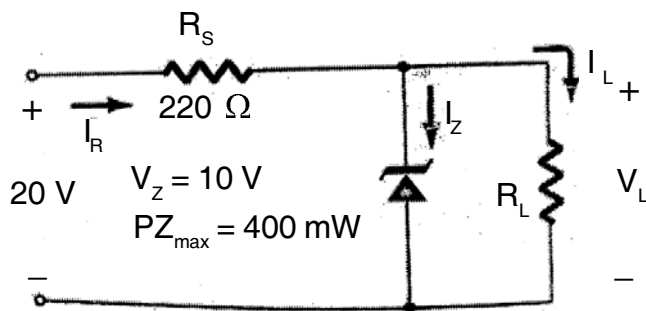
Time :3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** :

(4×3.5=14)

- a) Explain transition capacitance and diffusion capacitance.
- b) Draw the circuit of full wave bridge rectifier with capacitive filter and explain.
- c) Determine pn junction diode current when forward bias is of 0.22V at 25° C and reverse saturation current through diode is 1mA (take =1).
- d) Determine minimum value of R_L to ensure that Zener diode is in ON state.



e) Explain voltage doubler and tripler.

3. Attempt **two** of the following :

14

- a) A bridge rectifier is supplying load current 200mA at 30V. It uses π -filter with $L = 0.5$ H, $C_1 = C_2 = 80\mu$ F. Assume supply frequency of 50 Hz. Calculate.
 - i) rms voltage of secondary of transformer
 - ii) % of ripple in output.
- b) Draw inductor filter for full wave rectifier and Derive expression for its ripple factor.

Set S



- c) Design a shunt voltage regulator using Zener diode to provide 6V output from 15V unregulated power supply.

SECTION – II

4. Attempt **any four** : **(4×3.5=14)**

- a) Design collector to base bias circuit for $h_{fe} = 50$, $V_{cc} = 10$, $V_{ce} = 5V$ and $I_c = 1mA$.
- b) What is meant by stability factor ? Obtain stability factor of voltage divider bias.
- c) What is effect of coupling capacitor on low frequency response of single stage amplifier ?
- d) Explain FET as a voltage variable resistor amplifier. What is application of VVR ?
- e) Explain the following terms :
- i) Thermal runaway
 - ii) Power dissipation curve and its significance.

5. Attempt **any two** : **(2×7=14)**

- a) Design a single stage transistor amplifier for output voltage of 9V peak to peak with load resistance of $5K\Omega$ using transistor BC 147B.
- b) Draw hybrid parameter equivalent circuit of BJT amplifier and derive an expression for
- i) A_i
 - ii) R_i
 - iii) A_v
 - iv) R_o
- c) Draw and explain E – MOSFET and D – MOSFET. Compare their drain characteristics.
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SLR-TJ – 190

Seat No.	
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**S.E. (E and TC Engg.) (Part – I) (Old CGPA) Examination, 2017
CIRCUITS AND NETWORKS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:**
- i) **All questions are compulsory.**
 - ii) **Figures to *right* indicate full marks.**
 - iii) **Assume suitable data whenever necessary.**
 - iv) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.**
 - v) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Write the correct answer :

(14×1=14)

- 1) The maximum power transfer theorem can be applied
 - a) Only to DC circuits
 - b) Only to AC circuits
 - c) Both DC and AC circuits
 - d) None
- 2) If one of the resistors in a parallel circuit is removed, what happens to total resistance ?
 - a) Decreases
 - b) Increases
 - c) Remains constant
 - d) Exactly doubles
- 3) The number of branches in a tree is _____ the number of branches in the graph.
 - a) Less than
 - b) More than
 - c) Equal to
 - d) Same as
- 4) A two port network is defined by following pair of equations $I_1 = 2V_1 + V_2$ and $I_2 = 2V_1 + 3V_2$ then its impedance parameters Z_{11} , Z_{12} , Z_{21} and Z_{22} are given by
 - a) $0.25\Omega, -0.25\Omega, -0.5\Omega, 0.5\Omega$
 - b) $0.75\Omega, -0.25\Omega, -0.5\Omega, 0.5\Omega$
 - c) $0.75\Omega, -0.5\Omega, -0.5\Omega, -0.25\Omega$
 - d) $0.75\Omega, -0.25\Omega, 0.5\Omega, 0.5\Omega$

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**S.E. (E and TC Engg.) (Part – I) (Old CGPA) Examination, 2017
CIRCUITS AND NETWORKS**

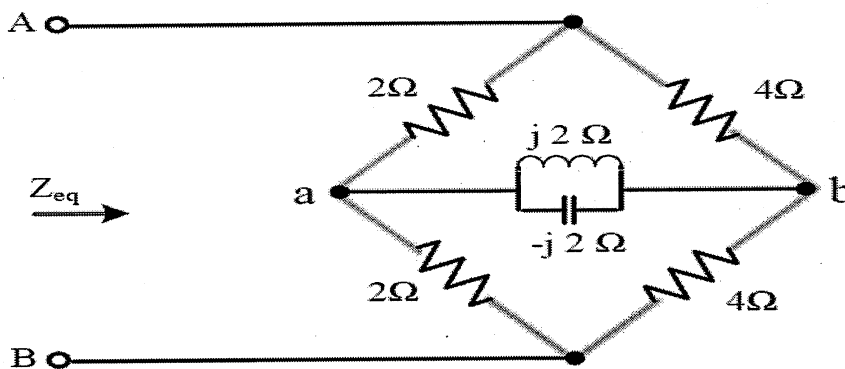
Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 56

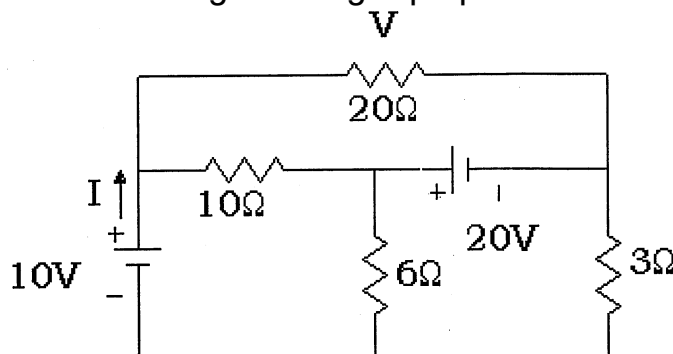
- Instructions:** i) **All** questions are **compulsory**.
ii) Figure to **right** indicate **full** marks.
iii) **Assume** suitable data whenever **necessary**.

SECTION – I

2. Solve **any three** of the followings : (4×3=12)
1) Find equivalent impedance seen across terminal AB



- 2) Prove that $AD-BC = 1$, for reciprocal network.
3) Find the voltage V using superposition.



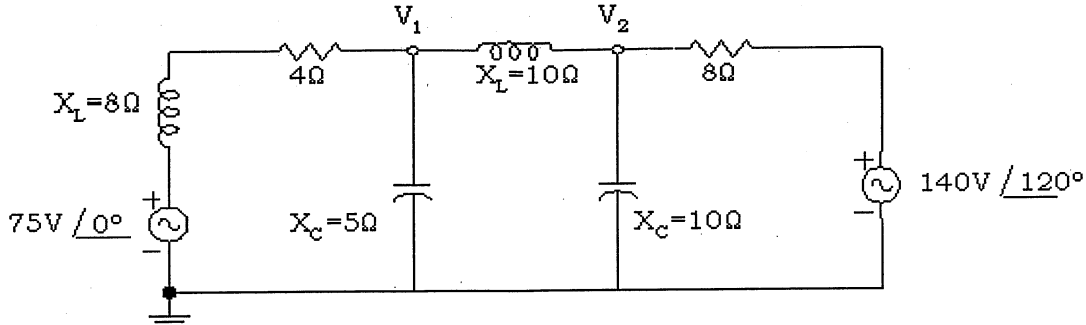
- 4) Obtain the values of R , L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50W from a 50V AC source operating at resonance frequency. The Bandwidth is 0.75 KHz.



3. Solve **any two** of the followings :

(8×2=16)

1) Find the magnitude of V_1 by using nodal analysis.



2) Derive necessary and sufficient condition for maximum power transfer from a voltage source with source impedance $R_s + jX_s$ to a load $R_L + jX_L$. What is the value of power transferred in this case.

3) What is series resonance ? State the properties of series resonance. Define bandwidth and hence prove that $Q = \frac{F_r}{F_2 - F_1}$

SECTION – II

4. Solve **any three** :

(4×3=12)

- Design lattice attenuator for attenuation 20dB and characteristic resistance 50Ω .
- Design constant K low pass filter for cut off frequency 5.5 KHz and nominal impedance 50Ω .
- Denominator polynomial equation is $Q(s) = s^5 + 7s^4 + 4s^3 + 3s^2 + 4s + 50$ determine stability of the circuit and calculate no. of poles with positive real part, zero real parts and negative real parts.
- Verify that characteristic impedance Z_0 is given by $Z_0 = \sqrt{Z_{oc} \cdot Z_{sc}}$.
- Write a note on complex frequency.

5. Solve **any two** :

(8×2=16)

- Design 'm' derived band pass filter for pass band frequencies between 10 KHz to 20KHz, design impedance 100Ω and $m = 0.35$.
- Driving point function is given by $Z(s) = \frac{5s}{(s+2)(s+4)}$ Draw pole zero diagram and obtain the time domain response.
- Explain step voltage response of series RLC circuit.
- Derive the relationship between neper and decibel. What is characteristic impedance and explain its behavior by plotting the graph for constant K high pass filter for different frequencies.



SLR-TJ – 190

Seat No.	
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Set	Q
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**S.E. (E and TC Engg.) (Part – I) (Old CGPA) Examination, 2017
CIRCUITS AND NETWORKS**

Day and Date : Saturday, 16-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions:**
- All questions are compulsory.**
 - Figures to **right** indicate **full** marks.
 - Assume** suitable data whenever **necessary**.
 - Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.
 - Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Write the correct answer :

(14×1=14)

- If $Z_{oc} = 200\Omega$, $Z_{sc} = 50\Omega$, the characteristic impedance is
 - 200Ω
 - 100Ω
 - 400Ω
 - None
- Laplace transform of capacitor C in farad is
 - $\frac{C}{S}$
 - $\frac{1}{CS}$
 - CS
 - CS^2
- The time constant in seconds of RL circuit is
 - $\frac{R}{L}$
 - RL
 - $\frac{L}{R}$
 - None
- The driving point function of a network is $\frac{s(s+2)}{(s+1+j2)(s+1-j2)}$ the number of zeros and poles respectively are
 - 3, 3
 - 2, 2
 - 1, 3
 - 3, 1

P.T.O.



- 5) The shunt arm impedance of the general m-derived T filter circuit is
- a) $\frac{z_2}{m} + \frac{4m}{1-m^2} Z_1$ b) $\frac{z_1}{m} + \frac{1-m^2}{4m} Z_2$
- c) $\frac{z_2}{m} + \frac{1-m^2}{2m} Z_1$ d) $\frac{z_2}{m} + \frac{1-m^2}{4m} Z_1$
- 6) If particular row of Routh array contains all elements zero that represents
- a) All poles with zero real part b) Even no. of poles with zero real parts
- c) All poles with negative real parts d) Odd no. of poles with zero real part
- 7) The transient behavior of the circuit occurs if circuit includes only
- a) All resistors b) All capacitors
- c) All inductors d) None of the above
- 8) The maximum power transfer theorem can be applied
- a) Only to DC circuits b) Only to AC circuits
- c) Both DC and AC circuits d) None
- 9) If one of the resistors in a parallel circuit is removed, what happens to total resistance ?
- a) Decreases b) Increases
- c) Remains constant d) Exactly doubles
- 10) The number of branches in a tree is _____ the number of branches in the graph.
- a) Less than b) More than
- c) Equal to d) Same as
- 11) A two port network is defined by following pair of equations $I_1 = 2V_1 + V_2$ and $I_2 = 2V_1 + 3V_2$ then its impedance parameters Z_{11} , Z_{12} , Z_{21} and Z_{22} are given by
- a) $0.25 \Omega, -0.25 \Omega, -0.5 \Omega, 0.5 \Omega$ b) $0.75 \Omega, -0.25 \Omega, -0.5 \Omega, 0.5 \Omega$
- c) $0.75 \Omega, -0.5 \Omega, -0.5 \Omega, -0.25 \Omega$ d) $0.75 \Omega, -0.25 \Omega, 0.5 \Omega, 0.5 \Omega$
- 12) The power factor at resonance in R-L-C series circuit is
- a) Zero b) 0.08 lagging
- c) 0.8 leading d) Unity
- 13) In order to tune a parallel resonant circuit to lower frequency, the capacitance must
- a) Be increased b) Be zero
- c) Be decreased d) Remain the same
- 14) Which parameters are widely used in transmission line theory
- a) Z parameters b) ABCD parameters
- c) Y parameters d) h parameters



Seat No.	
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**S.E. (E and TC Engg.) (Part – I) (Old CGPA) Examination, 2017
CIRCUITS AND NETWORKS**

Day and Date : Saturday, 16-12-2017

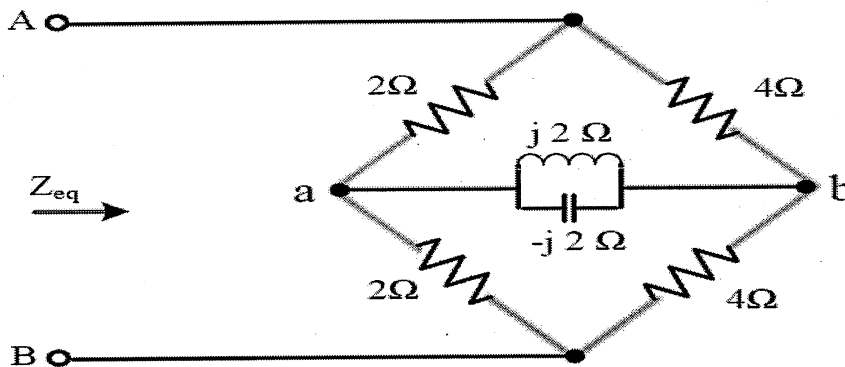
Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

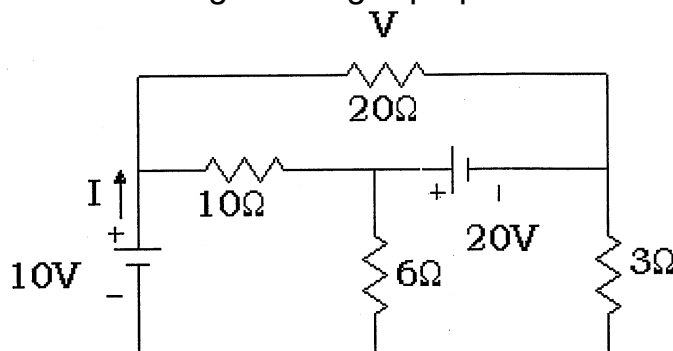
- Instructions :** i) **All** questions are **compulsory**.
ii) Figure to **right** indicate **full** marks.
iii) **Assume** suitable data whenever **necessary**.

SECTION – I

2. Solve **any three** of the followings : (4×3=12)
1) Find equivalent impedance seen across terminal AB



- 2) Prove that $AD-BC = 1$, for reciprocal network.
3) Find the voltage V using superposition.



- 4) Obtain the values of R , L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50W from a 50V AC source operating at resonance frequency. The Bandwidth is 0.75 KHz.

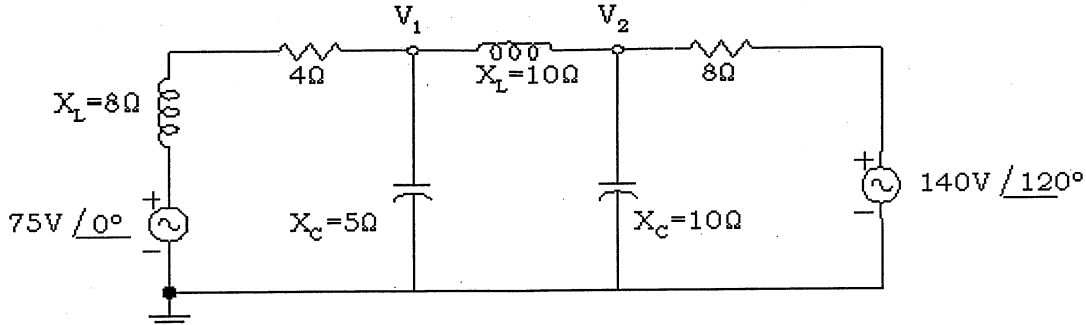
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3. Solve **any two** of the followings :

(8×2=16)

1) Find the magnitude of V_1 by using nodal analysis.



2) Derive necessary and sufficient condition for maximum power transfer from a voltage source with source impedance $R_s + jX_s$ to a load $R_L + jX_L$. What is the value of power transferred in this case.

3) What is series resonance ? State the properties of series resonance. Define bandwidth and hence prove that $Q = \frac{F_r}{F_2 - F_1}$

SECTION – II

4. Solve **any three** :

(4×3=12)

- Design lattice attenuator for attenuation 20dB and characteristic resistance 50Ω .
- Design constant K low pass filter for cut off frequency 5.5 KHz and nominal impedance 50Ω .
- Denominator polynomial equation is $Q(s) = s^5 + 7s^4 + 4s^3 + 3s^2 + 4s + 50$ determine stability of the circuit and calculate no. of poles with positive real part, zero real parts and negative real parts.
- Verify that characteristic impedance Z_0 is given by $Z_0 = \sqrt{Z_{oc} \cdot Z_{sc}}$.
- Write a note on complex frequency.

5. Solve **any two** :

(8×2=16)

- Design 'm' derived band pass filter for pass band frequencies between 10 KHz to 20KHz, design impedance 100Ω and $m = 0.35$.
- Driving point function is given by $Z(s) = \frac{5s}{(s+2)(s+4)}$ Draw pole zero diagram and obtain the time domain response.
- Explain step voltage response of series RLC circuit.
- Derive the relationship between neper and decibel. What is characteristic impedance and explain its behavior by plotting the graph for constant K high pass filter for different frequencies.



SLR-TJ – 190

Seat No.	
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**S.E. (E and TC Engg.) (Part – I) (Old CGPA) Examination, 2017
CIRCUITS AND NETWORKS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:**
- All questions are compulsory.**
 - Figures to **right** indicate **full** marks.
 - Assume** suitable data whenever **necessary**.
 - Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.
 - Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Write the correct answer :

(14×1=14)

- The power factor at resonance in R-L-C series circuit is
 - Zero
 - 0.08 lagging
 - 0.8 leading
 - Unity
- In order to tune a parallel resonant circuit to lower frequency, the capacitance must
 - Be increased
 - Be zero
 - Be decreased
 - Remain the same
- Which parameters are widely used in transmission line theory
 - Z parameters
 - ABCD parameters
 - Y parameters
 - h parameters
- If $Z_{oc} = 200\Omega$, $Z_{sc} = 50\Omega$, the characteristic impedance is
 - 200Ω
 - 100Ω
 - 400Ω
 - None
- Laplace transform of capacitor C in farad is
 - $\frac{C}{s}$
 - $\frac{1}{Cs}$
 - CS
 - CS^2

P.T.O.



- 6) The time constant in seconds of RL circuit is
- a) $\frac{R}{L}$ b) RL c) $\frac{L}{R}$ d) None
- 7) The driving point function of a network is $\frac{s(s+2)}{(s+1+j2)(s+1-j2)}$ the number of zeros and poles respectively are
- a) 3, 3 b) 2, 2 c) 1, 3 d) 3, 1
- 8) The shunt arm impedance of the general m-derived T filter circuit is
- a) $\frac{z_2}{m} + \frac{4m}{1-m^2} Z_1$ b) $\frac{z_1}{m} + \frac{1-m^2}{4m} Z_2$
- c) $\frac{z_2}{m} + \frac{1-m^2}{2m} Z_1$ d) $\frac{z_2}{m} + \frac{1-m^2}{4m} Z_1$
- 9) If particular row of Routh array contains all elements zero that represents
- a) All poles with zero real part b) Even no. of poles with zero real parts
- c) All poles with negative real parts d) Odd no. of poles with zero real part
- 10) The transient behavior of the circuit occurs if circuit includes only
- a) All resistors b) All capacitors
- c) All inductors d) None of the above
- 11) The maximum power transfer theorem can be applied
- a) Only to DC circuits b) Only to AC circuits
- c) Both DC and AC circuits d) None
- 12) If one of the resistors in a parallel circuit is removed, what happens to total resistance ?
- a) Decreases b) Increases
- c) Remains constant d) Exactly doubles
- 13) The number of branches in a tree is _____ the number of branches in the graph.
- a) Less than b) More than
- c) Equal to d) Same as
- 14) A two port network is defined by following pair of equations $I_1 = 2V_1 + V_2$ and $I_2 = 2V_1 + 3V_2$ then its impedance parameters Z_{11} , Z_{12} , Z_{21} and Z_{22} are given by
- a) $0.25\Omega, -0.25\Omega, -0.5\Omega, 0.5\Omega$ b) $0.75\Omega, -0.25\Omega, -0.5\Omega, 0.5\Omega$
- c) $0.75\Omega, -0.5\Omega, -0.5\Omega, -0.25\Omega$ d) $0.75\Omega, -0.25\Omega, 0.5\Omega, 0.5\Omega$



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**S.E. (E and TC Engg.) (Part – I) (Old CGPA) Examination, 2017
CIRCUITS AND NETWORKS**

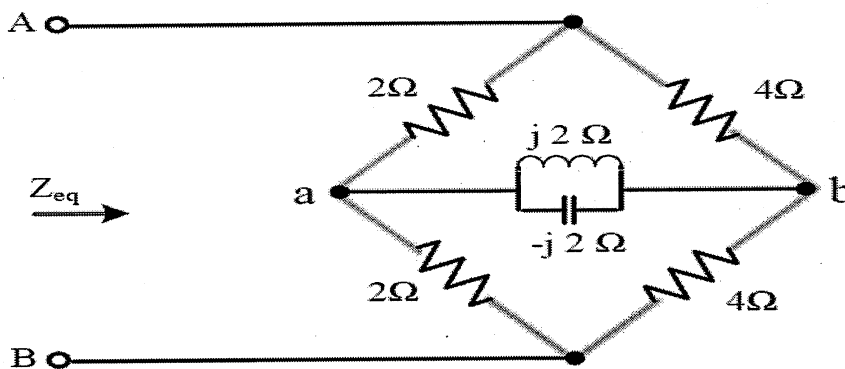
Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 56

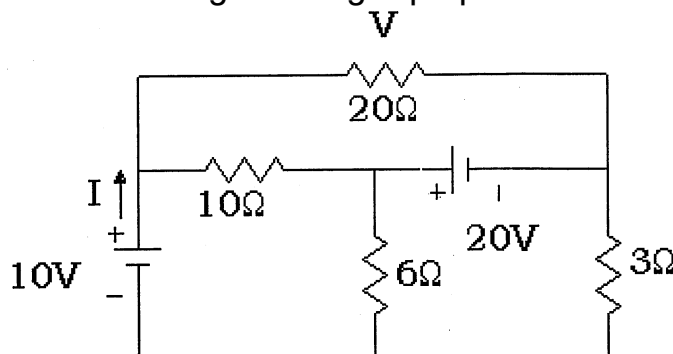
- Instructions:** i) **All** questions are **compulsory**.
ii) Figure to **right** indicate **full** marks.
iii) **Assume** suitable data whenever **necessary**.

SECTION – I

2. Solve **any three** of the followings : (4×3=12)
1) Find equivalent impedance seen across terminal AB



- 2) Prove that $AD-BC = 1$, for reciprocal network.
3) Find the voltage V using superposition.



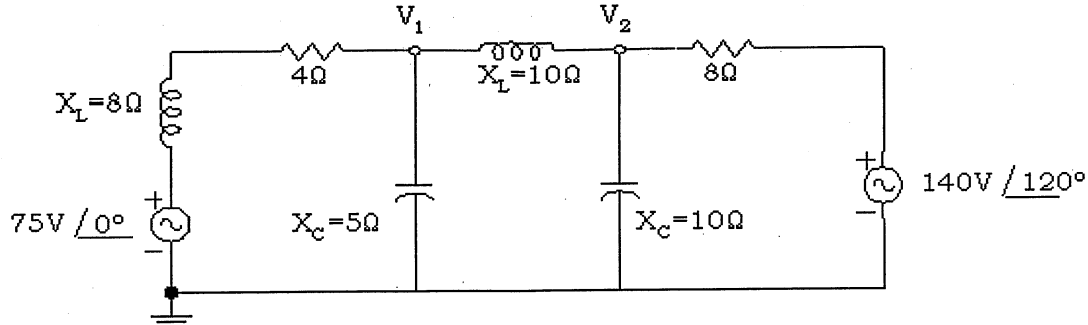
- 4) Obtain the values of R , L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50W from a 50V AC source operating at resonance frequency. The Bandwidth is 0.75 KHz.



3. Solve **any two** of the followings :

(8×2=16)

1) Find the magnitude of V_1 by using nodal analysis.



2) Derive necessary and sufficient condition for maximum power transfer from a voltage source with source impedance $R_s + jX_s$ to a load $R_L + jX_L$. What is the value of power transferred in this case.

3) What is series resonance ? State the properties of series resonance. Define bandwidth and hence prove that $Q = \frac{F_r}{F_2 - F_1}$

SECTION – II

4. Solve **any three** :

(4×3=12)

- Design lattice attenuator for attenuation 20dB and characteristic resistance 50Ω .
- Design constant K low pass filter for cut off frequency 5.5 KHz and nominal impedance 50Ω .
- Denominator polynomial equation is $Q(s) = s^5 + 7s^4 + 4s^3 + 3s^2 + 4s + 50$ determine stability of the circuit and calculate no. of poles with positive real part, zero real parts and negative real parts.
- Verify that characteristic impedance Z_0 is given by $Z_0 = \sqrt{Z_{oc} \cdot Z_{sc}}$.
- Write a note on complex frequency.

5. Solve **any two** :

(8×2=16)

- Design 'm' derived band pass filter for pass band frequencies between 10 KHz to 20KHz, design impedance 100Ω and $m = 0.35$.
- Driving point function is given by $Z(s) = \frac{5s}{(s+2)(s+4)}$ Draw pole zero diagram and obtain the time domain response.
- Explain step voltage response of series RLC circuit.
- Derive the relationship between neper and decibel. What is characteristic impedance and explain its behavior by plotting the graph for constant K high pass filter for different frequencies.



SLR-TJ – 190

Seat No.	
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**S.E. (E and TC Engg.) (Part – I) (Old CGPA) Examination, 2017
CIRCUITS AND NETWORKS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:**
- i) **All questions are compulsory.**
 - ii) **Figures to right indicate full marks.**
 - iii) **Assume suitable data whenever necessary.**
 - iv) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.**
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MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Write the correct answer :

(14×1=14)

1) The time constant in seconds of RL circuit is

- a) $\frac{R}{L}$ b) RL c) $\frac{L}{R}$ d) None

2) The driving point function of a network is $\frac{s(s+2)}{(s+1+j2)(s+1-j2)}$ the number of zeros and poles respectively are

- a) 3, 3 b) 2, 2 c) 1, 3 d) 3, 1

3) The shunt arm impedance of the general m-derived T filter circuit is

- a) $\frac{z_2}{m} + \frac{4m}{1-m^2} Z_1$ b) $\frac{z_1}{m} + \frac{1-m^2}{4m} Z_2$
c) $\frac{z_2}{m} + \frac{1-m^2}{2m} Z_1$ d) $\frac{z_2}{m} + \frac{1-m^2}{4m} Z_1$

4) If particular row of Routh array contains all elements zero that represents

- a) All poles with zero real part b) Even no. of poles with zero real parts
c) All poles with negative real parts d) Odd no. of poles with zero real part

P.T.O.



- 5) The transient behavior of the circuit occurs if circuit includes only
- a) All resistors
 - b) All capacitors
 - c) All inductors
 - d) None of the above
- 6) The maximum power transfer theorem can be applied
- a) Only to DC circuits
 - b) Only to AC circuits
 - c) Both DC and AC circuits
 - d) None
- 7) If one of the resistors in a parallel circuit is removed, what happens to total resistance ?
- a) Decreases
 - b) Increases
 - c) Remains constant
 - d) Exactly doubles
- 8) The number of branches in a tree is _____ the number of branches in the graph.
- a) Less than
 - b) More than
 - c) Equal to
 - d) Same as
- 9) A two port network is defined by following pair of equations $I_1 = 2V_1 + V_2$ and $I_2 = 2V_1 + 3V_2$ then its impedance parameters Z_{11} , Z_{12} , Z_{21} and Z_{22} are given by
- a) $0.25\Omega, -0.25\Omega, -0.5\Omega, 0.5\Omega$
 - b) $0.75\Omega, -0.25\Omega, -0.5\Omega, 0.5\Omega$
 - c) $0.75\Omega, -0.5\Omega, -0.5\Omega, -0.25\Omega$
 - d) $0.75\Omega, -0.25\Omega, 0.5\Omega, 0.5\Omega$
- 10) The power factor at resonance in R-L-C series circuit is
- a) Zero
 - b) 0.08 lagging
 - c) 0.8 leading
 - d) Unity
- 11) In order to tune a parallel resonant circuit to lower frequency, the capacitance must
- a) Be increased
 - b) Be zero
 - c) Be decreased
 - d) Remain the same
- 12) Which parameters are widely used in transmission line theory
- a) Z parameters
 - b) ABCD parameters
 - c) Y parameters
 - d) h parameters
- 13) If $Z_{oc} = 200\Omega$, $Z_{sc} = 50\Omega$, the characteristic impedance is
- a) 200Ω
 - b) 100Ω
 - c) 400Ω
 - d) None
- 14) Laplace transform of capacitor C in farad is
- a) $\frac{C}{S}$
 - b) $\frac{1}{CS}$
 - c) CS
 - d) CS^2
-



Seat No.	
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**S.E. (E and TC Engg.) (Part – I) (Old CGPA) Examination, 2017
CIRCUITS AND NETWORKS**

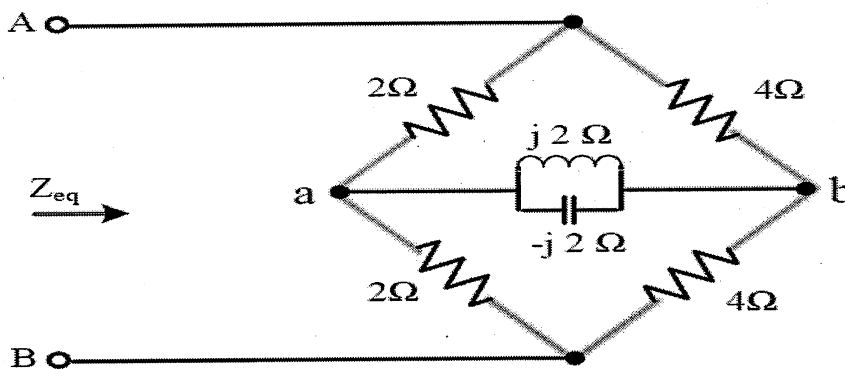
Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 56

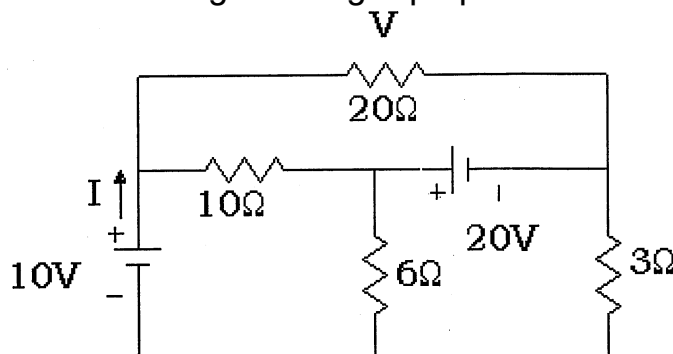
- Instructions:** i) **All** questions are **compulsory**.
ii) Figure to **right** indicate **full** marks.
iii) **Assume** suitable data whenever **necessary**.

SECTION – I

2. Solve **any three** of the followings : (4×3=12)
1) Find equivalent impedance seen across terminal AB



- 2) Prove that $AD-BC = 1$, for reciprocal network.
3) Find the voltage V using superposition.



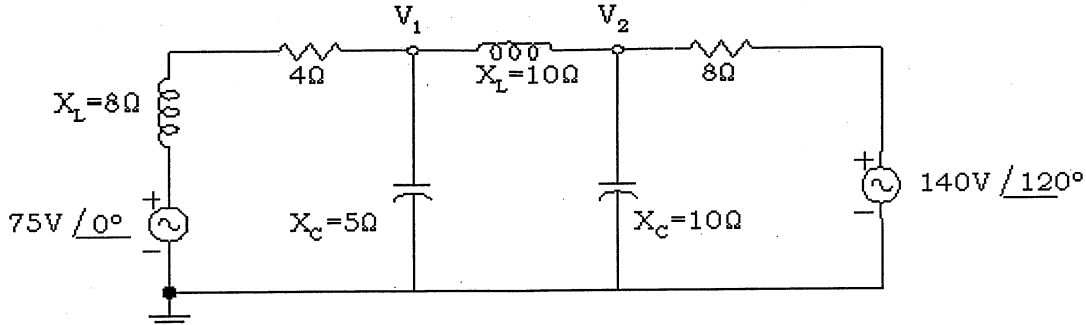
- 4) Obtain the values of R , L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50W from a 50V AC source operating at resonance frequency. The Bandwidth is 0.75 KHz.



3. Solve **any two** of the followings :

(8×2=16)

1) Find the magnitude of V_1 by using nodal analysis.



2) Derive necessary and sufficient condition for maximum power transfer from a voltage source with source impedance $R_s + jX_s$ to a load $R_L + jX_L$. What is the value of power transferred in this case.

3) What is series resonance ? State the properties of series resonance. Define bandwidth and hence prove that $Q = \frac{F_r}{F_2 - F_1}$

SECTION – II

4. Solve **any three** :

(4×3=12)

- Design lattice attenuator for attenuation 20dB and characteristic resistance 50Ω .
- Design constant K low pass filter for cut off frequency 5.5 KHz and nominal impedance 50Ω .
- Denominator polynomial equation is $Q(s) = s^5 + 7s^4 + 4s^3 + 3s^2 + 4s + 50$ determine stability of the circuit and calculate no. of poles with positive real part, zero real parts and negative real parts.
- Verify that characteristic impedance Z_0 is given by $Z_0 = \sqrt{Z_{oc} \cdot Z_{sc}}$.
- Write a note on complex frequency.

5. Solve **any two** :

(8×2=16)

- Design 'm' derived band pass filter for pass band frequencies between 10 KHz to 20KHz, design impedance 100Ω and $m = 0.35$.
- Driving point function is given by $Z(s) = \frac{5s}{(s+2)(s+4)}$ Draw pole zero diagram and obtain the time domain response.
- Explain step voltage response of series RLC circuit.
- Derive the relationship between neper and decibel. What is characteristic impedance and explain its behavior by plotting the graph for constant K high pass filter for different frequencies.



SLR-TJ – 191

Seat No.	
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Set	P
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**S.E. (Part – I) (Electronics and Telecommunication Engineering)
Examination, 2017
(Old – CGPA)
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **right** indicates **full** marks.
 - 3) Assume suitable data wherever **necessary**.
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) The fan out of TTL family is
A) 5 B) 10 C) 15 D) 20
 - 2) IC 7483 work as
A) Comparator B) Adder
C) Decoder D) Shift Register
 - 3) The general representation of an encoder is
A) $2^n : m$ B) $m : 2^n$ C) $n : 2^n$ D) $2^n : 1$
 - 4) _____ is the number of similar gates which can be driven by a gate.
A) Figure of merit B) Noise immunity
C) Fan out D) Power dissipation
 - 5) While obtaining minimal sum of products expression,
A) All don't cares are ignored
B) All don't cares are treated as logic 1's
C) All don't cares are treated as logic 0's
D) Only such don't cares that help minimization are treated as logic 1's

P.T.O.



- 6) Which of the following are asynchronous inputs ?
A) Preset B) Clear C) Both D) None
- 7) The dynamic hazard problem occurs in
A) Combinational circuit only
B) Sequential circuit only
C) Both Sequential and Combinational Circuit
D) None of the above
- 8) To serially shift a byte of data into a shift register there must be
A) One clock pulse
B) Four clock pulses
C) One clock pulse for each 1 in the data
D) Eight clock pulses
- 9) 4 bit ripple counter if output of last flip-flop is 4 kHz what will be the input frequency ?
A) 32 kHz B) 64 kHz C) 8 kHz D) 16 kHz
- 10) The maximum possible number of states in a clocked sequential circuit having 6 flip-flop are
A) 64 B) 16 C) 8 D) 32
- 11) A 4-bit asynchronous counter uses flip-flop with propagation delay time of 25ns each. The maximum possible time required for change of state will be
A) 25 ns B) 50 ns C) 75 ns D) 100 ns
- 12) The output of the Moore machine is the function of
A) Next state
B) Present state
C) Present state and present inputs
D) Present state and next state
- 13) A Mealy system produces a 1 output if input has been consecutively one three times. The number of flip-flops required are
A) 4 B) 3 C) 2 D) 1
- 14) A PLA can be used
A) To realise a sequential logic
B) To realise a combinational logic
C) As a memory
D) None of these



Seat No.	
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**S.E. (Part – I) (Electronics and Telecommunication Engineering)
Examination, 2017
(Old – CGPA)
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Figures to right indicates full marks.*
3) *Assume suitable data wherever necessary.*

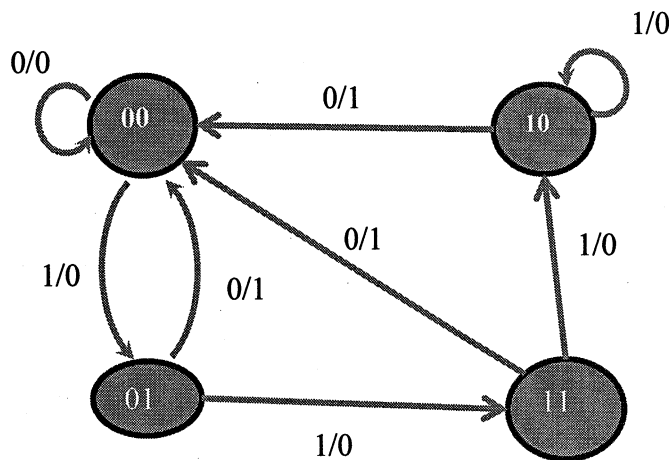
SECTION – I

2. Solve **any four** : **14**
- 1) Implement CMOS 3-input NAND and NOR gate.
 - 2) Explain flip-flop as 1 bit latch.
 - 3) Explain static hazards.
 - 4) Draw and explain IC 74181.
 - 5) Write a short note on Gray Code.
3. Attempt **any two** : **14**
- 1) Implement the following function using single 4 : 1 multiplexer $F(P, Q, R, S) = \sum m(0, 1, 3, 4, 8, 9, 11, 12, 13, 14, 15)$.
 - 2) Draw master slave JK FF. Explain how race around condition is eliminated in case of MS JK FF.
 - 3) Define and explain the following terms associated with TTL Gate.
 - a) Noise Margin
 - b) Power Dissipation
 - c) Fan in
 - d) Fan out.



SECTION – II

4. Attempt **any four** : 14
- 1) Draw and explain twisted ring counter.
 - 2) Design mod-8 up counter using IC 74191.
 - 3) Explain Mealy Machine in detail.
 - 4) Explain Programmable Logic Array with example.
 - 5) Draw the state diagram and state table of JK FF.
5. Attempt **any two** : 14
- 1) Implement the combinational logic functions by using $3 \times 4 \times 2$ PLA.
 $F_1(A, B, C) = \sum m(3, 5, 6, 7)$, $F_2(A, B, C) = \sum m(0, 2, 4, 7)$.
 - 2) Explain universal shift register using IC 7495.
 - 3) Design a sequential circuit using D FF for given state diagram.





SLR-TJ – 191

Seat No.	
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Set	Q
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**S.E. (Part – I) (Electronics and Telecommunication Engineering)
Examination, 2017
(Old – CGPA)
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **right** indicates **full** marks.
 - 3) Assume suitable data wherever **necessary**.
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

14

- 1) To serially shift a byte of data into a shift register there must be
 - A) One clock pulse
 - B) Four clock pulses
 - C) One clock pulse for each 1 in the data
 - D) Eight clock pulses
- 2) 4 bit ripple counter if output of last flip-flop is 4 kHz what will be the input frequency ?
 - A) 32 kHz
 - B) 64 kHz
 - C) 8 kHz
 - D) 16 kHz
- 3) The maximum possible number of states in a clocked sequential circuit having 6 flip-flop are
 - A) 64
 - B) 16
 - C) 8
 - D) 32
- 4) A 4-bit asynchronous counter uses flip-flop with propagation delay time of 25ns each. The maximum possible time required for change of state will be
 - A) 25 ns
 - B) 50 ns
 - C) 75 ns
 - D) 100 ns

P.T.O.



- 5) The output of the Moore machine is the function of
A) Next state
B) Present state
C) Present state and present inputs
D) Present state and next state
- 6) A Mealy system produces a 1 output if input has been consecutively one three times. The number of flip-flops required are
A) 4 B) 3 C) 2 D) 1
- 7) A PLA can be used
A) To realise a sequential logic B) To realise a combinational logic
C) As a memory D) None of these
- 8) The fan out of TTL family is
A) 5 B) 10 C) 15 D) 20
- 9) IC 7483 work as
A) Comparator B) Adder
C) Decoder D) Shift Register
- 10) The general representation of an encoder is
A) $2^n : m$ B) $m : 2^n$ C) $n : 2^n$ D) $2^n : 1$
- 11) _____ is the number of similar gates which can be driven by a gate.
A) Figure of merit B) Noise immunity
C) Fan out D) Power dissipation
- 12) While obtaining minimal sum of products expression,
A) All don't cares are ignored
B) All don't cares are treated as logic 1's
C) All don't cares are treated as logic 0's
D) Only such don't cares that help minimization are treated as logic 1's
- 13) Which of the following are asynchronous inputs ?
A) Preset B) Clear C) Both D) None
- 14) The dynamic hazard problem occurs in
A) Combinational circuit only
B) Sequential circuit only
C) Both Sequential and Combinational Circuit
D) None of the above
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Seat No.	
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**S.E. (Part – I) (Electronics and Telecommunication Engineering)
Examination, 2017
(Old – CGPA)
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Figures to right indicates full marks.*
3) *Assume suitable data wherever necessary.*

SECTION – I

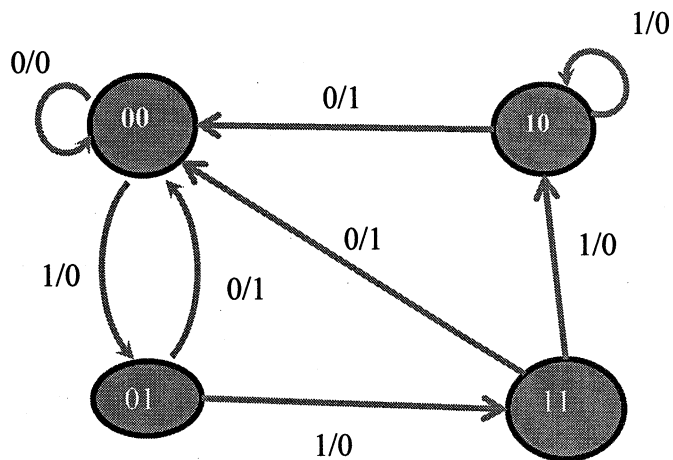
2. Solve **any four** : **14**
- 1) Implement CMOS 3-input NAND and NOR gate.
 - 2) Explain flip-flop as 1 bit latch.
 - 3) Explain static hazards.
 - 4) Draw and explain IC 74181.
 - 5) Write a short note on Gray Code.
3. Attempt **any two** : **14**
- 1) Implement the following function using single 4 : 1 multiplexer $F(P, Q, R, S) = \sum m(0, 1, 3, 4, 8, 9, 11, 12, 13, 14, 15)$.
 - 2) Draw master slave JK FF. Explain how race around condition is eliminated in case of MS JK FF.
 - 3) Define and explain the following terms associated with TTL Gate.
 - a) Noise Margin
 - b) Power Dissipation
 - c) Fan in
 - d) Fan out.

Set Q



SECTION – II

4. Attempt **any four** : 14
- 1) Draw and explain twisted ring counter.
 - 2) Design mod-8 up counter using IC 74191.
 - 3) Explain Mealy Machine in detail.
 - 4) Explain Programmable Logic Array with example.
 - 5) Draw the state diagram and state table of JK FF.
5. Attempt **any two** : 14
- 1) Implement the combinational logic functions by using $3 \times 4 \times 2$ PLA.
 $F_1(A, B, C) = \sum m(3, 5, 6, 7)$, $F_2(A, B, C) = \sum m(0, 2, 4, 7)$.
 - 2) Explain universal shift register using IC 7495.
 - 3) Design a sequential circuit using D FF for given state diagram.





SLR-TJ – 191

Seat No.	
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Set	R
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**S.E. (Part – I) (Electronics and Telecommunication Engineering)
Examination, 2017
(Old – CGPA)
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **right** indicates **full** marks.
 - 3) Assume suitable data wherever **necessary**.
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) While obtaining minimal sum of products expression,
A) All don't cares are ignored
B) All don't cares are treated as logic 1's
C) All don't cares are treated as logic 0's
D) Only such don't cares that help minimization are treated as logic 1's
 - 2) Which of the following are asynchronous inputs ?
A) Preset B) Clear C) Both D) None
 - 3) The dynamic hazard problem occurs in
A) Combinational circuit only
B) Sequential circuit only
C) Both Sequential and Combinational Circuit
D) None of the above
 - 4) To serially shift a byte of data into a shift register there must be
A) One clock pulse
B) Four clock pulses
C) One clock pulse for each 1 in the data
D) Eight clock pulses

P.T.O.



- 5) 4 bit ripple counter if output of last flip-flop is 4 kHz what will be the input frequency ?
A) 32 kHz B) 64 kHz C) 8 kHz D) 16 kHz
- 6) The maximum possible number of states in a clocked sequential circuit having 6 flip-flop are
A) 64 B) 16 C) 8 D) 32
- 7) A 4-bit asynchronous counter uses flip-flop with propagation delay time of 25ns each. The maximum possible time required for change of state will be
A) 25 ns B) 50 ns C) 75 ns D) 100 ns
- 8) The output of the Moore machine is the function of
A) Next state
B) Present state
C) Present state and present inputs
D) Present state and next state
- 9) A Mealy system produces a 1 output if input has been consecutively one three times. The number of flip-flops required are
A) 4 B) 3 C) 2 D) 1
- 10) A PLA can be used
A) To realise a sequential logic
B) To realise a combinational logic
C) As a memory
D) None of these
- 11) The fan out of TTL family is
A) 5 B) 10 C) 15 D) 20
- 12) IC 7483 work as
A) Comparator B) Adder
C) Decoder D) Shift Register
- 13) The general representation of an encoder is
A) $2^n : m$ B) $m : 2^n$ C) $n : 2^n$ D) $2^n : 1$
- 14) _____ is the number of similar gates which can be driven by a gate.
A) Figure of merit B) Noise immunity
C) Fan out D) Power dissipation
-



Seat No.	
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**S.E. (Part – I) (Electronics and Telecommunication Engineering)
Examination, 2017
(Old – CGPA)
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Figures to right indicates full marks.*
3) *Assume suitable data wherever necessary.*

SECTION – I

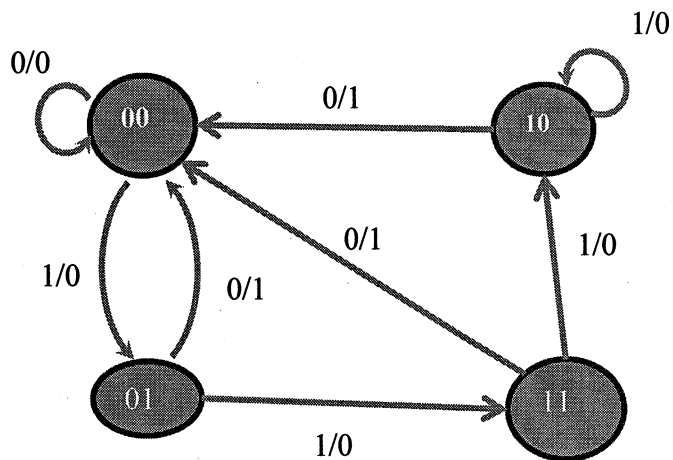
2. Solve **any four** : **14**
- 1) Implement CMOS 3-input NAND and NOR gate.
 - 2) Explain flip-flop as 1 bit latch.
 - 3) Explain static hazards.
 - 4) Draw and explain IC 74181.
 - 5) Write a short note on Gray Code.
3. Attempt **any two** : **14**
- 1) Implement the following function using single 4 : 1 multiplexer $F(P, Q, R, S) = \sum m(0, 1, 3, 4, 8, 9, 11, 12, 13, 14, 15)$.
 - 2) Draw master slave JK FF. Explain how race around condition is eliminated in case of MS JK FF.
 - 3) Define and explain the following terms associated with TTL Gate.
 - a) Noise Margin
 - b) Power Dissipation
 - c) Fan in
 - d) Fan out.

Set R



SECTION – II

4. Attempt **any four** : **14**
- 1) Draw and explain twisted ring counter.
 - 2) Design mod-8 up counter using IC 74191.
 - 3) Explain Mealy Machine in detail.
 - 4) Explain Programmable Logic Array with example.
 - 5) Draw the state diagram and state table of JK FF.
5. Attempt **any two** : **14**
- 1) Implement the combinational logic functions by using $3 \times 4 \times 2$ PLA.
 $F_1(A, B, C) = \sum m(3, 5, 6, 7)$, $F_2(A, B, C) = \sum m(0, 2, 4, 7)$.
 - 2) Explain universal shift register using IC 7495.
 - 3) Design a sequential circuit using D FF for given state diagram.





SLR-TJ – 191

Seat No.	
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Set	S
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**S.E. (Part – I) (Electronics and Telecommunication Engineering)
Examination, 2017
(Old – CGPA)
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **right** indicates **full** marks.
 - 3) Assume suitable data wherever **necessary**.
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) The maximum possible number of states in a clocked sequential circuit having 6 flip-flop are
A) 64 B) 16 C) 8 D) 32
 - 2) A 4-bit asynchronous counter uses flip-flop with propagation delay time of 25ns each. The maximum possible time required for change of state will be
A) 25 ns B) 50 ns
C) 75 ns D) 100 ns
 - 3) The output of the Moore machine is the function of
A) Next state
B) Present state
C) Present state and present inputs
D) Present state and next state
 - 4) A Mealy system produces a 1 output if input has been consecutively one three times. The number of flip-flops required are
A) 4 B) 3 C) 2 D) 1

P.T.O.



- 5) A PLA can be used
- A) To realise a sequential logic B) To realise a combinational logic
C) As a memory D) None of these
- 6) The fan out of TTL family is
- A) 5 B) 10 C) 15 D) 20
- 7) IC 7483 work as
- A) Comparator B) Adder
C) Decoder D) Shift Register
- 8) The general representation of an encoder is
- A) $2^n : m$ B) $m : 2^n$ C) $n : 2^n$ D) $2^n : 1$
- 9) _____ is the number of similar gates which can be driven by a gate.
- A) Figure of merit B) Noise immunity
C) Fan out D) Power dissipation
- 10) While obtaining minimal sum of products expression,
- A) All don't cares are ignored
B) All don't cares are treated as logic 1's
C) All don't cares are treated as logic 0's
D) Only such don't cares that help minimization are treated as logic 1's
- 11) Which of the following are asynchronous inputs ?
- A) Preset B) Clear C) Both D) None
- 12) The dynamic hazard problem occurs in
- A) Combinational circuit only
B) Sequential circuit only
C) Both Sequential and Combinational Circuit
D) None of the above
- 13) To serially shift a byte of data into a shift register there must be
- A) One clock pulse
B) Four clock pulses
C) One clock pulse for each 1 in the data
D) Eight clock pulses
- 14) 4 bit ripple counter if output of last flip-flop is 4 kHz what will be the input frequency ?
- A) 32 kHz B) 64 kHz C) 8 kHz D) 16 kHz
-



Seat No.	
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**S.E. (Part – I) (Electronics and Telecommunication Engineering)
Examination, 2017
(Old – CGPA)
DIGITAL TECHNIQUES**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Figures to right indicates full marks.*
3) *Assume suitable data wherever necessary.*

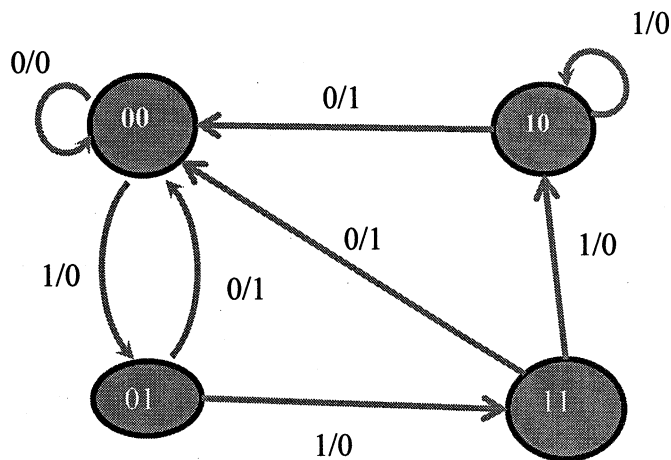
SECTION – I

2. Solve **any four** : **14**
- 1) Implement CMOS 3-input NAND and NOR gate.
 - 2) Explain flip-flop as 1 bit latch.
 - 3) Explain static hazards.
 - 4) Draw and explain IC 74181.
 - 5) Write a short note on Gray Code.
3. Attempt **any two** : **14**
- 1) Implement the following function using single 4 : 1 multiplexer $F(P, Q, R, S) = \sum m(0, 1, 3, 4, 8, 9, 11, 12, 13, 14, 15)$.
 - 2) Draw master slave JK FF. Explain how race around condition is eliminated in case of MS JK FF.
 - 3) Define and explain the following terms associated with TTL Gate.
 - a) Noise Margin
 - b) Power Dissipation
 - c) Fan in
 - d) Fan out.



SECTION – II

4. Attempt **any four** : 14
- 1) Draw and explain twisted ring counter.
 - 2) Design mod-8 up counter using IC 74191.
 - 3) Explain Mealy Machine in detail.
 - 4) Explain Programmable Logic Array with example.
 - 5) Draw the state diagram and state table of JK FF.
5. Attempt **any two** : 14
- 1) Implement the combinational logic functions by using $3 \times 4 \times 2$ PLA.
 $F_1(A, B, C) = \sum m(3, 5, 6, 7)$, $F_2(A, B, C) = \sum m(0, 2, 4, 7)$.
 - 2) Explain universal shift register using IC 7495.
 - 3) Design a sequential circuit using D FF for given state diagram.





SLR-TJ – 192

Seat No.	
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Set

P

**S.E. (E & TC) (Part – I) (Old) (CGPA Pattern) Examination, 2017
DATA STRUCTURES USING 'C'**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **All questions are compulsory.**
4) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(1×14=14)**
- 1) If the insertion and deletion happens from both the ends then the queue is called a
 - a) Deque
 - b) Header Queue
 - c) Queue
 - d) Circular Queue
 - 2) The following sequence of operations is carried out on a stack.
Push (A), Push (B), Pop(), Push(A), Push(B), Pop(), Pop(), Pop(), Push(B), Pop().
The sequence of values popped out is
 - a) BBAAB
 - b) BBABA
 - c) BABBA
 - d) BAABB
 - 3) In queue elements are added at
 - a) rear end
 - b) front end
 - c) top end
 - d) interior node
 - 4) The node of singly linked list contains
 - a) prev, info, next
 - b) info, next
 - c) both a) and b)
 - d) none of these
 - 5) The pointer which is travelling along the linked list is called as
 - a) External pointer
 - b) Internal pointer
 - c) Traversal pointer
 - d) None of these

P.T.O.



- 6) A _____ node will not contain any data.
a) head b) first c) NULL d) last
- 7) Recursively the fib(6) is
a) 2 b) 8 c) 5 d) 9
- 8) Any node in the path from the root to the node is called as
a) Successor node b) Ancestor node
c) Internal node d) None of these
- 9) The complexity of searching an element from a set of n elements using binary search algorithm is
a) $O(n)$ b) $O(\log n)$ c) $O(n^2)$ d) $O(n \log n)$
- 10) For an undirected graph with 'n' vertices and 'e' edges, sum of degree of each vertex is equal to
a) $2n$ b) $(2n - 1)/2$ c) $2e$ d) $e^2/2$
- 11) The binary search requires the list which should be a
a) sorted list b) unsorted list c) linked list d) array
- 12) Traversing a binary tree first left and then right and root subtrees is called _____ traversal.
a) post-order b) in-order c) pre-order d) none of these
- 13) Key to address transformation is done by
a) closed addressing b) hash function
c) primary clustering d) none of these
- 14) The sort based on values of actual digits in positional representation of numbers being sorted is known as
a) Quick sort b) Partition exchange sort
c) Radix sort d) None of these
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Seat No.	
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**S.E. (E & TC) (Part – I) (Old) (CGPA Pattern) Examination, 2017
DATA STRUCTURES USING 'C'**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Answer **any three**. **(4×3=12)**

- 1) Explain basic operations on stack with neat diagrams.
- 2) Explain the representation of doubly linked list with an example.
- 3) Convert infix expression to postfix using the algorithm : $(A + B) / (C - D) + E$.
- 4) Write a 'C' program to find the GCD of two numbers with recursive functions.

3. Answer **any two**. **(8×2=16)**

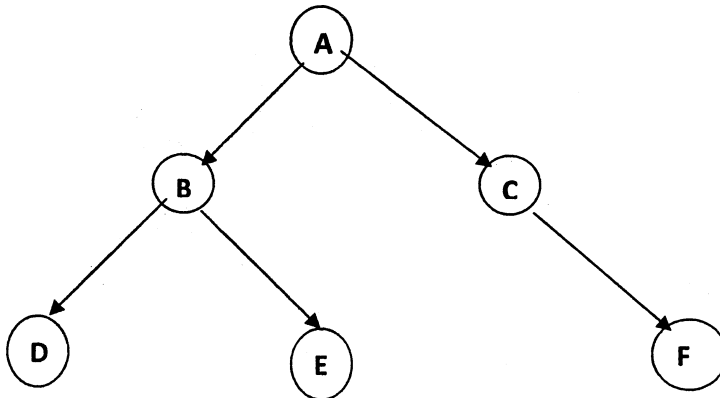
- 1) Evaluate following postfix expressions :
 - i) $2\ 9\ 6\ * \ 3 \ / \ + \ 1 \ -$
 - ii) $6\ 2\ * \ 2 \ / \ 4 \ + \ 5 \ -$
- 2) Draw the recursive flowchart. Write a 'C' program to find the factorial of a number with recursive functions.
- 3) Explain :
 - i) Linear Queue
 - ii) Priority Queue
 - iii) DEQUE.



SECTION – II

4. Answer **any three**.**(4×3=12)**

- What is hashing ? Explain any two hashing functions.
- Define graph. Explain following terms with respect to graph :
 - Directed graph
 - Undirected graph
 - Weighted graph
 - Cycle.
- What is the difference between linear search and binary search ? Explain with an example.
- Write pre-order, post-order and in-order of following tree

5. Answer **any two**.**(8×2=16)**

- What is collision ? Explain open addressing technique in detail.
- What are graph traversal methods ? Explain any one traversal method with flowchart and example.
- Sort the following elements using Radix sort. Show the status after each step.

163, 328, 567, 498, 345, 209, 124



SLR-TJ – 192

Seat No.	
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Set

Q

**S.E. (E & TC) (Part – I) (Old) (CGPA Pattern) Examination, 2017
DATA STRUCTURES USING 'C'**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **All questions are compulsory.**
4) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) Any node in the path from the root to the node is called as
 - a) Successor node
 - b) Ancestor node
 - c) Internal node
 - d) None of these
- 2) The complexity of searching an element from a set of n elements using binary search algorithm is
 - a) $O(n)$
 - b) $O(\log n)$
 - c) $O(n^2)$
 - d) $O(n \log n)$
- 3) For an undirected graph with 'n' vertices and 'e' edges, sum of degree of each vertex is equal to
 - a) $2n$
 - b) $(2n - 1)/2$
 - c) $2e$
 - d) $e^2/2$
- 4) The binary search requires the list which should be a
 - a) sorted list
 - b) unsorted list
 - c) linked list
 - d) array
- 5) Traversing a binary tree first left and then right and root subtrees is called _____ traversal.
 - a) post-order
 - b) in-order
 - c) pre-order
 - d) none of these
- 6) Key to address transformation is done by
 - a) closed addressing
 - b) hash function
 - c) primary clustering
 - d) none of these

P.T.O.



- 7) The sort based on values of actual digits in positional representation of numbers being sorted is known as
- a) Quick sort
 - b) Partition exchange sort
 - c) Radix sort
 - d) None of these
- 8) If the insertion and deletion happens from both the ends then the queue is called a
- a) Deque
 - b) Header Queue
 - c) Queue
 - d) Circular Queue
- 9) The following sequence of operations is carried out on a stack.
Push (A), Push (B), Pop(), Push(A), Push(B), Pop(), Pop(), Pop(), Push(B), Pop().
The sequence of values popped out is
- a) BBAAB
 - b) BBABA
 - c) BABBA
 - d) BAABB
- 10) In queue elements are added at
- a) rear end
 - b) front end
 - c) top end
 - d) interior node
- 11) The node of singly linked list contains
- a) prev, info, next
 - b) info, next
 - c) both a) and b)
 - d) none of these
- 12) The pointer which is travelling along the linked list is called as
- a) External pointer
 - b) Internal pointer
 - c) Traversal pointer
 - d) None of these
- 13) A _____ node will not contain any data.
- a) head
 - b) first
 - c) NULL
 - d) last
- 14) Recursively the fib(6) is
- a) 2
 - b) 8
 - c) 5
 - d) 9
-



Seat No.	
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**S.E. (E & TC) (Part – I) (Old) (CGPA Pattern) Examination, 2017
DATA STRUCTURES USING 'C'**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Answer **any three**. **(4×3=12)**

- 1) Explain basic operations on stack with neat diagrams.
- 2) Explain the representation of doubly linked list with an example.
- 3) Convert infix expression to postfix using the algorithm : $(A + B) / (C - D) + E$.
- 4) Write a 'C' program to find the GCD of two numbers with recursive functions.

3. Answer **any two**. **(8×2=16)**

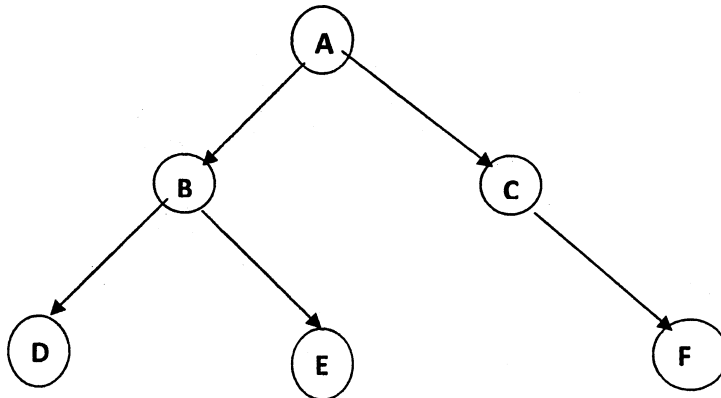
- 1) Evaluate following postfix expressions :
 - i) $2\ 9\ 6\ * \ 3 \ / \ + \ 1 \ -$
 - ii) $6\ 2\ * \ 2 \ / \ 4 \ + \ 5 \ -$
- 2) Draw the recursive flowchart. Write a 'C' program to find the factorial of a number with recursive functions.
- 3) Explain :
 - i) Linear Queue
 - ii) Priority Queue
 - iii) DEQUE.



SECTION – II

4. Answer **any three**.**(4×3=12)**

- What is hashing ? Explain any two hashing functions.
- Define graph. Explain following terms with respect to graph :
 - Directed graph
 - Undirected graph
 - Weighted graph
 - Cycle.
- What is the difference between linear search and binary search ? Explain with an example.
- Write pre-order, post-order and in-order of following tree

5. Answer **any two**.**(8×2=16)**

- What is collision ? Explain open addressing technique in detail.
- What are graph traversal methods ? Explain any one traversal method with flowchart and example.
- Sort the following elements using Radix sort. Show the status after each step.

163, 328, 567, 498, 345, 209, 124



SLR-TJ – 192

Seat No.	
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Set

R

**S.E. (E & TC) (Part – I) (Old) (CGPA Pattern) Examination, 2017
DATA STRUCTURES USING 'C'**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **All questions are compulsory.**
4) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The pointer which is travelling along the linked list is called as
 - a) External pointer
 - b) Internal pointer
 - c) Traversal pointer
 - d) None of these
- 2) A _____ node will not contain any data.
 - a) head
 - b) first
 - c) NULL
 - d) last
- 3) Recursively the fib(6) is
 - a) 2
 - b) 8
 - c) 5
 - d) 9
- 4) Any node in the path from the root to the node is called as
 - a) Successor node
 - b) Ancestor node
 - c) Internal node
 - d) None of these
- 5) The complexity of searching an element from a set of n elements using binary search algorithm is
 - a) O(n)
 - b) O(log n)
 - c) O(n²)
 - d) O(n log n)
- 6) For an undirected graph with 'n' vertices and 'e' edges, sum of degree of each vertex is equal to
 - a) 2n
 - b) (2n – 1)/2
 - c) 2e
 - d) e²/2

P.T.O.



- 7) The binary search requires the list which should be a
a) sorted list b) unsorted list c) linked list d) array
- 8) Traversing a binary tree first left and then right and root subtrees is called _____ traversal.
a) post-order b) in-order c) pre-order d) none of these
- 9) Key to address transformation is done by
a) closed addressing b) hash function
c) primary clustering d) none of these
- 10) The sort based on values of actual digits in positional representation of numbers being sorted is known as
a) Quick sort b) Partition exchange sort
c) Radix sort d) None of these
- 11) If the insertion and deletion happens from both the ends then the queue is called a
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c) Queue d) Circular Queue
- 12) The following sequence of operations is carried out on a stack.
Push (A), Push (B), Pop(), Push(A), Push(B), Pop(), Pop(), Pop(), Push(B), Pop().
The sequence of values popped out is
a) BBAAB b) BBABA c) BABBA d) BAABB
- 13) In queue elements are added at
a) rear end b) front end c) top end d) interior node
- 14) The node of singly linked list contains
a) prev, info, next b) info, next
c) both a) and b) d) none of these
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**S.E. (E & TC) (Part – I) (Old) (CGPA Pattern) Examination, 2017
DATA STRUCTURES USING 'C'**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Answer **any three**. **(4×3=12)**

- 1) Explain basic operations on stack with neat diagrams.
- 2) Explain the representation of doubly linked list with an example.
- 3) Convert infix expression to postfix using the algorithm : $(A + B) / (C - D) + E$.
- 4) Write a 'C' program to find the GCD of two numbers with recursive functions.

3. Answer **any two**. **(8×2=16)**

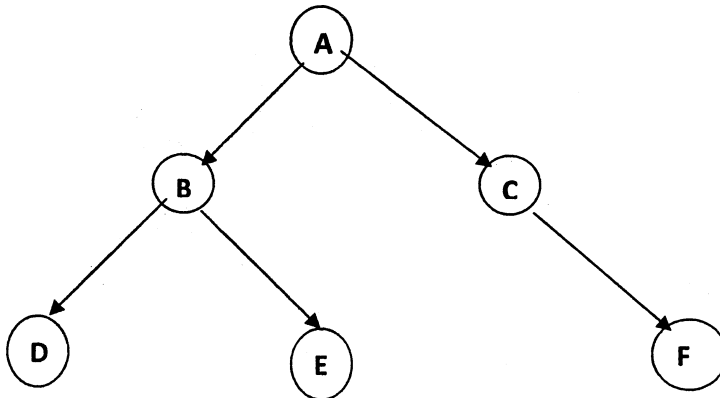
- 1) Evaluate following postfix expressions :
 - i) $2\ 9\ 6\ * \ 3 \ / \ + \ 1 \ -$
 - ii) $6\ 2\ * \ 2 \ / \ 4 \ + \ 5 \ -$
- 2) Draw the recursive flowchart. Write a 'C' program to find the factorial of a number with recursive functions.
- 3) Explain :
 - i) Linear Queue
 - ii) Priority Queue
 - iii) DEQUE.



SECTION – II

4. Answer **any three**.**(4×3=12)**

- What is hashing ? Explain any two hashing functions.
- Define graph. Explain following terms with respect to graph :
 - Directed graph
 - Undirected graph
 - Weighted graph
 - Cycle.
- What is the difference between linear search and binary search ? Explain with an example.
- Write pre-order, post-order and in-order of following tree

5. Answer **any two**.**(8×2=16)**

- What is collision ? Explain open addressing technique in detail.
- What are graph traversal methods ? Explain any one traversal method with flowchart and example.
- Sort the following elements using Radix sort. Show the status after each step.

163, 328, 567, 498, 345, 209, 124



SLR-TJ – 192

Seat No.	
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S

**S.E. (E & TC) (Part – I) (Old) (CGPA Pattern) Examination, 2017
DATA STRUCTURES USING ‘C’**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **All questions are compulsory.**
4) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) For an undirected graph with 'n' vertices and 'e' edges, sum of degree of each vertex is equal to
a) $2n$ b) $(2n - 1)/2$ c) $2e$ d) $e^2/2$
- 2) The binary search requires the list which should be a
a) sorted list b) unsorted list c) linked list d) array
- 3) Traversing a binary tree first left and then right and root subtrees is called _____ traversal.
a) post-order b) in-order c) pre-order d) none of these
- 4) Key to address transformation is done by
a) closed addressing b) hash function
c) primary clustering d) none of these
- 5) The sort based on values of actual digits in positional representation of numbers being sorted is known as
a) Quick sort b) Partition exchange sort
c) Radix sort d) None of these

P.T.O.



Seat No.	
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**S.E. (E & TC) (Part – I) (Old) (CGPA Pattern) Examination, 2017
DATA STRUCTURES USING 'C'**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Answer **any three**. **(4×3=12)**

- 1) Explain basic operations on stack with neat diagrams.
- 2) Explain the representation of doubly linked list with an example.
- 3) Convert infix expression to postfix using the algorithm : $(A + B) / (C - D) + E$.
- 4) Write a 'C' program to find the GCD of two numbers with recursive functions.

3. Answer **any two**. **(8×2=16)**

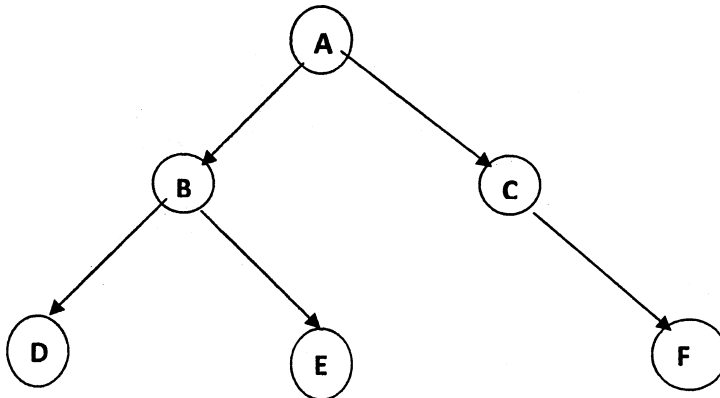
- 1) Evaluate following postfix expressions :
 - i) $2\ 9\ 6\ * \ 3 \ / \ + \ 1 \ -$
 - ii) $6\ 2\ * \ 2 \ / \ 4 \ + \ 5 \ -$
- 2) Draw the recursive flowchart. Write a 'C' program to find the factorial of a number with recursive functions.
- 3) Explain :
 - i) Linear Queue
 - ii) Priority Queue
 - iii) DEQUE.



SECTION – II

4. Answer **any three**.**(4×3=12)**

- What is hashing ? Explain any two hashing functions.
- Define graph. Explain following terms with respect to graph :
 - Directed graph
 - Undirected graph
 - Weighted graph
 - Cycle.
- What is the difference between linear search and binary search ? Explain with an example.
- Write pre-order, post-order and in-order of following tree

5. Answer **any two**.**(8×2=16)**

- What is collision ? Explain open addressing technique in detail.
- What are graph traversal methods ? Explain any one traversal method with flowchart and example.
- Sort the following elements using Radix sort. Show the status after each step.

163, 328, 567, 498, 345, 209, 124



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Seat No.	
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**S.E. (Part – II) (E & TC) (CGPA) Examination, 2017
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **Assume suitable data if required.**
 - 2) Figures to **right** indicate **full** marks.
 - 3) **Use of datasheets is allowed for design problems.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(14×1=14)**

- 1) Which of the following oscillator is having two stages of cascaded amplifier ?
A) RC phase shift
B) Wein bridge
C) Hartley
D) Cristal
- 2) The frequency response of _____ coupling is worst.
A) None
B) RC
C) Transformer
D) Direct
- 3) For oscillators feedback must be _____
A) +ve
B) Not required
C) -ve
D) None of above
- 4) In current series negative feedback output resistance _____
A) Increases
B) Decreases
C) Remains same
D) None
- 5) IC LM74121 is _____ trigrable monostable multivibrator.
A) Non
B) Re
C) None of these
D) Bi
- 6) The transistor amplifier with emitter resistor is having _____ feedback.
A) Current series
B) Voltage series
C) Current shunt
D) Voltage

P.T.O.



Seat No.	
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**S.E. (Part – II) (E & TC) (CGPA) Examination, 2017
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **Assume suitable data if required.**
2) **Figures to right indicate full marks.**
3) **Use of datasheets is allowed for design problems.**

SECTION – I

2. Solve **any four** : **(3.5×4=14)**

- a) List advantage and disadvantages of multistage RC coupled amplifier and explain its frequency response.
- b) Derive expression for oscillation frequency of wien bridge oscillator. Explain with diagram.
- c) What is difference between voltage and power amplifier ?
- d) What is effect of negative feedback on amplifier parameters ?
- e) Explain complimentary symmetry amplifier in detail and its advantages.

3. Solve **any two** : **(7×2=14)**

- a) Derive the expression for A_{vf} , R_{if} , R_{of} of voltage series negative feedback amplifier.
- b) Draw the circuit diagram of Colpitt's oscillator. At what frequency it will oscillate ? Derive expression for frequency of oscillations.
- c) Design Class B Push pull amplifier for following specification
 $P_o = 200$ m watt. $V_{cc} = 9V$ and loud speaker impedance = 8 Ohm.
(Use transistors with following specification $V_{ce(max)} = 25 V$, $I_c(max) = 1A$,
 $h_{ie} = 100$ ohm, $h_{fe} = 65$).



SECTION – II

4. Solve **any four** : **(3.5×4=14)**
- a) Draw and explain the IC555 as monostable multivibrator using internal block diagram.
 - b) Design a circuit using fixed voltage regulator (7805) for sourcing an output with load current of 1A.
 - c) Explain astable multivibrator using transistors.
 - d) Design dual voltage regulator for +9V and –9V using fixed IC regulators.
 - e) Explain pulse generator circuit using IC 74121.
5. Solve **any two** : **(7×2=14)**
- a) Design adjustable regulator for $V_o = 10V$ to $20V$ and $I_o = 1A$. Explain ratings of selected IC.
 - b) Design transistorized voltage regulator with pre regulator for output voltage of 18V and load current of 1 AMP, input voltage not exceeding 32V.
 - c) Design the circuit to switch the system ON and OFF rapidly using IC 555 where On time is 300 ms and off time is 400 ms. Suggest provision for changing duty cycle.
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Seat No.	
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Set	Q
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**S.E. (Part – II) (E & TC) (CGPA) Examination, 2017
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **Assume suitable data if required.**
 - 2) **Figures to right indicate full marks.**
 - 3) **Use of datasheets is allowed for design problems.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) The voltage gain due to regenerative feedback _____
A) None
B) Increases
C) Remains same
D) Decreases
- 2) Overall gain due to loading effect _____ in transistor amplifier.
A) Increases
B) Decreases
C) Remains same
D) None
- 3) Voltage at pin(5) of IC555 is
A) VCC
B) $\frac{1}{2}$ VCC
C) $\frac{1}{3}$ VCC
D) $\frac{2}{3}$ VCC
- 4) Zener diode in transistorized voltage regulator is used for generating constant
A) Current
B) Voltage references
C) Resistance
D) None
- 5) Efficiency of Class C amplifier is _____
A) 25%
B) 50%
C) 78.5%
D) None

P.T.O.



- 6) Output voltage of LM317 regulator is
A) Fixed and +ve
B) Adjustable and –ve
C) Fixed and –ve
D) Adjustable and +ve
- 7) _____ gives undamped sinusoidal oscillations, where AB is loop gain.
A) $AB = 1$
B) None
C) $AB = 0$
D) $AB < 1$
- 8) Which of the following oscillator is having two stages of cascaded amplifier ?
A) RC phase shift
B) Wein bridge
C) Hartley
D) Cristal
- 9) The frequency response of _____ coupling is worst.
A) None
B) RC
C) Transformer
D) Direct
- 10) For oscillators feedback must be _____
A) +ve
B) Not required
C) –ve
D) None of above
- 11) In current series negative feedback output resistance _____
A) Increases
B) Decreases
C) Remains same
D) None
- 12) IC LM74121 is _____ trigable monostable multivibrator.
A) Non
B) Re
C) None of these
D) Bi
- 13) The transistor amplifier with emitter resistor is having _____ feedback.
A) Current series
B) Voltage series
C) Current shunt
D) Voltage
- 14) The monostable multivibrator is having _____ stable states.
A) One
B) Both quasi
C) Two
D) None
-



Seat No.	
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**S.E. (Part – II) (E & TC) (CGPA) Examination, 2017
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **Assume suitable data if required.**
2) **Figures to right indicate full marks.**
3) **Use of datasheets is allowed for design problems.**

SECTION – I

2. Solve **any four** : **(3.5×4=14)**

- a) List advantage and disadvantages of multistage RC coupled amplifier and explain its frequency response.
- b) Derive expression for oscillation frequency of wien bridge oscillator. Explain with diagram.
- c) What is difference between voltage and power amplifier ?
- d) What is effect of negative feedback on amplifier parameters ?
- e) Explain complimentary symmetry amplifier in detail and its advantages.

3. Solve **any two** : **(7×2=14)**

- a) Derive the expression for A_{vf} , R_{if} , R_{of} of voltage series negative feedback amplifier.
- b) Draw the circuit diagram of Colpitt's oscillator. At what frequency it will oscillate ? Derive expression for frequency of oscillations.
- c) Design Class B Push pull amplifier for following specification
 $P_o = 200$ m watt. $V_{cc} = 9V$ and loud speaker impedance = 8 Ohm.
(Use transistors with following specification $V_{ce(max)} = 25 V$, $I_c(max) = 1A$,
 $h_{ie} = 100$ ohm, $h_{fe} = 65$).

Set Q



SECTION – II

4. Solve **any four** : **(3.5×4=14)**
- a) Draw and explain the IC555 as monostable multivibrator using internal block diagram.
 - b) Design a circuit using fixed voltage regulator (7805) for sourcing an output with load current of 1A.
 - c) Explain astable multivibrator using transistors.
 - d) Design dual voltage regulator for +9V and –9V using fixed IC regulators.
 - e) Explain pulse generator circuit using IC 74121.
5. Solve **any two** : **(7×2=14)**
- a) Design adjustable regulator for $V_o = 10V$ to $20V$ and $I_o = 1A$. Explain ratings of selected IC.
 - b) Design transistorized voltage regulator with pre regulator for output voltage of 18V and load current of 1 AMP, input voltage not exceeding 32V.
 - c) Design the circuit to switch the system ON and OFF rapidly using IC 555 where On time is 300 ms and off time is 400 ms. Suggest provision for changing duty cycle.
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SLR-TJ – 193

Seat No.	
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Set	R
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**S.E. (Part – II) (E & TC) (CGPA) Examination, 2017
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **Assume suitable data if required.**
 - 2) **Figures to right indicate full marks.**
 - 3) **Use of datasheets is allowed for design problems.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose correct option : (14×1=14)
- 1) IC LM74121 is _____ trigable monostable multivibrator.
A) Non
B) Re
C) None of these
D) Bi
 - 2) The transistor amplifier with emitter resistor is having _____ feedback.
A) Current series
B) Voltage series
C) Current shunt
D) Voltage
 - 3) The monostable multivibrator is having _____ stable states.
A) One
B) Both quasi
C) Two
D) None
 - 4) The voltage gain due to regenerative feedback _____
A) None
B) Increases
C) Remains same
D) Decreases
 - 5) Overall gain due to loading effect _____ in transistor amplifier.
A) Increases
B) Decreases
C) Remains same
D) None

P.T.O.



- 6) Voltage at pin(5) of IC555 is
A) VCC
B) $\frac{1}{2}$ VCC
C) $\frac{1}{3}$ VCC
D) $\frac{2}{3}$ VCC
- 7) Zener diode in transistorized voltage regulator is used for generating constant
A) Current
B) Voltage references
C) Resistance
D) None
- 8) Efficiency of Class C amplifier is _____
A) 25%
B) 50%
C) 78.5%
D) None
- 9) Output voltage of LM317 regulator is
A) Fixed and +ve
B) Adjustable and –ve
C) Fixed and –ve
D) Adjustable and +ve
- 10) _____ gives undamped sinusoidal oscillations, where AB is loop gain.
A) $AB = 1$
B) None
C) $AB = 0$
D) $AB < 1$
- 11) Which of the following oscillator is having two stages of cascaded amplifier ?
A) RC phase shift
B) Wein bridge
C) Hartley
D) Cristal
- 12) The frequency response of _____ coupling is worst.
A) None
B) RC
C) Transformer
D) Direct
- 13) For oscillators feedback must be _____
A) +ve
B) Not required
C) –ve
D) None of above
- 14) In current series negative feedback output resistance _____
A) Increases
B) Decreases
C) Remains same
D) None
-



Seat No.	
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**S.E. (Part – II) (E & TC) (CGPA) Examination, 2017
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **Assume suitable data if required.**
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3) **Use of datasheets is allowed for design problems.**

SECTION – I

2. Solve **any four** : **(3.5×4=14)**

- a) List advantage and disadvantages of multistage RC coupled amplifier and explain its frequency response.
- b) Derive expression for oscillation frequency of wien bridge oscillator. Explain with diagram.
- c) What is difference between voltage and power amplifier ?
- d) What is effect of negative feedback on amplifier parameters ?
- e) Explain complimentary symmetry amplifier in detail and its advantages.

3. Solve **any two** : **(7×2=14)**

- a) Derive the expression for A_{vf} , R_{if} , R_{of} of voltage series negative feedback amplifier.
- b) Draw the circuit diagram of Colpitt's oscillator. At what frequency it will oscillate ? Derive expression for frequency of oscillations.
- c) Design Class B Push pull amplifier for following specification
 $P_o = 200$ m watt. $V_{cc} = 9V$ and loud speaker impedance = 8 Ohm.
(Use transistors with following specification $V_{ce(max)} = 25 V$, $I_c(max) = 1A$,
 $h_{ie} = 100$ ohm, $h_{fe} = 65$).



SECTION – II

4. Solve **any four** : **(3.5×4=14)**
- a) Draw and explain the IC555 as monostable multivibrator using internal block diagram.
 - b) Design a circuit using fixed voltage regulator (7805) for sourcing an output with load current of 1A.
 - c) Explain astable multivibrator using transistors.
 - d) Design dual voltage regulator for +9V and –9V using fixed IC regulators.
 - e) Explain pulse generator circuit using IC 74121.
5. Solve **any two** : **(7×2=14)**
- a) Design adjustable regulator for $V_o = 10V$ to $20V$ and $I_o = 1A$. Explain ratings of selected IC.
 - b) Design transistorized voltage regulator with pre regulator for output voltage of 18V and load current of 1 AMP, input voltage not exceeding 32V.
 - c) Design the circuit to switch the system ON and OFF rapidly using IC 555 where On time is 300 ms and off time is 400 ms. Suggest provision for changing duty cycle.
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SLR-TJ – 193

Seat No.	
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**S.E. (Part – II) (E & TC) (CGPA) Examination, 2017
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **Assume suitable data if required.**
 - 2) **Figures to right indicate full marks.**
 - 3) **Use of datasheets is allowed for design problems.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose correct option :

(14×1=14)

- 1) Voltage at pin(5) of IC555 is
A) VCC
B) $\frac{1}{2}$ VCC
C) $\frac{1}{3}$ VCC
D) $\frac{2}{3}$ VCC
- 2) Zener diode in transistorized voltage regulator is used for generating constant
A) Current
B) Voltage references
C) Resistance
D) None
- 3) Efficiency of Class C amplifier is _____
A) 25%
B) 50%
C) 78.5%
D) None
- 4) Output voltage of LM317 regulator is
A) Fixed and +ve
B) Adjustable and –ve
C) Fixed and –ve
D) Adjustable and +ve
- 5) _____ gives undamped sinusoidal oscillations, where AB is loop gain.
A) $AB = 1$
B) None
C) $AB = 0$
D) $AB < 1$

P.T.O.



- 6) Which of the following oscillator is having two stages of cascaded amplifier ?
A) RC phase shift B) Wein bridge
C) Hartley D) Cristal
- 7) The frequency response of _____ coupling is worst.
A) None B) RC
C) Transformer D) Direct
- 8) For oscillators feedback must be _____
A) +ve B) Not required
C) -ve D) None of above
- 9) In current series negative feedback output resistance _____
A) Increases B) Decreases
C) Remains same D) None
- 10) IC LM74121 is _____ trigrable monostable multivibrator.
A) Non B) Re
C) None of these D) Bi
- 11) The transistor amplifier with emitter resistor is having _____ feedback.
A) Current series B) Voltage series
C) Current shunt D) Voltage
- 12) The monostable multivibrator is having _____ stable states.
A) One B) Both quasi
C) Two D) None
- 13) The voltage gain due to regenerative feedback _____
A) None B) Increases
C) Remains same D) Decreases
- 14) Overall gain due to loading effect _____ in transistor amplifier.
A) Increases B) Decreases
C) Remains same D) None



Seat No.	
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**S.E. (Part – II) (E & TC) (CGPA) Examination, 2017
ELECTRONIC CIRCUITS ANALYSIS AND DESIGN – II**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **Assume suitable data if required.**
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3) **Use of datasheets is allowed for design problems.**

SECTION – I

2. Solve **any four** : **(3.5×4=14)**

- a) List advantage and disadvantages of multistage RC coupled amplifier and explain its frequency response.
- b) Derive expression for oscillation frequency of wien bridge oscillator. Explain with diagram.
- c) What is difference between voltage and power amplifier ?
- d) What is effect of negative feedback on amplifier parameters ?
- e) Explain complimentary symmetry amplifier in detail and its advantages.

3. Solve **any two** : **(7×2=14)**

- a) Derive the expression for A_{vf} , R_{if} , R_{of} of voltage series negative feedback amplifier.
- b) Draw the circuit diagram of Colpitt's oscillator. At what frequency it will oscillate ? Derive expression for frequency of oscillations.
- c) Design Class B Push pull amplifier for following specification
 $P_o = 200$ m watt. $V_{cc} = 9V$ and loud speaker impedance = 8 Ohm.
(Use transistors with following specification $V_{ce(max)} = 25 V$, $I_c(max) = 1A$,
 $h_{ie} = 100$ ohm, $h_{fe} = 65$).



SECTION – II

4. Solve **any four** : **(3.5×4=14)**
- a) Draw and explain the IC555 as monostable multivibrator using internal block diagram.
 - b) Design a circuit using fixed voltage regulator (7805) for sourcing an output with load current of 1A.
 - c) Explain astable multivibrator using transistors.
 - d) Design dual voltage regulator for +9V and –9V using fixed IC regulators.
 - e) Explain pulse generator circuit using IC 74121.
5. Solve **any two** : **(7×2=14)**
- a) Design adjustable regulator for $V_o = 10V$ to $20V$ and $I_o = 1A$. Explain ratings of selected IC.
 - b) Design transistorized voltage regulator with pre regulator for output voltage of 18V and load current of 1 AMP, input voltage not exceeding 32V.
 - c) Design the circuit to switch the system ON and OFF rapidly using IC 555 where On time is 300 ms and off time is 400 ms. Suggest provision for changing duty cycle.
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**S.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

1. Choose the correct option from the following : **14**
- 1) A carrier voltage of unmodulated carrier power 10 kW on being amplitude modulated by an audio sinusoidal voltage to a depth of 70% has total modulated carrier power of
a) 12.45 kW b) 10 kW c) 2.45 kW d) 4 kW
 - 2) Balanced modulator is used in _____ generation.
a) AM b) SSB c) DSBSC d) b) and c)
 - 3) The adverse effect of noise in a communication system is maximum in
a) Encoder b) Channel c) Receiver d) Source
 - 4) Thermal noise voltage in a resistor R is proportional to
a) R b) R^2
c) \sqrt{R} d) Independent of R
 - 5) The modulating frequency in frequency modulation is increased from 10 kHz to 20 kHz. The bandwidth is
a) Doubled b) Halved
c) Increased by 20 kHz d) Increased tremendously



- 6) Man-made noise is caused by
- a) Solar eruptions
 - b) Distant stars
 - c) Lightening discharges
 - d) Arc discharges in electrical machines
- 7) One of the following cannot be used to remove unwanted sideband in SSB. This is the
- a) Filter method
 - b) Phase-shift method
 - c) Third method
 - d) Balanced modulator
- 8) In Narrowband FM system the maximum frequency deviation is
- a) 75 kHz
 - b) 75 Hz
 - c) 5 kHz
 - d) 5 Hz
- 9) The ground wave eventually disappears, as one move away from the transmitter, because of
- a) Interference from sky wave
 - b) Loss of line-of-sight condition
 - c) Maximum single hop distance limitation
 - d) Tilting
- 10) Frequency for busy tone is
- a) 400 Hz
 - b) 450 kHz
 - c) 33 Hz
 - d) 400 kHz
- 11) Another name of thermal noise
- a) Johnson Noise
 - b) Flicker Noise
 - c) Shot Noise
 - d) Transit Time Noise
- 12) Strowger switching system is _____ type of telephone system.
- a) Electronic
 - b) Manual
 - c) Electromechanical
 - d) Electrical
- 13) Modulation Index in FM is dependent upon
- a) f_c and f_m
 - b) δ and f_m
 - c) E_m and E_c
 - d) None of these
- 14) Which of the following frequency demodulators does not require an input limiter ?
- a) Foster-Seelay Discriminator
 - b) Balanced Slope Detector
 - c) Simple Slope Detector
 - d) Ratio Detector



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**S.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any three** : **(3×5=15)**
- a) Explain the term modulation and demodulation. Why modulation is necessary ?
 - b) The front end of the TV receiver, having a BW of 7 MHz and operating at the temperature of 27°C, consists of an amplifier having a gain of 15 followed by a mixer whose gain is 20. The amplifier has 300 Ω input resistance and a shot noise equivalent resistance of 500 Ω ; for the converter these values are 2.2 kΩ and 13.5 kΩ respectively. The mixer load resistance is 470 kΩ . Calculate Req of this TV receiver.
 - c) Explain why VSB is required in video transmission. Draw the frequency response and show different elements.
 - d) Compare TRF with superheterodyne receiver.
 - e) Write a short note on Thermal Agitation Noise.
3. a) Define Noise. Explain different types of noise present inside and outside of the receiver. **5**
- b) Attempt **any one** of the following : **(1×8=8)**
- i) Draw and explain superheterodyne receiver. What are its advantages and disadvantages over TRF receiver ?
 - ii) Explain practical diode detector. Also explain the types of AGC in detail.



SECTION – II

4. Attempt **any three** : **(3×5=15)**
- a) With the help of neat diagram, discuss the working of dual slope detector.
 - b) Differentiate between FM and PM systems.
 - c) Define :
 - i) Grade of Service
 - ii) Traffic
 - iii) Busy Hour
 - iv) Availability : Single processor and Dual processor
 - d) What is ground wave propagation ? What are its limitations ?
 - e) Compare wideband FM and Narrow Band FM.
5. a) In FM system the audio frequency is 1 kHz and audio voltage is 2V, the deviation is 4 kHz. If AF voltage is now increased to 8 V and its frequency dropped to 500 Hz. Find the modulation index and the corresponding bandwidth in each case. **5**
- b) Attempt **any one** : **(1×8=8)**
- i) What is emphasis ? Draw the typical pre-emphasis and de-emphasis circuit with suitable characteristics. Explain the need of pre-emphasis and de-emphasis in FM.
 - ii) Explain ionospheric layers and its effect on sky wave propagation.
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**S.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

1. Choose the correct option from the following : 14
- 1) In Narrowband FM system the maximum frequency deviation is
 - a) 75 kHz
 - b) 75 Hz
 - c) 5 kHz
 - d) 5 Hz
 - 2) The ground wave eventually disappears, as one move away from the transmitter, because of
 - a) Interference from sky wave
 - b) Loss of line-of-sight condition
 - c) Maximum single hop distance limitation
 - d) Tilting
 - 3) Frequency for busy tone is
 - a) 400 Hz
 - b) 450 kHz
 - c) 33 Hz
 - d) 400 kHz
 - 4) Another name of thermal noise
 - a) Johnson Noise
 - b) Flicker Noise
 - c) Shot Noise
 - d) Transit Time Noise
 - 5) Strowger switching system is _____ type of telephone system.
 - a) Electronic
 - b) Manual
 - c) Electromechanical
 - d) Electrical



- 6) Modulation Index in FM is dependent upon
- a) f_c and f_m
 - b) δ and f_m
 - c) E_m and E_c
 - d) None of these
- 7) Which of the following frequency demodulators does not require an input limiter ?
- a) Foster-Seelay Discriminator
 - b) Balanced Slope Detector
 - c) Simple Slope Detector
 - d) Ratio Detector
- 8) A carrier voltage of unmodulated carrier power 10 kW on being amplitude modulated by an audio sinusoidal voltage to a depth of 70% has total modulated carrier power of
- a) 12.45 kW
 - b) 10 kW
 - c) 2.45 kW
 - d) 4 kW
- 9) Balanced modulator is used in _____ generation.
- a) AM
 - b) SSB
 - c) DSBSC
 - d) b) and c)
- 10) The adverse effect of noise in a communication system is maximum in
- a) Encoder
 - b) Channel
 - c) Receiver
 - d) Source
- 11) Thermal noise voltage in a resistor R is proportional to
- a) R
 - b) R^2
 - c) \sqrt{R}
 - d) Independent of R
- 12) The modulating frequency in frequency modulation is increased from 10 KHz to 20 kHz. The bandwidth is
- a) Doubled
 - b) Halved
 - c) Increased by 20 kHz
 - d) Increased tremendously
- 13) Man-made noise is caused by
- a) Solar eruptions
 - b) Distant stars
 - c) Lightening discharges
 - d) Arc discharges in electrical machines
- 14) One of the following cannot be used to remove unwanted sideband in SSB. This is the
- a) Filter method
 - b) Phase-shift method
 - c) Third method
 - d) Balanced modulator
-



Seat No.	
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**S.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any three** : **(3×5=15)**
- a) Explain the term modulation and demodulation. Why modulation is necessary ?
 - b) The front end of the TV receiver, having a BW of 7 MHz and operating at the temperature of 27°C, consists of an amplifier having a gain of 15 followed by a mixer whose gain is 20. The amplifier has 300 Ω input resistance and a shot noise equivalent resistance of 500 Ω ; for the converter these values are 2.2 kΩ and 13.5 kΩ respectively. The mixer load resistance is 470 kΩ . Calculate Req of this TV receiver.
 - c) Explain why VSB is required in video transmission. Draw the frequency response and show different elements.
 - d) Compare TRF with superheterodyne receiver.
 - e) Write a short note on Thermal Agitation Noise.
3. a) Define Noise. Explain different types of noise present inside and outside of the receiver. **5**
- b) Attempt **any one** of the following : **(1×8=8)**
- i) Draw and explain superheterodyne receiver. What are its advantages and disadvantages over TRF receiver ?
 - ii) Explain practical diode detector. Also explain the types of AGC in detail.



SECTION – II

4. Attempt **any three** : **(3×5=15)**
- a) With the help of neat diagram, discuss the working of dual slope detector.
 - b) Differentiate between FM and PM systems.
 - c) Define :
 - i) Grade of Service
 - ii) Traffic
 - iii) Busy Hour
 - iv) Availability : Single processor and Dual processor
 - d) What is ground wave propagation ? What are its limitations ?
 - e) Compare wideband FM and Narrow Band FM.
5. a) In FM system the audio frequency is 1 kHz and audio voltage is 2V, the deviation is 4 kHz. If AF voltage is now increased to 8 V and its frequency dropped to 500 Hz. Find the modulation index and the corresponding bandwidth in each case. **5**
- b) Attempt **any one** : **(1×8=8)**
- i) What is emphasis ? Draw the typical pre-emphasis and de-emphasis circuit with suitable characteristics. Explain the need of pre-emphasis and de-emphasis in FM.
 - ii) Explain ionospheric layers and its effect on sky wave propagation.
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SLR-TJ – 194

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**S.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

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2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

1. Choose the correct option from the following : 14
- 1) The modulating frequency in frequency modulation is increased from 10 KHz to 20 kHz. The bandwidth is
 - a) Doubled
 - b) Halved
 - c) Increased by 20 kHz
 - d) Increased tremendously
 - 2) Man-made noise is caused by
 - a) Solar eruptions
 - b) Distant stars
 - c) Lightening discharges
 - d) Arc discharges in electrical machines
 - 3) One of the following cannot be used to remove unwanted sideband in SSB. This is the
 - a) Filter method
 - b) Phase-shift method
 - c) Third method
 - d) Balanced modulator
 - 4) In Narrowband FM system the maximum frequency deviation is
 - a) 75 kHz
 - b) 75 Hz
 - c) 5 kHz
 - d) 5 Hz

P.T.O.



- 5) The ground wave eventually disappears, as one move away from the transmitter, because of
- Interference from sky wave
 - Loss of line-of-sight condition
 - Maximum single hop distance limitation
 - Tilting
- 6) Frequency for busy tone is
- | | |
|-----------|------------|
| a) 400 Hz | b) 450 kHz |
| c) 33 Hz | d) 400 kHz |
- 7) Another name of thermal noise
- | | |
|------------------|-----------------------|
| a) Johnson Noise | b) Flicker Noise |
| c) Shot Noise | d) Transit Time Noise |
- 8) Strowger switching system is _____ type of telephone system.
- | | |
|----------------------|---------------|
| a) Electronic | b) Manual |
| c) Electromechanical | d) Electrical |
- 9) Modulation Index in FM is dependent upon
- | | |
|--------------------|-----------------------|
| a) f_c and f_m | b) δ and f_m |
| c) E_m and E_c | d) None of these |
- 10) Which of the following frequency demodulators does not require an input limiter ?
- | | |
|--------------------------------|----------------------------|
| a) Foster-Seelay Discriminator | b) Balanced Slope Detector |
| c) Simple Slope Detector | d) Ratio Detector |
- 11) A carrier voltage of unmodulated carrier power 10 kW on being amplitude modulated by an audio sinusoidal voltage to a depth of 70% has total modulated carrier power of
- | | | | |
|-------------|----------|------------|---------|
| a) 12.45 kW | b) 10 kW | c) 2.45 kW | d) 4 kW |
|-------------|----------|------------|---------|
- 12) Balanced modulator is used in _____ generation.
- | | | | |
|-------|--------|----------|--------------|
| a) AM | b) SSB | c) DSBSC | d) b) and c) |
|-------|--------|----------|--------------|
- 13) The adverse effect of noise in a communication system is maximum in
- | | | | |
|------------|------------|-------------|-----------|
| a) Encoder | b) Channel | c) Receiver | d) Source |
|------------|------------|-------------|-----------|
- 14) Thermal noise voltage in a resistor R is proportional to
- | | |
|---------------|---------------------|
| a) R | b) R^2 |
| c) \sqrt{R} | d) Independent of R |



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**S.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any three** : **(3×5=15)**
- a) Explain the term modulation and demodulation. Why modulation is necessary ?
 - b) The front end of the TV receiver, having a BW of 7 MHz and operating at the temperature of 27°C, consists of an amplifier having a gain of 15 followed by a mixer whose gain is 20. The amplifier has 300 Ω input resistance and a shot noise equivalent resistance of 500 Ω ; for the converter these values are 2.2 kΩ and 13.5 kΩ respectively. The mixer load resistance is 470 kΩ . Calculate Req of this TV receiver.
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- b) Attempt **any one** of the following : **(1×8=8)**
- i) Draw and explain superheterodyne receiver. What are its advantages and disadvantages over TRF receiver ?
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SECTION – II

4. Attempt **any three** : **(3×5=15)**
- a) With the help of neat diagram, discuss the working of dual slope detector.
 - b) Differentiate between FM and PM systems.
 - c) Define :
 - i) Grade of Service
 - ii) Traffic
 - iii) Busy Hour
 - iv) Availability : Single processor and Dual processor
 - d) What is ground wave propagation ? What are its limitations ?
 - e) Compare wideband FM and Narrow Band FM.
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- b) Attempt **any one** : **(1×8=8)**
- i) What is emphasis ? Draw the typical pre-emphasis and de-emphasis circuit with suitable characteristics. Explain the need of pre-emphasis and de-emphasis in FM.
 - ii) Explain ionospheric layers and its effect on sky wave propagation.
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Seat No.	
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**S.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

1. Choose the correct option from the following : 14
- 1) Frequency for busy tone is
 - a) 400 Hz
 - b) 450 kHz
 - c) 33 Hz
 - d) 400 kHz
 - 2) Another name of thermal noise
 - a) Johnson Noise
 - b) Flicker Noise
 - c) Shot Noise
 - d) Transit Time Noise
 - 3) Strowger switching system is _____ type of telephone system.
 - a) Electronic
 - b) Manual
 - c) Electromechanical
 - d) Electrical
 - 4) Modulation Index in FM is dependent upon
 - a) f_c and f_m
 - b) δ and f_m
 - c) E_m and E_c
 - d) None of these
 - 5) Which of the following frequency demodulators does not require an input limiter ?
 - a) Foster-Seelay Discriminator
 - b) Balanced Slope Detector
 - c) Simple Slope Detector
 - d) Ratio Detector



- 6) A carrier voltage of unmodulated carrier power 10 kW on being amplitude modulated by an audio sinusoidal voltage to a depth of 70% has total modulated carrier power of
- a) 12.45 kW b) 10 kW c) 2.45 kW d) 4 kW
- 7) Balanced modulator is used in _____ generation.
- a) AM b) SSB c) DSBSC d) b) and c)
- 8) The adverse effect of noise in a communication system is maximum in
- a) Encoder b) Channel c) Receiver d) Source
- 9) Thermal noise voltage in a resistor R is proportional to
- a) R b) R^2
c) \sqrt{R} d) Independent of R
- 10) The modulating frequency in frequency modulation is increased from 10 KHz to 20 kHz. The bandwidth is
- a) Doubled b) Halved
c) Increased by 20 kHz d) Increased tremendously
- 11) Man-made noise is caused by
- a) Solar eruptions b) Distant stars
c) Lightening discharges d) Arc discharges in electrical machines
- 12) One of the following cannot be used to remove unwanted sideband in SSB. This is the
- a) Filter method b) Phase-shift method
c) Third method d) Balanced modulator
- 13) In Narrowband FM system the maximum frequency deviation is
- a) 75 kHz b) 75 Hz
c) 5 kHz d) 5 Hz
- 14) The ground wave eventually disappears, as one move away from the transmitter, because of
- a) Interference from sky wave
b) Loss of line-of-sight condition
c) Maximum single hop distance limitation
d) Tilting
-



Seat No.	
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**S.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ANALOG COMMUNICATION**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any three** : **(3×5=15)**
- a) Explain the term modulation and demodulation. Why modulation is necessary ?
 - b) The front end of the TV receiver, having a BW of 7 MHz and operating at the temperature of 27°C, consists of an amplifier having a gain of 15 followed by a mixer whose gain is 20. The amplifier has $300\ \Omega$ input resistance and a shot noise equivalent resistance of $500\ \Omega$; for the converter these values are $2.2\ \text{k}\Omega$ and $13.5\ \text{k}\Omega$ respectively. The mixer load resistance is $470\ \text{k}\Omega$. Calculate R_{eq} of this TV receiver.
 - c) Explain why VSB is required in video transmission. Draw the frequency response and show different elements.
 - d) Compare TRF with superheterodyne receiver.
 - e) Write a short note on Thermal Agitation Noise.
3. a) Define Noise. Explain different types of noise present inside and outside of the receiver. **5**
- b) Attempt **any one** of the following : **(1×8=8)**
- i) Draw and explain superheterodyne receiver. What are its advantages and disadvantages over TRF receiver ?
 - ii) Explain practical diode detector. Also explain the types of AGC in detail.



SECTION – II

4. Attempt **any three** : **(3×5=15)**
- a) With the help of neat diagram, discuss the working of dual slope detector.
 - b) Differentiate between FM and PM systems.
 - c) Define :
 - i) Grade of Service
 - ii) Traffic
 - iii) Busy Hour
 - iv) Availability : Single processor and Dual processor
 - d) What is ground wave propagation ? What are its limitations ?
 - e) Compare wideband FM and Narrow Band FM.
5. a) In FM system the audio frequency is 1 kHz and audio voltage is 2V, the deviation is 4 kHz. If AF voltage is now increased to 8 V and its frequency dropped to 500 Hz. Find the modulation index and the corresponding bandwidth in each case. **5**
- b) Attempt **any one** : **(1×8=8)**
- i) What is emphasis ? Draw the typical pre-emphasis and de-emphasis circuit with suitable characteristics. Explain the need of pre-emphasis and de-emphasis in FM.
 - ii) Explain ionospheric layers and its effect on sky wave propagation.
-

Seat
No.Set **P****S.E. (E&TC) (Part – II) (CGPA) Examination, 2017**
CONTROL SYSTEMSDay and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) Assume suitable data **wherever** necessary.
 - 2) Figures to the **right** indicate **full** marks.
 - 3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) The damping ratio of a system having the characteristic equation $S^2 + 2S + 8 = 0$ is
a) 0.353 b) 0.330 c) 0.300 d) 0.250
- 2) The input to a controller is
a) Sensed signal b) Desired variable value
c) Error signal d) Servo-signal
- 3) If the transfer function of a first-order system is $G(s) = \frac{10}{1 + 2s}$, then the time constant of the system is
a) 10 seconds b) $\frac{1}{10}$ seconds c) 2 seconds d) $\frac{1}{2}$ seconds
- 4) For a second-order system with damping $\delta > 1$, the roots of the characteristic equation are
a) Real but not equal b) Real and equal
c) Complex conjugate d) Imaginary
- 5) The characteristic equation of a feedback control system is given by $2s^4 + s^3 + 2s^2 + 5s + 10 = 0$. The number of roots in the right half of s-plane are
a) Zero b) 1
c) 2 d) 3
- 6) Tachogenerator feedback is used in position control systems to
a) Increase the effective damping in the system
b) Decrease the effective damping in the system
c) Improve the steady-state response of the system
d) None of the above

P.T.O.



- 7) The initial response when the output is not equal to input is called
- Transient response
 - Error response
 - Dynamic response
 - Steady-state response
- 8) A unity feedback system has open-loop transfer function $G(s) = \frac{9}{s(s+3)}$. The system has
- Damping ratio = $\frac{1}{2}$, natural frequency = 9
 - Damping ratio = $\frac{1}{6}$, natural frequency = 3
 - Damping ratio = $\frac{1}{6}$, natural frequency = 9
 - Damping ratio = $\frac{1}{2}$, natural frequency = 3
- 9) Bode magnitude plot of a system has -20 dB gain at low frequencies, the system is
- Type -2
 - Type -1
 - Type -0
 - Cannot decide type
- 10) Consider the root locus plot of unity-feedback system with open-loop transfer function
- $$G(s) = \frac{k(s+5)}{s(s+2)(s+4)(s^2+2s+2)}$$
- The meeting point of the asymptotes on the real axis occurs at
- -1.2
 - -0.85
 - -1.05
 - -0.75
- 11) Consider the following statements :
- Lead compensation is suitable for systems having unsatisfactory transient response.
 - Lag compensation is suitable for systems having unsatisfactory steady-state response.
- Which of the following is correct ?
- Statement (i) is true and Statement (ii) is false
 - Statement (i) is false and Statement (ii) is true
 - Both the statements are true
 - Both the statements are false
- 12) The root locus of the system $G(s)H(s) = \frac{k}{s(s+2)(s+3)}$ has break-away point located at
- $(-0.5, 0)$
 - $(-2.548, 0)$
 - $(-4, 0)$
 - $(-0.784, 0)$
- 13) A unity feedback system has open-loop transfer function $G(s) = \frac{25}{s(s+6)}$. The time t_p at which the peak of the step-input response occurs is
- $\frac{11}{7}$ sec.
 - $\frac{11}{4}$ sec.
 - $\frac{11}{14}$ sec.
 - $\frac{11}{28}$ sec.
- 14) Which of the following is the best method for determining the stability and transient response ?
- Root locus
 - Bode plot
 - Both
 - None of the above



Seat No.	
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**S.E. (E&TC) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) Assume suitable data *wherever* necessary.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any four** : (4x4=16)

- a) Explain with neat diagram liquid level control system.
- b) Obtain the transfer function of basic mechanical translational system.
- c) Define the following :
 - i) Absolute stability
 - ii) Conditional stability
 - iii) Relative stability
 - iv) Marginal stability
- d) What is the procedure for block diagram reduction ?
- e) What is force-voltage analogy ?

3. a) Construct the signal-flow graph for the following set of equations and find the transfer function using Mason's gain formula. 6

$$Y_2 = G_1 Y_1 - G_2 Y_4$$

$$Y_3 = G_3 Y_2 + G_4 Y_3$$

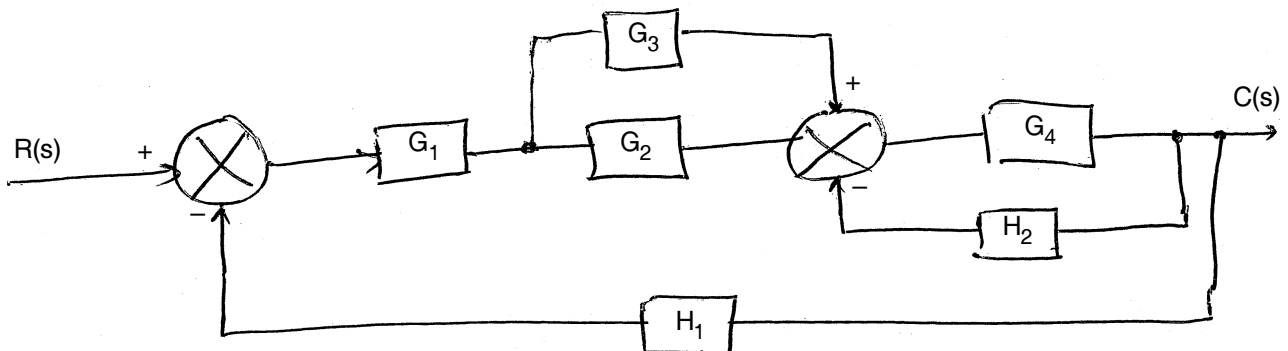
$$Y_4 = G_5 Y_1 + G_6 Y_3$$

where Y_1 = input

Y_2 = output.

b) Attempt **any one** : 6

- 1) A unity feedback control system is given by $G(s) = \frac{k(s+13)}{s(s+3)(s+7)}$. Find the range of values of k for which the system is stable.
- 2) Convert the following block diagram into its equivalent signal flow graph.



Set P



SECTION – II

4. Attempt **any four** : (4×4=16)
- a) What are time response specifications ?
 - b) Define the following :
 - 1) Phase crossover frequency
 - 2) Gain crossover frequency
 - 3) Phase margin
 - 4) Gain margin.
 - c) Explain lead compensator.
 - d) Explain K_p , K_v and K_a the error constants.
 - e) What is the contribution of different factors of transfer function in phase plot ?
5. a) A unity feedback control system has $G(s) = \frac{400(s+2)}{s^2(s+5)(s+10)}$. Draw the Bode plot. 6
- b) Attempt **any one** : 6
- 1) Sketch the root locus for a system having $G(s) = \frac{k}{s+1}$ and $H(s) = \frac{s+1}{(s^2+4s+5)}$.
 - 2) For a system having $\frac{C(s)}{R(s)} = \frac{20}{s^2+7s+25}$. Find its time response specifications and expression for output.
- _____



Seat No.	
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S.E. (E&TC) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) Assume suitable data **wherever** necessary.
 - 2) Figures to the **right** indicate **full** marks.
 - 3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) A unity feedback system has open-loop transfer function $G(s) = \frac{9}{s(s+3)}$. The system has
 - a) Damping ratio = $\frac{1}{2}$, natural frequency = 9
 - b) Damping ratio = $\frac{1}{6}$, natural frequency = 3
 - c) Damping ratio = $\frac{1}{6}$, natural frequency = 9
 - d) Damping ratio = $\frac{1}{2}$, natural frequency = 3
- 2) Bode magnitude plot of a system has – 20 dB gain at low frequencies, the system is
 - a) Type – 2
 - b) Type – 1
 - c) Type – 0
 - d) Cannot decide type
- 3) Consider the root locus plot of unity-feedback system with open-loop transfer function $G(s) = \frac{k(s+5)}{s(s+2)(s+4)(s^2+2s+2)}$. The meeting point of the asymptotes on the real axis occurs at
 - a) – 1.2
 - b) – 0.85
 - c) – 1.05
 - d) – 0.75
- 4) Consider the following statements :
 - i) Lead compensation is suitable for systems having unsatisfactory transient response.
 - ii) Lag compensation is suitable for systems having unsatisfactory steady-state response.Which of the following is correct ?
 - a) Statement (i) is true and Statement (ii) is false
 - b) Statement (i) is false and Statement (ii) is true
 - c) Both the statements are true
 - d) Both the statements are false



- 5) The root locus of the system $G(s)H(s) = \frac{k}{s(s+2)(s+3)}$ has break-away point located at
- a) $(-0.5, 0)$ b) $(-2.548, 0)$ c) $(-4, 0)$ d) $(-0.784, 0)$
- 6) A unity feedback system has open-loop transfer function $G(s) = \frac{25}{s(s+6)}$. The time t_p at which the peak of the step-input response occurs is
- a) $\frac{11}{7}$ sec. b) $\frac{11}{4}$ sec. c) $\frac{11}{14}$ sec. d) $\frac{11}{28}$ sec.
- 7) Which of the following is the best method for determining the stability and transient response ?
- a) Root locus b) Bode plot c) Both d) None of the above
- 8) The damping ratio of a system having the characteristic equation $S^2 + 2S + 8 = 0$ is
- a) 0.353 b) 0.330 c) 0.300 d) 0.250
- 9) The input to a controller is
- a) Sensed signal b) Desired variable value
c) Error signal d) Servo-signal
- 10) If the transfer function of a first-order system is $G(s) = \frac{10}{1+2s}$, then the time constant of the system is
- a) 10 seconds b) $\frac{1}{10}$ seconds c) 2 seconds d) $\frac{1}{2}$ seconds
- 11) For a second-order system with damping $\delta > 1$, the roots of the characteristic equation are
- a) Real but not equal b) Real and equal
c) Complex conjugate d) Imaginary
- 12) The characteristic equation of a feedback control system is given by $2s^4 + s^3 + 2s^2 + 5s + 10 = 0$. The number of roots in the right half of s-plane are
- a) Zero b) 1
c) 2 d) 3
- 13) Tachogenerator feedback is used in position control systems to
- a) Increase the effective damping in the system
b) Decrease the effective damping in the system
c) Improve the steady-state response of the system
d) None of the above
- 14) The initial response when the output is not equal to input is called
- a) Transient response b) Error response
c) Dynamic response d) Steady-state response



Seat No.	
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**S.E. (E&TC) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) Assume suitable data *wherever* necessary.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any four** : (4x4=16)

- a) Explain with neat diagram liquid level control system.
- b) Obtain the transfer function of basic mechanical translational system.
- c) Define the following :
 - i) Absolute stability
 - ii) Conditional stability
 - iii) Relative stability
 - iv) Marginal stability
- d) What is the procedure for block diagram reduction ?
- e) What is force-voltage analogy ?

3. a) Construct the signal-flow graph for the following set of equations and find the transfer function using Mason's gain formula. 6

$$Y_2 = G_1 Y_1 - G_2 Y_4$$

$$Y_3 = G_3 Y_2 + G_4 Y_3$$

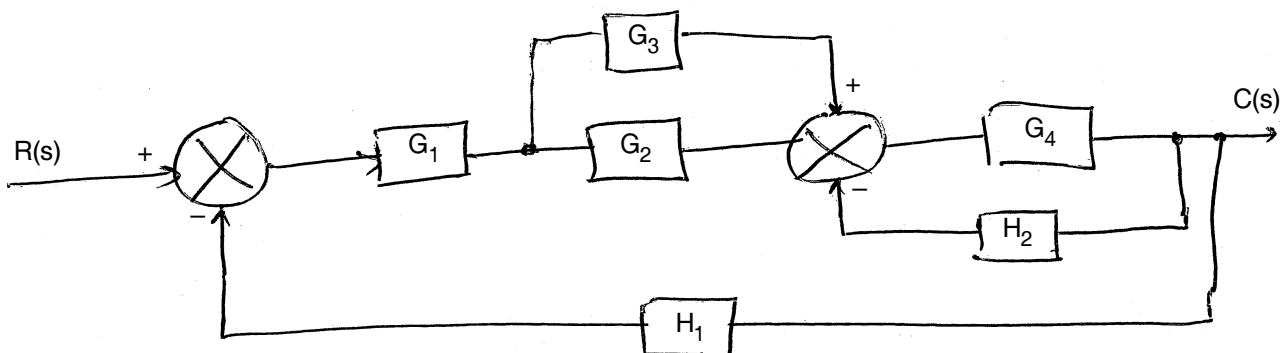
$$Y_4 = G_5 Y_1 + G_6 Y_3$$

where Y_1 = input

Y_2 = output.

b) Attempt **any one** : 6

- 1) A unity feedback control system is given by $G(s) = \frac{k(s+13)}{s(s+3)(s+7)}$. Find the range of values of k for which the system is stable.
- 2) Convert the following block diagram into its equivalent signal flow graph.



Set Q



SECTION – II

4. Attempt **any four** : (4×4=16)
- a) What are time response specifications ?
 - b) Define the following :
 - 1) Phase crossover frequency
 - 2) Gain crossover frequency
 - 3) Phase margin
 - 4) Gain margin.
 - c) Explain lead compensator.
 - d) Explain K_p , K_v and K_a the error constants.
 - e) What is the contribution of different factors of transfer function in phase plot ?
5. a) A unity feedback control system has $G(s) = \frac{400(s+2)}{s^2(s+5)(s+10)}$. Draw the Bode plot. 6
- b) Attempt **any one** : 6
- 1) Sketch the root locus for a system having $G(s) = \frac{k}{s+1}$ and $H(s) = \frac{s+1}{(s^2+4s+5)}$.
 - 2) For a system having $\frac{C(s)}{R(s)} = \frac{20}{s^2+7s+25}$. Find its time response specifications and expression for output.
- _____



SLR-TJ – 195

Seat
No.

Set **R**

S.E. (E&TC) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) Assume suitable data **wherever** necessary.
 - 2) Figures to the **right** indicate **full** marks.
 - 3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) The characteristic equation of a feedback control system is given by $2s^4 + s^3 + 2s^2 + 5s + 10 = 0$. The number of roots in the right half of s-plane are
 - a) Zero
 - b) 1
 - c) 2
 - d) 3
- 2) Tachogenerator feedback is used in position control systems to
 - a) Increase the effective damping in the system
 - b) Decrease the effective damping in the system
 - c) Improve the steady-state response of the system
 - d) None of the above
- 3) The initial response when the output is not equal to input is called
 - a) Transient response
 - b) Error response
 - c) Dynamic response
 - d) Steady-state response
- 4) A unity feedback system has open-loop transfer function $G(s) = \frac{9}{s(s+3)}$. The system has
 - a) Damping ratio = $\frac{1}{2}$, natural frequency = 9
 - b) Damping ratio = $\frac{1}{6}$, natural frequency = 3
 - c) Damping ratio = $\frac{1}{6}$, natural frequency = 9
 - d) Damping ratio = $\frac{1}{2}$, natural frequency = 3
- 5) Bode magnitude plot of a system has – 20 dB gain at low frequencies, the system is
 - a) Type – 2
 - b) Type – 1
 - c) Type – 0
 - d) Cannot decide type

P.T.O.



- 6) Consider the root locus plot of unity-feedback system with open-loop transfer function

$$G(s) = \frac{k(s+5)}{s(s+2)(s+4)(s^2+2s+2)}$$

The meeting point of the asymptotes on the real axis occurs at

- a) -1.2 b) -0.85 c) -1.05 d) -0.75

- 7) Consider the following statements :

- i) Lead compensation is suitable for systems having unsatisfactory transient response.
 ii) Lag compensation is suitable for systems having unsatisfactory steady-state response.

Which of the following is correct ?

- a) Statement (i) is true and Statement (ii) is false
 b) Statement (i) is false and Statement (ii) is true
 c) Both the statements are true
 d) Both the statements are false

- 8) The root locus of the system $G(s)H(s) = \frac{k}{s(s+2)(s+3)}$ has break-away point located at

- a) (-0.5, 0) b) (-2.548, 0) c) (-4, 0) d) (-0.784, 0)

- 9) A unity feedback system has open-loop transfer function $G(s) = \frac{25}{s(s+6)}$. The time t_p at which the peak of the step-input response occurs is

- a) $\frac{11}{7}$ sec. b) $\frac{11}{4}$ sec. c) $\frac{11}{14}$ sec. d) $\frac{11}{28}$ sec.

- 10) Which of the following is the best method for determining the stability and transient response ?

- a) Root locus b) Bode plot c) Both d) None of the above

- 11) The damping ratio of a system having the characteristic equation $S^2 + 2S + 8 = 0$ is

- a) 0.353 b) 0.330 c) 0.300 d) 0.250

- 12) The input to a controller is

- a) Sensed signal b) Desired variable value
 c) Error signal d) Servo-signal

- 13) If the transfer function of a first-order system is $G(s) = \frac{10}{1+2s}$, then the time constant of the system is

- a) 10 seconds b) $\frac{1}{10}$ seconds c) 2 seconds d) $\frac{1}{2}$ seconds

- 14) For a second-order system with damping $\delta > 1$, the roots of the characteristic equation are

- a) Real but not equal b) Real and equal
 c) Complex conjugate d) Imaginary



Seat No.	
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**S.E. (E&TC) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) Assume suitable data *wherever* necessary.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any four** : (4x4=16)

- a) Explain with neat diagram liquid level control system.
- b) Obtain the transfer function of basic mechanical translational system.
- c) Define the following :

i) Absolute stability	ii) Conditional stability
iii) Relative stability	iv) Marginal stability
- d) What is the procedure for block diagram reduction ?
- e) What is force-voltage analogy ?

3. a) Construct the signal-flow graph for the following set of equations and find the transfer function using Mason's gain formula. 6

$$Y_2 = G_1 Y_1 - G_2 Y_4$$

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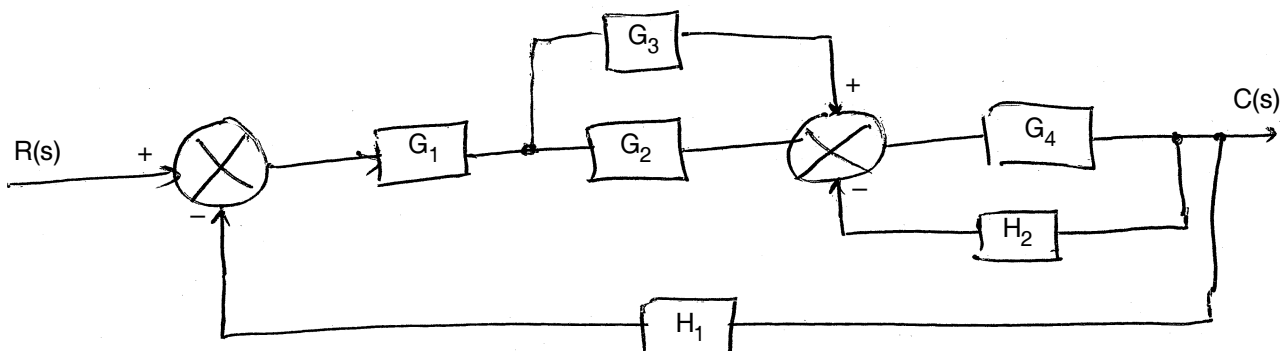
$$Y_4 = G_5 Y_1 + G_6 Y_3$$

where Y_1 = input

Y_2 = output.

b) Attempt **any one** : 6

- 1) A unity feedback control system is given by $G(s) = \frac{k(s+13)}{s(s+3)(s+7)}$. Find the range of values of k for which the system is stable.
- 2) Convert the following block diagram into its equivalent signal flow graph.



Set R



SECTION – II

4. Attempt **any four** : (4×4=16)
- a) What are time response specifications ?
 - b) Define the following :
 - 1) Phase crossover frequency
 - 2) Gain crossover frequency
 - 3) Phase margin
 - 4) Gain margin.
 - c) Explain lead compensator.
 - d) Explain K_p , K_v and K_a the error constants.
 - e) What is the contribution of different factors of transfer function in phase plot ?
5. a) A unity feedback control system has $G(s) = \frac{400(s+2)}{s^2(s+5)(s+10)}$. Draw the Bode plot. 6
- b) Attempt **any one** : 6
- 1) Sketch the root locus for a system having $G(s) = \frac{k}{s+1}$ and $H(s) = \frac{s+1}{(s^2+4s+5)}$.
 - 2) For a system having $\frac{C(s)}{R(s)} = \frac{20}{s^2+7s+25}$. Find its time response specifications and expression for output.
- _____

Seat
No.Set **S****S.E. (E&TC) (Part – II) (CGPA) Examination, 2017**
CONTROL SYSTEMSDay and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) Assume suitable data **wherever** necessary.
 - 2) Figures to the **right** indicate **full** marks.
 - 3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

1) Consider the root locus plot of unity-feedback system with open-loop transfer function

$$G(s) = \frac{k(s+5)}{s(s+2)(s+4)(s^2+2s+2)}$$

The meeting point of the asymptotes on the real axis occurs at

- a) -1.2 b) -0.85 c) -1.05 d) -0.75

2) Consider the following statements :

- i) Lead compensation is suitable for systems having unsatisfactory transient response.
- ii) Lag compensation is suitable for systems having unsatisfactory steady-state response.

Which of the following is correct ?

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- b) Statement (i) is false and Statement (ii) is true
- c) Both the statements are true
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3) The root locus of the system $G(s)H(s) = \frac{k}{s(s+2)(s+3)}$ has break-away point located at

- a) (-0.5, 0) b) (-2.548, 0) c) (-4, 0) d) (-0.784, 0)

4) A unity feedback system has open-loop transfer function $G(s) = \frac{25}{s(s+6)}$. The time t_p at which the peak of the step-input response occurs is

- a)
- $\frac{11}{7}$
- sec. b)
- $\frac{11}{4}$
- sec. c)
- $\frac{11}{14}$
- sec. d)
- $\frac{11}{28}$
- sec.

P.T.O.



- 5) Which of the following is the best method for determining the stability and transient response ?
 a) Root locus b) Bode plot c) Both d) None of the above
- 6) The damping ratio of a system having the characteristic equation $S^2 + 2S + 8 = 0$ is
 a) 0.353 b) 0.330 c) 0.300 d) 0.250
- 7) The input to a controller is
 a) Sensed signal b) Desired variable value
 c) Error signal d) Servo-signal
- 8) If the transfer function of a first-order system is $G(s) = \frac{10}{1 + 2s}$, then the time constant of the system is
 a) 10 seconds b) $\frac{1}{10}$ seconds c) 2 seconds d) $\frac{1}{2}$ seconds
- 9) For a second-order system with damping $\delta > 1$, the roots of the characteristic equation are
 a) Real but not equal b) Real and equal
 c) Complex conjugate d) Imaginary
- 10) The characteristic equation of a feedback control system is given by $2s^4 + s^3 + 2s^2 + 5s + 10 = 0$. The number of roots in the right half of s-plane are
 a) Zero b) 1
 c) 2 d) 3
- 11) Tachogenerator feedback is used in position control systems to
 a) Increase the effective damping in the system
 b) Decrease the effective damping in the system
 c) Improve the steady-state response of the system
 d) None of the above
- 12) The initial response when the output is not equal to input is called
 a) Transient response b) Error response
 c) Dynamic response d) Steady-state response
- 13) A unity feedback system has open-loop transfer function $G(s) = \frac{9}{s(s + 3)}$. The system has
 a) Damping ratio = $\frac{1}{2}$, natural frequency = 9 b) Damping ratio = $\frac{1}{6}$, natural frequency = 3
 c) Damping ratio = $\frac{1}{6}$, natural frequency = 9 d) Damping ratio = $\frac{1}{2}$, natural frequency = 3
- 14) Bode magnitude plot of a system has -20 dB gain at low frequencies, the system is
 a) Type -2 b) Type -1 c) Type -0 d) Cannot decide type



Seat No.	
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**S.E. (E&TC) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) Assume suitable data *wherever* necessary.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any four** : (4x4=16)

- a) Explain with neat diagram liquid level control system.
- b) Obtain the transfer function of basic mechanical translational system.
- c) Define the following :
 - i) Absolute stability
 - ii) Conditional stability
 - iii) Relative stability
 - iv) Marginal stability
- d) What is the procedure for block diagram reduction ?
- e) What is force-voltage analogy ?

3. a) Construct the signal-flow graph for the following set of equations and find the transfer function using Mason's gain formula. 6

$$Y_2 = G_1 Y_1 - G_2 Y_4$$

$$Y_3 = G_3 Y_2 + G_4 Y_3$$

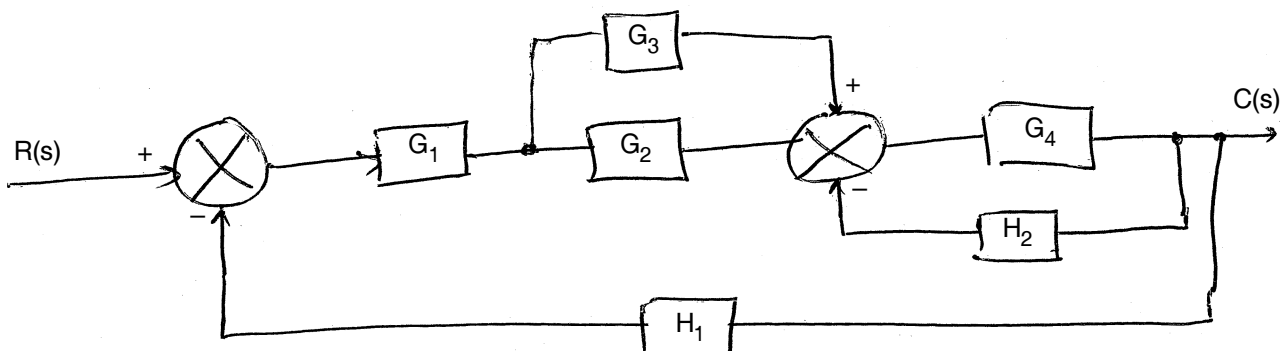
$$Y_4 = G_5 Y_1 + G_6 Y_3$$

where Y_1 = input

Y_2 = output.

b) Attempt **any one** : 6

- 1) A unity feedback control system is given by $G(s) = \frac{k(s+13)}{s(s+3)(s+7)}$. Find the range of values of k for which the system is stable.
- 2) Convert the following block diagram into its equivalent signal flow graph.



Set S



SECTION – II

4. Attempt **any four** : (4×4=16)
- a) What are time response specifications ?
 - b) Define the following :
 - 1) Phase crossover frequency
 - 2) Gain crossover frequency
 - 3) Phase margin
 - 4) Gain margin.
 - c) Explain lead compensator.
 - d) Explain K_p , K_v and K_a the error constants.
 - e) What is the contribution of different factors of transfer function in phase plot ?
5. a) A unity feedback control system has $G(s) = \frac{400(s+2)}{s^2(s+5)(s+10)}$. Draw the Bode plot. 6
- b) Attempt **any one** : 6
- 1) Sketch the root locus for a system having $G(s) = \frac{k}{s+1}$ and $H(s) = \frac{s+1}{(s^2+4s+5)}$.
 - 2) For a system having $\frac{C(s)}{R(s)} = \frac{20}{s^2+7s+25}$. Find its time response specifications and expression for output.
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SLR-TJ – 196

Seat No.	
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S.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) Figures to the **right** indicate **full** marks.
3) **Assume** suitable data **whenever** necessary.
4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(14×1=14)**
- Which of below configuration of OPAMP has smallest bandwidth ?
 - Open loop
 - Non inverting
 - Inverting
 - Differential
 - OPAMP is _____ coupled _____ amplifier.
 - Capacitor, high gain
 - Directly, class AB
 - Directly, high gain
 - Capacitor, nonlinear
 - Output offset voltage changes with change in
 - Temperature
 - Time
 - Supply voltage
 - All of above
 - Effect of slew rate for OPAMP is dominant at _____ frequency.
 - Low
 - High
 - Mid
 - None of above
 - Which amplifier offers best immunity for induced noise signal ?
 - Differential amplifier
 - Non-inverting amplifier
 - Common mode
 - Inverting amplifier

P.T.O.



- 6) V to I converter can be designed with
- a) Floating load
 - b) Grounded load
 - c) Both a) and b)
 - d) None of above
- 7) Which of following circuit is used as signal conditioning circuit ?
- a) Inverting amplifier
 - b) Non-inverting amplifier
 - c) Differential amplifier
 - d) Instrumentation amplifier
- 8) Which of below is open loop application ?
- a) Basic comparator
 - b) Zero crossing detector
 - c) Window detector
 - d) All of above
- 9) Clamper is also called as
- a) DC inserter
 - b) DC restorer
 - c) DC Level shifter
 - d) All of above
- 10) In wien bridge oscillator if $f_o = 965 \text{ Hz}$ and $C = 0.05 \mu\text{F}$ then $R = \underline{\hspace{2cm}}$
- a) $9.3 \text{ K}\Omega$
 - b) $3.3 \text{ K}\Omega$
 - c) $1.4 \text{ K}\Omega$
 - d) $11.4 \text{ K}\Omega$
- 11) For function generator IC 8038, amplitude of sine wave output is
- a) 0.11 Vs
 - b) 0.22 Vs
 - c) 0.33 Vs
 - d) None of above
- 12) Full wave precision rectifier can rectify input voltage $\underline{\hspace{2cm}}$
- a) Greater than 0.7 V
 - b) Less than 0.7 V
 - c) Both a) and b)
 - d) None
- 13) Which of following can be used as frequency multiplier ?
- a) Precision rectifier
 - b) Log-Antilog amplifier
 - c) PLL
 - d) None of above
- 14) For design of second order low pass Butterworth filter with $R_2=R_3$ and $C_2=C_3$, A_F is selected as
- a) 1.486
 - b) 2.486
 - c) 1.586
 - d) None of above
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**S.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
LINEAR INTEGRATED CIRCUITS**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) *Figures to the right indicate full marks.*
2) **Assume suitable data whenever necessary.**

SECTION – I

2. Solve **any four** of following : **(4×3=12)**
- a) Explain offset voltage compensating techniques for OPAMP.
 - b) What is slew rate and how it is measured practically ?
 - c) The 741 OPAMP having following parameters is connected as inverting amplifier with $R_1 = 1K\Omega$, $R_F = 10K\Omega$, $A = 200000$, $R_i = 2 M\Omega$, $R_o = 75\Omega$, $F_o = 5 Hz$, $V_{cc} = \pm 15V$, $V_o = +13V$. Compute voltage gain, input resistance, and total output offset voltage with feedback.
 - d) Explain basic and practical differentiator.
 - e) Draw circuit for V to I converter with floating load and derive the expression for output voltage.
3. Solve **any two** of following : **(2×8=16)**
- a) Derive expression for voltage gain and input resistance of DIBO amplifier.
 - b) Explain basic and practical integrator with circuit and its frequency response.
 - c) Draw high frequency equivalent circuit of OPAMP and derive expression for voltage gain as function of frequency in open loop and draw its frequency response.



SECTION – II

4. Solve **any four** of following : **(4×3=12)**
- a) Explain Sample and Hold Circuit using OPAMP.
 - b) Explain with neat diagram Quadrature oscillator.
 - c) Explain application of PLL as frequency multiplier.
 - d) Explain full wave precision rectifier.
 - e) Draw and explain negative clamper using OPAMP.
5. Solve **any two** of following : **(2×8=16)**
- a) Explain with neat diagram of triangular wave generator. Also derive expression to find Oscillating Frequency.
 - b) Explain with block diagram and pin diagram PLL IC 565. Define lock range and capture range.
 - c) Draw and explain second order low pass Butterworth filter using OPAMP. Design second order low pass Butterworth filter for high cut off frequency of 1 KHz.
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SLR-TJ – 196

Seat No.	
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Set	Q
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S.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) Figures to the **right** indicate **full** marks.
3) **Assume** suitable data **whenever** necessary.
4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(14×1=14)**

- 1) Which of below is open loop application ?
 - a) Basic comparator
 - b) Zero crossing detector
 - c) Window detector
 - d) All of above
- 2) Clamper is also called as
 - a) DC inserter
 - b) DC restorer
 - c) DC Level shifter
 - d) All of above
- 3) In wien bridge oscillator if $f_o = 965 \text{ Hz}$ and $C = 0.05 \mu\text{F}$ then $R = \underline{\hspace{2cm}}$
 - a) $9.3 \text{ K}\Omega$
 - b) $3.3 \text{ K}\Omega$
 - c) $1.4 \text{ K}\Omega$
 - d) $11.4 \text{ K}\Omega$
- 4) For function generator IC 8038, amplitude of sine wave output is
 - a) 0.11 Vs
 - b) 0.22 Vs
 - c) 0.33 Vs
 - d) None of above
- 5) Full wave precision rectifier can rectify input voltage $\underline{\hspace{2cm}}$
 - a) Greater than 0.7 V
 - b) Less than 0.7 V
 - c) Both a) and b)
 - d) None

P.T.O.



- 6) Which of following can be used as frequency multiplier ?
- a) Precision rectifier
 - b) Log-Antilog amplifier
 - c) PLL
 - d) None of above
- 7) For design of second order low pass Butterworth filter with $R_2=R_3$ and $C_2=C_3$, A_F is selected as
- a) 1.486
 - b) 2.486
 - c) 1.586
 - d) None of above
- 8) Which of below configuration of OPAMP has smallest bandwidth ?
- a) Open loop
 - b) Non inverting
 - c) Inverting
 - d) Differential
- 9) OPAMP is _____ coupled _____ amplifier.
- a) Capacitor, high gain
 - b) Directly, class AB
 - c) Directly, high gain
 - d) Capacitor, nonlinear
- 10) Output offset voltage changes with change in
- a) Temperature
 - b) Time
 - c) Supply voltage
 - d) All of above
- 11) Effect of slew rate for OPAMP is dominant at _____ frequency.
- a) Low
 - b) High
 - c) Mid
 - d) None of above
- 12) Which amplifier offers best immunity for induced noise signal ?
- a) Differential amplifier
 - b) Non-inverting amplifier
 - c) Common mode
 - d) Inverting amplifier
- 13) V to I converter can be designed with
- a) Floating load
 - b) Grounded load
 - c) Both a) and b)
 - d) None of above
- 14) Which of following circuit is used as signal conditioning circuit ?
- a) Inverting amplifier
 - b) Non-inverting amplifier
 - c) Differential amplifier
 - d) Instrumentation amplifier
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S.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) *Figures to the right indicate full marks.*
2) **Assume suitable data whenever necessary.**

SECTION – I

2. Solve **any four** of following : **(4×3=12)**
- a) Explain offset voltage compensating techniques for OPAMP.
 - b) What is slew rate and how it is measured practically ?
 - c) The 741 OPAMP having following parameters is connected as inverting amplifier with $R_1 = 1K\Omega$, $R_F = 10K\Omega$, $A = 200000$, $R_i = 2 M\Omega$, $R_o = 75\Omega$, $F_o = 5 Hz$, $V_{cc} = \pm 15V$, $V_o = +13V$. Compute voltage gain, input resistance, and total output offset voltage with feedback.
 - d) Explain basic and practical differentiator.
 - e) Draw circuit for V to I converter with floating load and derive the expression for output voltage.
3. Solve **any two** of following : **(2×8=16)**
- a) Derive expression for voltage gain and input resistance of DIBO amplifier.
 - b) Explain basic and practical integrator with circuit and its frequency response.
 - c) Draw high frequency equivalent circuit of OPAMP and derive expression for voltage gain as function of frequency in open loop and draw its frequency response.



SECTION – II

4. Solve **any four** of following : **(4×3=12)**
- a) Explain Sample and Hold Circuit using OPAMP.
 - b) Explain with neat diagram Quadrature oscillator.
 - c) Explain application of PLL as frequency multiplier.
 - d) Explain full wave precision rectifier.
 - e) Draw and explain negative clamper using OPAMP.
5. Solve **any two** of following : **(2×8=16)**
- a) Explain with neat diagram of triangular wave generator. Also derive expression to find Oscillating Frequency.
 - b) Explain with block diagram and pin diagram PLL IC 565. Define lock range and capture range.
 - c) Draw and explain second order low pass Butterworth filter using OPAMP. Design second order low pass Butterworth filter for high cut off frequency of 1 KHz.
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SLR-TJ – 196

Seat No.	
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Set	R
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**S.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
LINEAR INTEGRATED CIRCUITS**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) Figures to the **right** indicate **full** marks.
3) **Assume** suitable data **whenever** necessary.
4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) Which amplifier offers best immunity for induced noise signal ?
 - a) Differential amplifier
 - b) Non-inverting amplifier
 - c) Common mode
 - d) Inverting amplifier
- 2) V to I converter can be designed with
 - a) Floating load
 - b) Grounded load
 - c) Both a) and b)
 - d) None of above
- 3) Which of following circuit is used as signal conditioning circuit ?
 - a) Inverting amplifier
 - b) Non-inverting amplifier
 - c) Differential amplifier
 - d) Instrumentation amplifier
- 4) Which of below is open loop application ?
 - a) Basic comparator
 - b) Zero crossing detector
 - c) Window detector
 - d) All of above
- 5) Clamper is also called as
 - a) DC inserter
 - b) DC restorer
 - c) DC Level shifter
 - d) All of above

P.T.O.



- 6) In Wien bridge oscillator if $f_o = 965 \text{ Hz}$ and $C = 0.05 \mu\text{F}$ then $R =$ _____
- a) $9.3 \text{ K}\Omega$ b) $3.3 \text{ K}\Omega$
c) $1.4 \text{ K}\Omega$ d) $11.4 \text{ K}\Omega$
- 7) For function generator IC 8038, amplitude of sine wave output is
- a) 0.11 Vs b) 0.22 Vs
c) 0.33 Vs d) None of above
- 8) Full wave precision rectifier can rectify input voltage _____
- a) Greater than 0.7 V b) Less than 0.7 V
c) Both a) and b) d) None
- 9) Which of following can be used as frequency multiplier ?
- a) Precision rectifier b) Log-Antilog amplifier
c) PLL d) None of above
- 10) For design of second order low pass Butterworth filter with $R_2=R_3$ and $C_2=C_3$, A_F is selected as
- a) 1.486 b) 2.486
c) 1.586 d) None of above
- 11) Which of below configuration of OPAMP has smallest bandwidth ?
- a) Open loop b) Non inverting
c) Inverting d) Differential
- 12) OPAMP is _____ coupled _____ amplifier.
- a) Capacitor, high gain b) Directly, class AB
c) Directly, high gain d) Capacitor, nonlinear
- 13) Output offset voltage changes with change in
- a) Temperature b) Time
c) Supply voltage d) All of above
- 14) Effect of slew rate for OPAMP is dominant at _____ frequency.
- a) Low b) High
c) Mid d) None of above
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**S.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
LINEAR INTEGRATED CIRCUITS**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) *Figures to the right indicate full marks.*
2) **Assume** suitable data **whenever** necessary.

SECTION – I

2. Solve **any four** of following : **(4×3=12)**
- a) Explain offset voltage compensating techniques for OPAMP.
 - b) What is slew rate and how it is measured practically ?
 - c) The 741 OPAMP having following parameters is connected as inverting amplifier with $R_1 = 1K\Omega$, $R_F = 10K\Omega$, $A = 200000$, $R_i = 2 M\Omega$, $R_o = 75\Omega$, $F_o = 5 Hz$, $V_{cc} = \pm 15V$, $V_o = +13V$. Compute voltage gain, input resistance, and total output offset voltage with feedback.
 - d) Explain basic and practical differentiator.
 - e) Draw circuit for V to I converter with floating load and derive the expression for output voltage.
3. Solve **any two** of following : **(2×8=16)**
- a) Derive expression for voltage gain and input resistance of DIBO amplifier.
 - b) Explain basic and practical integrator with circuit and its frequency response.
 - c) Draw high frequency equivalent circuit of OPAMP and derive expression for voltage gain as function of frequency in open loop and draw its frequency response.



SECTION – II

4. Solve **any four** of following : **(4×3=12)**
- a) Explain Sample and Hold Circuit using OPAMP.
 - b) Explain with neat diagram Quadrature oscillator.
 - c) Explain application of PLL as frequency multiplier.
 - d) Explain full wave precision rectifier.
 - e) Draw and explain negative clamper using OPAMP.
5. Solve **any two** of following : **(2×8=16)**
- a) Explain with neat diagram of triangular wave generator. Also derive expression to find Oscillating Frequency.
 - b) Explain with block diagram and pin diagram PLL IC 565. Define lock range and capture range.
 - c) Draw and explain second order low pass Butterworth filter using OPAMP. Design second order low pass Butterworth filter for high cut off frequency of 1 KHz.
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**S.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
LINEAR INTEGRATED CIRCUITS**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) Figures to the **right** indicate **full** marks.
3) **Assume** suitable data **whenever** necessary.
4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(14×1=14)**
- 1) In Wien bridge oscillator if $f_o = 965 \text{ Hz}$ and $C = 0.05 \mu\text{F}$ then $R =$ _____
 - a) $9.3 \text{ K}\Omega$
 - b) $3.3 \text{ K}\Omega$
 - c) $1.4 \text{ K}\Omega$
 - d) $11.4 \text{ K}\Omega$
 - 2) For function generator IC 8038, amplitude of sine wave output is
 - a) 0.11 Vs
 - b) 0.22 Vs
 - c) 0.33 Vs
 - d) None of above
 - 3) Full wave precision rectifier can rectify input voltage _____
 - a) Greater than 0.7 V
 - b) Less than 0.7 V
 - c) Both a) and b)
 - d) None
 - 4) Which of following can be used as frequency multiplier ?
 - a) Precision rectifier
 - b) Log-Antilog amplifier
 - c) PLL
 - d) None of above
 - 5) For design of second order low pass Butterworth filter with $R_2=R_3$ and $C_2=C_3$, A_F is selected as
 - a) 1.486
 - b) 2.486
 - c) 1.586
 - d) None of above

P.T.O.



- 6) Which of below configuration of OPAMP has smallest bandwidth ?
- a) Open loop
 - b) Non inverting
 - c) Inverting
 - d) Differential
- 7) OPAMP is _____ coupled _____ amplifier.
- a) Capacitor, high gain
 - b) Directly, class AB
 - c) Directly, high gain
 - d) Capacitor, nonlinear
- 8) Output offset voltage changes with change in
- a) Temperature
 - b) Time
 - c) Supply voltage
 - d) All of above
- 9) Effect of slew rate for OPAMP is dominant at _____ frequency.
- a) Low
 - b) High
 - c) Mid
 - d) None of above
- 10) Which amplifier offers best immunity for induced noise signal ?
- a) Differential amplifier
 - b) Non-inverting amplifier
 - c) Common mode
 - d) Inverting amplifier
- 11) V to I converter can be designed with
- a) Floating load
 - b) Grounded load
 - c) Both a) and b)
 - d) None of above
- 12) Which of following circuit is used as signal conditioning circuit ?
- a) Inverting amplifier
 - b) Non-inverting amplifier
 - c) Differential amplifier
 - d) Instrumentation amplifier
- 13) Which of below is open loop application ?
- a) Basic comparator
 - b) Zero crossing detector
 - c) Window detector
 - d) All of above
- 14) Clamper is also called as
- a) DC inserter
 - b) DC restorer
 - c) DC Level shifter
 - d) All of above
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S.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) *Figures to the right indicate full marks.*
2) **Assume suitable data whenever necessary.**

SECTION – I

2. Solve **any four** of following : **(4×3=12)**
- a) Explain offset voltage compensating techniques for OPAMP.
 - b) What is slew rate and how it is measured practically ?
 - c) The 741 OPAMP having following parameters is connected as inverting amplifier with $R_1 = 1K\Omega$, $R_F = 10K\Omega$, $A = 200000$, $R_i = 2 M\Omega$, $R_o = 75\Omega$, $F_o = 5 Hz$, $V_{cc} = \pm 15V$, $V_o = +13V$. Compute voltage gain, input resistance, and total output offset voltage with feedback.
 - d) Explain basic and practical differentiator.
 - e) Draw circuit for V to I converter with floating load and derive the expression for output voltage.
3. Solve **any two** of following : **(2×8=16)**
- a) Derive expression for voltage gain and input resistance of DIBO amplifier.
 - b) Explain basic and practical integrator with circuit and its frequency response.
 - c) Draw high frequency equivalent circuit of OPAMP and derive expression for voltage gain as function of frequency in open loop and draw its frequency response.



SECTION – II

4. Solve **any four** of following : **(4×3=12)**
- a) Explain Sample and Hold Circuit using OPAMP.
 - b) Explain with neat diagram Quadrature oscillator.
 - c) Explain application of PLL as frequency multiplier.
 - d) Explain full wave precision rectifier.
 - e) Draw and explain negative clamper using OPAMP.
5. Solve **any two** of following : **(2×8=16)**
- a) Explain with neat diagram of triangular wave generator. Also derive expression to find Oscillating Frequency.
 - b) Explain with block diagram and pin diagram PLL IC 565. Define lock range and capture range.
 - c) Draw and explain second order low pass Butterworth filter using OPAMP. Design second order low pass Butterworth filter for high cut off frequency of 1 KHz.
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Seat No.	
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Set	P
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**S.E. (Electronics and Telecommunication) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS**

Day and Date : Saturday, 25-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. Each question carries one mark.
 - 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
 - 3) Figures to the right indicates max. marks.
 - 4) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

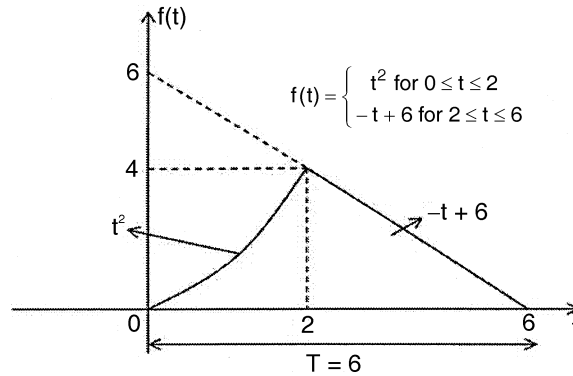
(1×14=14)

- 1) The shifting property of impulse is $x[n] * \delta[n - n_0] =$
a) $x[n]$ b) $\delta[n]$ c) $x[n - n_0]$ d) $\delta[n - n_0]$
- 2) The system $y(t) = x^2(t) + 6$ is
a) Linear b) Non linear c) Invertible d) None of these
- 3) The system $y[n] = x[-n]$ is
a) Time variant b) Time invariant c) Both (a) and (b) d) None of these
- 4) Given sequence $x_1[n] = \{1, -2, 3, 1\}$ and $x_2[n] = \{2, -3, -2\}$ then their convolution $y[n]$ is
a) $\{2, -7, 10, -7\}$ b) $\{2, -7, 10, -3, -9, -2\}$
c) $\{10, -7, -9, 2\}$ d) $\{2, -7, 10, -7, 9\}$
- 5) The step response of the system whose impulse response $h(t) = t.u(t)$ is
a) $t^2 u(t)$ b) $(t^2/2) u(t)$ c) $(t^3/3) u(t)$ d) $(3t^2/2) u(t)$
- 6) With $u[n]$ as unit step function, $u[n] - u[n - 1]$ is
a) $\delta[n]$ b) $\delta[n] + \delta[n - 1]$ c) $\delta[n] - \delta[n - 1]$ d) $\delta[n] + \delta[n + 1]$
- 7) Unit ramp signal can be expressed as
a) $u(t) + t$ b) $u(t) - t$ c) $u(t)/t$ d) $t u(t)$
- 8) The ROC of the sequence $x[n] = u[n]$ is
a) $|Z| > 1$ b) $|Z| < 1$ c) No ROC d) $-1 < |Z| < 1$
- 9) The system function $H(Z) = \frac{z^3 - 2z^2 + z}{z^2 + 0.25z + 0.125}$ is
a) Causal b) Non causal
c) Both (a) and (b) d) Cannot be defined

P.T.O.

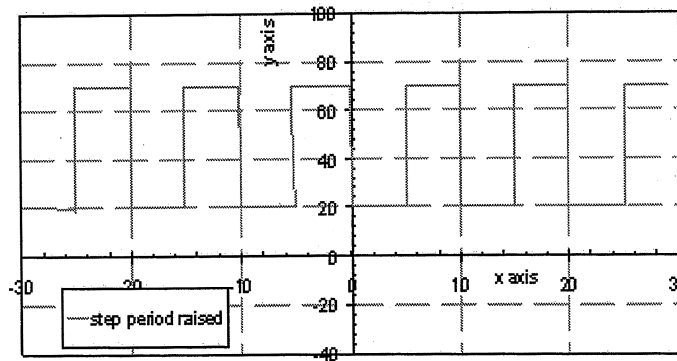


10) Given the following periodic function, $f(t)$



The coefficient a_0 of the continuous Fourier series associated with the above given function $f(t)$ can be computed as

- a) $8/3$
 - b) $16/9$
 - c) $32/9$
 - d) $32/3$
- 11) What is the integral of $f(x)$ over one period ?



- a) 250
 - b) 200
 - c) 450
 - d) None of above
- 12) If $x(t) \leftrightarrow X(\omega)$ then FT of $x(t) = \text{Cos}(\omega t)$ is $X(\omega) =$
- a) $2\pi\delta(\omega + \omega_0)$
 - b) $2\pi\delta(\omega - \omega_0)$
 - c) $\pi[\delta(\omega - \omega_0) - \delta(\omega + \omega_0)]$
 - d) $\pi[\delta(\omega - \omega_0) + \delta(\omega + \omega_0)]$
- 13) The antialiasing filter is a
- a) Low pass filter
 - b) High pass filter
 - c) Band pass filter
 - d) Band stop filter
- 14) The undersampling a signal may cause
- a) Aliasing error
 - b) Interference of high frequency on low frequency
 - c) Loss of data
 - d) All of these



Seat No.	
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**S.E. (Electronics and Telecommunication) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS**

Day and Date : Saturday, 25-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions: 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Attempt **any four** : **(5×4=20)**

- a) Explain the transformations of independent variable.
- b) Find even and odd components of the signal
$$x(t) = 1 + t + 3t^2 + 5t^3 + 9t^4$$
- c) Explain the properties of CT and DT convolution.
- d) For the CT LTI system $y(t) = x(t - 3)$, find impulse response $h(t)$. Also check whether system is invertible or not. If invertible, find impulse response of inverse system.
- e) Determine whether or not each of the following DT signals are periodic or not. If they are periodic, find its fundamental time period :

i) $x[n] = 2 \cos\left(\frac{\pi}{4} n\right) + \sin\left(\frac{\pi}{8} n\right)$

ii) $x(t) = j e^{j10t}$.

3. Attempt the following : **(1×8=8)**

- a) Determine which of the properties listed below will hold and which do not hold for $y[n] = n x[n + 1]$ Static, Time Invariance, Linearity, Causality.

OR

- a) Determine the convolution of following two signals :

$$x(t) = \begin{cases} t + 1 & 0 \leq t \leq 1 \\ 2 - t & 1 \leq t \leq 2 \\ 0 & \text{elsewhere} \end{cases}$$

and $h(t) = \delta(t + 2) + 2 \delta(t + 1)$.



SECTION – II

4. Attempt **any four** : **(5×4=20)**

- a) Explain the convergence of Fourier series and Dirichlet conditions.
- b) Find the Fourier transform of a rectangular pulse of width T, amplitude A and centered at origin.
- c) Find X(Z) if $x[n] = (2)^n u[n] + (5)^n u[-n - 1]$.
- d) Define 'Aliasing error'. Explain how it can be avoided.
- e) Determine the complex exponential Fourier series representation for

$$x(t) = \cos\left(2t + \frac{\pi}{4}\right) + \sin(3t).$$

5. Attempt the following : **(1×8=8)**

- a) Explain sampling theorem in time domain. Also, explain various interpolation techniques.

OR

- a) State and prove following properties of Z transform :
 - i) Time shifting
 - ii) Time scaling
 - iii) Time reversal.
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**S.E. (Electronics and Telecommunication) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS**

Day and Date : Saturday, 25-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Figures to the **right** indicates max. marks.
 - 4) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration : 30 Minutes

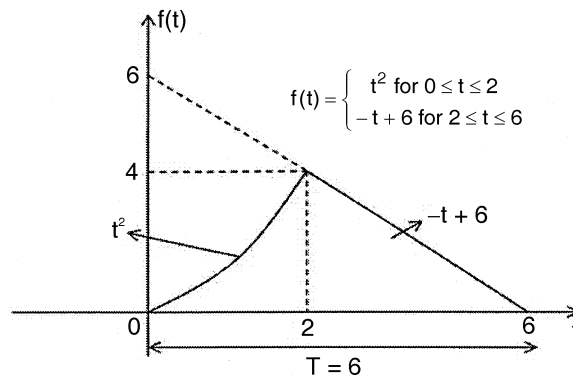
Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The ROC of the sequence $x[n] = u[n]$ is
 - a) $|Z| > 1$
 - b) $|Z| < 1$
 - c) No ROC
 - d) $-1 < |Z| < 1$
- 2) The system function $H(Z) = \frac{z^3 - 2z^2 + z}{z^2 + 0.25z + 0.125}$ is
 - a) Causal
 - b) Non causal
 - c) Both (a) and (b)
 - d) Cannot be defined

3) Given the following periodic function, $f(t)$

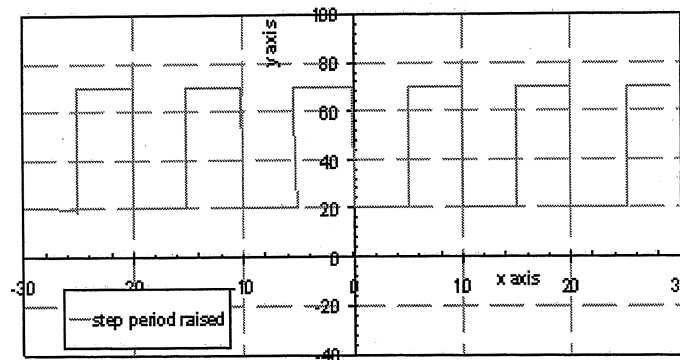


The coefficient a_0 of the continuous Fourier series associated with the above given function $f(t)$ can be computed as

- a) $8/3$
- b) $16/9$
- c) $32/9$
- d) $32/3$



4) What is the integral of $f(x)$ over one period ?



- a) 250 b) 200 c) 450 d) None of above
- 5) If $x(t) \leftrightarrow X(\omega)$ then FT of $x(t) = \cos(\omega_0 t)$ is $X(\omega) =$
- a) $2\pi\delta(\omega + \omega_0)$ b) $2\pi\delta(\omega - \omega_0)$
 c) $\pi[\delta(\omega - \omega_0) - \delta(\omega + \omega_0)]$ d) $\pi[\delta(\omega - \omega_0) + \delta(\omega + \omega_0)]$
- 6) The antialiasing filter is a
- a) Low pass filter b) High pass filter
 c) Band pass filter d) Band stop filter
- 7) The undersampling a signal may cause
- a) Aliasing error
 b) Interference of high frequency on low frequency
 c) Loss of data
 d) All of these
- 8) The shifting property of impulse is $x[n] * \delta[n - n_0] =$
- a) $x[n]$ b) $\delta[n]$ c) $x[n - n_0]$ d) $\delta[n - n_0]$
- 9) The system $y(t) = x^2(t) + 6$ is
- a) Linear b) Non linear c) Invertible d) None of these
- 10) The system $y[n] = x[-n]$ is
- a) Time variant b) Time invariant c) Both (a) and (b) d) None of these
- 11) Given sequence $x_1[n] = \{1, -2, 3, 1\}$ and $x_2[n] = \{2, -3, -2\}$ then their convolution $y[n]$ is
- a) $\{2, -7, 10, -7\}$ b) $\{2, -7, 10, -3, -9, -2\}$
 c) $\{10, -7, -9, 2\}$ d) $\{2, -7, 10, -7, 9\}$
- 12) The step response of the system whose impulse response $h(t) = t \cdot u(t)$ is
- a) $t^2 u(t)$ b) $(t^2/2) u(t)$ c) $(t^3/3) u(t)$ d) $(3t^2/2) u(t)$
- 13) With $u[n]$ as unit step function, $u[n] - u[n - 1]$ is
- a) $\delta[n]$ b) $\delta[n] + \delta[n - 1]$ c) $\delta[n] - \delta[n - 1]$ d) $\delta[n] + \delta[n + 1]$
- 14) Unit ramp signal can be expressed as
- a) $u(t) + t$ b) $u(t) - t$ c) $u(t)/t$ d) $t u(t)$



Seat No.	
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**S.E. (Electronics and Telecommunication) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS**

Day and Date : Saturday, 25-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) **All questions are compulsory.**
2) **Assume suitable data if necessary.**

SECTION – I

2. Attempt **any four** : **(5×4=20)**

- a) Explain the transformations of independent variable.
- b) Find even and odd components of the signal
$$x(t) = 1 + t + 3t^2 + 5t^3 + 9t^4$$
- c) Explain the properties of CT and DT convolution.
- d) For the CT LTI system $y(t) = x(t - 3)$, find impulse response $h(t)$. Also check whether system is invertible or not. If invertible, find impulse response of inverse system.
- e) Determine whether or not each of the following DT signals are periodic or not. If they are periodic, find its fundamental time period :

i) $x[n] = 2 \cos\left(\frac{\pi}{4} n\right) + \sin\left(\frac{\pi}{8} n\right)$

ii) $x(t) = j e^{j10t}$.

3. Attempt the following : **(1×8=8)**

- a) Determine which of the properties listed below will hold and which do not hold for $y[n] = n x[n + 1]$ Static, Time Invariance, Linearity, Causality.

OR

- a) Determine the convolution of following two signals :

$$x(t) = \begin{cases} t + 1 & 0 \leq t \leq 1 \\ 2 - t & 1 \leq t \leq 2 \\ 0 & \text{elsewhere} \end{cases}$$

and $h(t) = \delta(t + 2) + 2 \delta(t + 1)$.



SECTION – II

4. Attempt **any four** : **(5×4=20)**

- a) Explain the convergence of Fourier series and Dirichlet conditions.
- b) Find the Fourier transform of a rectangular pulse of width T, amplitude A and centered at origin.
- c) Find X(Z) if $x[n] = (2)^n u[n] + (5)^n u[-n - 1]$.
- d) Define 'Aliasing error'. Explain how it can be avoided.
- e) Determine the complex exponential Fourier series representation for

$$x(t) = \cos\left(2t + \frac{\pi}{4}\right) + \sin(3t).$$

5. Attempt the following : **(1×8=8)**

- a) Explain sampling theorem in time domain. Also, explain various interpolation techniques.

OR

- a) State and prove following properties of Z transform :
 - i) Time shifting
 - ii) Time scaling
 - iii) Time reversal.
-



Seat No.	
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**S.E. (Electronics and Telecommunication) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS**

Day and Date : Saturday, 25-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. Each question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Figures to the **right** indicates max. marks.
 - 4) Assume suitable data if necessary.

MCQ/Objective Type Questions

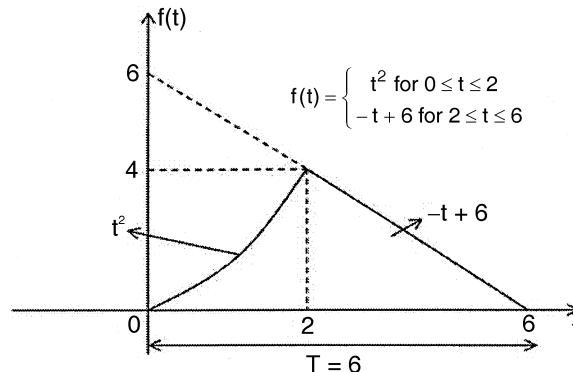
Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The step response of the system whose impulse response $h(t) = t.u(t)$ is
 a) $t^2 u(t)$ b) $(t^2/2) u(t)$ c) $(t^3/3) u(t)$ d) $(3t^2/2) u(t)$
- 2) With $u[n]$ as unit step function, $u[n] - u[n - 1]$ is
 a) $\delta[n]$ b) $\delta[n] + \delta[n - 1]$ c) $\delta[n] - \delta[n - 1]$ d) $\delta[n] + \delta[n + 1]$
- 3) Unit ramp signal can be expressed as
 a) $u(t) + t$ b) $u(t) - t$ c) $u(t)/t$ d) $t u(t)$
- 4) The ROC of the sequence $x[n] = u[n]$ is
 a) $|Z| > 1$ b) $|Z| < 1$ c) No ROC d) $-1 < |Z| < 1$
- 5) The system function $H(Z) = \frac{z^3 - 2z^2 + z}{z^2 + 0.25z + 0.125}$ is
 a) Causal b) Non causal
 c) Both (a) and (b) d) Cannot be defined
- 6) Given the following periodic function, $f(t)$



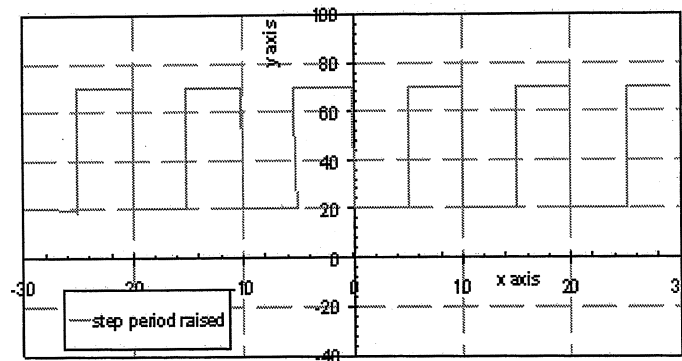
The coefficient a_0 of the continuous Fourier series associated with the above given function $f(t)$ can be computed as

- a) 8/3
- b) 16/9
- c) 32/9
- d) 32/3

P.T.O.



7) What is the integral of $f(x)$ over one period ?



- a) 250 b) 200 c) 450 d) None of above
- 8) If $x(t) \leftrightarrow X(\omega)$ then FT of $x(t) = \cos(\omega t)$ is $X(\omega) =$
- a) $2\pi\delta(\omega + \omega_0)$ b) $2\pi\delta(\omega - \omega_0)$
 c) $\pi[\delta(\omega - \omega_0) - \delta(\omega + \omega_0)]$ d) $\pi[\delta(\omega - \omega_0) + \delta(\omega + \omega_0)]$
- 9) The antialiasing filter is a
- a) Low pass filter b) High pass filter
 c) Band pass filter d) Band stop filter
- 10) The undersampling a signal may cause
- a) Aliasing error
 b) Interference of high frequency on low frequency
 c) Loss of data
 d) All of these
- 11) The shifting property of impulse is $x[n] * \delta[n - n_0] =$
- a) $x[n]$ b) $\delta[n]$ c) $x[n - n_0]$ d) $\delta[n - n_0]$
- 12) The system $y(t) = x^2(t) + 6$ is
- a) Linear b) Non linear c) Invertible d) None of these
- 13) The system $y[n] = x[-n]$ is
- a) Time variant b) Time invariant c) Both (a) and (b) d) None of these
- 14) Given sequence $x_1[n] = \{1, -2, 3, 1\}$ and $x_2[n] = \{2, -3, -2\}$ then their convolution $y[n]$ is
- a) $\{2, -7, 10, -7\}$ b) $\{2, -7, 10, -3, -9, -2\}$
 c) $\{10, -7, -9, 2\}$ d) $\{2, -7, 10, -7, 9\}$



Seat No.	
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**S.E. (Electronics and Telecommunication) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS**

Day and Date : Saturday, 25-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions: 1) **All questions are compulsory.**
2) **Assume suitable data if necessary.**

SECTION – I

2. Attempt **any four** : **(5×4=20)**

- a) Explain the transformations of independent variable.
- b) Find even and odd components of the signal
$$x(t) = 1 + t + 3t^2 + 5t^3 + 9t^4$$
- c) Explain the properties of CT and DT convolution.
- d) For the CT LTI system $y(t) = x(t - 3)$, find impulse response $h(t)$. Also check whether system is invertible or not. If invertible, find impulse response of inverse system.
- e) Determine whether or not each of the following DT signals are periodic or not. If they are periodic, find its fundamental time period :

i) $x[n] = 2 \cos\left(\frac{\pi}{4} n\right) + \sin\left(\frac{\pi}{8} n\right)$

ii) $x(t) = j e^{j10t}$.

3. Attempt the following : **(1×8=8)**

- a) Determine which of the properties listed below will hold and which do not hold for $y[n] = n x[n + 1]$ Static, Time Invariance, Linearity, Causality.

OR

- a) Determine the convolution of following two signals :

$$x(t) = \begin{cases} t + 1 & 0 \leq t \leq 1 \\ 2 - t & 1 \leq t \leq 2 \\ 0 & \text{elsewhere} \end{cases}$$

and $h(t) = \delta(t + 2) + 2 \delta(t + 1)$.



SECTION – II

4. Attempt **any four** : **(5×4=20)**

- a) Explain the convergence of Fourier series and Dirichlet conditions.
- b) Find the Fourier transform of a rectangular pulse of width T, amplitude A and centered at origin.
- c) Find X(Z) if $x[n] = (2)^n u[n] + (5)^n u[-n - 1]$.
- d) Define 'Aliasing error'. Explain how it can be avoided.
- e) Determine the complex exponential Fourier series representation for

$$x(t) = \cos\left(2t + \frac{\pi}{4}\right) + \sin(3t).$$

5. Attempt the following : **(1×8=8)**

- a) Explain sampling theorem in time domain. Also, explain various interpolation techniques.

OR

- a) State and prove following properties of Z transform :
 - i) Time shifting
 - ii) Time scaling
 - iii) Time reversal.
-



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**S.E. (Electronics and Telecommunication) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS**

Day and Date : Saturday, 25-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Figures to the **right** indicates max. marks.
 - 4) Assume suitable data if necessary.

MCQ/Objective Type Questions

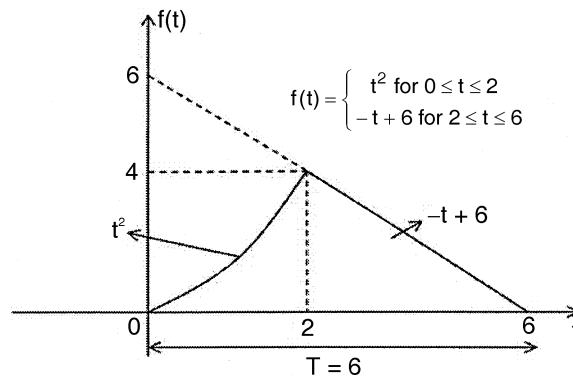
Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

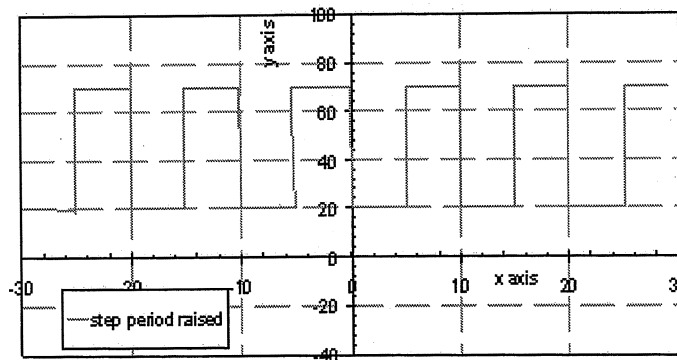
(1×14=14)

1) Given the following periodic function, f(t)



The coefficient a_0 of the continuous Fourier series associated with the above given function f(t) can be computed as

- a) 8/3 b) 16/9 c) 32/9 d) 32/3
- 2) What is the integral of f(x) over one period ?



- a) 250 b) 200 c) 450 d) None of above

P.T.O.



Seat No.	
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**S.E. (Electronics and Telecommunication) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS**

Day and Date : Saturday, 25-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) **All questions are compulsory.**
2) **Assume suitable data if necessary.**

SECTION – I

2. Attempt **any four** : **(5×4=20)**

- a) Explain the transformations of independent variable.
- b) Find even and odd components of the signal
$$x(t) = 1 + t + 3t^2 + 5t^3 + 9t^4$$
- c) Explain the properties of CT and DT convolution.
- d) For the CT LTI system $y(t) = x(t - 3)$, find impulse response $h(t)$. Also check whether system is invertible or not. If invertible, find impulse response of inverse system.
- e) Determine whether or not each of the following DT signals are periodic or not. If they are periodic, find its fundamental time period :

i) $x[n] = 2 \cos\left(\frac{\pi}{4} n\right) + \sin\left(\frac{\pi}{8} n\right)$

ii) $x(t) = j e^{j10t}$.

3. Attempt the following : **(1×8=8)**

- a) Determine which of the properties listed below will hold and which do not hold for $y[n] = n x[n + 1]$ Static, Time Invariance, Linearity, Causality.

OR

- a) Determine the convolution of following two signals :

$$x(t) = \begin{cases} t + 1 & 0 \leq t \leq 1 \\ 2 - t & 1 \leq t \leq 2 \\ 0 & \text{elsewhere} \end{cases}$$

and $h(t) = \delta(t + 2) + 2 \delta(t + 1)$.



SECTION – II

4. Attempt **any four** :**(5×4=20)**

- a) Explain the convergence of Fourier series and Dirichlet conditions.
- b) Find the Fourier transform of a rectangular pulse of width T, amplitude A and centered at origin.
- c) Find X(Z) if $x[n] = (2)^n u[n] + (5)^n u[-n - 1]$.
- d) Define 'Aliasing error'. Explain how it can be avoided.
- e) Determine the complex exponential Fourier series representation for

$$x(t) = \cos\left(2t + \frac{\pi}{4}\right) + \sin(3t).$$

5. Attempt the following :

(1×8=8)

- a) Explain sampling theorem in time domain. Also, explain various interpolation techniques.

OR

- a) State and prove following properties of Z transform :
 - i) Time shifting
 - ii) Time scaling
 - iii) Time reversal.
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SLR-TJ – 198

Seat No.	
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Set	P
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**T.E. (Electronics and Telecommunication Engg.) (Part – I) (CGPA)
Examination, 2017**

ELECTROMAGNETIC ENGG. AND RADIATING SYSTEMS

Day and Date : Wednesday, 29-11-2017

Total Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in the Answer Book Page No. 3. Each question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

3) **Assume** suitable data **wherever** necessary.

4) Figures to the **right** indicate **full** marks.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) If potential of 1 V is applied across a capacitor for 10 pF, the energy stored is
a) 5 pJ b) 2.5 pJ c) 10 pJ d) zero
- 2) If pair of +ve and –ve charges of 1 C separated by distance 5 μ m then the magnitude of dipole moment is
a) 5 C-μ m b) 2.5 C-μ m c) 2 C-μ m d) 25 C-μ m
- 3) If the force acting on 3 C charge is 6 N then electric field on that charge is
a) 18 V/m b) 0.5 V/m c) 2 V/m d) None of these
- 4) If $F_{t1} = \overline{ax}$ and $E_{n1} = 0$, then $\overline{E_2}$ in dielectric medium 2 is
a) \overline{ay} b) $-\overline{ax}$ c) \overline{az} d) \overline{ax}
- 5) In spherical co-ordinates ϕ increases in _____
a) Clockwise b) Anticlockwise c) Both a) and b) d) None of these
- 6) If the voltage applied across the capacitor is increased, the capacitance value
a) Increases b) Decreases
c) Remains constant d) Becomes infinity

P.T.O.



- 7) The unit of electric field intensity is
a) N/C b) V-m c) J-C/m d) All of these
- 8) Which of following term represents far field ?
a) $1/r$ b) $1/r^2$ c) $1/r^3$ d) $1/r^4$
- 9) A Yagi antenna has driven antenna
a) Only
b) With a reflector
c) With one or more directors
d) With a reflector and one or more directors
- 10) Magnetic vector potential for volume current is expressed as
a) $\bar{B} = \nabla \times \bar{A}$ b) $\bar{B} = \nabla \cdot \bar{A}$ c) $\bar{A} = \nabla \times \bar{B}$ d) $\bar{A} = \nabla \cdot \bar{A}$
- 11) The direction of emf induced is always such as to oppose the very reason producing the emf. This is according to
a) Bio-Savart's b) Lenz's c) Ampere's d) Faraday's
- 12) Radiation intensity does not depend upon
a) The antenna direction b) Antenna width
c) Both a) and b) d) None of these
- 13) According to Ampere's law
a) Total magnetic flux is equal to electric charge
b) Total magnetic flux is equal to current passing
c) Total electric flux is equal to electric charge
d) None of these
- 14) Curl of magnetic field intensity is
a) Current density b) Magnetic field intensity
c) Current d) None
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Seat No.	
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**T.E. (Electronics and Telecommunication Engg.) (Part – I) (CGPA)
Examination, 2017
ELECTROMAGNETIC ENGG. AND RADIATING SYSTEMS**

Day and Date : Wednesday, 29-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

Instructions : 1) **Assume** suitable data **wherever** necessary.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any three** : **(3×4=12)**

- 1) Given potential field $V = \frac{200 \sin \theta \cos \phi}{r^2}$ Volts. Find \bar{E} at point P (0.93, 30°, 30°).
- 2) State and derive divergence theorem.
- 3) A point charge of 6 nC located at origin in free space. Find V_{PQ} of point P is located at (0.2, -0.4, 0.4) and Q is at (-0.5, 1, -1). Also find V_P if $V = 20$ V at point Q.
- 4) Evaluate the work done in bringing 5 μ C charge from origin to (2, -1, 4) in the field $\bar{E} = 2xy \bar{a}_x + x^2z \bar{a}_y + x^2y \bar{a}_z$ along stright line $x = 2y, z = 2x$.
- 5) Derive the expression electric field intensity for a dipole.

3. Attempt **any two** : **(2×8=16)**

- a) State and prove point form of Gauss law.
- b) A point charge of 30 nC is located at the origin while a sheet charge of 10 nC/m² is placed at $y = 3$. Find \bar{D} at (0, 4, 3).
- c) In the region $x < 0$ contains a dielectric medium having $\epsilon r_1 = 4$ while region $x > 0$ is characterized by $\epsilon r_2 = 2$ if $\bar{E}_1 = 50 \bar{a}_x + 30 \bar{a}_y + 60 \bar{a}_z$ V/m.

Find :

- i) \bar{E}_{n1} ii) θ_1 iii) \bar{E}_{t1} iv) \bar{E}_2 v) θ_2 .

Where, 'n' indicates normal component and 't' indicates tangential component, θ is the angle made w.r. to the boundary separating two media.

Set P



SECTION – II

4. Solve **any three** : **(3×4=12)**
- 1) State and prove Ampere's circuital law.
 - 2) Derive Helmholtz wave equation in conducting media.
 - 3) Given points are A (1, 2, 4), B (-2, -1, 3) and C (3, 1, -2). Let a differential current element with $I = 6A$ and $|\overline{dl}| = 10^{-4} m$ be located at A. The direction of \overline{dl} is from A to B. Find \overline{dH} at C.
 - 4) What is pattern multiplication ? Explain with example how radiation pattern of array is obtained.
 - 5) Determine the propagation constants γ for material having $\mu_r = 1, \epsilon_r = 8, \sigma = 0.25 pS/m$, if frequency of the wave is 1.6 MHz.
5. Solve **any two** : **(2×8=16)**
- 1) If $\sigma = 0, \epsilon = 2.5\epsilon_0$ and $\mu = 10\mu_0$ determine whether or not the following pairs of fields satisfy Maxwell's equation.
 - a) $\overline{E} = 100 \sin(6 \times 10^7 t) \sin z \overline{a}_y, \overline{H} = -0.1328 \cos(6 \times 10^7 t) \cos z \overline{a}_x$
 - b) $\overline{D} = (z + 6 \times 10^7 t) \overline{a}_x, \overline{B} = (-754 z - 4.52 \times 10^{10} t) \overline{a}_y$.
 - 2) Explain other antenna parameter in detail.
 - 3) Evaluate both sides of Stroke's theorem for field $\overline{H} = (x^2 z / y) \overline{a}_y + (0.5 x^2 z^2 / y^2) \overline{a}_z$ and find current in the \overline{a}_x direction crossing the square surface in the plane $x = 2$ bounded by $y = z = 1$ and $y = z = 2$.
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Set	Q
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**T.E. (Electronics and Telecommunication Engg.) (Part – I) (CGPA)
Examination, 2017**

ELECTROMAGNETIC ENGG. AND RADIATING SYSTEMS

Day and Date : Wednesday, 29-11-2017

Total Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in the Answer Book Page No. 3. Each question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

3) **Assume** suitable data **wherever** necessary.

4) Figures to the **right** indicate **full** marks.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) Which of following term represents far field ?
a) $1/r$ b) $1/r^2$ c) $1/r^3$ d) $1/r^4$
- 2) A Yagi antenna has driven antenna
a) Only
b) With a reflector
c) With one or more directors
d) With a reflector and one or more directors
- 3) Magnetic vector potential for volume current is expressed as
a) $\bar{B} = \nabla \times \bar{A}$ b) $\bar{B} = \nabla \cdot \bar{A}$ c) $\bar{A} = \nabla \times \bar{B}$ d) $\bar{A} = \nabla \cdot \bar{A}$
- 4) The direction of emf induced is always such as to oppose the very reason producing the emf. This is according to
a) Bio-Savart's b) Lenz's c) Ampere's d) Faraday's
- 5) Radiation intensity does not depend upon
a) The antenna direction b) Antenna width
c) Both a) and b) d) None of these

P.T.O.



- 6) According to Ampere's law
- Total magnetic flux is equal to electric charge
 - Total magnetic flux is equal to current passing
 - Total electric flux is equal to electric charge
 - None of these
- 7) Curl of magnetic field intensity is
- Current density
 - Magnetic field intensity
 - Current
 - None
- 8) If potential of 1 V is applied across a capacitor for 10 pF, the energy stored is
- 5 pJ
 - 2.5 pJ
 - 10 pJ
 - zero
- 9) If pair of +ve and -ve charges of 1 C separated by distance $5\mu\text{m}$ then the magnitude of dipole moment is
- 5 C- μm
 - 2.5 C- μm
 - 2 C- μm
 - 25 C- μm
- 10) If the force acting on 3 C charge is 6 N then electric field on that charge is
- 18 V/m
 - 0.5 V/m
 - 2 V/m
 - None of these
- 11) If $F_{t1} = \overline{ax}$ and $E_{n1} = 0$, then \overline{E}_2 in dielectric medium 2 is
- \overline{ay}
 - $-\overline{ax}$
 - \overline{az}
 - \overline{ax}
- 12) In spherical co-ordinates ϕ increases in _____
- Clockwise
 - Anticlockwise
 - Both a) and b)
 - None of these
- 13) If the voltage applied across the capacitor is increased, the capacitance value
- Increases
 - Decreases
 - Remains constant
 - Becomes infinity
- 14) The unit of electric field intensity is
- N/C
 - V-m
 - J-C/m
 - All of these
-



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**T.E. (Electronics and Telecommunication Engg.) (Part – I) (CGPA)
Examination, 2017
ELECTROMAGNETIC ENGG. AND RADIATING SYSTEMS**

Day and Date : Wednesday, 29-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

Instructions : 1) **Assume** suitable data **wherever** necessary.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any three** : **(3×4=12)**

- 1) Given potential field $V = \frac{200 \sin \theta \cos \phi}{r^2}$ Volts. Find \bar{E} at point P (0.93, 30°, 30°).
- 2) State and derive divergence theorem.
- 3) A point charge of 6 nC located at origin in free space. Find V_{PQ} of point P is located at (0.2, -0.4, 0.4) and Q is at (-0.5, 1, -1). Also find V_P if $V = 20$ V at point Q.
- 4) Evaluate the work done in bringing 5 μ C charge from origin to (2, -1, 4) in the field $\bar{E} = 2xy \bar{a}_x + x^2z \bar{a}_y + x^2y \bar{a}_z$ along stright line $x = 2y, z = 2x$.
- 5) Derive the expression electric field intensity for a dipole.

3. Attempt **any two** : **(2×8=16)**

- a) State and prove point form of Gauss law.
- b) A point charge of 30 nC is located at the origin while a sheet charge of 10 nC/m² is placed at $y = 3$. Find \bar{D} at (0, 4, 3).
- c) In the region $x < 0$ contains a dielectric medium having $\epsilon r_1 = 4$ while region $x > 0$ is characterized by $\epsilon r_2 = 2$ if $\bar{E}_1 = 50 \bar{a}_x + 30 \bar{a}_y + 60 \bar{a}_z$ V/m.

Find :

- i) \bar{E}_{n1} ii) θ_1 iii) \bar{E}_{t1} iv) \bar{E}_2 v) θ_2 .

Where, 'n' indicates normal component and 't' indicates tangential component, θ is the angle made w.r. to the boundary separating two media.

Set Q



SECTION – II

4. Solve **any three** : **(3×4=12)**
- 1) State and prove Ampere's circuital law.
 - 2) Derive Helmholtz wave equation in conducting media.
 - 3) Given points are A (1, 2, 4), B (-2, -1, 3) and C (3, 1, -2). Let a differential current element with $I = 6A$ and $|\overline{dl}| = 10^{-4} m$ be located at A. The direction of \overline{dl} is from A to B. Find \overline{dH} at C.
 - 4) What is pattern multiplication ? Explain with example how radiation pattern of array is obtained.
 - 5) Determine the propagation constants γ for material having $\mu_1 = 1, \epsilon_r = 8, \sigma = 0.25 \text{ pS/m}$, if frequency of the wave is 1.6 MHz.
5. Solve **any two** : **(2×8=16)**
- 1) If $\sigma = 0, \epsilon = 2.5\epsilon_0$ and $\mu = 10\mu_0$ determine whether or not the following pairs of fields satisfy Maxwell's equation.
 - a) $\overline{E} = 100 \sin(6 \times 10^7 t) \sin z \overline{a}_y, \overline{H} = -0.1328 \cos(6 \times 10^7 t) \cos z \overline{a}_x$
 - b) $\overline{D} = (z + 6 \times 10^7 t) \overline{a}_x, \overline{B} = (-754 z - 4.52 \times 10^{10} t) \overline{a}_y$.
 - 2) Explain other antenna parameter in detail.
 - 3) Evaluate both sides of Stroke's theorem for field $\overline{H} = (x^2 z / y) \overline{a}_y + (0.5 x^2 z^2 / y^2) \overline{a}_z$ and find current in the \overline{a}_x direction crossing the square surface in the plane $x = 2$ bounded by $y = z = 1$ and $y = z = 2$.
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Seat No.	
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**T.E. (Electronics and Telecommunication Engg.) (Part – I) (CGPA)
Examination, 2017**

ELECTROMAGNETIC ENGG. AND RADIATING SYSTEMS

Day and Date : Wednesday, 29-11-2017

Total Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in the Answer Book Page No. 3. Each question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

3) **Assume** suitable data **wherever** necessary.

4) Figures to the **right** indicate **full** marks.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) In spherical co-ordinates ϕ increases in _____
a) Clockwise b) Anticlockwise c) Both a) and b) d) None of these
- 2) If the voltage applied across the capacitor is increased, the capacitance value
a) Increases b) Decreases
c) Remains constant d) Becomes infinity
- 3) The unit of electric field intensity is
a) N/C b) V-m c) J-C/m d) All of these
- 4) Which of following term represents far field ?
a) $1/r$ b) $1/r^2$ c) $1/r^3$ d) $1/r^4$
- 5) A Yagi antenna has driven antenna
a) Only
b) With a reflector
c) With one or more directors
d) With a reflector and one or more directors
- 6) Magnetic vector potential for volume current is expressed as
a) $\bar{B} = \nabla \times \bar{A}$ b) $\bar{B} = \nabla \cdot \bar{A}$ c) $\bar{A} = \nabla \times \bar{B}$ d) $\bar{A} = \nabla \cdot \bar{A}$

P.T.O.



- 7) The direction of emf induced is always such as to oppose the very reason producing the emf. This is according to
a) Bio-Savart's b) Lenz's c) Ampere's d) Faraday's
- 8) Radiation intensity does not depend upon
a) The antenna direction b) Antenna width
c) Both a) and b) d) None of these
- 9) According to Ampere's law
a) Total magnetic flux is equal to electric charge
b) Total magnetic flux is equal to current passing
c) Total electric flux is equal to electric charge
d) None of these
- 10) Curl of magnetic field intensity is
a) Current density b) Magnetic field intensity
c) Current d) None
- 11) If potential of 1 V is applied across a capacitor for 10 pF, the energy stored is
a) 5 pJ b) 2.5 pJ c) 10 pJ d) zero
- 12) If pair of +ve and -ve charges of 1 C separated by distance $5\mu\text{ m}$ then the magnitude of dipole moment is
a) $5\text{ C}\cdot\mu\text{ m}$ b) $2.5\text{ C}\cdot\mu\text{ m}$ c) $2\text{ C}\cdot\mu\text{ m}$ d) $25\text{ C}\cdot\mu\text{ m}$
- 13) If the force acting on 3 C charge is 6 N then electric field on that charge is
a) 18 V/m b) 0.5 V/m c) 2 V/m d) None of these
- 14) If $F_{t1} = \overline{ax}$ and $E_{n1} = 0$, then \overline{E}_2 in dielectric medium 2 is
a) \overline{ay} b) $-\overline{ax}$ c) \overline{az} d) \overline{ax}
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**T.E. (Electronics and Telecommunication Engg.) (Part – I) (CGPA)
Examination, 2017
ELECTROMAGNETIC ENGG. AND RADIATING SYSTEMS**

Day and Date : Wednesday, 29-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

Instructions : 1) **Assume** suitable data **wherever** necessary.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any three** : **(3×4=12)**

- 1) Given potential field $V = \frac{200 \sin \theta \cos \phi}{r^2}$ Volts. Find \bar{E} at point P (0.93, 30°, 30°).
- 2) State and derive divergence theorem.
- 3) A point charge of 6 nC located at origin in free space. Find V_{PQ} of point P is located at (0.2, -0.4, 0.4) and Q is at (-0.5, 1, -1). Also find V_P if $V = 20$ V at point Q.
- 4) Evaluate the work done in bringing 5 μ C charge from origin to (2, -1, 4) in the field $\bar{E} = 2xy \bar{a}_x + x^2z \bar{a}_y + x^2y \bar{a}_z$ along stright line $x = 2y, z = 2x$.
- 5) Derive the expression electric field intensity for a dipole.

3. Attempt **any two** : **(2×8=16)**

- a) State and prove point form of Gauss law.
- b) A point charge of 30 nC is located at the origin while a sheet charge of 10 nC/m² is placed at $y = 3$. Find \bar{D} at (0, 4, 3).
- c) In the region $x < 0$ contains a dielectric medium having $\epsilon r_1 = 4$ while region $x > 0$ is characterized by $\epsilon r_2 = 2$ if $\bar{E}_1 = 50 \bar{a}_x + 30 \bar{a}_y + 60 \bar{a}_z$ V/m.

Find :

- i) \bar{E}_{n1} ii) θ_1 iii) \bar{E}_{t1} iv) \bar{E}_2 v) θ_2 .

Where, 'n' indicates normal component and 't' indicates tangential component, θ is the angle made w.r. to the boundary separating two media.

Set R



SECTION – II

4. Solve **any three** : **(3×4=12)**
- 1) State and prove Ampere's circuital law.
 - 2) Derive Helmholtz wave equation in conducting media.
 - 3) Given points are A (1, 2, 4), B (-2, -1, 3) and C (3, 1, -2). Let a differential current element with $I = 6A$ and $|\overline{dl}| = 10^{-4} m$ be located at A. The direction of \overline{dl} is from A to B. Find \overline{dH} at C.
 - 4) What is pattern multiplication ? Explain with example how radiation pattern of array is obtained.
 - 5) Determine the propagation constants γ for material having $\mu_1 = 1, \epsilon_r = 8, \sigma = 0.25 pS/m$, if frequency of the wave is 1.6 MHz.
5. Solve **any two** : **(2×8=16)**
- 1) If $\sigma = 0, \epsilon = 2.5\epsilon_0$ and $\mu = 10\mu_0$ determine whether or not the following pairs of fields satisfy Maxwell's equation.
 - a) $\overline{E} = 100 \sin(6 \times 10^7 t) \sin z \overline{a}_y, \overline{H} = -0.1328 \cos(6 \times 10^7 t) \cos z \overline{a}_x$
 - b) $\overline{D} = (z + 6 \times 10^7 t) \overline{a}_x, \overline{B} = (-754 z - 4.52 \times 10^{10} t) \overline{a}_y$.
 - 2) Explain other antenna parameter in detail.
 - 3) Evaluate both sides of Stroke's theorem for field $\overline{H} = (x^2 z / y) \overline{a}_y + (0.5 x^2 z^2 / y^2) \overline{a}_z$ and find current in the \overline{a}_x direction crossing the square surface in the plane $x = 2$ bounded by $y = z = 1$ and $y = z = 2$.



SLR-TJ – 198

Seat No.	
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**T.E. (Electronics and Telecommunication Engg.) (Part – I) (CGPA)
Examination, 2017**

ELECTROMAGNETIC ENGG. AND RADIATING SYSTEMS

Day and Date : Wednesday, 29-11-2017

Total Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in the Answer Book Page No. 3. Each question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

3) **Assume** suitable data **wherever** necessary.

4) Figures to the **right** indicate **full** marks.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

1) Magnetic vector potential for volume current is expressed as

- a) $\bar{B} = \nabla \times \bar{A}$ b) $\bar{B} = \nabla \cdot \bar{A}$ c) $\bar{A} = \nabla \times \bar{B}$ d) $\bar{A} = \nabla \cdot \bar{A}$

2) The direction of emf induced is always such as to oppose the very reason producing the emf. This is according to

- a) Bio-Savart's b) Lenz's c) Ampere's d) Faraday's

3) Radiation intensity does not depend upon

- a) The antenna direction b) Antenna width
c) Both a) and b) d) None of these

4) According to Ampere's law

- a) Total magnetic flux is equal to electric charge
b) Total magnetic flux is equal to current passing
c) Total electric flux is equal to electric charge
d) None of these

5) Curl of magnetic field intensity is

- a) Current density b) Magnetic field intensity
c) Current d) None

P.T.O.



- 6) If potential of 1 V is applied across a capacitor for 10 pF, the energy stored is
a) 5 pJ b) 2.5 pJ c) 10 pJ d) zero
- 7) If pair of +ve and -ve charges of 1 C separated by distance 5 μ m then the magnitude of dipole moment is
a) 5 C- μ m b) 2.5 C- μ m c) 2 C- μ m d) 25 C- μ m
- 8) If the force acting on 3 C charge is 6 N then electric field on that charge is
a) 18 V/m b) 0.5 V/m c) 2 V/m d) None of these
- 9) If $F_{t1} = \overline{ax}$ and $E_{n1} = 0$, then \overline{E}_2 in dielectric medium 2 is
a) \overline{ay} b) $-\overline{ax}$ c) \overline{az} d) \overline{ax}
- 10) In spherical co-ordinates ϕ increases in _____
a) Clockwise b) Anticlockwise c) Both a) and b) d) None of these
- 11) If the voltage applied across the capacitor is increased, the capacitance value
a) Increases b) Decreases
c) Remains constant d) Becomes infinity
- 12) The unit of electric field intensity is
a) N/C b) V-m c) J-C/m d) All of these
- 13) Which of following term represents far field ?
a) $1/r$ b) $1/r^2$ c) $1/r^3$ d) $1/r^4$
- 14) A Yagi antenna has driven antenna
a) Only
b) With a reflector
c) With one or more directors
d) With a reflector and one or more directors
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Seat No.	
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**T.E. (Electronics and Telecommunication Engg.) (Part – I) (CGPA)
Examination, 2017
ELECTROMAGNETIC ENGG. AND RADIATING SYSTEMS**

Day and Date : Wednesday, 29-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

Instructions : 1) **Assume** suitable data **wherever** necessary.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any three** : **(3×4=12)**

- 1) Given potential field $V = \frac{200 \sin \theta \cos \phi}{r^2}$ Volts. Find \bar{E} at point P (0.93, 30°, 30°).
- 2) State and derive divergence theorem.
- 3) A point charge of 6 nC located at origin in free space. Find V_{PQ} of point P is located at (0.2, -0.4, 0.4) and Q is at (-0.5, 1, -1). Also find V_P if $V = 20$ V at point Q.
- 4) Evaluate the work done in bringing 5 μ C charge from origin to (2, -1, 4) in the field $\bar{E} = 2xy \bar{a}_x + x^2z \bar{a}_y + x^2y \bar{a}_z$ along stright line $x = 2y, z = 2x$.
- 5) Derive the expression electric field intensity for a dipole.

3. Attempt **any two** : **(2×8=16)**

- a) State and prove point form of Gauss law.
- b) A point charge of 30 nC is located at the origin while a sheet charge of 10 nC/m² is placed at $y = 3$. Find \bar{D} at (0, 4, 3).
- c) In the region $x < 0$ contains a dielectric medium having $\epsilon r_1 = 4$ while region $x > 0$ is characterized by $\epsilon r_2 = 2$ if $\bar{E}_1 = 50 \bar{a}_x + 30 \bar{a}_y + 60 \bar{a}_z$ V/m.

Find :

- i) \bar{E}_{n1} ii) θ_1 iii) \bar{E}_{t1} iv) \bar{E}_2 v) θ_2 .

Where, 'n' indicates normal component and 't' indicates tangential component, θ is the angle made w.r. to the boundary separating two media.



SECTION – II

4. Solve **any three** : **(3×4=12)**
- 1) State and prove Ampere's circuital law.
 - 2) Derive Helmholtz wave equation in conducting media.
 - 3) Given points are A (1, 2, 4), B (-2, -1, 3) and C (3, 1, -2). Let a differential current element with $I = 6A$ and $|\overline{dl}| = 10^{-4} m$ be located at A. The direction of \overline{dl} is from A to B. Find \overline{dH} at C.
 - 4) What is pattern multiplication ? Explain with example how radiation pattern of array is obtained.
 - 5) Determine the propagation constants γ for material having $\mu_1 = 1, \epsilon_r = 8, \sigma = 0.25 pS/m$, if frequency of the wave is 1.6 MHz.
5. Solve **any two** : **(2×8=16)**
- 1) If $\sigma = 0, \epsilon = 2.5\epsilon_0$ and $\mu = 10\mu_0$ determine whether or not the following pairs of fields satisfy Maxwell's equation.
 - a) $\overline{E} = 100 \sin(6 \times 10^7 t) \sin z \overline{a}_y, \overline{H} = -0.1328 \cos(6 \times 10^7 t) \cos z \overline{a}_x$
 - b) $\overline{D} = (z + 6 \times 10^7 t) \overline{a}_x, \overline{B} = (-754 z - 4.52 \times 10^{10} t) \overline{a}_y$.
 - 2) Explain other antenna parameter in detail.
 - 3) Evaluate both sides of Stroke's theorem for field $\overline{H} = (x^2 z / y) \overline{a}_y + (0.5 x^2 z^2 / y^2) \overline{a}_z$ and find current in the \overline{a}_x direction crossing the square surface in the plane $x = 2$ bounded by $y = z = 1$ and $y = z = 2$.
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SLR-TJ – 199

Seat No.	
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Set	P
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
PRINCIPLES OF DIGITAL COMMUNICATION**

Day and Date : Saturday, 2-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

1) Aliasing occurs when Nyquist Rate is

- a) 2 fm b) 3 fm c) 2.5 fm d) 1.2 fm

2) In DM, granular noise occurs when modulating signal is

- a) Increases rapidly b) Decreases rapidly
c) Changes within step size d) Has high frequency component

3) The maximum value of H is reached for two messages when its probability is

- a) $P = 1/2$ b) $P = 1$
c) $P = 0$ d) $P = 2$

4) In eye pattern as eye opens

- a) ISI increases b) ISI Decreases
c) ISI remains same d) None of the above

5) According to Shannon's Theorem the output from any source of rate R can be coded and transmitted over a channel of capacity C with condition that

- a) $C < R$ b) $R \leq C$
c) $C < R^2$ d) $R^2 > C$

P.T.O.



- 6) The quantizer in the PCM transmitter is used for
- a) Converting analog signal into N bit digital word
 - b) Converting N bit parallel word into a serial word
 - c) Rounding off each sample values of its nearest standard value
 - d) None of the above
- 7) The circuit required to generate the flat topped PAM signal is
- a) A simple integrator circuit
 - b) A Differentiator circuit
 - c) A Sample and hold circuit
 - d) None of these
- 8) A major problem of multicarrier modulation is
- a) Fading
 - b) Diversity
 - c) High peak to average power ratio
 - d) None of these
- 9) Which of the following gives maximum probability of error ?
- a) ASK
 - b) FSK
 - c) PSK
 - d) DPSK
- 10) The early gate synchronizer techniques used for
- a) Carrier synchronization
 - b) A symbol synchronization
 - c) Frame synchronization
 - d) None of these
- 11) Frequency shift keying is mostly used in
- a) Radio transmission
 - b) Telegraphy
 - c) Telephony
 - d) None of these
- 12) In a QAM both identities are varied
- a) Amplitude and phase
 - b) Frequency and phase
 - c) Bit rate and phase
 - d) Baud rate and phase
- 13) Multichannel signal transmission is commonly used on time varying channel to overcome the effects of
- a) Attenuation
 - b) Amplification
 - c) Phase shift
 - d) Signal fading
- 14) Non-Coherent FSK demodulation uses
- a) Square law device
 - b) LPF
 - c) Envelope detector
 - d) All of these



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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
PRINCIPLES OF DIGITAL COMMUNICATION**

Day and Date : Saturday, 2-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **(4×4=16)**

- a) What is significance of eye diagram ? Explain.
- b) An event has 6 possible outcomes with probabilities $P_1 = 1/2$, $P_2 = 1/4$, $P_3 = 1/8$, $P_4 = 1/16$, $P_5 = P_6 = 1/32$. Find entropy of the system. Also find the rate of information if there are 16 outcomes/sec.
- c) Derive the expression for PCM bandwidth.
- d) What is the function of equalizer ? Explain any one equalization method.
- e) Explain with circuit diagram indirect method of PTM generation.

3. Solve **any two** : **(6×2=12)**

- a) Apply Huffman coding procedure for the following message ensemble. Calculate its efficiency.

$$[X] = [X_1 \quad X_2 \quad X_3 \quad X_4 \quad X_5 \quad X_6 \quad X_7]$$

$$[P] = [0.4 \quad 0.2 \quad 0.12 \quad 0.08 \quad 0.08 \quad 0.08 \quad 0.04]$$

Take $M = 3$.

- b) With the help of block diagram explain the DPCM system. Explain how drawbacks of PCM system is overcome in DPCM system.
- c) Explain any one method of frame synchronization.



SECTION – II

4. Answer **any four** : **(4×4=16)**
- a) Explain BFSK transmitter with neat block diagram.
 - b) Explain costas loop method of carrier recovery.
 - c) Draw and explain QPSK transmitter.
 - d) Compare different digital modulation techniques.
 - e) What is significance of multicarrier communication techniques ?
5. Solve **any two** : **(6×2=12)**
- a) Write a note on comparison of digital modulation scheme with respect to bandwidth, power requirement, equipment complexity.
 - b) Write a note on FFT based multicarrier system.
 - c) Write a note on principle of MSK signal generation.
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Seat No.	
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Set	Q
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
PRINCIPLES OF DIGITAL COMMUNICATION**

Day and Date : Saturday, 2-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) A major problem of multicarrier modulation is
 - a) Fading
 - b) Diversity
 - c) High peak to average power ratio
 - d) None of these
- 2) Which of the following gives maximum probability of error ?
 - a) ASK
 - b) FSK
 - c) PSK
 - d) DPSK
- 3) The early gate synchronizer techniques used for
 - a) Carrier synchronization
 - b) A symbol synchronization
 - c) Frame synchronization
 - d) None of these
- 4) Frequency shift keying is mostly used in
 - a) Radio transmission
 - b) Telegraphy
 - c) Telephony
 - d) None of these
- 5) In a QAM both identities are varied
 - a) Amplitude and phase
 - b) Frequency and phase
 - c) Bit rate and phase
 - d) Baud rate and phase

P.T.O.



- 6) Multichannel signal transmission is commonly used on time varying channel to overcome the effects of
- a) Attenuation
 - b) Amplification
 - c) Phase shift
 - d) Signal fading
- 7) Non-Coherent FSK demodulation uses
- a) Square law device
 - b) LPF
 - c) Envelope detector
 - d) All of these
- 8) Aliasing occurs when Nyquist Rate is
- a) 2 fm
 - b) 3 fm
 - c) 2.5 fm
 - d) 1.2 fm
- 9) In DM, granular noise occurs when modulating signal is
- a) Increases rapidly
 - b) Decreases rapidly
 - c) Changes within step size
 - d) Has high frequency component
- 10) The maximum value of H is reached for two messages when its probability is
- a) $P = 1/2$
 - b) $P = 1$
 - c) $P = 0$
 - d) $P = 2$
- 11) In eye pattern as eye opens
- a) ISI increases
 - b) ISI Decreases
 - c) ISI remains same
 - d) None of the above
- 12) According to Shannon's Theorem the output from any source of rate R can be coded and transmitted over a channel of capacity C with condition that
- a) $C < R$
 - b) $R \leq C$
 - c) $C < R^2$
 - d) $R^2 > C$
- 13) The quantizer in the PCM transmitter is used for
- a) Converting analog signal into N bit digital word
 - b) Converting N bit parallel word into a serial word
 - c) Rounding off each sample values of its nearest standard value
 - d) None of the above
- 14) The circuit required to generate the flat topped PAM signal is
- a) A simple integrator circuit
 - b) A Differentiator circuit
 - c) A Sample and hold circuit
 - d) None of these



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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
PRINCIPLES OF DIGITAL COMMUNICATION**

Day and Date : Saturday, 2-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **(4×4=16)**

- a) What is significance of eye diagram ? Explain.
- b) An event has 6 possible outcomes with probabilities $P_1 = 1/2$, $P_2 = 1/4$, $P_3 = 1/8$, $P_4 = 1/16$, $P_5 = P_6 = 1/32$. Find entropy of the system. Also find the rate of information if there are 16 outcomes/sec.
- c) Derive the expression for PCM bandwidth.
- d) What is the function of equalizer ? Explain any one equalization method.
- e) Explain with circuit diagram indirect method of PTM generation.

3. Solve **any two** : **(6×2=12)**

- a) Apply Huffman coding procedure for the following message ensemble. Calculate its efficiency.

$$[X] = [X_1 \quad X_2 \quad X_3 \quad X_4 \quad X_5 \quad X_6 \quad X_7]$$

$$[P] = [0.4 \quad 0.2 \quad 0.12 \quad 0.08 \quad 0.08 \quad 0.08 \quad 0.04]$$

Take $M = 3$.

- b) With the help of block diagram explain the DPCM system. Explain how drawbacks of PCM system is overcome in DPCM system.
- c) Explain any one method of frame synchronization.



SECTION – II

4. Answer **any four** : **(4×4=16)**
- a) Explain BFSK transmitter with neat block diagram.
 - b) Explain costas loop method of carrier recovery.
 - c) Draw and explain QPSK transmitter.
 - d) Compare different digital modulation techniques.
 - e) What is significance of multicarrier communication techniques ?
5. Solve **any two** : **(6×2=12)**
- a) Write a note on comparison of digital modulation scheme with respect to bandwidth, power requirement, equipment complexity.
 - b) Write a note on FFT based multicarrier system.
 - c) Write a note on principle of MSK signal generation.
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Seat No.	
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Set	R
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
PRINCIPLES OF DIGITAL COMMUNICATION**

Day and Date : Saturday, 2-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) According to Shannon's Theorem the output from any source of rate R can be coded and transmitted over a channel of capacity C with condition that
 - a) $C < R$
 - b) $R \leq C$
 - c) $C < R^2$
 - d) $R^2 > C$
- 2) The quantizer in the PCM transmitter is used for
 - a) Converting analog signal into N bit digital word
 - b) Converting N bit parallel word into a serial word
 - c) Rounding off each sample values of its nearest standard value
 - d) None of the above
- 3) The circuit required to generate the flat topped PAM signal is
 - a) A simple integrator circuit
 - b) A Differentiator circuit
 - c) A Sample and hold circuit
 - d) None of these
- 4) A major problem of multicarrier modulation is
 - a) Fading
 - b) Diversity
 - c) High peak to average power ratio
 - d) None of these

P.T.O.



- 5) Which of the following gives maximum probability of error ?
- a) ASK
 - b) FSK
 - c) PSK
 - d) DPSK
- 6) The early gate synchronizer techniques used for
- a) Carrier synchronization
 - b) A symbol synchronization
 - c) Frame synchronization
 - d) None of these
- 7) Frequency shift keying is mostly used in
- a) Radio transmission
 - b) Telegraphy
 - c) Telephony
 - d) None of these
- 8) In a QAM both identities are varied
- a) Amplitude and phase
 - b) Frequency and phase
 - c) Bit rate and phase
 - d) Baud rate and phase
- 9) Multichannel signal transmission is commonly used on time varying channel to overcome the effects of
- a) Attenuation
 - b) Amplification
 - c) Phase shift
 - d) Signal fading
- 10) Non-Coherent FSK demodulation uses
- a) Square law device
 - b) LPF
 - c) Envelope detector
 - d) All of these
- 11) Aliasing occurs when Nyquist Rate is
- a) 2 fm
 - b) 3 fm
 - c) 2.5 fm
 - d) 1.2 fm
- 12) In DM, granular noise occurs when modulating signal is
- a) Increases rapidly
 - b) Decreases rapidly
 - c) Changes within step size
 - d) Has high frequency component
- 13) The maximum value of H is reached for two messages when its probability is
- a) $P = 1/2$
 - b) $P = 1$
 - c) $P = 0$
 - d) $P = 2$
- 14) In eye pattern as eye opens
- a) ISI increases
 - b) ISI Decreases
 - c) ISI remains same
 - d) None of the above
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
PRINCIPLES OF DIGITAL COMMUNICATION**

Day and Date : Saturday, 2-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **(4×4=16)**

- a) What is significance of eye diagram ? Explain.
- b) An event has 6 possible outcomes with probabilities $P_1 = 1/2$, $P_2 = 1/4$, $P_3 = 1/8$, $P_4 = 1/16$, $P_5 = P_6 = 1/32$. Find entropy of the system. Also find the rate of information if there are 16 outcomes/sec.
- c) Derive the expression for PCM bandwidth.
- d) What is the function of equalizer ? Explain any one equalization method.
- e) Explain with circuit diagram indirect method of PTM generation.

3. Solve **any two** : **(6×2=12)**

- a) Apply Huffman coding procedure for the following message ensemble. Calculate its efficiency.

$$[X] = [X_1 \quad X_2 \quad X_3 \quad X_4 \quad X_5 \quad X_6 \quad X_7]$$

$$[P] = [0.4 \quad 0.2 \quad 0.12 \quad 0.08 \quad 0.08 \quad 0.08 \quad 0.04]$$

Take $M = 3$.

- b) With the help of block diagram explain the DPCM system. Explain how drawbacks of PCM system is overcome in DPCM system.
- c) Explain any one method of frame synchronization.



SECTION – II

4. Answer **any four** : **(4×4=16)**
- a) Explain BFSK transmitter with neat block diagram.
 - b) Explain costas loop method of carrier recovery.
 - c) Draw and explain QPSK transmitter.
 - d) Compare different digital modulation techniques.
 - e) What is significance of multicarrier communication techniques ?
5. Solve **any two** : **(6×2=12)**
- a) Write a note on comparison of digital modulation scheme with respect to bandwidth, power requirement, equipment complexity.
 - b) Write a note on FFT based multicarrier system.
 - c) Write a note on principle of MSK signal generation.
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Set	S
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
PRINCIPLES OF DIGITAL COMMUNICATION**

Day and Date : Saturday, 2-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.

2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) The early gate synchronizer techniques used for
 - a) Carrier synchronization
 - b) A symbol synchronization
 - c) Frame synchronization
 - d) None of these
- 2) Frequency shift keying is mostly used in
 - a) Radio transmission
 - b) Telegraphy
 - c) Telephony
 - d) None of these
- 3) In a QAM both identities are varied
 - a) Amplitude and phase
 - b) Frequency and phase
 - c) Bit rate and phase
 - d) Baud rate and phase
- 4) Multichannel signal transmission is commonly used on time varying channel to overcome the effects of
 - a) Attenuation
 - b) Amplification
 - c) Phase shift
 - d) Signal fading
- 5) Non-Coherent FSK demodulation uses
 - a) Square law device
 - b) LPF
 - c) Envelope detector
 - d) All of these

P.T.O.



- 6) Aliasing occurs when Nyquist Rate is
a) 2 fm b) 3 fm c) 2.5 fm d) 1.2 fm
- 7) In DM, granular noise occurs when modulating signal is
a) Increases rapidly b) Decreases rapidly
c) Changes within step size d) Has high frequency component
- 8) The maximum value of H is reached for two messages when its probability is
a) $P = 1/2$ b) $P = 1$
c) $P = 0$ d) $P = 2$
- 9) In eye pattern as eye opens
a) ISI increases b) ISI Decreases
c) ISI remains same d) None of the above
- 10) According to Shannon's Theorem the output from any source of rate R can be coded and transmitted over a channel of capacity C with condition that
a) $C < R$ b) $R \leq C$
c) $C < R^2$ d) $R^2 > C$
- 11) The quantizer in the PCM transmitter is used for
a) Converting analog signal into N bit digital word
b) Converting N bit parallel word into a serial word
c) Rounding off each sample values of its nearest standard value
d) None of the above
- 12) The circuit required to generate the flat topped PAM signal is
a) A simple integrator circuit b) A Differentiator circuit
c) A Sample and hold circuit d) None of these
- 13) A major problem of multicarrier modulation is
a) Fading b) Diversity
c) High peak to average power ratio d) None of these
- 14) Which of the following gives maximum probability of error ?
a) ASK b) FSK
c) PSK d) DPSK



Seat No.	
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
PRINCIPLES OF DIGITAL COMMUNICATION**

Day and Date : Saturday, 2-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **(4×4=16)**

- a) What is significance of eye diagram ? Explain.
- b) An event has 6 possible outcomes with probabilities $P_1 = 1/2, P_2 = 1/4, P_3 = 1/8, P_4 = 1/16, P_5 = P_6 = 1/32$. Find entropy of the system. Also find the rate of information if there are 16 outcomes/sec.
- c) Derive the expression for PCM bandwidth.
- d) What is the function of equalizer ? Explain any one equalization method.
- e) Explain with circuit diagram indirect method of PTM generation.

3. Solve **any two** : **(6×2=12)**

- a) Apply Huffman coding procedure for the following message ensemble. Calculate its efficiency.

$$[X] = [X_1 \quad X_2 \quad X_3 \quad X_4 \quad X_5 \quad X_6 \quad X_7]$$

$$[P] = [0.4 \quad 0.2 \quad 0.12 \quad 0.08 \quad 0.08 \quad 0.08 \quad 0.04]$$

Take $M = 3$.

- b) With the help of block diagram explain the DPCM system. Explain how drawbacks of PCM system is overcome in DPCM system.
- c) Explain any one method of frame synchronization.



SECTION – II

4. Answer **any four** : **(4×4=16)**
- a) Explain BFSK transmitter with neat block diagram.
 - b) Explain costas loop method of carrier recovery.
 - c) Draw and explain QPSK transmitter.
 - d) Compare different digital modulation techniques.
 - e) What is significance of multicarrier communication techniques ?
5. Solve **any two** : **(6×2=12)**
- a) Write a note on comparison of digital modulation scheme with respect to bandwidth, power requirement, equipment complexity.
 - b) Write a note on FFT based multicarrier system.
 - c) Write a note on principle of MSK signal generation.
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SLR-TJ – 200

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Set	P
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**T.E. (E and TC) (Part – I) (CGPA) Examination, 2017
SOFTWARE ENGINEERING AND PROJECT MANAGEMENT SYSTEM
(SEPMS)**

Day and Date : Tuesday, 5-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. 3. **Each** question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct alternative. **All MCQ are compulsory :** **14**
- 1) Which of the following life cycle model can be chosen if the development team has less experience on similar projects ?
 - a) Incremental
 - b) Waterfall
 - c) RUP
 - d) Iterative Enhancement Model
 - 2) Process adopted for one project is same as the process adopted from another project.
 - a) True
 - b) False
 - 3) Which phase of the RUP is used to establish a business case for the system ?
 - a) Transition
 - b) Elaboration
 - c) Construction
 - d) Inception
 - 4) Which one of the following is not a fundamental activity for software processes in software engineering ?
 - a) Software verification
 - b) Software validation
 - c) Software design and implementation
 - d) None of these

P.T.O.



Seat No.	
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**T.E. (E and TC) (Part – I) (CGPA) Examination, 2017
SOFTWARE ENGINEERING AND PROJECT MANAGEMENT SYSTEM
(SEPMS)**

Day and Date : Tuesday, 5-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Solve **any three** : **(3×4=12)**
- A) List and explain characterizes of software process.
 - B) Compare functional requirement with nonfunctional requirement.
 - C) Write note on “Software Life Cycle concept”.
 - D) Explain Test Automation.
3. Solve **any two** : **(8×2=16)**
- A) List system models and explain any one of them.
 - B) Compare : V model with prototyping model.
 - C) Write note on :
 - 1) Incremental Delivery Model
 - 2) Requirement Validation Process.

SECTION – II

4. Solve **any four (3.5 marks each)** : **(4×3.5=14)**
- 1) Explain cost-benefit evaluation techniques.
 - 2) What is change control, explain change control procedures ?
 - 3) Explain categories of risk.
 - 4) Explain cost monitoring with cumulative expenditure chart.
 - 5) Write note on assessment.
5. Solve **any two (7 marks each)** : **(2×7=14)**
- 1) Explain forward path and backward path with example, from example identify critical path.
 - 2) Explain in details Monte Carlo simulation and critical chain concepts.
 - 3) Write step wise project planning activates.



SLR-TJ – 200

Seat No.	
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Set	Q
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**T.E. (E and TC) (Part – I) (CGPA) Examination, 2017
SOFTWARE ENGINEERING AND PROJECT MANAGEMENT SYSTEM
(SEPMS)**

Day and Date : Tuesday, 5-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. 3. **Each** question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct alternative. **All MCQ are compulsory :** **14**
- 1) _____ provides a more tracking Visual Indication of those activities that are not progressing to schedule.
 - a) Slip chart
 - b) Gantt chart
 - c) Time line
 - d) Ball chart
 - 2) In an activity on arrow network, which of below have duration ?
 - a) Link
 - b) Loop
 - c) Node
 - d) All
 - 3) _____ is carried out to calculate the latest dates on which each activity may be started and completed.
 - a) Backward pass
 - b) Forward pass
 - c) End pass
 - d) None
 - 4) The Gantt chart is used for
 - a) Tracking project progress
 - b) Knowing date of project
 - c) Knowing starting date of project
 - d) Knowing end date of project
 - 5) CPM stands for _____
 - a) Critical Path Machine
 - b) Critical Path Model
 - c) Critical Path Method
 - d) None

P.T.O.



Seat No.	
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**T.E. (E and TC) (Part – I) (CGPA) Examination, 2017
SOFTWARE ENGINEERING AND PROJECT MANAGEMENT SYSTEM
(SEPMS)**

Day and Date : Tuesday, 5-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Solve **any three** : **(3×4=12)**
- A) List and explain characterizes of software process.
 - B) Compare functional requirement with nonfunctional requirement.
 - C) Write note on “Software Life Cycle concept”.
 - D) Explain Test Automation.
3. Solve **any two** : **(8×2=16)**
- A) List system models and explain any one of them.
 - B) Compare : V model with prototyping model.
 - C) Write note on :
 - 1) Incremental Delivery Model
 - 2) Requirement Validation Process.

SECTION – II

4. Solve **any four (3.5 marks each)** : **(4×3.5=14)**
- 1) Explain cost-benefit evaluation techniques.
 - 2) What is change control, explain change control procedures ?
 - 3) Explain categories of risk.
 - 4) Explain cost monitoring with cumulative expenditure chart.
 - 5) Write note on assessment.
5. Solve **any two (7 marks each)** : **(2×7=14)**
- 1) Explain forward path and backward path with example, from example identify critical path.
 - 2) Explain in details Monte Carlo simulation and critical chain concepts.
 - 3) Write step wise project planning activates.



SLR-TJ – 200

Seat No.	
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**T.E. (E and TC) (Part – I) (CGPA) Examination, 2017
SOFTWARE ENGINEERING AND PROJECT MANAGEMENT SYSTEM
(SEPMS)**

Day and Date : Tuesday, 5-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. 3. **Each** question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct alternative. **All MCQ are compulsory :** **14**
- 1) Requirements analysis is an iterative process.
a) True b) False
 - 2) Which model in system modelling depicts the dynamic behaviour of the system ?
a) Context model b) Behavioral model
c) Data model d) Object model
 - 3) System testing involves
a) Integration testing b) Release testing
c) Interface testing d) Both a) and b)
 - 4) _____ provides a more tracking Visual Indication of those activities that are not progressing to schedule.
a) Slip chart b) Gantt chart
c) Time line d) Ball chart
 - 5) In an activity on arrow network, which of below have duration ?
a) Link b) Loop c) Node d) All

P.T.O.



Seat No.	
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**T.E. (E and TC) (Part – I) (CGPA) Examination, 2017
SOFTWARE ENGINEERING AND PROJECT MANAGEMENT SYSTEM
(SEPMS)**

Day and Date : Tuesday, 5-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Solve **any three** : **(3×4=12)**
- A) List and explain characterizes of software process.
 - B) Compare functional requirement with nonfunctional requirement.
 - C) Write note on “Software Life Cycle concept”.
 - D) Explain Test Automation.
3. Solve **any two** : **(8×2=16)**
- A) List system models and explain any one of them.
 - B) Compare : V model with prototyping model.
 - C) Write note on :
 - 1) Incremental Delivery Model
 - 2) Requirement Validation Process.

SECTION – II

4. Solve **any four (3.5 marks each)** : **(4×3.5=14)**
- 1) Explain cost-benefit evaluation techniques.
 - 2) What is change control, explain change control procedures ?
 - 3) Explain categories of risk.
 - 4) Explain cost monitoring with cumulative expenditure chart.
 - 5) Write note on assessment.
5. Solve **any two (7 marks each)** : **(2×7=14)**
- 1) Explain forward path and backward path with example, from example identify critical path.
 - 2) Explain in details Monte Carlo simulation and critical chain concepts.
 - 3) Write step wise project planning activates.



Seat No.	
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**T.E. (E and TC) (Part – I) (CGPA) Examination, 2017
SOFTWARE ENGINEERING AND PROJECT MANAGEMENT SYSTEM
(SEPMS)**

Day and Date : Tuesday, 5-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Solve **any three** : **(3×4=12)**
- A) List and explain characterizes of software process.
 - B) Compare functional requirement with nonfunctional requirement.
 - C) Write note on “Software Life Cycle concept”.
 - D) Explain Test Automation.
3. Solve **any two** : **(8×2=16)**
- A) List system models and explain any one of them.
 - B) Compare : V model with prototyping model.
 - C) Write note on :
 - 1) Incremental Delivery Model
 - 2) Requirement Validation Process.

SECTION – II

4. Solve **any four (3.5 marks each)** : **(4×3.5=14)**
- 1) Explain cost-benefit evaluation techniques.
 - 2) What is change control, explain change control procedures ?
 - 3) Explain categories of risk.
 - 4) Explain cost monitoring with cumulative expenditure chart.
 - 5) Write note on assessment.
5. Solve **any two (7 marks each)** : **(2×7=14)**
- 1) Explain forward path and backward path with example, from example identify critical path.
 - 2) Explain in details Monte Carlo simulation and critical chain concepts.
 - 3) Write step wise project planning activates.



Seat No.	
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Set P

T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
DIGITAL SIGNAL PROCESSING

Day and Date : Thursday, 7-12-2017
 Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 70

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Figures to the **right** indicate **full** marks.
 - 4) Assume suitable data **if necessary**.

MCQ/Objective Type Questions

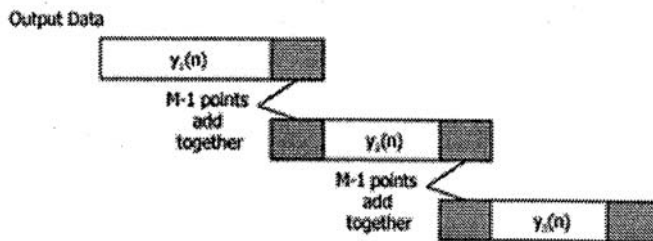
Duration : 30 Minutes

Marks : 14

(1×14=14)

1. Choose the correct answer :

- 1) Odd functions are said to be
 A) Symmetric B) Aperiodic C) Antisymmetric D) Periodic
- 2) Which of the following is done to convert a continuous time signal into discrete time signal ?
 A) Modulating B) Differentiating C) Sampling D) Integrating
- 3) In which of the following methods, the input sequence is considered as shown in the below diagram ?



- A) Overlap save method B) Overlap add method
- 4) Overlap-Add Method Deals with principles that
 - A) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $L + M$
 - B) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $2L + M - 1$
 - C) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $L + M - 1$
 - D) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $2L + 2M - 1$



- 5) Decimation-in frequency FFT algorithm is used to compute $H(k)$.
A) False B) True
- 6) Which is the correct order of the following steps to be done in one of the algorithm of divide and conquer method ?
1. Store the signal column wise.
2. Compute the M -point DFT of each row.
3. Multiply the resulting array by the phase factors WN^{lq} .
4. Compute the L -point DFT of each column.
5. Read the result array row wise.
A) 1 2 4 3 5 B) 1 3 2 4 5 C) 1 4 3 2 5 D) 1 2 3 4 5
- 7) If we split the N point data sequence into two $N/2$ point data sequences $f_1(n)$ and $f_2(n)$ corresponding to the even numbered and odd numbered samples of $x(n)$, then such an FFT algorithm is known as decimation-in-time algorithm.
A) True B) False
- 8) A digital filter is casual if its impulse response
A) $h(n) = 0$ for $n > 0$ B) $h(n) = 0$ for $n < 0$
C) $h(n) = 0$ for $n = 0$ D) None
- 9) The frequency sampling structure are efficient because
A) sample points are less
B) some sampled DFT coefficients are zero when filter is narrow band
C) some sampled values can be assumed zero
D) parallel structures are efficient
- 10) The symmetrical impulse response for N odd can be used for application as
A) low pass filter B) high pass filter
C) band pass filter D) all of the above
- 11) Poles of Butterworth filter lies on
A) Ellipse B) Circle C) Parabola D) None
- 12) The mapping of bilinear transformation is
A) many to many mapping B) many to one mapping
C) one to one mapping D) none
- 13) Undesirable effect due to coefficient inaccuracy are far more pronounced when higher order systems are directly implemented using
A) Direct form I realization B) Cascade form realization
C) Parallel realization D) Any realization
- 14) For linear phase realization of FIR filters, for N even; number of multipliers required is
A) N B) $(N + 1)/2$ C) $N/2$ D) N^2



Seat No.	
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
DIGITAL SIGNAL PROCESSING**

Day and Date : Thursday, 7-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any four** of the following : **(4×4=16)**
- a) Compute the auto correlation of the sequence $x(n) = \{1, 2, 3, 4\}$
 - b) Why the result of linear and circular convolution is not same ? How to obtain the same result ?
 - c) Compute DFT of the sequence $x[n] = \{1 + j, 2 + j2, 3 + j3, 4 + j2\}$.
 - d) Compare overlap add and overlap save method.
 - e) With the help of block diagram explain DSP system.
3. Attempt **any one** of the following : **(1×12=12)**
- a) i) Find DFT $X(k)$ of a sequence $x[n]$ where $x[n]$ is $X[n] = \{1, 0, 2, 0, 3, 0, 4, 0\}$ using DIT FFT algorithm. **9**
 - ii) Explain bit reversal and in place computation for FFT algorithm. **3**
 - b) i) Find circular convolution of $x[n] = \{1, 2, 3, 4\}$ and $h[n] = \{5, 6, 7, 0\}$ using graphical method. **10**
 - ii) Write the difference between Linear convolution and circular convolution. **2**

SECTION – II

4. Solve **any four** : **(4×4=16)**
- a) Explain FIR implementation techniques.
 - b) What is bilinear transformation ? What are the advantages of bilinear transformation ?
 - c) For analog transfer function

$$H(s) = \frac{2}{(s+1)(s+2)}$$

Determine $H(Z)$ using impulse invariant technique with $t = 1$ sec.

Set P



d) Obtain cascade form realization of the system function

$$H(Z) = (1 + 2Z^{-1} - Z^{-2}) (1 + Z^{-1} - Z^{-2}).$$

e) Explain the application of DSP in image processing.

5. Solve **any two** :

(6×2=12)

a) Design seven coefficients FIR LPF using frequency sampling method with following specifications.

$$H_d(e^{j\omega}) = \begin{cases} e^{-j(N-1)\omega/2} & \text{for } 0 \leq \omega \leq \pi/2 \\ 0 & \text{for } \pi/2 \leq \omega \leq \pi \end{cases}$$

b) Convert the given analog transfer function into equivalent digital transfer function using impulse invariant transformation technique ($T=1$ second/sample)

$$H(s) = \frac{s+0.1}{(s+0.1)^2+9}$$

c) Determine Direct form I and direct form II realization for second order filter given by

$$y(n) = -0.1(n-1) - 0.2y(n-2) + 3x(n) - 3.6x(n-1) + 0.6x(n-2).$$



SLR-TJ– 201

Seat No.	
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Set

Q

T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
DIGITAL SIGNAL PROCESSING

Day and Date : Thursday, 7-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 70

- Instructions** : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) Figures to the **right** indicate **full** marks.
4) Assume suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

(1×14=14)

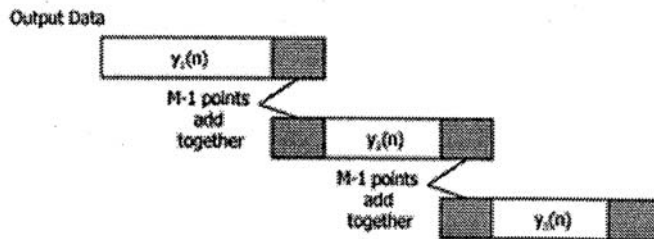
1. Choose the correct answer :

- 1) A digital filter is casual if its impulse response
 - A) $h(n) = 0$ for $n > 0$
 - B) $h(n) = 0$ for $n < 0$
 - C) $h(n) = 0$ for $n = 0$
 - D) None
- 2) The frequency sampling structure are efficient because
 - A) sample points are less
 - B) some sampled DFT coefficients are zero when filter is narrow band
 - C) some sampled values can be assumed zero
 - D) parallel structures are efficient
- 3) The symmetrical impulse response for N odd can be used for application as
 - A) low pass filter
 - B) high pass filter
 - C) band pass filter
 - D) all of the above
- 4) Poles of Butterworth filter lies on
 - A) Ellipse
 - B) Circle
 - C) Parabola
 - D) None
- 5) The mapping of bilinear transformation is
 - A) many to many mapping
 - B) many to one mapping
 - C) one to one mapping
 - D) none
- 6) Undesirable effect due to coefficient inaccuracy are far more pronounced when higher order systems are directly implemented using
 - A) Direct form I realization
 - B) Cascade form realization
 - C) Parallel realization
 - D) Any realization
- 7) For linear phase realization of FIR filters, for N even; number of multipliers required is
 - A) N
 - B) $(N + 1)/2$
 - C) $N/2$
 - D) N^2

P.T.O.



- 8) Odd functions are said to be
 A) Symmetric B) Aperiodic C) Antisymmetric D) Periodic
- 9) Which of the following is done to convert a continuous time signal into discrete time signal ?
 A) Modulating B) Differentiating C) Sampling D) Integrating
- 10) In which of the following methods, the input sequence is considered as shown in the below diagram ?



- A) Overlap save method B) Overlap add method
- 11) Overlap-Add Method Deals with principles that
 A) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $L + M$
 B) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $2L + M - 1$
 C) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $L + M - 1$
 D) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $2L + 2M - 1$
- 12) Decimation-in frequency FFT algorithm is used to compute $H(k)$.
 A) False B) True
- 13) Which is the correct order of the following steps to be done in one of the algorithm of divide and conquer method ?
 1. Store the signal column wise.
 2. Compute the M -point DFT of each row.
 3. Multiply the resulting array by the phase factors W_N^{lq} .
 4. Compute the L -point DFT of each column.
 5. Read the result array row wise.
 A) 1 2 4 3 5 B) 1 3 2 4 5 C) 1 4 3 2 5 D) 1 2 3 4 5
- 14) If we split the N point data sequence into two $N/2$ point data sequences $f_1(n)$ and $f_2(n)$ corresponding to the even numbered and odd numbered samples of $x(n)$, then such an FFT algorithm is known as decimation-in-time algorithm.
 A) True B) False



Seat No.	
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
DIGITAL SIGNAL PROCESSING**

Day and Date : Thursday, 7-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any four** of the following : **(4×4=16)**
- a) Compute the auto correlation of the sequence $x(n) = \{1, 2, 3, 4\}$
 - b) Why the result of linear and circular convolution is not same ? How to obtain the same result ?
 - c) Compute DFT of the sequence $x[n] = \{1 + j, 2 + j2, 3 + j3, 4 + j2\}$.
 - d) Compare overlap add and overlap save method.
 - e) With the help of block diagram explain DSP system.
3. Attempt **any one** of the following : **(1×12=12)**
- a) i) Find DFT $X(k)$ of a sequence $x[n]$ where $x[n]$ is $X[n] = \{1, 0, 2, 0, 3, 0, 4, 0\}$ using DIT FFT algorithm. **9**
 - ii) Explain bit reversal and in place computation for FFT algorithm. **3**
 - b) i) Find circular convolution of $x[n] = \{1, 2, 3, 4\}$ and $h[n] = \{5, 6, 7, 0\}$ using graphical method. **10**
 - ii) Write the difference between Linear convolution and circular convolution. **2**

SECTION – II

4. Solve **any four** : **(4×4=16)**
- a) Explain FIR implementation techniques.
 - b) What is bilinear transformation ? What are the advantages of bilinear transformation ?
 - c) For analog transfer function

$$H(s) = \frac{2}{(s+1)(s+2)}$$

Determine $H(Z)$ using impulse invariant technique with $t = 1$ sec.

Set Q



d) Obtain cascade form realization of the system function

$$H(Z) = (1 + 2Z^{-1} - Z^{-2}) (1 + Z^{-1} - Z^{-2}).$$

e) Explain the application of DSP in image processing.

5. Solve **any two** :

(6×2=12)

a) Design seven coefficients FIR LPF using frequency sampling method with following specifications.

$$H_d(e^{j\omega}) = e^{-j(N-1)\omega/2} \quad \text{for } 0 \leq \omega \leq \pi/2$$
$$= 0 \quad \text{for } \pi/2 \leq \omega \leq \pi$$

b) Convert the given analog transfer function into equivalent digital transfer function using impulse invariant transformation technique ($T=1$ second/sample)

$$H(s) = \frac{s+0.1}{(s+0.1)^2+9}$$

c) Determine Direct form I and direct form II realization for second order filter given by

$$y(n) = -0.1(n-1) - 0.2y(n-2) + 3x(n) - 3.6x(n-1) + 0.6x(n-2).$$



SLR-TJ– 201

Seat No.	
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Set

R

T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
DIGITAL SIGNAL PROCESSING

Day and Date : Thursday, 7-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 70

- Instructions** : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) Figures to the **right** indicate **full** marks.
4) Assume suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

(1×14=14)

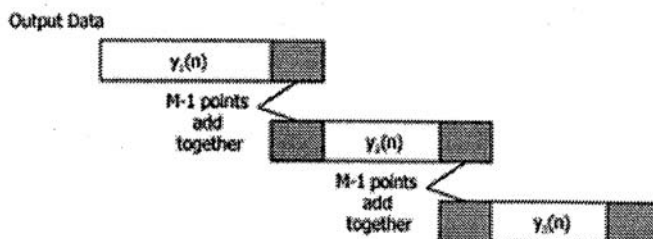
1. Choose the correct answer :

- 1) Decimation-in frequency FFT algorithm is used to compute $H(k)$.
A) False B) True
- 2) Which is the correct order of the following steps to be done in one of the algorithm of divide and conquer method ?
 1. Store the signal column wise.
 2. Compute the M-point DFT of each row.
 3. Multiply the resulting array by the phase factors WN^{lq} .
 4. Compute the L-point DFT of each column.
 5. Read the result array row wise.A) 1 2 4 3 5 B) 1 3 2 4 5 C) 1 4 3 2 5 D) 1 2 3 4 5
- 3) If we split the N point data sequence into two $N/2$ point data sequences $f_1(n)$ and $f_2(n)$ corresponding to the even numbered and odd numbered samples of $x(n)$, then such an FFT algorithm is known as decimation-in-time algorithm.
A) True B) False
- 4) A digital filter is casual if its impulse response
A) $h(n) = 0$ for $n > 0$ B) $h(n) = 0$ for $n < 0$
C) $h(n) = 0$ for $n = 0$ D) None
- 5) The frequency sampling structure are efficient because
A) sample points are less
B) some sampled DFT coefficients are zero when filter is narrow band
C) some sampled values can be assumed zero
D) parallel structures are efficient
- 6) The symmetrical impulse response for N odd can be used for application as
A) low pass filter B) high pass filter
C) band pass filter D) all of the above

P.T.O.



- 7) Poles of Butterworth filter lies on
 A) Ellipse B) Circle C) Parabola D) None
- 8) The mapping of bilinear transformation is
 A) many to many mapping B) many to one mapping
 C) one to one mapping D) none
- 9) Undesirable effect due to coefficient inaccuracy are far more pronounced when higher order systems are directly implemented using
 A) Direct form I realization B) Cascade form realization
 C) Parallel realization D) Any realization
- 10) For linear phase realization of FIR filters, for N even; number of multipliers required is
 A) N B) $(N + 1)/2$ C) $N/2$ D) N^2
- 11) Odd functions are said to be
 A) Symmetric B) Aperiodic C) Antisymmetric D) Periodic
- 12) Which of the following is done to convert a continuous time signal into discrete time signal ?
 A) Modulating B) Differentiating C) Sampling D) Integrating
- 13) In which of the following methods, the input sequence is considered as shown in the below diagram ?



- A) Overlap save method B) Overlap add method
- 14) Overlap-Add Method Deals with principles that
 A) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $L + M$
 B) The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $2L + M - 1$
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Seat No.	
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
DIGITAL SIGNAL PROCESSING**

Day and Date : Thursday, 7-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any four** of the following : **(4×4=16)**
- a) Compute the auto correlation of the sequence $x(n) = \{1, 2, 3, 4\}$
 - b) Why the result of linear and circular convolution is not same ? How to obtain the same result ?
 - c) Compute DFT of the sequence $x[n] = \{1 + j, 2 + j2, 3 + j3, 4 + j2\}$.
 - d) Compare overlap add and overlap save method.
 - e) With the help of block diagram explain DSP system.
3. Attempt **any one** of the following : **(1×12=12)**
- a) i) Find DFT $X(k)$ of a sequence $x[n]$ where $x[n]$ is $X[n] = \{1, 0, 2, 0, 3, 0, 4, 0\}$ using DIT FFT algorithm. **9**
 - ii) Explain bit reversal and in place computation for FFT algorithm. **3**
 - b) i) Find circular convolution of $x[n] = \{1, 2, 3, 4\}$ and $h[n] = \{5, 6, 7, 0\}$ using graphical method. **10**
 - ii) Write the difference between Linear convolution and circular convolution. **2**

SECTION – II

4. Solve **any four** : **(4×4=16)**
- a) Explain FIR implementation techniques.
 - b) What is bilinear transformation ? What are the advantages of bilinear transformation ?
 - c) For analog transfer function

$$H(s) = \frac{2}{(s+1)(s+2)}$$

Determine $H(Z)$ using impulse invariant technique with $t = 1$ sec.

Set R



d) Obtain cascade form realization of the system function

$$H(Z) = (1 + 2Z^{-1} - Z^{-2}) (1 + Z^{-1} - Z^{-2}).$$

e) Explain the application of DSP in image processing.

5. Solve **any two** :

(6×2=12)

a) Design seven coefficients FIR LPF using frequency sampling method with following specifications.

$$H_d(e^{j\omega}) = \begin{cases} e^{-j(N-1)\omega/2} & \text{for } 0 \leq \omega \leq \pi/2 \\ 0 & \text{for } \pi/2 \leq \omega \leq \pi \end{cases}$$

b) Convert the given analog transfer function into equivalent digital transfer function using impulse invariant transformation technique (T= 1 second/sample)

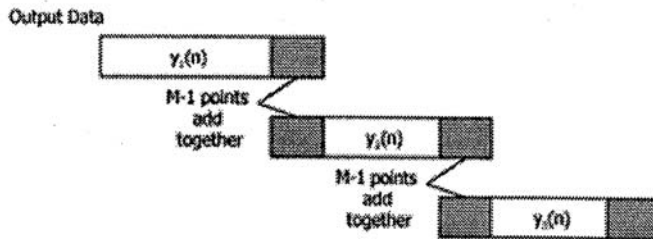
$$H(s) = \frac{s+0.1}{(s+0.1)^2 + 9}$$

c) Determine Direct form I and direct form II realization for second order filter given by

$$y(n) = -0.1 (n-1) - 0.2y(n-2) + 3x(n) - 3.6x(n-1) + 0.6x(n-2).$$



- 8) In which of the following methods, the input sequence is considered as shown in the below diagram ?



- A) Overlap save method B) Overlap add method
- 9) Overlap-Add Method Deals with principles that
- The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $L + M$
 - The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $2L + M - 1$
 - The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $L + M - 1$
 - The linear convolution of a discrete-time signal of length L and a discrete-time signal of length M produces a discrete-time convolved result of length $2L + 2M - 1$
- 10) Decimation-in frequency FFT algorithm is used to compute $H(k)$.
- A) False B) True
- 11) Which is the correct order of the following steps to be done in one of the algorithm of divide and conquer method ?
- Store the signal column wise.
 - Compute the M -point DFT of each row.
 - Multiply the resulting array by the phase factors WN^lq .
 - Compute the L -point DFT of each column.
 - Read the result array row wise.
- A) 1 2 4 3 5 B) 1 3 2 4 5 C) 1 4 3 2 5 D) 1 2 3 4 5
- 12) If we split the N point data sequence into two $N/2$ point data sequences $f_1(n)$ and $f_2(n)$ corresponding to the even numbered and odd numbered samples of $x(n)$, then such an FFT algorithm is known as decimation-in-time algorithm.
- A) True B) False
- 13) A digital filter is casual if its impulse response
- A) $h(n) = 0$ for $n > 0$ B) $h(n) = 0$ for $n < 0$
- C) $h(n) = 0$ for $n = 0$ D) None
- 14) The frequency sampling structure are efficient because
- A) sample points are less
- B) some sampled DFT coefficients are zero when filter is narrow band
- C) some sampled values can be assumed zero
- D) parallel structures are efficient



Seat No.	
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
DIGITAL SIGNAL PROCESSING**

Day and Date : Thursday, 7-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any four** of the following : **(4×4=16)**
- a) Compute the auto correlation of the sequence $x(n) = \{1, 2, 3, 4\}$
 - b) Why the result of linear and circular convolution is not same ? How to obtain the same result ?
 - c) Compute DFT of the sequence $x[n] = \{1 + j, 2 + j2, 3 + j3, 4 + j2\}$.
 - d) Compare overlap add and overlap save method.
 - e) With the help of block diagram explain DSP system.
3. Attempt **any one** of the following : **(1×12=12)**
- a) i) Find DFT $X(k)$ of a sequence $x[n]$ where $x[n]$ is $X[n] = \{1, 0, 2, 0, 3, 0, 4, 0\}$ using DIT FFT algorithm. **9**
 - ii) Explain bit reversal and in place computation for FFT algorithm. **3**
 - b) i) Find circular convolution of $x[n] = \{1, 2, 3, 4\}$ and $h[n] = \{5, 6, 7, 0\}$ using graphical method. **10**
 - ii) Write the difference between Linear convolution and circular convolution. **2**

SECTION – II

4. Solve **any four** : **(4×4=16)**
- a) Explain FIR implementation techniques.
 - b) What is bilinear transformation ? What are the advantages of bilinear transformation ?
 - c) For analog transfer function

$$H(s) = \frac{2}{(s+1)(s+2)}$$

Determine $H(Z)$ using impulse invariant technique with $t = 1$ sec.

Set S



d) Obtain cascade form realization of the system function

$$H(Z) = (1 + 2Z^{-1} - Z^{-2}) (1 + Z^{-1} - Z^{-2}).$$

e) Explain the application of DSP in image processing.

5. Solve **any two** :

(6×2=12)

a) Design seven coefficients FIR LPF using frequency sampling method with following specifications.

$$H_d(e^{j\omega}) = \begin{cases} e^{-j(N-1)\omega/2} & \text{for } 0 \leq \omega \leq \pi/2 \\ 0 & \text{for } \pi/2 \leq \omega \leq \pi \end{cases}$$

b) Convert the given analog transfer function into equivalent digital transfer function using impulse invariant transformation technique (T= 1 second/sample)

$$H(s) = \frac{s+0.1}{(s+0.1)^2+9}$$

c) Determine Direct form I and direct form II realization for second order filter given by

$$y(n) = -0.1(n-1) - 0.2y(n-2) + 3x(n) - 3.6x(n-1) + 0.6x(n-2).$$



SLR-TJ – 202

Seat
No.

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Set

P

**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
MICROPROCESSORS**

Day and Date : Saturday, 9-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The number of cycles required to fetch and execute the instruction is called as
 - a) Machine cycle
 - b) T-state
 - c) Duty cycle
 - d) Instruction cycle
- 2) A register which holds the address of the next instruction to be fetched is
 - a) PC
 - b) SP
 - c) ACC
 - d) Instruction register
- 3) Direct Memory Access (DMA) deals with which of the two pins of 8085
 - a) HOLD, HLDA
 - b) Reset out, Clock out
 - c) SID, SOD
 - d) None
- 4) Number of machine cycles and T-states required to execute XTHL instruction are
 - a) MC = 3, T = 10
 - b) MC = 3, T = 12
 - c) MC = 5, T = 16
 - d) MC = 2, T = 9
- 5) Which one of the following is the correct description for reset in
 - a) Active high and output pin
 - b) Active high and input pin
 - c) Active low and output pin
 - d) Active low and input pin
- 6) Select wrong instructions
 - a) PUSH 10 H
 - b) ADI 20 H
 - c) LXI H, 2000 H
 - d) ANI 0FH
- 7) Minimum and maximum operating frequency for 8085 microprocessor is
 - a) 500 KHz, 6.125 MHz
 - b) 100 KHz, 1 MHz
 - c) 500 KHz, 2 MHz
 - d) None

P.T.O.



- 8) Port C of 8255 can function independently as
- a) input port
 - b) output port
 - c) either input or output ports
 - d) both input and output ports
- 9) The input provided by the microprocessor to the read/write control logic is
- a) RESET
 - b) A1
 - c) WR (ACTIVE LOW)
 - d) all of the mentioned
- 10) The device that receives or transmits data upon the execution of input or output instructions by the microprocessor is
- a) control word register
 - b) read/write control logic
 - c) 3-state bidirectional buffer
 - d) all of above
- 11) 8086 microprocessor is interfaced to 8253 a programmable interval timer. The maximum number by which the clock frequency on one of the timers is divided by
- a) 2^{16}
 - b) 2^8
 - c) 2^{10}
 - d) 2^{20}
- 12) In ADC 0808 if _____ pin high enables output.
- a) EOC
 - b) I/P0-I/P7
 - c) SOC
 - d) OE
- 13) Which mode is used for single handshake in 8255 ?
- a) Mode 0
 - b) Mode 1
 - c) Mode 2
 - d) None of these
- 14) If the size of a memory chip is 512×1 bits how many chips are required to make up 1 K bytes of memory ?
- a) 2
 - b) 8
 - c) 16
 - d) 1024
-



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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
MICROPROCESSORS**

Day and Date : Saturday, 9-12-2017

Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Explain **any four** of following : **(4×4=16)**
- 1) Draw the logical diagram to generate control signals. Also explain it.
 - 2) Draw timing diagram of OUT instruction.
 - 3) Differentiate between memory mapped I/O and I/O mapped schemes.
 - 4) Write ALP for converting decimal number stored at memory location with address 2000 H to hex at location with address 2020 H.
 - 5) Explain SIM format in detail.
3. Explain **any two** of following : **(6×2=12)**
- 1) Draw and explain internal architecture of 8085 in brief.
 - 2) Design 2 K × 8 RAM using 1 K × 4 RAM.
 - 3) Explain 8085 interrupt structure in detail.

SECTION – II

4. Explain **any four** of following : **(4×4=16)**
- 1) Draw and explain working of R-2R ladder type DAC.
 - 2) List the features of 80286.
 - 3) Compare synchronous and asynchronous type of serial data communication.
 - 4) Draw asynchronous mode word format for 8251USART.
 - 5) Explain control word register format of 8253.
5. Explain **any two** of following : **(6×2=12)**
- 1) Draw and explain block diagram of 8253.
 - 2) Draw and explain architecture of 8086.
 - 3) Interface keyboard and seven segment LED display to 8085 using 8255.



SLR-TJ – 202

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No.

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Set

Q

**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
MICROPROCESSORS**

Day and Date : Saturday, 9-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) Port C of 8255 can function independently as
 - a) input port
 - b) output port
 - c) either input or output ports
 - d) both input and output ports
- 2) The input provided by the microprocessor to the read/write control logic is
 - a) RESET
 - b) A1
 - c) WR (ACTIVE LOW)
 - d) all of the mentioned
- 3) The device that receives or transmits data upon the execution of input or output instructions by the microprocessor is
 - a) control word register
 - b) read/write control logic
 - c) 3-state bidirectional buffer
 - d) all of above
- 4) 8086 microprocessor is interfaced to 8253 a programmable interval timer. The maximum number by which the clock frequency on one of the timers is divided by
 - a) 2^{16}
 - b) 2^8
 - c) 2^{10}
 - d) 2^{20}
- 5) In ADC 0808 if _____ pin high enables output.
 - a) EOC
 - b) I/P0-I/P7
 - c) SOC
 - d) OE
- 6) Which mode is used for single handshake in 8255 ?
 - a) Mode 0
 - b) Mode 1
 - c) Mode 2
 - d) None of these
- 7) If the size of a memory chip is 512×1 bits how many chips are required to make up 1 K bytes of memory ?
 - a) 2
 - b) 8
 - c) 16
 - d) 1024

P.T.O.



- 8) The number of cycles required to fetch and execute the instruction is called as
- a) Machine cycle
 - b) T-state
 - c) Duty cycle
 - d) Instruction cycle
- 9) A register which holds the address of the next instruction to be fetched is
- a) PC
 - b) SP
 - c) ACC
 - d) Instruction register
- 10) Direct Memory Access (DMA) deals with which of the two pins of 8085
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 - b) Reset out, Clock out
 - c) SID, SOD
 - d) None
- 11) Number of machine cycles and T-states required to execute XTHL instruction are
- a) MC = 3, T = 10
 - b) MC = 3, T = 12
 - c) MC = 5, T = 16
 - d) MC = 2, T = 9
- 12) Which one of the following is the correct description for reset in
- a) Active high and output pin
 - b) Active high and input pin
 - c) Active low and output pin
 - d) Active low and input pin
- 13) Select wrong instructions
- a) PUSH 10 H
 - b) ADI 20 H
 - c) LXI H, 2000 H
 - d) ANI 0FH
- 14) Minimum and maximum operating frequency for 8085 microprocessor is
- a) 500 KHz, 6.125 MHz
 - b) 100 KHz, 1 MHz
 - c) 500 KHz, 2 MHz
 - d) None
-



Seat No.	
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
MICROPROCESSORS**

Day and Date : Saturday, 9-12-2017

Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Explain **any four** of following : **(4×4=16)**
- 1) Draw the logical diagram to generate control signals. Also explain it.
 - 2) Draw timing diagram of OUT instruction.
 - 3) Differentiate between memory mapped I/O and I/O mapped schemes.
 - 4) Write ALP for converting decimal number stored at memory location with address 2000 H to hex at location with address 2020 H.
 - 5) Explain SIM format in detail.
3. Explain **any two** of following : **(6×2=12)**
- 1) Draw and explain internal architecture of 8085 in brief.
 - 2) Design 2 K × 8 RAM using 1 K × 4 RAM.
 - 3) Explain 8085 interrupt structure in detail.

SECTION – II

4. Explain **any four** of following : **(4×4=16)**
- 1) Draw and explain working of R-2R ladder type DAC.
 - 2) List the features of 80286.
 - 3) Compare synchronous and asynchronous type of serial data communication.
 - 4) Draw asynchronous mode word format for 8251USART.
 - 5) Explain control word register format of 8253.
5. Explain **any two** of following : **(6×2=12)**
- 1) Draw and explain block diagram of 8253.
 - 2) Draw and explain architecture of 8086.
 - 3) Interface keyboard and seven segment LED display to 8085 using 8255.



SLR-TJ – 202

Seat No.	
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Set **R**

**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
MICROPROCESSORS**

Day and Date : Saturday, 9-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) Which one of the following is the correct description for reset in
 - a) Active high and output pin
 - b) Active high and input pin
 - c) Active low and output pin
 - d) Active low and input pin
- 2) Select wrong instructions
 - a) PUSH 10 H
 - b) ADI 20 H
 - c) LXI H, 2000 H
 - d) ANI 0FH
- 3) Minimum and maximum operating frequency for 8085 microprocessor is
 - a) 500 KHz, 6.125 MHz
 - b) 100 KHz, 1 MHz
 - c) 500 KHz, 2 MHz
 - d) None
- 4) Port C of 8255 can function independently as
 - a) input port
 - b) output port
 - c) either input or output ports
 - d) both input and output ports
- 5) The input provided by the microprocessor to the read/write control logic is
 - a) RESET
 - b) A1
 - c) WR (ACTIVE LOW)
 - d) all of the mentioned
- 6) The device that receives or transmits data upon the execution of input or output instructions by the microprocessor is
 - a) control word register
 - b) read/write control logic
 - c) 3-state bidirectional buffer
 - d) all of above
- 7) 8086 microprocessor is interfaced to 8253 a programmable interval timer. The maximum number by which the clock frequency on one of the timers is divided by
 - a) 2^{16}
 - b) 2^8
 - c) 2^{10}
 - d) 2^{20}

P.T.O.



Seat No.	
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
MICROPROCESSORS**

Day and Date : Saturday, 9-12-2017

Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Explain **any four** of following : **(4×4=16)**
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 - 5) Explain SIM format in detail.
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- 1) Draw and explain internal architecture of 8085 in brief.
 - 2) Design 2 K × 8 RAM using 1 K × 4 RAM.
 - 3) Explain 8085 interrupt structure in detail.

SECTION – II

4. Explain **any four** of following : **(4×4=16)**
- 1) Draw and explain working of R-2R ladder type DAC.
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 - 3) Interface keyboard and seven segment LED display to 8085 using 8255.



SLR-TJ – 202

Seat
No.

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Set

S

**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
MICROPROCESSORS**

Day and Date : Saturday, 9-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The device that receives or transmits data upon the execution of input or output instructions by the microprocessor is
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 - c) 3-state bidirectional buffer
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 - d) None of these
- 5) If the size of a memory chip is 512×1 bits how many chips are required to make up 1 K bytes of memory ?
 - a) 2
 - b) 8
 - c) 16
 - d) 1024
- 6) The number of cycles required to fetch and execute the instruction is called as
 - a) Machine cycle
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 - c) Duty cycle
 - d) Instruction cycle

P.T.O.



- 7) A register which holds the address of the next instruction to be fetched is
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 - c) Active low and output pin
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- 12) Minimum and maximum operating frequency for 8085 microprocessor is
- a) 500 KHz, 6.125 MHz
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 - c) 500 KHz, 2 MHz
 - d) None
- 13) Port C of 8255 can function independently as
- a) input port
 - b) output port
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 - d) both input and output ports
- 14) The input provided by the microprocessor to the read/write control logic is
- a) RESET
 - b) A1
 - c) WR (ACTIVE LOW)
 - d) all of the mentioned
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Seat No.	
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**T.E. (E&TC) (Part – I) (CGPA) Examination, 2017
MICROPROCESSORS**

Day and Date : Saturday, 9-12-2017

Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Explain **any four** of following : **(4×4=16)**
- 1) Draw the logical diagram to generate control signals. Also explain it.
 - 2) Draw timing diagram of OUT instruction.
 - 3) Differentiate between memory mapped I/O and I/O mapped schemes.
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 - 5) Explain SIM format in detail.
3. Explain **any two** of following : **(6×2=12)**
- 1) Draw and explain internal architecture of 8085 in brief.
 - 2) Design 2 K × 8 RAM using 1 K × 4 RAM.
 - 3) Explain 8085 interrupt structure in detail.

SECTION – II

4. Explain **any four** of following : **(4×4=16)**
- 1) Draw and explain working of R-2R ladder type DAC.
 - 2) List the features of 80286.
 - 3) Compare synchronous and asynchronous type of serial data communication.
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- 1) Draw and explain block diagram of 8253.
 - 2) Draw and explain architecture of 8086.
 - 3) Interface keyboard and seven segment LED display to 8085 using 8255.



SLR-TJ – 204

Seat No.	
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Set	P
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
RADAR AND MICROWAVE ENGG.**

Day and Date : Tuesday, 21-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- N. B. :**
- 1) **All questions are compulsory.**
 - 2) **Figures indicate full marks.**
 - 3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.**
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

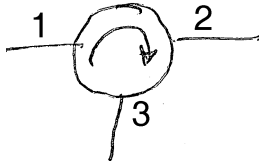
- 1) The primary constant of transmission line exhibits its dependency of value on the cross sectional area of conductor is _____
a) resistance b) inductance c) conductance d) capacitance
- 2) The constant x circles of Smith chart becomes smaller due to increase in the value of 'x' from _____
a) 0 to π b) 0 to 2π c) 0 to $\frac{\pi}{2}$ d) 0 to ∞
- 3) The semiconductor diode which can be used in switching circuits at microwave range is _____
a) PIN diode b) Tunnel diode c) Varactor diode d) Gunn diode
- 4) For Gunn diodes, gallium arsenide is preferred to silicon because the former _____
a) has a suitable empty energy band, which silicon does not have
b) has a higher ion mobility
c) has a lower noise at the highest frequency
d) is capable of handling higher power densities
- 5) In a directional coupler _____
a) Isolation (dB) equals coupling plus directivity
b) Coupling (dB) equals isolation plus directivity
c) Directivity (dB) equals isolation plus coupling
d) Isolation (dB) equals (coupling) (directivity)

P.T.O.



- 6) Which mode has the minimum cut off frequency in rectangular waveguide ?
 a) TE_{11} b) TE_{10} c) TE_{01} d) TE_{20}

- 7) A 3 port circulator is in the given figure. It's scattering matrix is _____



- a) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$

- 8) A reflex Klystron functions as
 a) Microwave oscillator
 b) Microwave amplifier
 c) Both as Microwave amplifier and oscillator
 d) A high gain cavity
- 9) A microwave tube amplifier uses an axial magnetic field and radial electric field. This is the
 a) Reflex Klystron b) Coaxial Magnetron
 c) Travelling wave magnetron d) CFA-Crossed Field Amplifier
- 10) A calorimetric measurement for average power of a signal gave a value of 400 W. The value was interpreted for the peak power as 0.5 MW. Then the duty cycle of the signal is
 a) 0.08% b) 8% c) 80% d) 40%
- 11) If the peak transmitted power in a radar system is increased by a factor of 16, the maximum range will be increased by a factor
 a) 2 b) 4 c) 8 d) 16
- 12) The biggest disadvantage of CW Doppler radar is that
 a) it does not give the target velocity b) it does not give the target range
 c) a transponder is required at the target d) it does not give the target position
- 13) The A scope displays
 a) the target position and range b) the target range, but not position
 c) the target position, but not range d) neither range nor position, but not only velocity
- 14) The remedy for the problem of "blind speed" is
 a) Variation of PRF b) Use of monopulse
 c) Use of MTI d) Change in Doppler frequency



Seat No.	
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
RADAR AND MICROWAVE ENGG.**

Day and Date : Tuesday, 21-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- N. B. :** 1) **All questions are compulsory.**
2) **Figures indicate full marks.**

SECTION – I

2. Attempt **any three** : **(3×4=12)**

- a) State physical interpretation of phase velocity and group velocity. Show that multiplication of phase velocity and group velocity is same as square of speed of EM wave in free space.
- b) A transmission line characteristic impedance of 50Ω is terminated in a load impedance Z_L , The VSWR is measured as 5. Then determine the value of load impedance.
- c) Explain the working of E plane Tee with mathematical expression.
- d) State the importance of intrinsic layer in PIN diode. Explain how PIN diode acts as phase shifter.

3. Attempt **any two** : **(2×8=16)**

- a) The dimensions of a guide are $2.5 \text{ cm} \times 1 \text{ cm}$. The frequency is 8.6 GHz. Find the following :
 - a) Possible modes
 - b) Cut off frequency
 - c) Guide wavelength.
- b) What is RWH Theory ? State the criteria for selection of material. Give examples of materials which satisfy above criteria.
- c) Derive the expression for voltage and current relationships on a transmission line using circuit distributed theory.

Set P



SECTION – II

4. Attempt **any four** of the following : **(4×4=16)**
- a) Explain limitations of conventional tubes.
 - b) Write a note on impedance measurement in Microwave communication.
 - c) Explain Target Information extraction in Radar.
 - d) Explain MTI radar block diagram.
 - e) With neat figures, explain mode jumping in Magnetron.
5. Attempt **any two** of the following : **(6×2=12)**
- a) Derive the free space radar range equation.
 - b) Explain construction and operation of cavity magnetron.
 - c) State the importance of Doppler frequency shift and derive the expression for Doppler frequency shift for moving target.
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SLR-TJ – 204

Seat No.	
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Set	Q
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
RADAR AND MICROWAVE ENGG.**

Day and Date : Tuesday, 21-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- N. B. :**
- 1) **All questions are compulsory.**
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MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) A reflex Klystron functions as
 - a) Microwave oscillator
 - b) Microwave amplifier
 - c) Both as Microwave amplifier and oscillator
 - d) A high gain cavity
- 2) A microwave tube amplifier uses an axial magnetic field and radial electric field. This is the
 - a) Reflex Klystron
 - b) Coaxial Magnetron
 - c) Travelling wave magnetron
 - d) CFA-Crossed Field Amplifier
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 - c) 80%
 - d) 40%
- 4) If the peak transmitted power in a radar system is increased by a factor of 16, the maximum range will be increased by a factor
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- 5) The biggest disadvantage of CW Doppler radar is that
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 - d) it does not give the target position
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 - a) the target position and range
 - b) the target range, but not position
 - c) the target position, but not range
 - d) neither range nor position, but not only velocity

P.T.O.



Seat No.	
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
RADAR AND MICROWAVE ENGG.**

Day and Date : Tuesday, 21-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- N. B. :** 1) **All questions are compulsory.**
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SECTION – I

2. Attempt **any three** : **(3×4=12)**

- a) State physical interpretation of phase velocity and group velocity. Show that multiplication of phase velocity and group velocity is same as square of speed of EM wave in free space.
- b) A transmission line characteristic impedance of 50Ω is terminated in a load impedance Z_L , The VSWR is measured as 5. Then determine the value of load impedance.
- c) Explain the working of E plane Tee with mathematical expression.
- d) State the importance of intrinsic layer in PIN diode. Explain how PIN diode acts as phase shifter.

3. Attempt **any two** : **(2×8=16)**

- a) The dimensions of a guide are $2.5 \text{ cm} \times 1 \text{ cm}$. The frequency is 8.6 GHz. Find the following :
 - a) Possible modes
 - b) Cut off frequency
 - c) Guide wavelength.
- b) What is RWH Theory ? State the criteria for selection of material. Give examples of materials which satisfy above criteria.
- c) Derive the expression for voltage and current relationships on a transmission line using circuit distributed theory.

Set Q



SECTION – II

4. Attempt **any four** of the following : **(4×4=16)**
- a) Explain limitations of conventional tubes.
 - b) Write a note on impedance measurement in Microwave communication.
 - c) Explain Target Information extraction in Radar.
 - d) Explain MTI radar block diagram.
 - e) With neat figures, explain mode jumping in Magnetron.
5. Attempt **any two** of the following : **(6×2=12)**
- a) Derive the free space radar range equation.
 - b) Explain construction and operation of cavity magnetron.
 - c) State the importance of Doppler frequency shift and derive the expression for Doppler frequency shift for moving target.
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Seat No.	
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Set	R
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
RADAR AND MICROWAVE ENGG.**

Day and Date : Tuesday, 21-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- N. B. :**
- 1) **All questions are compulsory.**
 - 2) **Figures indicate full marks.**
 - 3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.**
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

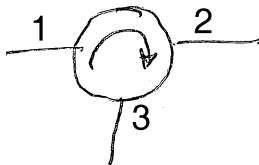
Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) In a directional coupler _____
 - a) Isolation (dB) equals coupling plus directivity
 - b) Coupling (dB) equals isolation plus directivity
 - c) Directivity (dB) equals isolation plus coupling
 - d) Isolation (dB) equals (coupling) (directivity)
- 2) Which mode has the minimum cut off frequency in rectangular waveguide ?
 - a) TE_{11}
 - b) TE_{10}
 - c) TE_{01}
 - d) TE_{20}
- 3) A 3 port circulator is in the given figure. It's scattering matrix is _____



- a) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$
- b) $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 1 \end{bmatrix}$
- c) $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$
- d) $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$

- 4) A reflex Klystron functions as
 - a) Microwave oscillator
 - b) Microwave amplifier
 - c) Both as Microwave amplifier and oscillator
 - d) A high gain cavity

P.T.O.



Seat No.	
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
RADAR AND MICROWAVE ENGG.**

Day and Date : Tuesday, 21-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- N. B. :** 1) **All questions are compulsory.**
2) **Figures indicate full marks.**

SECTION – I

2. Attempt **any three** : **(3×4=12)**

- a) State physical interpretation of phase velocity and group velocity. Show that multiplication of phase velocity and group velocity is same as square of speed of EM wave in free space.
- b) A transmission line characteristic impedance of 50Ω is terminated in a load impedance Z_L , The VSWR is measured as 5. Then determine the value of load impedance.
- c) Explain the working of E plane Tee with mathematical expression.
- d) State the importance of intrinsic layer in PIN diode. Explain how PIN diode acts as phase shifter.

3. Attempt **any two** : **(2×8=16)**

- a) The dimensions of a guide are $2.5 \text{ cm} \times 1 \text{ cm}$. The frequency is 8.6 GHz. Find the following :
 - a) Possible modes
 - b) Cut off frequency
 - c) Guide wavelength.
- b) What is RWH Theory ? State the criteria for selection of material. Give examples of materials which satisfy above criteria.
- c) Derive the expression for voltage and current relationships on a transmission line using circuit distributed theory.



SECTION – II

4. Attempt **any four** of the following : **(4×4=16)**
- a) Explain limitations of conventional tubes.
 - b) Write a note on impedance measurement in Microwave communication.
 - c) Explain Target Information extraction in Radar.
 - d) Explain MTI radar block diagram.
 - e) With neat figures, explain mode jumping in Magnetron.
5. Attempt **any two** of the following : **(6×2=12)**
- a) Derive the free space radar range equation.
 - b) Explain construction and operation of cavity magnetron.
 - c) State the importance of Doppler frequency shift and derive the expression for Doppler frequency shift for moving target.
-



SLR-TJ – 204

Seat No.	
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Set	S
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
RADAR AND MICROWAVE ENGG.**

Day and Date : Tuesday, 21-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- N. B. :**
- 1) **All questions are compulsory.**
 - 2) **Figures indicate full marks.**
 - 3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.**
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

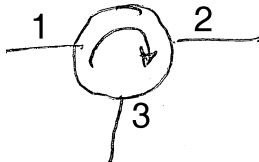
(14×1=14)

- 1) A calorimetric measurement for average power of a signal gave a value of 400 W. The value was interpreted for the peak power as 0.5 MW. Then the duty cycle of the signal is
a) 0.08% b) 8% c) 80% d) 40%
- 2) If the peak transmitted power in a radar system is increased by a factor of 16, the maximum range will be increased by a factor
a) 2 b) 4 c) 8 d) 16
- 3) The biggest disadvantage of CW Doppler radar is that
a) it does not give the target velocity b) it does not give the target range
c) a transponder is required at the target d) it does not give the target position
- 4) The A scope displays
a) the target position and range b) the target range, but not position
c) the target position, but not range d) neither range nor position, but not only velocity
- 5) The remedy for the problem of "blind speed" is
a) Variation of PRF b) Use of monopulse
c) Use of MTI d) Change in Doppler frequency
- 6) The primary constant of transmission line exhibits its dependency of value on the cross sectional area of conductor is _____
a) resistance b) inductance
c) conductance d) capacitance

P.T.O.



- 7) The constant x circles of Smith chart becomes smaller due to increase in the value of 'x' from _____
- a) 0 to π b) 0 to 2π c) 0 to $\frac{\pi}{2}$ d) 0 to ∞
- 8) The semiconductor diode which can be used in switching circuits at microwave range is _____
- a) PIN diode b) Tunnel diode c) Varactor diode d) Gunn diode
- 9) For Gunn diodes, gallium arsenide is preferred to silicon because the former _____
- a) has a suitable empty energy band, which silicon does not have
b) has a higher ion mobility
c) has a lower noise at the highest frequency
d) is capable of handling higher power densities
- 10) In a directional coupler _____
- a) Isolation (dB) equals coupling plus directivity
b) Coupling (dB) equals isolation plus directivity
c) Directivity (dB) equals isolation plus coupling
d) Isolation (dB) equals (coupling) (directivity)
- 11) Which mode has the minimum cut off frequency in rectangular waveguide ?
- a) TE_{11} b) TE_{10} c) TE_{01} d) TE_{20}
- 12) A 3 port circulator is in the given figure. It's scattering matrix is _____



- a) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 0 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 0 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$
- 13) A reflex Klystron functions as
- a) Microwave oscillator
b) Microwave amplifier
c) Both as Microwave amplifier and oscillator
d) A high gain cavity
- 14) A microwave tube amplifier uses an axial magnetic field and radial electric field. This is the
- a) Reflex Klystron b) Coaxial Magnetron
c) Travelling wave magnetron d) CFA-Crossed Field Amplifier



Seat No.	
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
RADAR AND MICROWAVE ENGG.**

Day and Date : Tuesday, 21-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- N. B. :** 1) **All questions are compulsory.**
2) **Figures indicate full marks.**

SECTION – I

2. Attempt **any three** : **(3×4=12)**

- a) State physical interpretation of phase velocity and group velocity. Show that multiplication of phase velocity and group velocity is same as square of speed of EM wave in free space.
- b) A transmission line characteristic impedance of 50Ω is terminated in a load impedance Z_L , The VSWR is measured as 5. Then determine the value of load impedance.
- c) Explain the working of E plane Tee with mathematical expression.
- d) State the importance of intrinsic layer in PIN diode. Explain how PIN diode acts as phase shifter.

3. Attempt **any two** : **(2×8=16)**

- a) The dimensions of a guide are $2.5 \text{ cm} \times 1 \text{ cm}$. The frequency is 8.6 GHz. Find the following :
 - a) Possible modes
 - b) Cut off frequency
 - c) Guide wavelength.
- b) What is RWH Theory ? State the criteria for selection of material. Give examples of materials which satisfy above criteria.
- c) Derive the expression for voltage and current relationships on a transmission line using circuit distributed theory.



SECTION – II

4. Attempt **any four** of the following : **(4×4=16)**
- a) Explain limitations of conventional tubes.
 - b) Write a note on impedance measurement in Microwave communication.
 - c) Explain Target Information extraction in Radar.
 - d) Explain MTI radar block diagram.
 - e) With neat figures, explain mode jumping in Magnetron.
5. Attempt **any two** of the following : **(6×2=12)**
- a) Derive the free space radar range equation.
 - b) Explain construction and operation of cavity magnetron.
 - c) State the importance of Doppler frequency shift and derive the expression for Doppler frequency shift for moving target.
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SLR-TJ – 205

Seat No.	
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Set	P
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**T.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
MICROCONTROLLER AND APPLICATIONS**

Day and Date : Wednesday, 22-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :** 1) **All questions are compulsory.**
2) **Assume suitable data, if required.**
3) **Figures to the right indicate full marks.**
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.**
5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) After Reset, which internal RAM addresses are used as registers R0-R7 by 8051 ?
 - a) 07 h – 0F h
 - b) 17 h – 1F h
 - c) 20 h – 2F h
 - d) 00 h – 07 h
 - 2) Which of the following is an invalid instruction of 8051 microcontroller ?
 - a) CJNE R0, #30, dn
 - b) MOVX A, #30 H
 - c) SWAP A
 - d) MOV A, @R0
 - 3) If TE0 is set, it indicates
 - a) Timer-0 Running
 - b) Timer-0 Stopped
 - c) Timer-0 Overflow
 - d) Timer-0 initialized
 - 4) Which of the following is an invalid baud rate for serial communication in 8051 ?
 - a) 4800
 - b) 1200
 - c) 900
 - d) 19200
 - 5) OE pin on ADC0808 is used for
 - a) Overflow Enable
 - b) Output Evaluate
 - c) Output Enable
 - d) Op-Amp Enable

P.T.O.



6) What will be contents of Port-1 after execution of following set of instructions ?

MOV A, #2Fh

MOV R0, #0F5h

ADD A, R0

JNC DN

MOV P1, A

SJMP DN1

DN : MOV P1, #0Ah

DN1 : SJMP DN1

- a) 0A H b) 24 H c) 2F H d) 0F5 H
- 7) What is the vector address for serial interrupt ?
a) 0003 H b) 0013 H c) 0023 H d) 001B H
- 8) In compare mode _____ is used.
a) Timer 0 b) Timer 1 c) Timer 2 d) Timer 3
- 9) CCP means
a) Capture Control Protocol b) Capture/Compare PWM
c) Compare Control Protocol d) None of the above
- 10) The reset vector and interrupts vector for PIC are
a) 00074, 00044 b) 00044, 0007h c) 00h, 07h d) 0000h, 0004h
- 11) FLASH program memory, Data Memory (RAM) and Data Memory (EEPROM) for PIC 16F877 are
a) 8K × 8, 368 × 8, 256 × 8 b) 14K × 8, 14 K × 8, 256 × 8
c) 8K × 14, 368 × 16, 256 × 8 d) 8K × 14, 368 × 8, 256 × 8
- 12) The CALL and GOTO instruction provides _____ bits of address to allow branching within any _____ program memory page.
a) 13 bit, 8K b) 16 bit, 64 K c) 11 bit, 2K d) None of these
- 13) PIC has _____ bit multichannel analog to digital converter.
a) 12 b) 14 c) 10 d) 20
- 14) Sink and source capability of PIC is
a) 20 mA b) 25 mA c) 40 mA d) 50 mA
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Seat No.	
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**T.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
MICROCONTROLLER AND APPLICATIONS**

Day and Date : Wednesday, 22-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data, if required.*
3) *Figures to the right indicate full marks.*

SECTION – I

2. Solve **any four** : **(4×3=12)**
- a) Explain pin configuration of 8051 Microcontroller.
 - b) Write an ALP transfer a block of eight 8-bit numbers stored in Bank-0 to Bank-3.
 - c) Explain TMOD register.
 - d) If the crystal frequency is 12 MHz, calculate time required for execution of following instructions :
 - 1) MOV A, R0
 - 2) SJMP <Address>
 - 3) ACALL <Address>
 - e) Explain the pins of a 16 × 2 alphanumeric LCD.
3. Solve **any two** : **(2×8=16)**
- a) Draw hardware circuit to interface DAC0808 and two control switches SW1 and SW2 to 8051. Write a program in Assembly or 'C' language to generate square wave if SW1 is pressed, triangular wave if SW2 is pressed and Saw tooth wave if both SW1 and SW2 are open.
 - b) Explain SFRs associated with serial communication in 8051.
 - c) Interface 16 × 8 program ROM and 16 × 8 Data RAM to 8051. Write an ALP to transfer data from external data RAM locations 4000 h – 4007 h to internal RAM locations 20 h – 27 h.



SECTION – II

4. Answer **any three** : **(3×4=12)**
- a) Explain in detail single master slave implementation in SPI mode.
 - b) Write a program for addition of two eight bit numbers.
 - c) Differentiate between Von-Neumann architecture and Harvard architecture.
 - d) Write in brief how data is transferred using I²C bus.
5. Answer **any two** : **(2×8=16)**
- a) List features of PIC and explain PCON, OPTION and STATUS registers of PIC.
 - b) Write the assembly language program for toggling the LED and draw pin diagram of PIC also interfacing diagram of LED with PIC.
 - c) Explain capture, compare and PWM modules in PIC.
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SLR-TJ – 205

Seat No.	
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Set	Q
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**T.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
MICROCONTROLLER AND APPLICATIONS**

Day and Date : Wednesday, 22-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Assume suitable data, if required.**
 - 3) **Figures to the right indicate full marks.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : 14
- 1) In compare mode _____ is used.
a) Timer 0 b) Timer 1 c) Timer 2 d) Timer 3
 - 2) CCP means
a) Capture Control Protocol b) Capture/Compare PWM
c) Compare Control Protocol d) None of the above
 - 3) The reset vector and interrupts vector for PIC are
a) 00074, 00044 b) 00044, 0007h c) 00h, 07h d) 0000h, 0004h
 - 4) FLASH program memory, Data Memory (RAM) and Data Memory (EEPROM) for PIC 16F877 are
a) 8K × 8, 368 × 8, 256 × 8 b) 14K × 8, 14 K × 8, 256 × 8
c) 8K × 14, 368 × 16, 256 × 8 d) 8K × 14, 368 × 8, 256 × 8
 - 5) The CALL and GOTO instruction provides _____ bits of address to allow branching within any _____ program memory page.
a) 13 bit, 8K b) 16 bit, 64 K c) 11 bit, 2K d) None of these
 - 6) PIC has _____ bit multichannel analog to digital converter.
a) 12 b) 14 c) 10 d) 20

P.T.O.



- 7) Sink and source capability of PIC is
a) 20 mA b) 25 mA c) 40 mA d) 50 mA
- 8) After Reset, which internal RAM addresses are used as registers R0-R7 by 8051 ?
a) 07 h – 0F h b) 17 h – 1F h
c) 20 h – 2F h d) 00 h – 07 h
- 9) Which of the following is an invalid instruction of 8051 microcontroller ?
a) CJNE R0, #30, dn b) MOVX A, #30 H
c) SWAP A d) MOV A, @R0
- 10) If TE0 is set, it indicates
a) Timer-0 Running b) Timer-0 Stopped
c) Timer-0 Overflow d) Timer-0 initialized
- 11) Which of the following is an invalid baud rate for serial communication in 8051 ?
a) 4800 b) 1200 c) 900 d) 19200
- 12) OE pin on ADC0808 is used for
a) Overflow Enable b) Output Evaluate
c) Output Enable d) Op-Amp Enable
- 13) What will be contents of Port-1 after execution of following set of instructions ?
MOV A, #2Fh
MOV R0, #0F5h
ADD A, R0
JNC DN
MOV P1, A
SJMP DN1
DN : MOV P1, #0Ah
DN1 : SJMP DN1
a) 0A H b) 24 H c) 2F H d) 0F5 H
- 14) What is the vector address for serial interrupt ?
a) 0003 H b) 0013 H c) 0023 H d) 001B H
-



Seat No.	
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**T.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
MICROCONTROLLER AND APPLICATIONS**

Day and Date : Wednesday, 22-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data, if required.*
3) *Figures to the right indicate full marks.*

SECTION – I

2. Solve **any four** : **(4×3=12)**
- a) Explain pin configuration of 8051 Microcontroller.
 - b) Write an ALP transfer a block of eight 8-bit numbers stored in Bank-0 to Bank-3.
 - c) Explain TMOD register.
 - d) If the crystal frequency is 12 MHz, calculate time required for execution of following instructions :
 - 1) MOV A, R0
 - 2) SJMP <Address>
 - 3) ACALL <Address>
 - e) Explain the pins of a 16 × 2 alphanumeric LCD.
3. Solve **any two** : **(2×8=16)**
- a) Draw hardware circuit to interface DAC0808 and two control switches SW1 and SW2 to 8051. Write a program in Assembly or 'C' language to generate square wave if SW1 is pressed, triangular wave if SW2 is pressed and Saw tooth wave if both SW1 and SW2 are open.
 - b) Explain SFRs associated with serial communication in 8051.
 - c) Interface 16 × 8 program ROM and 16 × 8 Data RAM to 8051. Write an ALP to transfer data from external data RAM locations 4000 h – 4007 h to internal RAM locations 20 h – 27 h.



SECTION – II

4. Answer **any three** : **(3×4=12)**
- a) Explain in detail single master slave implementation in SPI mode.
 - b) Write a program for addition of two eight bit numbers.
 - c) Differentiate between Von-Neumann architecture and Harvard architecture.
 - d) Write in brief how data is transferred using I²C bus.
5. Answer **any two** : **(2×8=16)**
- a) List features of PIC and explain PCON, OPTION and STATUS registers of PIC.
 - b) Write the assembly language program for toggling the LED and draw pin diagram of PIC also interfacing diagram of LED with PIC.
 - c) Explain capture, compare and PWM modules in PIC.
-



SLR-TJ – 205

Seat No.	
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Set	R
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**T.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
MICROCONTROLLER AND APPLICATIONS**

Day and Date : Wednesday, 22-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Assume suitable data, if required.**
 - 3) **Figures to the right indicate full marks.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : 14

- 1) OE pin on ADC0808 is used for
 - a) Overflow Enable
 - b) Output Evaluate
 - c) Output Enable
 - d) Op-Amp Enable
- 2) What will be contents of Port-1 after execution of following set of instructions ?
MOV A, #2Fh
MOV R0, #0F5h
ADD A, R0
JNC DN
MOV P1, A
SJMP DN1
DN : MOV P1, #0Ah
DN1 : SJMP DN1
 - a) 0A H
 - b) 24 H
 - c) 2F H
 - d) 0F5 H
- 3) What is the vector address for serial interrupt ?
 - a) 0003 H
 - b) 0013 H
 - c) 0023 H
 - d) 001B H
- 4) In compare mode _____ is used.
 - a) Timer 0
 - b) Timer 1
 - c) Timer 2
 - d) Timer 3

P.T.O.



- 5) CCP means
a) Capture Control Protocol b) Capture/Compare PWM
c) Compare Control Protocol d) None of the above
- 6) The reset vector and interrupts vector for PIC are
a) 00074, 00044 b) 00044, 0007h c) 00h, 07h d) 0000h, 0004h
- 7) FLASH program memory, Data Memory (RAM) and Data Memory (EEPROM) for PIC 16F877 are
a) 8K × 8, 368 × 8, 256 × 8 b) 14K × 8, 14 K × 8, 256 × 8
c) 8K × 14, 368 × 16, 256 × 8 d) 8K × 14, 368 × 8, 256 × 8
- 8) The CALL and GOTO instruction provides _____ bits of address to allow branching within any _____ program memory page.
a) 13 bit, 8K b) 16 bit, 64 K c) 11 bit, 2K d) None of these
- 9) PIC has _____ bit multichannel analog to digital converter.
a) 12 b) 14 c) 10 d) 20
- 10) Sink and source capability of PIC is
a) 20 mA b) 25 mA c) 40 mA d) 50 mA
- 11) After Reset, which internal RAM addresses are used as registers R0-R7 by 8051 ?
a) 07 h – 0F h b) 17 h – 1F h
c) 20 h – 2F h d) 00 h – 07 h
- 12) Which of the following is an invalid instruction of 8051 microcontroller ?
a) CJNE R0, #30, dn b) MOVX A, #30 H
c) SWAP A d) MOV A, @R0
- 13) If TE0 is set, it indicates
a) Timer-0 Running b) Timer-0 Stopped
c) Timer-0 Overflow d) Timer-0 initialized
- 14) Which of the following is an invalid baud rate for serial communication in 8051 ?
a) 4800 b) 1200 c) 900 d) 19200



Seat No.	
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**T.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
MICROCONTROLLER AND APPLICATIONS**

Day and Date : Wednesday, 22-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data, if required.*
3) *Figures to the right indicate full marks.*

SECTION – I

2. Solve **any four** : **(4×3=12)**
- a) Explain pin configuration of 8051 Microcontroller.
 - b) Write an ALP transfer a block of eight 8-bit numbers stored in Bank-0 to Bank-3.
 - c) Explain TMOD register.
 - d) If the crystal frequency is 12 MHz, calculate time required for execution of following instructions :
 - 1) MOV A, R0
 - 2) SJMP <Address>
 - 3) ACALL <Address>
 - e) Explain the pins of a 16 × 2 alphanumeric LCD.
3. Solve **any two** : **(2×8=16)**
- a) Draw hardware circuit to interface DAC0808 and two control switches SW1 and SW2 to 8051. Write a program in Assembly or 'C' language to generate square wave if SW1 is pressed, triangular wave if SW2 is pressed and Saw tooth wave if both SW1 and SW2 are open.
 - b) Explain SFRs associated with serial communication in 8051.
 - c) Interface 16 × 8 program ROM and 16 × 8 Data RAM to 8051. Write an ALP to transfer data from external data RAM locations 4000 h – 4007 h to internal RAM locations 20 h – 27 h.



SECTION – II

4. Answer **any three** : **(3×4=12)**
- a) Explain in detail single master slave implementation in SPI mode.
 - b) Write a program for addition of two eight bit numbers.
 - c) Differentiate between Von-Neumann architecture and Harvard architecture.
 - d) Write in brief how data is transferred using I²C bus.
5. Answer **any two** : **(2×8=16)**
- a) List features of PIC and explain PCON, OPTION and STATUS registers of PIC.
 - b) Write the assembly language program for toggling the LED and draw pin diagram of PIC also interfacing diagram of LED with PIC.
 - c) Explain capture, compare and PWM modules in PIC.
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SLR-TJ – 205

Seat No.	
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Set	S
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**T.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
MICROCONTROLLER AND APPLICATIONS**

Day and Date : Wednesday, 22-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Assume suitable data, if required.**
 - 3) **Figures to the right indicate full marks.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : 14
- 1) The reset vector and interrupts vector for PIC are
a) 00074, 00044 b) 00044, 0007h c) 00h, 07h d) 0000h, 0004h
 - 2) FLASH program memory, Data Memory (RAM) and Data Memory (EEPROM) for PIC 16F877 are
a) 8K × 8, 368 × 8, 256 × 8 b) 14K × 8, 14 K × 8, 256 × 8
c) 8K × 14, 368 × 16, 256 × 8 d) 8K × 14, 368 × 8, 256 × 8
 - 3) The CALL and GOTO instruction provides _____ bits of address to allow branching within any _____ program memory page.
a) 13 bit, 8K b) 16 bit, 64 K c) 11 bit, 2K d) None of these
 - 4) PIC has _____ bit multichannel analog to digital converter.
a) 12 b) 14 c) 10 d) 20
 - 5) Sink and source capability of PIC is
a) 20 mA b) 25 mA c) 40 mA d) 50 mA
 - 6) After Reset, which internal RAM addresses are used as registers R0-R7 by 8051 ?
a) 07 h – 0F h b) 17 h – 1F h
c) 20 h – 2F h d) 00 h – 07 h

P.T.O.



Seat No.	
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**T.E. (Electronics and Telecommunication Engineering) (Part – II)
(CGPA) Examination, 2017
MICROCONTROLLER AND APPLICATIONS**

Day and Date : Wednesday, 22-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data, if required.*
3) *Figures to the right indicate full marks.*

SECTION – I

2. Solve **any four** : **(4×3=12)**
- a) Explain pin configuration of 8051 Microcontroller.
 - b) Write an ALP transfer a block of eight 8-bit numbers stored in Bank-0 to Bank-3.
 - c) Explain TMOD register.
 - d) If the crystal frequency is 12 MHz, calculate time required for execution of following instructions :
 - 1) MOV A, R0
 - 2) SJMP <Address>
 - 3) ACALL <Address>
 - e) Explain the pins of a 16 × 2 alphanumeric LCD.
3. Solve **any two** : **(2×8=16)**
- a) Draw hardware circuit to interface DAC0808 and two control switches SW1 and SW2 to 8051. Write a program in Assembly or 'C' language to generate square wave if SW1 is pressed, triangular wave if SW2 is pressed and Saw tooth wave if both SW1 and SW2 are open.
 - b) Explain SFRs associated with serial communication in 8051.
 - c) Interface 16 × 8 program ROM and 16 × 8 Data RAM to 8051. Write an ALP to transfer data from external data RAM locations 4000 h – 4007 h to internal RAM locations 20 h – 27 h.



SECTION – II

4. Answer **any three** : **(3×4=12)**
- a) Explain in detail single master slave implementation in SPI mode.
 - b) Write a program for addition of two eight bit numbers.
 - c) Differentiate between Von-Neumann architecture and Harvard architecture.
 - d) Write in brief how data is transferred using I²C bus.
5. Answer **any two** : **(2×8=16)**
- a) List features of PIC and explain PCON, OPTION and STATUS registers of PIC.
 - b) Write the assembly language program for toggling the LED and draw pin diagram of PIC also interfacing diagram of LED with PIC.
 - c) Explain capture, compare and PWM modules in PIC.
-



SLR-TJ – 206

Seat No.	
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Set

P

**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
ELECTRONICS APPLICATIONS AND SYSTEM DESIGN**

Day and Date : Thursday, 23-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data if necessary.**
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.**
5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

I. Choose the correct option :

14

- 1) After firing an SCR, the gate pulse is removed. The current in the SCR will
 - a) Remain the same
 - b) Immediately fall to zero
 - c) Rise up
 - d) Rise a little and then fall to zero
- 2) The duration of the pulse in a pulse triggering system for SCRs should be atleast
 - a) 60 us
 - b) 40 us
 - c) 20 us
 - d) 10 us
- 3) For thyristors, pulse triggering is preferred over dc triggering because
 - a) The gate dissipation is low
 - b) The pulse system is simpler
 - c) The triggering signal is required for a short duration
 - d) Of all of the above
- 4) An SCR is considered to be a semi controlled device because
 - a) it can be turned OFF but not ON with a gate pulse
 - b) it conducts only during one half cycle of an alternating current wave
 - c) it can be turned ON but not OFF with a gate pulse
 - d) it can be turned ON only during one half cycle of an AC

P.T.O.



- 5) Rise time is defined by the interval when
- gate current rises from 90% to 100% of its final value
 - anode voltage drops from 90% to 10% of its initial value
 - anode current rises 10% to 90% of its final value
 - both b) and c)
- 6) A single phase fully controlled converter with highly inductive load and freewheeling diode provides _____ direction of voltage and _____ of current.
- positive, negative
 - positive, positive
 - negative, negative
 - negative, positive
- 7) In CD4046, phase comparator II is used in _____ application.
- low frequency
 - high frequency
 - mid frequency
 - all frequency
- 8) If the sensitivity of a temperature sensor is $50 \mu\text{v}/^\circ\text{C}$ then how much is the output voltage at 60°C ?
- 3mv
 - 0.3 mv
 - 3v
 - 0.3v
- 9) In which of the following controller, noise is less ?
- ON-OFF controller
 - ON-OFF with dead band
 - Proportional controller
 - None of the above
- 10) IC XR2240 consists of
- 8 bit programmable counter
 - 4 bit programmable counter
 - 8 digit programmable counter
 - 4 digit programmable counter
- 11) IC 74C926 can be used for programming measurements of
- Frequency
 - Time period
 - Event
 - All of these
- 12) Which of the following characteristics are required for selection of instrumentation amplifier ?
- High input impedance
 - High CMRR
 - Both a) and b)
 - None of these
- 13) Ladder diagram operates on
- AC supply
 - DC supply
 - Both AC and DC
 - None of these
- 14) For input voltage range of $0 - 2\text{v}$, $t_2 = 2000$, required DVM design is
- 2 digit
 - 3 digit
 - $3\frac{1}{2}$ digit
 - $3\frac{3}{4}$ digit
-



Seat No.	
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
ELECTRONICS APPLICATIONS AND SYSTEM DESIGN**

Day and Date : Thursday, 23-11-2017

Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

II. Answer **any three** : **(4×3=12)**

- 1) What are different triggering methods of SCR ?
- 2) What is dielectric heating ? What are applications of dielectric heating ?
- 3) Design and explain working of Mixer using balanced modulator IC 1596.
- 4) Describe the dynamic turn-on switching characteristics of SCR.

III. Answer **any one** : **(8×1=8)**

- 1) With the help of circuit diagram and waveform explain single phase fully controlled bridge rectifier with inductive load. Derive the expression of average DC load voltage.
- 2) Sketch V-I characteristics of TRIAC and explain its principle of working. How AC power control for a lamp dimmer is achieved using DIAC and TRIAC.

IV. Design a frequency synthesizer using PLL CD 4046 to generate a frequency of 500 KHz. Use 4.43 MHz crystal. **8**

SECTION – II

V. Solve **any three** : **(4×3=12)**

- 1) Draw and explain architecture of PLC in detail.
- 2) Design a timer using XR2240 to generate a delay of 150 seconds in two sections.
- 3) Compare between ON-OFF controller and proportional controller.
- 4) Design a signal conditioning circuit to convert 0° C to 120° C into 4mA to 20mA.

Set P



VI. Solve **any one** :

(1×8=8)

- 1) Design an ON-OFF controller with dead band to control temperature in the range of 50° C to 180° C, set point 70° C. Dead band is 5° C. Use PT₁₀₀.
- 2) Design a frequency ratio measurement setup to measure ratio of frequencies upto 1000 with 0.01 Hz accuracy.

VII. Design 3 $\frac{1}{2}$ digit DVM to measure $V_{in} = 2$ V. Use 1MHz clock.

8



SLR-TJ – 206

Seat No.	
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Set **Q**

**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
ELECTRONICS APPLICATIONS AND SYSTEM DESIGN**

Day and Date : Thursday, 23-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data if necessary.**
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.**
5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

I. Choose the correct option :

14

- 1) If the sensitivity of a temperature sensor is $50 \mu\text{v}/^\circ\text{C}$ then how much is the output voltage at 60°C ?
a) 3mv b) 0.3 mv c) 3v d) 0.3v
- 2) In which of the following controller, noise is less ?
a) ON-OFF controller b) ON-OFF with dead band
c) Proportional controller d) None of the above
- 3) IC XR2240 consists of
a) 8 bit programmable counter b) 4 bit programmable counter
c) 8 digit programmable counter d) 4 digit programmable counter
- 4) IC 74C926 can be used for programming measurements of
a) Frequency b) Time period c) Event d) All of these
- 5) Which of the following characteristics are required for selection of instrumentation amplifier ?
a) High input impedance b) High CMRR
c) Both a) and b) d) None of these
- 6) Ladder diagram operates on
a) AC supply b) DC supply
c) Both AC and DC d) None of these

P.T.O.



- 7) For input voltage range of $0 - 2\text{v}$, $t_2 = 2000$, required DVM design is
- a) 2 digit
 - b) 3 digit
 - c) $3 \frac{1}{2}$ digit
 - d) $3 \frac{3}{4}$ digit
- 8) After firing an SCR, the gate pulse is removed. The current in the SCR will
- a) Remain the same
 - b) Immediately fall to zero
 - c) Rise up
 - d) Rise a little and then fall to zero
- 9) The duration of the pulse in a pulse triggering system for SCRs should be atleast
- a) 60 us
 - b) 40 us
 - c) 20 us
 - d) 10 us
- 10) For thyristors, pulse triggering is preferred over dc triggering because
- a) The gate dissipation is low
 - b) The pulse system is simpler
 - c) The triggering signal is required for a short duration
 - d) Of all of the above
- 11) An SCR is considered to be a semi controlled device because
- a) it can be turned OFF but not ON with a gate pulse
 - b) it conducts only during one half cycle of an alternating current wave
 - c) it can be turned ON but not OFF with a gate pulse
 - d) it can be turned ON only during one half cycle of an AC
- 12) Rise time is defined by the interval when
- a) gate current rises from 90% to 100% of its final value
 - b) anode voltage drops from 90% to 10% of its initial value
 - c) anode current rises 10% to 90% of its final value
 - d) both b) and c)
- 13) A single phase fully controlled converter with highly inductive load and freewheeling diode provides _____ direction of voltage and _____ of current.
- a) positive, negative
 - b) positive, positive
 - c) negative, negative
 - d) negative, positive
- 14) In CD4046, phase comparator II is used in _____ application.
- a) low frequency
 - b) high frequency
 - c) mid frequency
 - d) all frequency
-



Seat No.	
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
ELECTRONICS APPLICATIONS AND SYSTEM DESIGN**

Day and Date : Thursday, 23-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

SECTION – I

II. Answer **any three** : **(4×3=12)**

- 1) What are different triggering methods of SCR ?
- 2) What is dielectric heating ? What are applications of dielectric heating ?
- 3) Design and explain working of Mixer using balanced modulator IC 1596.
- 4) Describe the dynamic turn-on switching characteristics of SCR.

III. Answer **any one** : **(8×1=8)**

- 1) With the help of circuit diagram and waveform explain single phase fully controlled bridge rectifier with inductive load. Derive the expression of average DC load voltage.
- 2) Sketch V-I characteristics of TRIAC and explain its principle of working. How AC power control for a lamp dimmer is achieved using DIAC and TRIAC.

IV. Design a frequency synthesizer using PLL CD 4046 to generate a frequency of 500 KHz. Use 4.43 MHz crystal. **8**

SECTION – II

V. Solve **any three** : **(4×3=12)**

- 1) Draw and explain architecture of PLC in detail.
- 2) Design a timer using XR2240 to generate a delay of 150 seconds in two sections.
- 3) Compare between ON-OFF controller and proportional controller.
- 4) Design a signal conditioning circuit to convert 0° C to 120° C into 4mA to 20mA.

Set Q



VI. Solve **any one** :

(1×8=8)

- 1) Design an ON-OFF controller with dead band to control temperature in the range of 50° C to 180° C, set point 70° C. Dead band is 5° C. Use PT₁₀₀.
- 2) Design a frequency ratio measurement setup to measure ratio of frequencies upto 1000 with 0.01 Hz accuracy.

VII. Design 3 $\frac{1}{2}$ digit DVM to measure $V_{in} = 2$ V. Use 1MHz clock.

8



SLR-TJ – 206

Seat No.	
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Set **R**

**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
ELECTRONICS APPLICATIONS AND SYSTEM DESIGN**

Day and Date : Thursday, 23-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Assume suitable data if necessary.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

I. Choose the correct option :

14

- 1) Rise time is defined by the interval when
 - a) gate current rises from 90% to 100% of its final value
 - b) anode voltage drops from 90% to 10% of its initial value
 - c) anode current rises 10% to 90% of its final value
 - d) both b) and c)
- 2) A single phase fully controlled converter with highly inductive load and freewheeling diode provides _____ direction of voltage and _____ of current.
 - a) positive, negative
 - b) positive, positive
 - c) negative, negative
 - d) negative, positive
- 3) In CD4046, phase comparator II is used in _____ application.
 - a) low frequency
 - b) high frequency
 - c) mid frequency
 - d) all frequency
- 4) If the sensitivity of a temperature sensor is $50 \mu\text{V}/^\circ\text{C}$ then how much is the output voltage at 60°C ?
 - a) 3mv
 - b) 0.3 mv
 - c) 3v
 - d) 0.3v
- 5) In which of the following controller, noise is less ?
 - a) ON-OFF controller
 - b) ON-OFF with dead band
 - c) Proportional controller
 - d) None of the above

P.T.O.



- 6) IC XR2240 consists of
- a) 8 bit programmable counter
 - b) 4 bit programmable counter
 - c) 8 digit programmable counter
 - d) 4 digit programmable counter
- 7) IC 74C926 can be used for programming measurements of
- a) Frequency
 - b) Time period
 - c) Event
 - d) All of these
- 8) Which of the following characteristics are required for selection of instrumentation amplifier ?
- a) High input impedance
 - b) High CMRR
 - c) Both a) and b)
 - d) None of these
- 9) Ladder diagram operates on
- a) AC supply
 - b) DC supply
 - c) Both AC and DC
 - d) None of these
- 10) For input voltage range of $0 - 2\text{v}$, $t_2 = 2000$, required DVM design is
- a) 2 digit
 - b) 3 digit
 - c) $3 \frac{1}{2}$ digit
 - d) $3 \frac{3}{4}$ digit
- 11) After firing an SCR, the gate pulse is removed. The current in the SCR will
- a) Remain the same
 - b) Immediately fall to zero
 - c) Rise up
 - d) Rise a little and then fall to zero
- 12) The duration of the pulse in a pulse triggering system for SCRs should be atleast
- a) 60 us
 - b) 40 us
 - c) 20 us
 - d) 10 us
- 13) For thyristors, pulse triggering is preferred over dc triggering because
- a) The gate dissipation is low
 - b) The pulse system is simpler
 - c) The triggering signal is required for a short duration
 - d) Of all of the above
- 14) An SCR is considered to be a semi controlled device because
- a) it can be turned OFF but not ON with a gate pulse
 - b) it conducts only during one half cycle of an alternating current wave
 - c) it can be turned ON but not OFF with a gate pulse
 - d) it can be turned ON only during one half cycle of an AC
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Seat No.	
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
ELECTRONICS APPLICATIONS AND SYSTEM DESIGN**

Day and Date : Thursday, 23-11-2017

Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

II. Answer **any three** : **(4×3=12)**

- 1) What are different triggering methods of SCR ?
- 2) What is dielectric heating ? What are applications of dielectric heating ?
- 3) Design and explain working of Mixer using balanced modulator IC 1596.
- 4) Describe the dynamic turn-on switching characteristics of SCR.

III. Answer **any one** : **(8×1=8)**

- 1) With the help of circuit diagram and waveform explain single phase fully controlled bridge rectifier with inductive load. Derive the expression of average DC load voltage.
- 2) Sketch V-I characteristics of TRIAC and explain its principle of working. How AC power control for a lamp dimmer is achieved using DIAC and TRIAC.

IV. Design a frequency synthesizer using PLL CD 4046 to generate a frequency of 500 KHz. Use 4.43 MHz crystal. **8**

SECTION – II

V. Solve **any three** : **(4×3=12)**

- 1) Draw and explain architecture of PLC in detail.
- 2) Design a timer using XR2240 to generate a delay of 150 seconds in two sections.
- 3) Compare between ON-OFF controller and proportional controller.
- 4) Design a signal conditioning circuit to convert 0° C to 120° C into 4mA to 20mA.

Set R



VI. Solve **any one** :

(1×8=8)

- 1) Design an ON-OFF controller with dead band to control temperature in the range of 50° C to 180° C, set point 70° C. Dead band is 5° C. Use PT₁₀₀.
- 2) Design a frequency ratio measurement setup to measure ratio of frequencies upto 1000 with 0.01 Hz accuracy.

VII. Design 3 $\frac{1}{2}$ digit DVM to measure $V_{in} = 2$ V. Use 1MHz clock.

8



SLR-TJ – 206

Seat No.	
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Set **S**

**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
ELECTRONICS APPLICATIONS AND SYSTEM DESIGN**

Day and Date : Thursday, 23-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Assume suitable data if necessary.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

I. Choose the correct option :

14

- 1) IC XR2240 consists of
 - a) 8 bit programmable counter
 - b) 4 bit programmable counter
 - c) 8 digit programmable counter
 - d) 4 digit programmable counter
- 2) IC 74C926 can be used for programming measurements of
 - a) Frequency
 - b) Time period
 - c) Event
 - d) All of these
- 3) Which of the following characteristics are required for selection of instrumentation amplifier ?
 - a) High input impedance
 - b) High CMRR
 - c) Both a) and b)
 - d) None of these
- 4) Ladder diagram operates on
 - a) AC supply
 - b) DC supply
 - c) Both AC and DC
 - d) None of these
- 5) For input voltage range of $0 - 2\text{v}$, $t_2 = 2000$, required DVM design is
 - a) 2 digit
 - b) 3 digit
 - c) $3\frac{1}{2}$ digit
 - d) $3\frac{3}{4}$ digit

P.T.O.



- 6) After firing an SCR, the gate pulse is removed. The current in the SCR will
- Remain the same
 - Immediately fall to zero
 - Rise up
 - Rise a little and then fall to zero
- 7) The duration of the pulse in a pulse triggering system for SCRs should be atleast
- 60 us
 - 40 us
 - 20 us
 - 10 us
- 8) For thyristors, pulse triggering is preferred over dc triggering because
- The gate dissipation is low
 - The pulse system is simpler
 - The triggering signal is required for a short duration
 - Of all of the above
- 9) An SCR is considered to be a semi controlled device because
- it can be turned OFF but not ON with a gate pulse
 - it conducts only during one half cycle of an alternating current wave
 - it can be turned ON but not OFF with a gate pulse
 - it can be turned ON only during one half cycle of an AC
- 10) Rise time is defined by the interval when
- gate current rises from 90% to 100% of its final value
 - anode voltage drops from 90% to 10% of its initial value
 - anode current rises 10% to 90% of its final value
 - both b) and c)
- 11) A single phase fully controlled converter with highly inductive load and freewheeling diode provides _____ direction of voltage and _____ of current.
- positive, negative
 - positive, positive
 - negative, negative
 - negative, positive
- 12) In CD4046, phase comparator II is used in _____ application.
- low frequency
 - high frequency
 - mid frequency
 - all frequency
- 13) If the sensitivity of a temperature sensor is $50 \mu\text{V}/^\circ\text{C}$ then how much is the output voltage at 60°C ?
- 3mv
 - 0.3 mv
 - 3v
 - 0.3v
- 14) In which of the following controller, noise is less ?
- ON-OFF controller
 - ON-OFF with dead band
 - Proportional controller
 - None of the above



Seat No.	
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**T.E. (E and TC) (Part – II) (CGPA) Examination, 2017
ELECTRONICS APPLICATIONS AND SYSTEM DESIGN**

Day and Date : Thursday, 23-11-2017

Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

II. Answer **any three** : **(4×3=12)**

- 1) What are different triggering methods of SCR ?
- 2) What is dielectric heating ? What are applications of dielectric heating ?
- 3) Design and explain working of Mixer using balanced modulator IC 1596.
- 4) Describe the dynamic turn-on switching characteristics of SCR.

III. Answer **any one** : **(8×1=8)**

- 1) With the help of circuit diagram and waveform explain single phase fully controlled bridge rectifier with inductive load. Derive the expression of average DC load voltage.
- 2) Sketch V-I characteristics of TRIAC and explain its principle of working. How AC power control for a lamp dimmer is achieved using DIAC and TRIAC.

IV. Design a frequency synthesizer using PLL CD 4046 to generate a frequency of 500 KHz. Use 4.43 MHz crystal. **8**

SECTION – II

V. Solve **any three** : **(4×3=12)**

- 1) Draw and explain architecture of PLC in detail.
- 2) Design a timer using XR2240 to generate a delay of 150 seconds in two sections.
- 3) Compare between ON-OFF controller and proportional controller.
- 4) Design a signal conditioning circuit to convert 0° C to 120° C into 4mA to 20mA.

Set S



VI. Solve **any one** :

(1×8=8)

- 1) Design an ON-OFF controller with dead band to control temperature in the range of 50° C to 180° C, set point 70° C. Dead band is 5° C. Use PT₁₀₀.
- 2) Design a frequency ratio measurement setup to measure ratio of frequencies upto 1000 with 0.01 Hz accuracy.

VII. Design 3 $\frac{1}{2}$ digit DVM to measure $V_{in} = 2$ V. Use 1MHz clock.

8



SLR-TJ – 207

Seat No.	
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Set	P
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
OPTICAL COMMUNICATION**

Day and Date : Friday, 24-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) Light is confined within the core of a simple optical fiber by
 - a) Refraction
 - b) Total internal reflection at the outer edge of cladding
 - c) Total internal reflection at the core cladding boundary
 - d) Reflection from the fiber's plastic coating
- 2) The common online measurement techniques uses fiber image projection (shadow method) for the measurement of
 - a) Numerical aperture
 - b) Core diameter
 - c) Outer diameter
 - d) Dispersion
- 3) The ray tracing helical path through fiber gives change in direction of 2γ at each reflection called
 - a) Meridional ray
 - b) Skew ray
 - c) Axial ray
 - d) None of these
- 4) Impact ionization phenomenon occur in
 - a) PN diode
 - b) Avalanche photodiode
 - c) PIN photodiode
 - d) None of above
- 5) Multimode graded index fibers tends to have _____ core diameters than multimode step index fibers.
 - a) Smaller
 - b) Greater
 - c) Varying
 - d) Constant

P.T.O.



Seat No.	
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
OPTICAL COMMUNICATION**

Day and Date : Friday, 24-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **16**

- i) Explain with diagram the stripe geometry injection laser.
- ii) With ray theory explain the acceptance angle and derive the expression of numerical aperture.
- iii) Explain vapour phase deposition technique for preparing fiber optics.
- iv) Briefly write about connectors of fiber optics.
- v) Determine the cutoff wavelength for a step index fiber to exhibit single mode operation when the core refractive index and radius are 1.46 and 4.5 μm , respectively, with the relative index difference being 0.25%.

3. Answer **any two** : **12**

- a) A 15 km optical fiber link uses fiber with a loss of 1.5 dBkm^{-1} . The fiber is jointed every kilometer with connectors which give an attenuation of 0.8 dB each. Determine the minimum mean optical power which must be launched into the fiber in order to maintain a mean optical power level of 0.3 μW at the detector.
- b) Explain the intramodal dispersion in optical fiber.
- c) Explain in brief types of optical fibers.

SECTION – II

4. Answer **any four** : **16**

- i) Explain the concept of double Heterojunction LED.
- ii) Explain the benefits and drawbacks of avalanche photodiode.

Set P



- iii) Explain in detail the receiver design.
- iv) Explain the technique for multimode fiber dispersion measurement in the time domain.
- v) When 800 photons per second are incident on a p-i-n photodiode operating at a wavelength of $1.3 \mu\text{m}$, they generate on average 550 electrons per second which are collected. Calculate the responsivity of the device.

5. Answer **any two** :

12

- a) A p-n photodiode has a quantum efficiency of 50% at a wavelength of $0.9 \mu\text{m}$. Calculate :
 - i) Its responsivity at $0.9 \mu\text{m}$.
 - ii) The received optical power if the mean photocurrent is 10^{-6} A .
 - iii) The corresponding number of received photons at this wavelength.
 - b) The radiative and nonradiative recombination lifetimes of the minority carriers in the active region of a double heterojunction LED are 60 ns and 100 ns respectively. Determine the total carrier recombination lifetime and the power internally generated within the device when the peak emission wavelength is $0.87 \mu\text{m}$ at a drive current of 40 mA.
 - c) Explain the concept of WDM system.
-



SLR-TJ – 207

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Set	Q
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
OPTICAL COMMUNICATION**

Day and Date : Friday, 24-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) For drive current of 40 mA, quantum efficiency of 0.625, the power internally generated within the device when the peak emission wavelength of $0.87 \mu\text{m}$ is
a) 34.5 mw b) 53.6 mw c) 35.6 mw d) 24.7 mw
- 2) A photo detector has 50% quantum efficiency at 900 nm. What is its responsivity (A/W) ?
a) 36 b) 3.6 c) 0.36 d) 0.036
- 3) _____ is a multiplexing technique used to combine optical signals.
a) FDM b) TDM
c) WDM d) None of these
- 4) _____ absorption requires assistance of photons so that momentum as well as energy is conserved.
a) Direct b) Indirect
c) Direct but not indirect d) Both a) and b)
- 5) _____ are the semipermanent or permanent joints.
a) Connectors b) Splices
c) Couplers d) None of above
- 6) Loss in dB due to Fresnel reflection at a single interface is
a) $-10 \log_{10}(1 - r)$ b) $-10 \log_{10}(r - 1)$
c) $10 \log_{10}(1 - r)$ d) $10 \log_{10}(r - 1)$

P.T.O.



- 7) Rayleigh and Mie scattering are the types of
- a) Linear scattering
 - b) Nonlinear scattering
 - c) Exponential scattering
 - d) None of these
- 8) Light is confined within the core of a simple optical fiber by
- a) Refraction
 - b) Total internal reflection at the outer edge of cladding
 - c) Total internal reflection at the core cladding boundary
 - d) Reflection from the fiber's plastic coating
- 9) The common online measurement techniques uses fiber image projection (shadow method) for the measurement of
- a) Numerical aperture
 - b) Core diameter
 - c) Outer diameter
 - d) Dispersion
- 10) The ray tracing helical path through fiber gives change in direction of 2γ at each reflection called
- a) Meridional ray
 - b) Skew ray
 - c) Axial ray
 - d) None of these
- 11) Impact ionization phenomenon occur in
- a) PN diode
 - b) Avalanche photodiode
 - c) PIN photodiode
 - d) None of above
- 12) Multimode graded index fibers tends to have _____ core diameters than multimode step index fibers.
- a) Smaller
 - b) Greater
 - c) Varying
 - d) Constant
- 13) The core diameter of single mode step index fiber is about
- a) 60 to 70 μm
 - b) 8 to 10 μm
 - c) 100 to 250 μm
 - d) 50 to 200 μm
- 14) The typical best bandwidth length products for single mode step index fiber is
- a) 50 MHzkm
 - b) 100 MHzkm
 - c) 1 GHzkm
 - d) 100 GHzkm
-



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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
OPTICAL COMMUNICATION**

Day and Date : Friday, 24-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **16**

- i) Explain with diagram the stripe geometry injection laser.
- ii) With ray theory explain the acceptance angle and derive the expression of numerical aperture.
- iii) Explain vapour phase deposition technique for preparing fiber optics.
- iv) Briefly write about connectors of fiber optics.
- v) Determine the cutoff wavelength for a step index fiber to exhibit single mode operation when the core refractive index and radius are 1.46 and 4.5 μm , respectively, with the relative index difference being 0.25%.

3. Answer **any two** : **12**

- a) A 15 km optical fiber link uses fiber with a loss of 1.5 dBkm^{-1} . The fiber is jointed every kilometer with connectors which give an attenuation of 0.8 dB each. Determine the minimum mean optical power which must be launched into the fiber in order to maintain a mean optical power level of 0.3 μW at the detector.
- b) Explain the intramodal dispersion in optical fiber.
- c) Explain in brief types of optical fibers.

SECTION – II

4. Answer **any four** : **16**

- i) Explain the concept of double Heterojunction LED.
- ii) Explain the benefits and drawbacks of avalanche photodiode.

Set Q



- iii) Explain in detail the receiver design.
- iv) Explain the technique for multimode fiber dispersion measurement in the time domain.
- v) When 800 photons per second are incident on a p-i-n photodiode operating at a wavelength of $1.3 \mu\text{m}$, they generate on average 550 electrons per second which are collected. Calculate the responsivity of the device.

5. Answer **any two** :

12

- a) A p-n photodiode has a quantum efficiency of 50% at a wavelength of $0.9 \mu\text{m}$. Calculate :
 - i) Its responsivity at $0.9 \mu\text{m}$.
 - ii) The received optical power if the mean photocurrent is 10^{-6} A.
 - iii) The corresponding number of received photons at this wavelength.
 - b) The radiative and nonradiative recombination lifetimes of the minority carriers in the active region of a double heterojunction LED are 60 ns and 100 ns respectively. Determine the total carrier recombination lifetime and the power internally generated within the device when the peak emission wavelength is $0.87 \mu\text{m}$ at a drive current of 40 mA.
 - c) Explain the concept of WDM system.
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SLR-TJ – 207

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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
OPTICAL COMMUNICATION**

Day and Date : Friday, 24-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) Multimode graded index fibers tends to have _____ core diameters than multimode step index fibers.
a) Smaller b) Greater c) Varying d) Constant
- 2) The core diameter of single mode step index fiber is about
a) 60 to 70 μm b) 8 to 10 μm
c) 100 to 250 μm d) 50 to 200 μm
- 3) The typical best bandwidth length products for single mode step index fiber is
a) 50 MHzkm b) 100 MHzkm
c) 1 GHzkm d) 100 GHzkm
- 4) For drive current of 40 mA, quantum efficiency of 0.625, the power internally generated within the device when the peak emission wavelength of 0.87 μm is
a) 34.5 mw b) 53.6 mw c) 35.6 mw d) 24.7 mw
- 5) A photo detector has 50% quantum efficiency at 900 nm. What is its responsivity (A/W) ?
a) 36 b) 3.6 c) 0.36 d) 0.036
- 6) _____ is a multiplexing technique used to combine optical signals.
a) FDM b) TDM
c) WDM d) None of these

P.T.O.



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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
OPTICAL COMMUNICATION**

Day and Date : Friday, 24-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **16**

- i) Explain with diagram the stripe geometry injection laser.
- ii) With ray theory explain the acceptance angle and derive the expression of numerical aperture.
- iii) Explain vapour phase deposition technique for preparing fiber optics.
- iv) Briefly write about connectors of fiber optics.
- v) Determine the cutoff wavelength for a step index fiber to exhibit single mode operation when the core refractive index and radius are 1.46 and 4.5 μm , respectively, with the relative index difference being 0.25%.

3. Answer **any two** : **12**

- a) A 15 km optical fiber link uses fiber with a loss of 1.5 dBkm^{-1} . The fiber is jointed every kilometer with connectors which give an attenuation of 0.8 dB each. Determine the minimum mean optical power which must be launched into the fiber in order to maintain a mean optical power level of $0.3 \mu\text{W}$ at the detector.
- b) Explain the intramodal dispersion in optical fiber.
- c) Explain in brief types of optical fibers.

SECTION – II

4. Answer **any four** : **16**

- i) Explain the concept of double Heterojunction LED.
- ii) Explain the benefits and drawbacks of avalanche photodiode.

Set R



- iii) Explain in detail the receiver design.
- iv) Explain the technique for multimode fiber dispersion measurement in the time domain.
- v) When 800 photons per second are incident on a p-i-n photodiode operating at a wavelength of $1.3 \mu\text{m}$, they generate on average 550 electrons per second which are collected. Calculate the responsivity of the device.

5. Answer **any two** :

12

- a) A p-n photodiode has a quantum efficiency of 50% at a wavelength of $0.9 \mu\text{m}$. Calculate :
 - i) Its responsivity at $0.9 \mu\text{m}$.
 - ii) The received optical power if the mean photocurrent is 10^{-6} A .
 - iii) The corresponding number of received photons at this wavelength.
 - b) The radiative and nonradiative recombination lifetimes of the minority carriers in the active region of a double heterojunction LED are 60 ns and 100 ns respectively. Determine the total carrier recombination lifetime and the power internally generated within the device when the peak emission wavelength is $0.87 \mu\text{m}$ at a drive current of 40 mA.
 - c) Explain the concept of WDM system.
-



SLR-TJ – 207

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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
OPTICAL COMMUNICATION**

Day and Date : Friday, 24-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) _____ is a multiplexing technique used to combine optical signals.
 - a) FDM
 - b) TDM
 - c) WDM
 - d) None of these
- 2) _____ absorption requires assistance of photons so that momentum as well as energy is conserved.
 - a) Direct
 - b) Indirect
 - c) Direct but not indirect
 - d) Both a) and b)
- 3) _____ are the semipermanent or permanent joints.
 - a) Connectors
 - b) Splices
 - c) Couplers
 - d) None of above
- 4) Loss in dB due to Fresnel reflection at a single interface is
 - a) $-10 \log_{10}(1 - r)$
 - b) $-10 \log_{10}(r - 1)$
 - c) $10 \log_{10}(1 - r)$
 - d) $10 \log_{10}(r - 1)$
- 5) Rayleigh and Mie scattering are the types of
 - a) Linear scattering
 - b) Nonlinear scattering
 - c) Exponential scattering
 - d) None of these

P.T.O.



- 6) Light is confined within the core of a simple optical fiber by
- Refraction
 - Total internal reflection at the outer edge of cladding
 - Total internal reflection at the core cladding boundary
 - Reflection from the fiber's plastic coating
- 7) The common online measurement techniques uses fiber image projection (shadow method) for the measurement of
- Numerical aperture
 - Core diameter
 - Outer diameter
 - Dispersion
- 8) The ray tracing helical path through fiber gives change in direction of 2γ at each reflection called
- Meridional ray
 - Skew ray
 - Axial ray
 - None of these
- 9) Impact ionization phenomenon occur in
- PN diode
 - Avalanche photodiode
 - PIN photodiode
 - None of above
- 10) Multimode graded index fibers tends to have _____ core diameters than multimode step index fibers.
- Smaller
 - Greater
 - Varying
 - Constant
- 11) The core diameter of single mode step index fiber is about
- 60 to 70 μm
 - 8 to 10 μm
 - 100 to 250 μm
 - 50 to 200 μm
- 12) The typical best bandwidth length products for single mode step index fiber is
- 50 MHzkm
 - 100 MHzkm
 - 1 GHzkm
 - 100 GHzkm
- 13) For drive current of 40 mA, quantum efficiency of 0.625, the power internally generated within the device when the peak emission wavelength of 0.87 μm is
- 34.5 mw
 - 53.6 mw
 - 35.6 mw
 - 24.7 mw
- 14) A photo detector has 50% quantum efficiency at 900 nm. What is its responsivity (A/W) ?
- 36
 - 3.6
 - 0.36
 - 0.036
-



Seat No.	
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
OPTICAL COMMUNICATION**

Day and Date : Friday, 24-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Answer **any four** : **16**

- i) Explain with diagram the stripe geometry injection laser.
- ii) With ray theory explain the acceptance angle and derive the expression of numerical aperture.
- iii) Explain vapour phase deposition technique for preparing fiber optics.
- iv) Briefly write about connectors of fiber optics.
- v) Determine the cutoff wavelength for a step index fiber to exhibit single mode operation when the core refractive index and radius are 1.46 and 4.5 μm , respectively, with the relative index difference being 0.25%.

3. Answer **any two** : **12**

- a) A 15 km optical fiber link uses fiber with a loss of 1.5 dBkm^{-1} . The fiber is jointed every kilometer with connectors which give an attenuation of 0.8 dB each. Determine the minimum mean optical power which must be launched into the fiber in order to maintain a mean optical power level of 0.3 μW at the detector.
- b) Explain the intramodal dispersion in optical fiber.
- c) Explain in brief types of optical fibers.

SECTION – II

4. Answer **any four** : **16**

- i) Explain the concept of double Heterojunction LED.
- ii) Explain the benefits and drawbacks of avalanche photodiode.

Set S



- iii) Explain in detail the receiver design.
- iv) Explain the technique for multimode fiber dispersion measurement in the time domain.
- v) When 800 photons per second are incident on a p-i-n photodiode operating at a wavelength of $1.3 \mu\text{m}$, they generate on average 550 electrons per second which are collected. Calculate the responsivity of the device.

5. Answer **any two** :

12

- a) A p-n photodiode has a quantum efficiency of 50% at a wavelength of $0.9 \mu\text{m}$. Calculate :
 - i) Its responsivity at $0.9 \mu\text{m}$.
 - ii) The received optical power if the mean photocurrent is 10^{-6} A .
 - iii) The corresponding number of received photons at this wavelength.
 - b) The radiative and nonradiative recombination lifetimes of the minority carriers in the active region of a double heterojunction LED are 60 ns and 100 ns respectively. Determine the total carrier recombination lifetime and the power internally generated within the device when the peak emission wavelength is $0.87 \mu\text{m}$ at a drive current of 40 mA.
 - c) Explain the concept of WDM system.
-



- 6) Spot beam antenna is used in which of the following multiple access technique.
a) FDMA b) TDMA c) SDMA d) Both a) and b)
- 7) In FDMA/TDD system, forward and reverse channels uses _____ carrier frequencies.
a) Same b) Different c) Both a) and b) d) None of these
- 8) The downlink frequency of P-GSM system is
a) 935-960 MHz b) 890-915 MHz
c) 920-940 MHz d) None of these
- 9) GSM uses _____ security algorithm for authentication.
a) A3 b) A5 c) A8 d) None of these
- 10) The _____ is the database at MSC that keeps the information about the identity of mobile phone equipment.
a) HLR b) VLR c) AuC d) EIR
- 11) In IS-95 paging framing channel, paging channel slot consists of
a) 8 half frames b) 6 half frames
c) 10 half frames d) 18 half frames
- 12) In IS-95 CDMA _____ forward channel require to do power control.
a) Pilot channel b) Synchronization channel
c) Paging channel d) Traffic channel
- 13) IMT 2000 stands for
a) International Mobile Telecommunication
b) Interim Mobile Telecommunication
c) International Mobile Technology
d) None of these
- 14) In IMT 2000 _____ channel is used to send alert message to the subscriber to page the information.
a) Primary common control physical channel
b) Acquisition indication channel
c) Paging indication channel
d) None of these
-



Seat No.	
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
MOBILE COMMUNICATION**

Day and Date : Saturday, 25-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

- a) Explain spread spectrum multiple access technique with FHMA.
- b) Explain in brief free space propagation model.
- c) Describe the Umbrella cell approach.
- d) Explain Doppler effect in small scale fading.
- e) Explain concept of interference and system capacity.

3. Solve **any two** : **(6×2=12)**

- a) Explain time dispersion parameter and coherence bandwidth.
- b) Explain TDMA technique with its frame efficiency.
- c) What is the effect of cluster size on system capacity ? Calculate the system capacity for 7-cell reuse for a coverage of a 2000 sq. km. with each cell having a radii of 5 sq. km., there are a total of 1000 radio channels available. For 4-cell reuse how many time the cluster has to replicated to cover the entire coverage are ? Calculate system capacity for both.



SECTION – II

4. Solve **any four** : **(4×4=16)**
- a) What are the different identifiers used in GSM ? Explain in detail.
 - b) What are the different channels used in GSM ? Explain in detail
 - c) Explain in detail forward IS 95-CDMA link structure.
 - d) Explain in detail forward IS 95-CDMA channels.
 - e) Explain with neat block diagram reverse channels in CDMA-2000.
5. Solve **any two** : **(6×2=12)**
- a) Draw and explain CDPD network architecture in detail.
 - b) Explain packet and frame format for forward and reverse CDMA IS-95 channels.
 - c) Explain with neat block diagram forward and reverse channels in W-CDMA.
-



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Seat No.	
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Set **Q**

**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
MOBILE COMMUNICATION**

Day and Date : Saturday, 25-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Assume suitable data if necessary.**
 - 3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

- 1) The downlink frequency of P-GSM system is
 - a) 935-960 MHz
 - b) 890-915 MHz
 - c) 920-940 MHz
 - d) None of these
- 2) GSM uses _____ security algorithm for authentication.
 - a) A3
 - b) A5
 - c) A8
 - d) None of these
- 3) The _____ is the database at MSC that keeps the information about the identity of mobile phone equipment.
 - a) HLR
 - b) VLR
 - c) AuC
 - d) EIR
- 4) In IS-95 paging framing channel, paging channel slot consists of
 - a) 8 half frames
 - b) 6 half frames
 - c) 10 half frames
 - d) 18 half frames
- 5) In IS-95 CDMA _____ forward channel require to do power control.
 - a) Pilot channel
 - b) Synchronization channel
 - c) Paging channel
 - d) Traffic channel

P.T.O.



- 6) IMT 2000 stands for
- a) International Mobile Telecommunication
 - b) Interim Mobile Telecommunication
 - c) International Mobile Technology
 - d) None of these
- 7) In IMT 2000 _____ channel is used to send alert message to the subscriber to page the information.
- a) Primary common control physical channel
 - b) Acquisition indication channel
 - c) Paging indication channel
 - d) None of these
- 8) _____ is the major concern in frequency reuse.
- a) System noise
 - b) Co-channel interference
 - c) Intermodulation
 - d) None of these
- 9) The average duration of typical call called as
- a) Set up time
 - b) Holding time
 - c) Release time
 - d) Blocked time
- 10) In fixed channel scheme each cell is allocated a _____ set of voice channel.
- a) Predetermined
 - b) Dynamically
 - c) Demand based
 - d) None of these
- 11) Rapid changes in signal strength over a small travel distance or time interval is
- a) Fading effect
 - b) Propagation effect
 - c) Doppler effect
 - d) None of these
- 12) _____ occurs when the radio path between transmitter and receiver is obstructed by a surface that has a sharp irregularities.
- a) Reflection
 - b) Diffraction
 - c) Scattering
 - d) None of the above
- 13) Spot beam antenna is used in which of the following multiple access technique.
- a) FDMA
 - b) TDMA
 - c) SDMA
 - d) Both a) and b)
- 14) In FDMA/TDD system, forward and reverse channels uses _____ carrier frequencies.
- a) Same
 - b) Different
 - c) Both a) and b)
 - d) None of these
-



Seat No.	
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
MOBILE COMMUNICATION**

Day and Date : Saturday, 25-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
- a) Explain spread spectrum multiple access technique with FHMA.
 - b) Explain in brief free space propagation model.
 - c) Describe the Umbrella cell approach.
 - d) Explain Doppler effect in small scale fading.
 - e) Explain concept of interference and system capacity.
3. Solve **any two** : **(6×2=12)**
- a) Explain time dispersion parameter and coherence bandwidth.
 - b) Explain TDMA technique with its frame efficiency.
 - c) What is the effect of cluster size on system capacity ? Calculate the system capacity for 7-cell reuse for a coverage of a 2000 sq. km. with each cell having a radii of 5 sq. km., there are a total of 1000 radio channels available. For 4-cell reuse how many time the cluster has to replicated to cover the entire coverage are ? Calculate system capacity for both.



SECTION – II

4. Solve **any four** : **(4×4=16)**
- a) What are the different identifiers used in GSM ? Explain in detail.
 - b) What are the different channels used in GSM ? Explain in detail
 - c) Explain in detail forward IS 95-CDMA link structure.
 - d) Explain in detail forward IS 95-CDMA channels.
 - e) Explain with neat block diagram reverse channels in CDMA-2000.
5. Solve **any two** : **(6×2=12)**
- a) Draw and explain CDPD network architecture in detail.
 - b) Explain packet and frame format for forward and reverse CDMA IS-95 channels.
 - c) Explain with neat block diagram forward and reverse channels in W-CDMA.
-



- 7) In IS-95 paging framing channel, paging channel slot consists of
- a) 8 half frames
 - b) 6 half frames
 - c) 10 half frames
 - d) 18 half frames
- 8) In IS-95 CDMA _____ forward channel require to do power control.
- a) Pilot channel
 - b) Synchronization channel
 - c) Paging channel
 - d) Traffic channel
- 9) IMT 2000 stands for
- a) International Mobile Telecommunication
 - b) Interim Mobile Telecommunication
 - c) International Mobile Technology
 - d) None of these
- 10) In IMT 2000 _____ channel is used to send alert message to the subscriber to page the information.
- a) Primary common control physical channel
 - b) Acquisition indication channel
 - c) Paging indication channel
 - d) None of these
- 11) _____ is the major concern in frequency reuse.
- a) System noise
 - b) Co-channel interference
 - c) Intermodulation
 - d) None of these
- 12) The average duration of typical call called as
- a) Set up time
 - b) Holding time
 - c) Release time
 - d) Blocked time
- 13) In fixed channel scheme each cell is allocated a _____ set of voice channel.
- a) Predetermined
 - b) Dynamically
 - c) Demand based
 - d) None of these
- 14) Rapid changes in signal strength over a small travel distance or time interval is
- a) Fading effect
 - b) Propagation effect
 - c) Doppler effect
 - d) None of these
-



Seat No.	
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
MOBILE COMMUNICATION**

Day and Date : Saturday, 25-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
- a) Explain spread spectrum multiple access technique with FHMA.
 - b) Explain in brief free space propagation model.
 - c) Describe the Umbrella cell approach.
 - d) Explain Doppler effect in small scale fading.
 - e) Explain concept of interference and system capacity.
3. Solve **any two** : **(6×2=12)**
- a) Explain time dispersion parameter and coherence bandwidth.
 - b) Explain TDMA technique with its frame efficiency.
 - c) What is the effect of cluster size on system capacity ? Calculate the system capacity for 7-cell reuse for a coverage of a 2000 sq. km. with each cell having a radii of 5 sq. km., there are a total of 1000 radio channels available. For 4-cell reuse how many time the cluster has to replicated to cover the entire coverage are ? Calculate system capacity for both.

Set R



SECTION – II

4. Solve **any four** : **(4×4=16)**
- a) What are the different identifiers used in GSM ? Explain in detail.
 - b) What are the different channels used in GSM ? Explain in detail
 - c) Explain in detail forward IS 95-CDMA link structure.
 - d) Explain in detail forward IS 95-CDMA channels.
 - e) Explain with neat block diagram reverse channels in CDMA-2000.
5. Solve **any two** : **(6×2=12)**
- a) Draw and explain CDPD network architecture in detail.
 - b) Explain packet and frame format for forward and reverse CDMA IS-95 channels.
 - c) Explain with neat block diagram forward and reverse channels in W-CDMA.
-



SLR-TJ – 208

Seat No.	
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Set	S
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
MOBILE COMMUNICATION**

Day and Date : Saturday, 25-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Assume suitable data if necessary.**
 - 3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

- 1) The _____ is the database at MSC that keeps the information about the identity of mobile phone equipment.
a) HLR b) VLR c) AuC d) EIR
- 2) In IS-95 paging framing channel, paging channel slot consists of
a) 8 half frames b) 6 half frames
c) 10 half frames d) 18 half frames
- 3) In IS-95 CDMA _____ forward channel require to do power control.
a) Pilot channel b) Synchronization channel
c) Paging channel d) Traffic channel
- 4) IMT 2000 stands for
a) International Mobile Telecommunication
b) Interim Mobile Telecommunication
c) International Mobile Technology
d) None of these

P.T.O.



- 5) In IMT 2000 _____ channel is used to send alert message to the subscriber to page the information.
- Primary common control physical channel
 - Acquisition indication channel
 - Paging indication channel
 - None of these
- 6) _____ is the major concern in frequency reuse.
- System noise
 - Co-channel interference
 - Intermodulation
 - None of these
- 7) The average duration of typical call called as
- Set up time
 - Holding time
 - Release time
 - Blocked time
- 8) In fixed channel scheme each cell is allocated a _____ set of voice channel.
- Predetermined
 - Dynamically
 - Demand based
 - None of these
- 9) Rapid changes in signal strength over a small travel distance or time interval is
- Fading effect
 - Propagation effect
 - Doppler effect
 - None of these
- 10) _____ occurs when the radio path between transmitter and receiver is obstructed by a surface that has a sharp irregularities.
- Reflection
 - Diffraction
 - Scattering
 - None of the above
- 11) Spot beam antenna is used in which of the following multiple access technique.
- FDMA
 - TDMA
 - SDMA
 - Both a) and b)
- 12) In FDMA/TDD system, forward and reverse channels uses _____ carrier frequencies.
- Same
 - Different
 - Both a) and b)
 - None of these
- 13) The downlink frequency of P-GSM system is
- 935-960 MHz
 - 890-915 MHz
 - 920-940 MHz
 - None of these
- 14) GSM uses _____ security algorithm for authentication.
- A3
 - A5
 - A8
 - None of these



Seat No.	
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
MOBILE COMMUNICATION**

Day and Date : Saturday, 25-11-2017
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
- a) Explain spread spectrum multiple access technique with FHMA.
 - b) Explain in brief free space propagation model.
 - c) Describe the Umbrella cell approach.
 - d) Explain Doppler effect in small scale fading.
 - e) Explain concept of interference and system capacity.
3. Solve **any two** : **(6×2=12)**
- a) Explain time dispersion parameter and coherence bandwidth.
 - b) Explain TDMA technique with its frame efficiency.
 - c) What is the effect of cluster size on system capacity ? Calculate the system capacity for 7-cell reuse for a coverage of a 2000 sq. km. with each cell having a radii of 5 sq. km., there are a total of 1000 radio channels available. For 4-cell reuse how many time the cluster has to replicated to cover the entire coverage are ? Calculate system capacity for both.



SECTION – II

4. Solve **any four** : **(4×4=16)**
- a) What are the different identifiers used in GSM ? Explain in detail.
 - b) What are the different channels used in GSM ? Explain in detail
 - c) Explain in detail forward IS 95-CDMA link structure.
 - d) Explain in detail forward IS 95-CDMA channels.
 - e) Explain with neat block diagram reverse channels in CDMA-2000.
5. Solve **any two** : **(6×2=12)**
- a) Draw and explain CDPD network architecture in detail.
 - b) Explain packet and frame format for forward and reverse CDMA IS-95 channels.
 - c) Explain with neat block diagram forward and reverse channels in W-CDMA.
-



SLR-TJ – 209

Seat No.	
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Set	P
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
COMPUTER ORGANIZATION (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

Instructions: 1) *Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.*

2) *Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : 10

1) A group of eight bits is known as

- | | |
|-----------|---------------------|
| a) Nibble | b) Byte |
| c) Bit | d) All of the above |

2) _____ is used to store the data and program.

- | | |
|----------------|----------------------|
| a) Memory unit | b) Input unit |
| c) Output unit | d) None of the above |

3) RAM stands for

- | | |
|------------------------|-------------------------|
| a) Read Access Memory | b) Random Access Memory |
| c) Random Added Memory | d) None of the above |

4) In _____ representation, numbers are represented by mantissa comprising the significant digits and an exponent part of radix.

- | | |
|-------------------|----------------------|
| a) Floating point | b) Fixed point |
| c) Decimal number | d) None of the above |

5) LRU stands for

- | | |
|------------------------|-----------------------|
| a) Least Recently Used | b) Last Recently Used |
| c) Last Randomly Used | d) None of the above |

P.T.O.



- 6) _____ are the different types of generating control signals.
- a) Microprogrammed
 - b) Hardwired
 - c) Microinstruction
 - d) Both a) and b)
- 7) Hardwired control generator consists of
- a) Decoder/Encoder
 - b) Condition codes
 - c) Control step counter
 - d) All of the above
- 8) In microprogrammed approach, signals are generated by
- a) Machine instructions
 - b) System programs
 - c) Utility tools
 - d) None of the above
- 9) DMA transfers are performed by control circuit called
- a) DMA controller
 - b) Data controller
 - c) Device interface
 - d) Overlooker
- 10) DMA controller has _____ registers.
- a) 1
 - b) 2
 - c) 3
 - d) 4
-



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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
COMPUTER ORGANIZATION (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Marks : 40

SECTION – I

2. Solve **any two** : **20**
- a) Explain the fundamental units of CPU.
 - b) Explain various memory allocations schemes.
 - c) Write a note on :
 - i) CISC.
 - ii) Virtual memory.

SECTION – II

3. Solve **any two** : **20**
- a) Explain microprogrammed control design with the help of neat diagram.
 - b) Explain DMA architecture with the help of neat diagram.
 - c) Explain the concept of interrupt I/O hardware.
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SLR-TJ – 209

Seat No.	
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Set	Q
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
COMPUTER ORGANIZATION (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

Instructions: 1) *Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.*
2) *Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : 10

- 1) DMA transfers are performed by control circuit called
 - a) DMA controller
 - b) Data controller
 - c) Device interface
 - d) Overlooker
- 2) DMA controller has _____ registers.
 - a) 1
 - b) 2
 - c) 3
 - d) 4
- 3) Hardwired control generator consists of
 - a) Decoder/Encoder
 - b) Condition codes
 - c) Control step counter
 - d) All of the above
- 4) In microprogrammed approach, signals are generated by
 - a) Machine instructions
 - b) System programs
 - c) Utility tools
 - d) None of the above
- 5) A group of eight bits is known as
 - a) Nibble
 - b) Byte
 - c) Bit
 - d) All of the above
- 6) _____ is used to store the data and program.
 - a) Memory unit
 - b) Input unit
 - c) Output unit
 - d) None of the above

P.T.O.



- 7) RAM stands for
- a) Read Access Memory
 - b) Random Access Memory
 - c) Random Added Memory
 - d) None of the above
- 8) In _____ representation, numbers are represented by mantissa comprising the significant digits and an exponent part of radix.
- a) Floating point
 - b) Fixed point
 - c) Decimal number
 - d) None of the above
- 9) LRU stands for
- a) Least Recently Used
 - b) Last Recently Used
 - c) Last Randomly Used
 - d) None of the above
- 10) _____ are the different types of generating control signals.
- a) Microprogrammed
 - b) Hardwired
 - c) Microinstruction
 - d) Both a) and b)
-



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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
COMPUTER ORGANIZATION (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Marks : 40

SECTION – I

2. Solve **any two** : **20**
- a) Explain the fundamental units of CPU.
 - b) Explain various memory allocations schemes.
 - c) Write a note on :
 - i) CISC.
 - ii) Virtual memory.

SECTION – II

3. Solve **any two** : **20**
- a) Explain microprogrammed control design with the help of neat diagram.
 - b) Explain DMA architecture with the help of neat diagram.
 - c) Explain the concept of interrupt I/O hardware.
-



SLR-TJ – 209

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Set	R
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
COMPUTER ORGANIZATION (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer :

10

1) LRU stands for

- | | |
|------------------------|-----------------------|
| a) Least Recently Used | b) Last Recently Used |
| c) Last Randomly Used | d) None of the above |

2) _____ are the different types of generating control signals.

- | | |
|---------------------|-------------------|
| a) Microprogrammed | b) Hardwired |
| c) Microinstruction | d) Both a) and b) |

3) DMA transfers are performed by control circuit called

- | | |
|---------------------|--------------------|
| a) DMA controller | b) Data controller |
| c) Device interface | d) Overlooker |

4) DMA controller has _____ registers.

- | | |
|------|------|
| a) 1 | b) 2 |
| c) 3 | d) 4 |

5) RAM stands for

- | |
|-------------------------|
| a) Read Access Memory |
| b) Random Access Memory |
| c) Random Added Memory |
| d) None of the above |

P.T.O.



- 6) In _____ representation, numbers are represented by mantissa comprising the significant digits and an exponent part of radix.
- a) Floating point
 - b) Fixed point
 - c) Decimal number
 - d) None of the above
- 7) A group of eight bits is known as
- a) Nibble
 - b) Byte
 - c) Bit
 - d) All of the above
- 8) _____ is used to store the data and program.
- a) Memory unit
 - b) Input unit
 - c) Output unit
 - d) None of the above
- 9) Hardwired control generator consists of
- a) Decoder/Encoder
 - b) Condition codes
 - c) Control step counter
 - d) All of the above
- 10) In microprogrammed approach, signals are generated by
- a) Machine instructions
 - b) System programs
 - c) Utility tools
 - d) None of the above
-



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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
COMPUTER ORGANIZATION (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Marks : 40

SECTION – I

2. Solve **any two** : **20**
- a) Explain the fundamental units of CPU.
 - b) Explain various memory allocations schemes.
 - c) Write a note on :
 - i) CISC.
 - ii) Virtual memory.

SECTION – II

3. Solve **any two** : **20**
- a) Explain microprogrammed control design with the help of neat diagram.
 - b) Explain DMA architecture with the help of neat diagram.
 - c) Explain the concept of interrupt I/O hardware.
-



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Set	S
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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
COMPUTER ORGANIZATION (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

Instructions: 1) *Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.*
2) *Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.*

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : 10

- 1) RAM stands for
 - a) Read Access Memory
 - b) Random Access Memory
 - c) Random Added Memory
 - d) None of the above
- 2) In _____ representation, numbers are represented by mantissa comprising the significant digits and an exponent part of radix.
 - a) Floating point
 - b) Fixed point
 - c) Decimal number
 - d) None of the above
- 3) LRU stands for
 - a) Least Recently Used
 - b) Last Recently Used
 - c) Last Randomly Used
 - d) None of the above
- 4) _____ are the different types of generating control signals.
 - a) Microprogrammed
 - b) Hardwired
 - c) Microinstruction
 - d) Both a) and b)
- 5) Hardwired control generator consists of
 - a) Decoder/Encoder
 - b) Condition codes
 - c) Control step counter
 - d) All of the above

P.T.O.



- 6) In microprogrammed approach, signals are generated by
- a) Machine instructions
 - b) System programs
 - c) Utility tools
 - d) None of the above
- 7) DMA transfers are performed by control circuit called
- a) DMA controller
 - b) Data controller
 - c) Device interface
 - d) Overlooker
- 8) DMA controller has _____ registers.
- a) 1
 - b) 2
 - c) 3
 - d) 4
- 9) A group of eight bits is known as
- a) Nibble
 - b) Byte
 - c) Bit
 - d) All of the above
- 10) _____ is used to store the data and program.
- a) Memory unit
 - b) Input unit
 - c) Output unit
 - d) None of the above
-



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**T.E. (Electronics and Telecommunication) (Part – II) (CGPA)
Examination, 2017
COMPUTER ORGANIZATION (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Marks : 40

SECTION – I

2. Solve **any two** : **20**
- a) Explain the fundamental units of CPU.
 - b) Explain various memory allocations schemes.
 - c) Write a note on :
 - i) CISC.
 - ii) Virtual memory.

SECTION – II

3. Solve **any two** : **20**
- a) Explain microprogrammed control design with the help of neat diagram.
 - b) Explain DMA architecture with the help of neat diagram.
 - c) Explain the concept of interrupt I/O hardware.
-



SLR-TJ – 210

Seat No.	
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Set

P

**T.E. (E and TC) Part – II (CGPA) Examination, 2017
OPERATING SYSTEM (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. Each question carries one mark.
2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**
- 1) What is operating system ?
 - a) Collection of programs that manages hardware resources
 - b) System service provider to the application programs
 - c) Link to interface the hardware and application programs
 - d) All of the mentioned
 - 2) Which one of the following error will be handle by the operating system ?
 - a) power failure
 - b) lack of paper in printer
 - c) connection failure in the network
 - d) all of the mentioned
 - 3) Which one of the following is not a real time operating system ?
 - a) Palm Os
 - b) Windows CE
 - c) RTLinux
 - d) VxWorks
 - 4) A process can be terminated due to
 - a) normal exit
 - b) fatal error
 - c) killed by another process
 - d) all of the mentioned
 - 5) A set of processes is deadlock if
 - a) Each process is terminated
 - b) Each process is blocked and will remain so forever
 - c) All processes are trying to kill each other
 - d) None of the mentioned

P.T.O.



- 6) Which scheduling algorithm allocates the CPU first to the process that requests the CPU first ?
- a) priority scheduling
 - b) shortest job scheduling
 - c) first-come, first-served scheduling
 - d) none of the mentioned
- 7) Program always deals with
- a) logical address
 - b) absolute address
 - c) physical address
 - d) relative address
- 8) Operating system maintains the page table for
- a) each process
 - b) each thread
 - c) each instruction
 - d) each address
- 9) To avoid deadlock
- a) resource allocation must be done only once
 - b) there must be a fixed number of resources to allocate
 - c) all deadlocked processes must be aborted
 - d) inversion technique can be used
- 10) Deadlock prevention is a set of methods
- a) to ensure that at least one of the necessary conditions cannot hold
 - b) to ensure that all of the necessary conditions do not hold
 - c) to decide if the requested resources for a process have to be given or not
 - d) to recover from a deadlock
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Seat No.	
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**T.E. (E and TC) Part – II (CGPA) Examination, 2017
OPERATING SYSTEM (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Marks : 40

2. Attempt **any 4** : **40**

- 1) What is OS ? Explain different function and objectives of OS.
- 2) What is deadlock ? Explain necessary conditions to occur deadlock. What is difference between deadlock avoidance and deadlock prevention.
- 3) Consider the following set of processes with CPU burst time.

Process	Burst Time	Arrival Time
P1	10	1
P2	4	2
P3	5	3
P4	3	4

- i) Draw Gantt chart for FCFS and SJF pre-emptive.
 - ii) Calculate avg. waiting time and average turn around time. Also explain which scheduling policy is adopted by OS.
- 4) Explain the concept of Swapping with example.
 - 5) What is process ? Explain different operations on process.
-



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Set

Q

**T.E. (E and TC) Part – II (CGPA) Examination, 2017
OPERATING SYSTEM (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer :

(10×1=10)

- 1) To avoid deadlock
 - a) resource allocation must be done only once
 - b) there must be a fixed number of resources to allocate
 - c) all deadlocked processes must be aborted
 - d) inversion technique can be used
- 2) Deadlock prevention is a set of methods
 - a) to ensure that at least one of the necessary conditions cannot hold
 - b) to ensure that all of the necessary conditions do not hold
 - c) to decide if the requested resources for a process have to be given or not
 - d) to recover from a deadlock
- 3) Program always deals with
 - a) logical address
 - b) absolute address
 - c) physical address
 - d) relative address
- 4) Operating system maintains the page table for
 - a) each process
 - b) each thread
 - c) each instruction
 - d) each address

P.T.O.



- 5) What is operating system ?
 - a) Collection of programs that manages hardware resources
 - b) System service provider to the application programs
 - c) Link to interface the hardware and application programs
 - d) All of the mentioned
 - 6) Which one of the following error will be handle by the operating system ?
 - a) power failure
 - b) lack of paper in printer
 - c) connection failure in the network
 - d) all of the mentioned
 - 7) Which one of the following is not a real time operating system ?
 - a) Palm Os
 - b) Windows CE
 - c) RTLinux
 - d) VxWorks
 - 8) A process can be terminated due to
 - a) normal exit
 - b) fatal error
 - c) killed by another process
 - d) all of the mentioned
 - 9) A set of processes is deadlock if
 - a) Each process is terminated
 - b) Each process is blocked and will remain so forever
 - c) All processes are trying to kill each other
 - d) None of the mentioned
 - 10) Which scheduling algorithm allocates the CPU first to the process that requests the CPU first ?
 - a) priority scheduling
 - b) shortest job scheduling
 - c) first-come, first-served scheduling
 - d) none of the mentioned
-



Seat No.	
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**T.E. (E and TC) Part – II (CGPA) Examination, 2017
OPERATING SYSTEM (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Marks : 40

2. Attempt **any 4** : **40**

- 1) What is OS ? Explain different function and objectives of OS.
- 2) What is deadlock ? Explain necessary conditions to occur deadlock. What is difference between deadlock avoidance and deadlock prevention.
- 3) Consider the following set of processes with CPU burst time.

Process	Burst Time	Arrival Time
P1	10	1
P2	4	2
P3	5	3
P4	3	4

- i) Draw Gantt chart for FCFS and SJF pre-emptive.
 - ii) Calculate avg. waiting time and average turn around time. Also explain which scheduling policy is adopted by OS.
- 4) Explain the concept of Swapping with example.
 - 5) What is process ? Explain different operations on process.
-



SLR-TJ – 210

Seat No.	
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Set **R**

**T.E. (E and TC) Part – II (CGPA) Examination, 2017
OPERATING SYSTEM (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. Each question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer :

(10×1=10)

- 1) A set of processes is deadlock if
 - a) Each process is terminated
 - b) Each process is blocked and will remain so forever
 - c) All processes are trying to kill each other
 - d) None of the mentioned
- 2) Which scheduling algorithm allocates the CPU first to the process that requests the CPU first ?
 - a) priority scheduling
 - b) shortest job scheduling
 - c) first-come, first-served scheduling
 - d) none of the mentioned
- 3) To avoid deadlock
 - a) resource allocation must be done only once
 - b) there must be a fixed number of resources to allocate
 - c) all deadlocked processes must be aborted
 - d) inversion technique can be used

P.T.O.



- 4) Deadlock prevention is a set of methods
 - a) to ensure that at least one of the necessary conditions cannot hold
 - b) to ensure that all of the necessary conditions do not hold
 - c) to decide if the requested resources for a process have to be given or not
 - d) to recover from a deadlock
 - 5) Which one of the following is not a real time operating system ?
 - a) Palm Os
 - b) Windows CE
 - c) RTLinux
 - d) VxWorks
 - 6) A process can be terminated due to
 - a) normal exit
 - b) fatal error
 - c) killed by another process
 - d) all of the mentioned
 - 7) What is operating system ?
 - a) Collection of programs that manages hardware resources
 - b) System service provider to the application programs
 - c) Link to interface the hardware and application programs
 - d) All of the mentioned
 - 8) Which one of the following error will be handle by the operating system ?
 - a) power failure
 - b) lack of paper in printer
 - c) connection failure in the network
 - d) all of the mentioned
 - 9) Program always deals with
 - a) logical address
 - b) absolute address
 - c) physical address
 - d) relative address
 - 10) Operating system maintains the page table for
 - a) each process
 - b) each thread
 - c) each instruction
 - d) each address
-



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**T.E. (E and TC) Part – II (CGPA) Examination, 2017
OPERATING SYSTEM (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Marks : 40

2. Attempt **any 4** : **40**

- 1) What is OS ? Explain different function and objectives of OS.
- 2) What is deadlock ? Explain necessary conditions to occur deadlock. What is difference between deadlock avoidance and deadlock prevention.
- 3) Consider the following set of processes with CPU burst time.

Process	Burst Time	Arrival Time
P1	10	1
P2	4	2
P3	5	3
P4	3	4

- i) Draw Gantt chart for FCFS and SJF pre-emptive.
 - ii) Calculate avg. waiting time and average turn around time. Also explain which scheduling policy is adopted by OS.
- 4) Explain the concept of Swapping with example.
 - 5) What is process ? Explain different operations on process.
-



- 6) Operating system maintains the page table for
- a) each process
 - b) each thread
 - c) each instruction
 - d) each address
- 7) To avoid deadlock
- a) resource allocation must be done only once
 - b) there must be a fixed number of resources to allocate
 - c) all deadlocked processes must be aborted
 - d) inversion technique can be used
- 8) Deadlock prevention is a set of methods
- a) to ensure that at least one of the necessary conditions cannot hold
 - b) to ensure that all of the necessary conditions do not hold
 - c) to decide if the requested resources for a process have to be given or not
 - d) to recover from a deadlock
- 9) What is operating system ?
- a) Collection of programs that manages hardware resources
 - b) System service provider to the application programs
 - c) Link to interface the hardware and application programs
 - d) All of the mentioned
- 10) Which one of the following error will be handle by the operating system ?
- a) power failure
 - b) lack of paper in printer
 - c) connection failure in the network
 - d) all of the mentioned
-



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**T.E. (E and TC) Part – II (CGPA) Examination, 2017
OPERATING SYSTEM (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 noon

Marks : 40

2. Attempt **any 4** : **40**

- 1) What is OS ? Explain different function and objectives of OS.
- 2) What is deadlock ? Explain necessary conditions to occur deadlock. What is difference between deadlock avoidance and deadlock prevention.
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Process	Burst Time	Arrival Time
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P4	3	4

- i) Draw Gantt chart for FCFS and SJF pre-emptive.
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- 4) Explain the concept of Swapping with example.
 - 5) What is process ? Explain different operations on process.
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Set	P
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**T.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ROBOTICS (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 Noon

Total Marks : 50

- Note :** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book on Page No. 3.
2) Solve **any four** out of Q. 2 to Q. 7.

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : 10

- 1) Which of the following terms IS NOT one of the four basic parts of a robot ?
 - a) Peripheral tools
 - b) Sensor
 - c) Controller
 - d) Drive
- 2) Which of the following is a sensor that measures the movement of an object ?
 - a) Pressure sensor
 - b) Motion sensor
 - c) Action sensor
 - d) Touch sensor
- 3) The number of movable joints in the base, the arm and the end effectors of the robot determines
 - a) Degrees of freedom
 - b) Payload capacity
 - c) Operational limits
 - d) Flexibility
- 4) Which of the following is the most common type of actuator ?
 - a) Electric motor
 - b) Stepper motor
 - c) Solenoid
 - d) Hydraulic pump
- 5) Which of the following is a device that receives information from an input device and changes the output if required ?
 - a) Microprocessor
 - b) Actuator
 - c) Sensing device
 - d) Controller
- 6) The common robotic arm has _____ degrees of freedom.
 - a) Six
 - b) Five
 - c) Four
 - d) Three

P.T.O.



- 7) Robots used in automobile plants would be classified as
- a) Perception system robots
 - b) Industrial robots
 - c) Mobile robots
 - d) Knowledge robots
- 8) What is the name for information sent from robot sensors to robot controllers ?
- a) Temperature
 - b) Feedback
 - c) Signal
 - d) Output
- 9) Which of the following terms refers to the rotational motion of a robot arm ?
- a) swivel
 - b) axle
 - c) roll
 - d) yaw
- 10) Computer-controlled machines that mimic the motor activities of living things are
- a) virtual reality
 - b) robotics
 - c) knowledge-based systems
 - d) machines that think like a human
-



Seat No.	
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**T.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ROBOTICS (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 Noon

Marks : 40

Note : Solve **any four** out of Q. 2 to Q. 7.

2. What is a robot ? Describe the function of the basic components of a robot. **10**
 3. Explain the following terms related to robotics : **10**
 - i) Accuracy
 - ii) Precision
 - iii) Resolution
 - iv) Repeatability
 - v) Speed.
 4. Explain DC motor Overload over current and stall detection methods. **10**
 5. Explain the following sensors used in robots. **10**
 - i) Touch and acceleration sensors
 - ii) Proximity sensor.
 6. What are different functions of robot vision system ? Explain low level and high level machine vision systems. **10**
 7. Define MEMS. List their advantages. Write short note on Micro robotics. **10**
-



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**T.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ROBOTICS (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 Noon

Total Marks : 50

- Note :** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book on Page No. 3.
2) Solve **any four** out of Q. 2 to Q. 7.

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

- 1) Which of the following terms refers to the rotational motion of a robot arm ?
 - a) swivel
 - b) axle
 - c) roll
 - d) yaw
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 - c) Controller
 - d) Drive
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 - a) Pressure sensor
 - b) Motion sensor
 - c) Action sensor
 - d) Touch sensor

P.T.O.



- 7) The number of movable joints in the base, the arm and the end effectors of the robot determines
- a) Degrees of freedom
 - b) Payload capacity
 - c) Operational limits
 - d) Flexibility
- 8) Which of the following is the most common type of actuator ?
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 - d) Hydraulic pump
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 - b) Actuator
 - c) Sensing device
 - d) Controller
- 10) The common robotic arm has _____ degrees of freedom.
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 - b) Five
 - c) Four
 - d) Three
-



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**T.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ROBOTICS (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 Noon

Marks : 40

Note : Solve **any four** out of Q. 2 to Q. 7.

2. What is a robot ? Describe the function of the basic components of a robot. **10**
 3. Explain the following terms related to robotics : **10**
 - i) Accuracy
 - ii) Precision
 - iii) Resolution
 - iv) Repeatability
 - v) Speed.
 4. Explain DC motor Overload over current and stall detection methods. **10**
 5. Explain the following sensors used in robots. **10**
 - i) Touch and acceleration sensors
 - ii) Proximity sensor.
 6. What are different functions of robot vision system ? Explain low level and high level machine vision systems. **10**
 7. Define MEMS. List their advantages. Write short note on Micro robotics. **10**
-



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**T.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ROBOTICS (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 Noon

Total Marks : 50

- Note :** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book on Page No. 3.
2) Solve **any four** out of Q. 2 to Q. 7.

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : 10

- 1) Which of the following is a device that receives information from an input device and changes the output if required ?
 - a) Microprocessor
 - b) Actuator
 - c) Sensing device
 - d) Controller
- 2) The common robotic arm has _____ degrees of freedom.
 - a) Six
 - b) Five
 - c) Four
 - d) Three
- 3) Which of the following terms refers to the rotational motion of a robot arm ?
 - a) swivel
 - b) axle
 - c) roll
 - d) yaw
- 4) Computer-controlled machines that mimic the motor activities of living things are
 - a) virtual reality
 - b) robotics
 - c) knowledge-based systems
 - d) machines that think like a human
- 5) The number of movable joints in the base, the arm and the end effectors of the robot determines
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 - c) Operational limits
 - d) Flexibility
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 - b) Stepper motor
 - c) Solenoid
 - d) Hydraulic pump

P.T.O.



- 7) Which of the following terms IS NOT one of the four basic parts of a robot ?
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 - d) Drive
- 8) Which of the following is a sensor that measures the movement of an object ?
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 - c) Mobile robots
 - d) Knowledge robots
- 10) What is the name for information sent from robot sensors to robot controllers ?
- a) Temperature
 - b) Feedback
 - c) Signal
 - d) Output
-



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**T.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ROBOTICS (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 Noon

Marks : 40

Note : Solve **any four** out of Q. 2 to Q. 7.

2. What is a robot ? Describe the function of the basic components of a robot. **10**
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 7. Define MEMS. List their advantages. Write short note on Micro robotics. **10**
-



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**T.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ROBOTICS (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 Noon

Total Marks : 50

- Note :** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book on Page No. 3.
2) Solve **any four** out of Q. 2 to Q. 7.

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : 10

- 1) The number of movable joints in the base, the arm and the end effectors of the robot determines
 - a) Degrees of freedom
 - b) Payload capacity
 - c) Operational limits
 - d) Flexibility
- 2) Which of the following is the most common type of actuator ?
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 - c) Solenoid
 - d) Hydraulic pump
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 - a) Microprocessor
 - b) Actuator
 - c) Sensing device
 - d) Controller
- 4) The common robotic arm has _____ degrees of freedom.
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 - b) Five
 - c) Four
 - d) Three
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 - b) Feedback
 - c) Signal
 - d) Output

P.T.O.



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 - c) roll
 - d) yaw
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- a) virtual reality
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- 9) Which of the following terms IS NOT one of the four basic parts of a robot ?
- a) Peripheral tools
 - b) Sensor
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 - d) Drive
- 10) Which of the following is a sensor that measures the movement of an object ?
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 - b) Motion sensor
 - c) Action sensor
 - d) Touch sensor
-



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**T.E. (E & TC) (Part – II) (CGPA) Examination, 2017
ROBOTICS (Self Learning)**

Day and Date : Monday, 27-11-2017
Time : 10.00 a.m. to 12.00 Noon

Marks : 40

Note : Solve **any four** out of Q. 2 to Q. 7.

2. What is a robot ? Describe the function of the basic components of a robot. **10**
 3. Explain the following terms related to robotics : **10**
 - i) Accuracy
 - ii) Precision
 - iii) Resolution
 - iv) Repeatability
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-



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Seat No.	
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Set	P
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**T.E. (E&TC) (Part – II) (Old) Examination, 2017
INDUSTRIAL ELECTRONICS**

Day and Date : Wednesday, 13-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer for following :

(20×1=20)

- 1) Which one of the following is lower ?
A) Holding current B) Leakage current
C) Latching current D) None
- 2) Converters use _____ to control output voltage.
A) Phase angle control B) Natural commutation
C) PWM D) Forced commutation
- 3) 1 phase fully controlled converter with inductive load operates in _____ quadrant.
A) One B) Two C) One and two D) Four
- 4) TRIAC with MT2 positive w.r.t. MT1 can be triggered by _____
A) Positive gate signal B) Negative gate signal
C) Positive or negative gate signal D) None
- 5) Thermal protection is provided for SCR using _____
A) Thermocouple B) Thermistor C) Heat sink D) Fuse
- 6) When UJT is used as relaxation oscillator it is used in _____ region of characteristics.
A) Cut-off B) ON
C) Negative resistance D) ON and cut-off
- 7) Thyrector is used for _____ protection of SCR.
A) Over current
B) Over voltage
C) Rate of change of voltage dV/dt
D) Rate of change of current di/dt

P.T.O.



- 8) Which of the following device has better switching characteristics ?
A) SCR B) MOSFET C) IGBT D) TRIAC
- 9) In controlled rectifiers _____ commutation is used.
A) Line B) Self
C) Auxiliary D) Complimentary
- 10) A 3 phase full wave converter is also called as _____ pulse converter.
A) Two B) Three C) Four D) Six
- 11) Step up cyclo converter uses _____ type of commutation.
A) Natural B) Forced
C) Either natural or forced D) None
- 12) Morgan's chopper uses _____ commutation.
A) Natural B) Self
C) Auxiliary D) Complimentary
- 13) Using Jones chopper _____ time ratio control is supported.
A) Fixed frequency B) Variable frequency
C) Fixed and variable frequency D) CLC
- 14) How many power devices will conduct at any time in three phase 180 degree mode inverter ?
A) One B) Two C) Three D) Four
- 15) For step down Cyclo converter, output frequency is _____ than input frequency.
A) Greater B) Less C) Equal D) Both A) and B)
- 16) Inverter is _____ converter.
A) AC to DC B) DC to DC C) DC to AC D) AC to AC
- 17) Step down chopper uses _____ for controlling load voltage.
A) Firing angle control B) Duty cycle control using PWM
C) Both A) and B) D) None
- 18) For speed control of DC motor _____ circuit is used.
A) Controlled rectifier B) Chopper
C) Both A) and B) D) Cyclo converter
- 19) Battery is specified using _____
A) Voltage B) Ampere Hour i.e. AH
C) Both A) and B) D) None
- 20) Dielectric heating is used for heating _____
A) Metals B) Insulators C) Both A) and B) D) None
-



Seat No.	
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**T.E. (E&TC) (Part – II) (Old) Examination, 2017
INDUSTRIAL ELECTRONICS**

Day and Date : Wednesday, 13-12-2017

Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**

SECTION – I

2. Solve **any four** : **16**
- a) Draw and explain VI characteristics of TRIAC.
 - b) Explain Auxiliary commutation.
 - c) Explain thermal and dV/dt protection for SCR.
 - d) Explain Lamp dimmer circuit.
 - e) Explain half wave controlled rectifier with inductive load.
3. Solve **any three** : **24**
- a) Draw and explain digital firing circuit.
 - b) Explain any eight ratings of SCR.
 - c) Explain single phase full wave controlled rectifier with resistive load. Derive expression for average and RMS load voltage.
 - d) Explain three phase full wave controlled rectifier with resistive load. Derive expression for average load voltage.



SECTION – II

4. Solve **any four** : **16**
- a) Explain parallel inverter.
 - b) Explain the principle of step up cyclo converter.
 - c) Explain principle of step up chopper and derive expression for average load voltage.
 - d) What is Online and Offline UPS ? Explain with block diagram.
 - e) Explain chopper control techniques.
5. Solve **any three** : **24**
- a) Explain operation of three phase bridge inverter in 180° mode with resistive load. Draw necessary waveforms.
 - b) How choppers are classified ? Explain Jones chopper.
 - c) Explain the principle of Dielectric heating. What are its applications ? Explain any one.
 - d) Explain single phase separately excited DC motor drive.
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SLR-TJ – 212

Seat No.	
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Set	Q
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**T.E. (E&TC) (Part – II) (Old) Examination, 2017
INDUSTRIAL ELECTRONICS**

Day and Date : Wednesday, 13-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer for following :

(20×1=20)

- 1) Inverter is _____ converter.
A) AC to DC B) DC to DC C) DC to AC D) AC to AC
- 2) Step down chopper uses _____ for controlling load voltage.
A) Firing angle control B) Duty cycle control using PWM
C) Both A) and B) D) None
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P.T.O.



- 9) TRIAC with MT2 positive w.r.t. MT1 can be triggered by _____
A) Positive gate signal B) Negative gate signal
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- 19) How many power devices will conduct at any time in three phase 180 degree mode inverter ?
A) One B) Two C) Three D) Four
- 20) For step down Cyclo converter, output frequency is _____ than input frequency.
A) Greater B) Less C) Equal D) Both A) and B)
-



Seat No.	
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**T.E. (E&TC) (Part – II) (Old) Examination, 2017
INDUSTRIAL ELECTRONICS**

Day and Date : Wednesday, 13-12-2017

Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**

SECTION – I

2. Solve **any four** : **16**
- a) Draw and explain VI characteristics of TRIAC.
 - b) Explain Auxiliary commutation.
 - c) Explain thermal and dV/dt protection for SCR.
 - d) Explain Lamp dimmer circuit.
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- a) Draw and explain digital firing circuit.
 - b) Explain any eight ratings of SCR.
 - c) Explain single phase full wave controlled rectifier with resistive load. Derive expression for average and RMS load voltage.
 - d) Explain three phase full wave controlled rectifier with resistive load. Derive expression for average load voltage.



SECTION – II

4. Solve **any four** : **16**
- a) Explain parallel inverter.
 - b) Explain the principle of step up cyclo converter.
 - c) Explain principle of step up chopper and derive expression for average load voltage.
 - d) What is Online and Offline UPS ? Explain with block diagram.
 - e) Explain chopper control techniques.
5. Solve **any three** : **24**
- a) Explain operation of three phase bridge inverter in 180° mode with resistive load. Draw necessary waveforms.
 - b) How choppers are classified ? Explain Jones chopper.
 - c) Explain the principle of Dielectric heating. What are its applications ? Explain any one.
 - d) Explain single phase separately excited DC motor drive.
-



- 9) Battery is specified using _____
A) Voltage
B) Ampere Hour i.e. AH
C) Both A) and B)
D) None
- 10) Dielectric heating is used for heating _____
A) Metals
B) Insulators
C) Both A) and B)
D) None
- 11) Which one of the following is lower ?
A) Holding current
B) Leakage current
C) Latching current
D) None
- 12) Converters use _____ to control output voltage.
A) Phase angle control
B) Natural commutation
C) PWM
D) Forced commutation
- 13) 1 phase fully controlled converter with inductive load operates in _____ quadrant.
A) One
B) Two
C) One and two
D) Four
- 14) TRIAC with MT2 positive w.r.t. MT1 can be triggered by _____
A) Positive gate signal
B) Negative gate signal
C) Positive or negative gate signal
D) None
- 15) Thermal protection is provided for SCR using _____
A) Thermocouple
B) Thermistor
C) Heat sink
D) Fuse
- 16) When UJT is used as relaxation oscillator it is used in _____ region of characteristics.
A) Cut-off
B) ON
C) Negative resistance
D) ON and cut-off
- 17) Thyrector is used for _____ protection of SCR.
A) Over current
B) Over voltage
C) Rate of change of voltage dV/dt
D) Rate of change of current di/dt
- 18) Which of the following device has better switching characteristics ?
A) SCR
B) MOSFET
C) IGBT
D) TRIAC
- 19) In controlled rectifiers _____ commutation is used.
A) Line
B) Self
C) Auxiliary
D) Complimentary
- 20) A 3 phase full wave converter is also called as _____ pulse converter.
A) Two
B) Three
C) Four
D) Six
-



Seat No.	
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**T.E. (E&TC) (Part – II) (Old) Examination, 2017
INDUSTRIAL ELECTRONICS**

Day and Date : Wednesday, 13-12-2017

Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**

SECTION – I

2. Solve **any four** : **16**
- a) Draw and explain VI characteristics of TRIAC.
 - b) Explain Auxiliary commutation.
 - c) Explain thermal and dV/dt protection for SCR.
 - d) Explain Lamp dimmer circuit.
 - e) Explain half wave controlled rectifier with inductive load.
3. Solve **any three** : **24**
- a) Draw and explain digital firing circuit.
 - b) Explain any eight ratings of SCR.
 - c) Explain single phase full wave controlled rectifier with resistive load. Derive expression for average and RMS load voltage.
 - d) Explain three phase full wave controlled rectifier with resistive load. Derive expression for average load voltage.



SECTION – II

4. Solve **any four** : **16**
- a) Explain parallel inverter.
 - b) Explain the principle of step up cyclo converter.
 - c) Explain principle of step up chopper and derive expression for average load voltage.
 - d) What is Online and Offline UPS ? Explain with block diagram.
 - e) Explain chopper control techniques.
5. Solve **any three** : **24**
- a) Explain operation of three phase bridge inverter in 180° mode with resistive load. Draw necessary waveforms.
 - b) How choppers are classified ? Explain Jones chopper.
 - c) Explain the principle of Dielectric heating. What are its applications ? Explain any one.
 - d) Explain single phase separately excited DC motor drive.
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SLR-TJ – 212

Seat No.	
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**T.E. (E&TC) (Part – II) (Old) Examination, 2017
INDUSTRIAL ELECTRONICS**

Day and Date : Wednesday, 13-12-2017
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
 - 4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer for following :

(20×1=20)

- 1) When UJT is used as relaxation oscillator it is used in _____ region of characteristics.
A) Cut-off
B) ON
C) Negative resistance
D) ON and cut-off
- 2) Thyrector is used for _____ protection of SCR.
A) Over current
B) Over voltage
C) Rate of change of voltage dV/dt
D) Rate of change of current di/dt
- 3) Which of the following device has better switching characteristics ?
A) SCR
B) MOSFET
C) IGBT
D) TRIAC
- 4) In controlled rectifiers _____ commutation is used.
A) Line
B) Self
C) Auxiliary
D) Complimentary
- 5) A 3 phase full wave converter is also called as _____ pulse converter.
A) Two
B) Three
C) Four
D) Six
- 6) Step up cyclo converter uses _____ type of commutation.
A) Natural
B) Forced
C) Either natural or forced
D) None
- 7) Morgan's chopper uses _____ commutation.
A) Natural
B) Self
C) Auxiliary
D) Complimentary

P.T.O.



Seat No.	
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**T.E. (E&TC) (Part – II) (Old) Examination, 2017
INDUSTRIAL ELECTRONICS**

Day and Date : Wednesday, 13-12-2017

Marks : 80

Time : 10.00 a.m. to 1.00 p.m.

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**

SECTION – I

2. Solve **any four** : **16**
- a) Draw and explain VI characteristics of TRIAC.
 - b) Explain Auxiliary commutation.
 - c) Explain thermal and dV/dt protection for SCR.
 - d) Explain Lamp dimmer circuit.
 - e) Explain half wave controlled rectifier with inductive load.
3. Solve **any three** : **24**
- a) Draw and explain digital firing circuit.
 - b) Explain any eight ratings of SCR.
 - c) Explain single phase full wave controlled rectifier with resistive load. Derive expression for average and RMS load voltage.
 - d) Explain three phase full wave controlled rectifier with resistive load. Derive expression for average load voltage.



SECTION – II

4. Solve **any four** : **16**
- a) Explain parallel inverter.
 - b) Explain the principle of step up cyclo converter.
 - c) Explain principle of step up chopper and derive expression for average load voltage.
 - d) What is Online and Offline UPS ? Explain with block diagram.
 - e) Explain chopper control techniques.
5. Solve **any three** : **24**
- a) Explain operation of three phase bridge inverter in 180° mode with resistive load. Draw necessary waveforms.
 - b) How choppers are classified ? Explain Jones chopper.
 - c) Explain the principle of Dielectric heating. What are its applications ? Explain any one.
 - d) Explain single phase separately excited DC motor drive.
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SLR-TJ – 213

Seat No.	
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Set	P
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**B.E. (E&TC) (Part – I) (New) (CGPA) Examination, 2017
COMPUTER COMMUNICATION NETWORK**

Day and Date : Tuesday, 28-11-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Figures to the **right** indicate **full** marks.
 - 4) **Use of calculator is allowed.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The _____ layer adds a header to the packet coming from the upper layer that includes the logical addresses of the sender and receiver.
 - a) Data link
 - b) Network
 - c) Physical
 - d) None of the above
- 2) The _____ layer enables the users to access the network.
 - a) Application
 - b) Physical
 - c) Data link
 - d) Transport
- 3) We add r redundant bits to each block to make the length $n = k + r$. The resulting n-bit blocks are called _____.
 - a) Codewords
 - b) Datawords
 - c) Blockwords
 - d) None of the above
- 4) The Hamming distance between 100 and 001 is _____.
 - a) 0
 - b) 1
 - c) 2
 - d) None of the above

P.T.O.



- 5) The _____ of errors are more difficult than the _____
- a) Detection; correction b) Correction; detection
c) Creation; correction d) Creation; detection
- 6) In _____ protocols, we use _____
- a) Bit-oriented; character stuffing b) Character-oriented; bit stuffing
c) Character-oriented; byte stuffing d) None of the above
- 7) ARQ stands for _____
- a) Acknowledge repeat request b) Automatic retransmission request
c) Automatic repeat quantization d) Automatic repeat request
- 8) The options field of the TCP header ranges from 0 to _____ bytes.
- a) 10 b) 20
c) 40 d) None of the above
- 9) TCP uses _____ to check the safe and sound arrival of data.
- a) An acknowledgment mechanism b) Out-of-band signaling
c) The services of another protocol d) None of the above
- 10) The value of the window size is determined by _____
- a) The sender b) The receiver
c) Both the sender and receiver d) None of the above
- 11) The technique of _____ refers to a congestion control mechanism in which a congested node stops receiving data from the immediate upstream node or nodes.
- a) backpressure b) Choke packet
c) Implicit signaling d) Explicit signaling
- 12) Which protocol works at the Internet layer and provides a connection service between hosts ?
- a) IP b) ARP c) TCP d) UDP
- 13) Which of the following standards used for CSMA/CD LAN ?
- a) IEEE 802.3 b) IEEE 802.2 c) IEEE 802.5 d) IEEE 802.4
- 14) IPv6 does not use _____ type of address.
- a) Broadcast b) Multicast
c) Any cast d) None



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B.E. (E&TC) (Part – I) (New) (CGPA) Examination, 2017
COMPUTER COMMUNICATION NETWORK

Day and Date : Tuesday, 28-11-2017

Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :** 1) *Figures to the **right** indicate **full** marks.*
2) **Use of calculator is allowed.**

SECTION – I

2. Attempt **any three** : **(4×3=12)**

- 1) Explain any two network topologies with their advantages and disadvantages.
- 2) If message to be transmitted is 1101011011 and $G(x) = X^3 + X + 1$. What is the transmitted bit pattern according to CRC ?
- 3) Describe TCP connection establishment, using three way handshaking.
- 4) Explain different classes of IP addresses along with their address ranges. Enlist four special IP address.

3. Attempt **any two** : **(8×2=16)**

- 1) Draw TCP header format and explain each field.
- 2) What are different mode transition commands ? Draw and explain mode transition diagram in HDLC.
- 3) Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation and identify its class.



SECTION – II

4. Attempt **any three** : **(4×3=12)**
- 1) Write a short note on Megabit LAN.
 - 2) Explain principle of Optimality with example.
 - 3) Explain the functionality of Switches and Bridges.
 - 4) How ARP resolves IP addresses into MAC addresses ?
5. Attempt **any two** : **(8×2=16)**
- 1) Draw and explain header format of DHCP. Explain various features of DHCP.
 - 2) What is Internet Domain Name System ? Draw and explain Domain Server message format.
 - 3) Explain in detail Link State routing.
-



- 5) Which protocol works at the Internet layer and provides a connection service between hosts ?
a) IP b) ARP c) TCP d) UDP
- 6) Which of the following standards used for CSMA/CD LAN ?
a) IEEE 802.3 b) IEEE 802.2 c) IEEE 802.5 d) IEEE 802.4
- 7) IPv6 does not use _____ type of address.
a) Broadcast b) Multicast
c) Any cast d) None
- 8) The _____ layer adds a header to the packet coming from the upper layer that includes the logical addresses of the sender and receiver.
a) Data link b) Network
c) Physical d) None of the above
- 9) The _____ layer enables the users to access the network.
a) Application b) Physical
c) Data link d) Transport
- 10) We add r redundant bits to each block to make the length $n = k + r$. The resulting n -bit blocks are called _____
a) Codewords b) Datawords
c) Blockwords d) None of the above
- 11) The Hamming distance between 100 and 001 is _____
a) 0 b) 1
c) 2 d) None of the above
- 12) The _____ of errors are more difficult than the _____
a) Detection; correction b) Correction; detection
c) Creation; correction d) Creation; detection
- 13) In _____ protocols, we use _____
a) Bit-oriented; character stuffing b) Character-oriented; bit stuffing
c) Character-oriented; byte stuffing d) None of the above
- 14) ARQ stands for _____
a) Acknowledge repeat request b) Automatic retransmission request
c) Automatic repeat quantization d) Automatic repeat request



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**B.E. (E&TC) (Part – I) (New) (CGPA) Examination, 2017
COMPUTER COMMUNICATION NETWORK**

Day and Date : Tuesday, 28-11-2017

Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :** 1) *Figures to the **right** indicate **full** marks.*
2) **Use of calculator is allowed.**

SECTION – I

2. Attempt **any three** : **(4×3=12)**

- 1) Explain any two network topologies with their advantages and disadvantages.
- 2) If message to be transmitted is 1101011011 and $G(x) = X^3 + X + 1$. What is the transmitted bit pattern according to CRC ?
- 3) Describe TCP connection establishment, using three way handshaking.
- 4) Explain different classes of IP addresses along with their address ranges. Enlist four special IP address.

3. Attempt **any two** : **(8×2=16)**

- 1) Draw TCP header format and explain each field.
- 2) What are different mode transition commands ? Draw and explain mode transition diagram in HDLC.
- 3) Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation and identify its class.



SECTION – II

4. Attempt **any three** : **(4×3=12)**
- 1) Write a short note on Megabit LAN.
 - 2) Explain principle of Optimality with example.
 - 3) Explain the functionality of Switches and Bridges.
 - 4) How ARP resolves IP addresses into MAC addresses ?
5. Attempt **any two** : **(8×2=16)**
- 1) Draw and explain header format of DHCP. Explain various features of DHCP.
 - 2) What is Internet Domain Name System ? Draw and explain Domain Server message format.
 - 3) Explain in detail Link State routing.
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**B.E. (E&TC) (Part – I) (New) (CGPA) Examination, 2017
COMPUTER COMMUNICATION NETWORK**

Day and Date : Tuesday, 28-11-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. 3. **Each** question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
- 3) Figures to the **right** indicate **full** marks.
- 4) **Use of calculator is allowed.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The _____ of errors are more difficult than the _____
- a) Detection; correction b) Correction; detection
c) Creation; correction d) Creation; detection
- 2) In _____ protocols, we use _____
- a) Bit-oriented; character stuffing b) Character-oriented; bit stuffing
c) Character-oriented; byte stuffing d) None of the above
- 3) ARQ stands for _____
- a) Acknowledge repeat request b) Automatic retransmission request
c) Automatic repeat quantization d) Automatic repeat request
- 4) The options field of the TCP header ranges from 0 to _____ bytes.
- a) 10 b) 20
c) 40 d) None of the above

P.T.O.



- 5) TCP uses _____ to check the safe and sound arrival of data.
a) An acknowledgment mechanism b) Out-of-band signaling
c) The services of another protocol d) None of the above
- 6) The value of the window size is determined by _____.
a) The sender b) The receiver
c) Both the sender and receiver d) None of the above
- 7) The technique of _____ refers to a congestion control mechanism in which a congested node stops receiving data from the immediate upstream node or nodes.
a) backpressure b) Choke packet
c) Implicit signaling d) Explicit signaling
- 8) Which protocol works at the Internet layer and provides a connection service between hosts ?
a) IP b) ARP c) TCP d) UDP
- 9) Which of the following standards used for CSMA/CD LAN ?
a) IEEE 802.3 b) IEEE 802.2 c) IEEE 802.5 d) IEEE 802.4
- 10) IPv6 does not use _____ type of address.
a) Broadcast b) Multicast
c) Any cast d) None
- 11) The _____ layer adds a header to the packet coming from the upper layer that includes the logical addresses of the sender and receiver.
a) Data link b) Network
c) Physical d) None of the above
- 12) The _____ layer enables the users to access the network.
a) Application b) Physical
c) Data link d) Transport
- 13) We add r redundant bits to each block to make the length $n = k + r$. The resulting n -bit blocks are called _____.
a) Codewords b) Datawords
c) Blockwords d) None of the above
- 14) The Hamming distance between 100 and 001 is _____.
a) 0 b) 1
c) 2 d) None of the above
-



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B.E. (E&TC) (Part – I) (New) (CGPA) Examination, 2017
COMPUTER COMMUNICATION NETWORK

Day and Date : Tuesday, 28-11-2017

Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :** 1) *Figures to the **right** indicate **full** marks.*
2) **Use of calculator is allowed.**

SECTION – I

2. Attempt **any three** : **(4×3=12)**

- 1) Explain any two network topologies with their advantages and disadvantages.
- 2) If message to be transmitted is 1101011011 and $G(x) = X^3 + X + 1$. What is the transmitted bit pattern according to CRC ?
- 3) Describe TCP connection establishment, using three way handshaking.
- 4) Explain different classes of IP addresses along with their address ranges. Enlist four special IP address.

3. Attempt **any two** : **(8×2=16)**

- 1) Draw TCP header format and explain each field.
- 2) What are different mode transition commands ? Draw and explain mode transition diagram in HDLC.
- 3) Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation and identify its class.



SECTION – II

4. Attempt **any three** : **(4×3=12)**
- 1) Write a short note on Megabit LAN.
 - 2) Explain principle of Optimality with example.
 - 3) Explain the functionality of Switches and Bridges.
 - 4) How ARP resolves IP addresses into MAC addresses ?
5. Attempt **any two** : **(8×2=16)**
- 1) Draw and explain header format of DHCP. Explain various features of DHCP.
 - 2) What is Internet Domain Name System ? Draw and explain Domain Server message format.
 - 3) Explain in detail Link State routing.
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**B.E. (E&TC) (Part – I) (New) (CGPA) Examination, 2017
COMPUTER COMMUNICATION NETWORK**

Day and Date : Tuesday, 28-11-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Figures to the **right** indicate **full** marks.
 - 4) **Use of calculator is allowed.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The value of the window size is determined by _____
 - a) The sender
 - b) The receiver
 - c) Both the sender and receiver
 - d) None of the above
- 2) The technique of _____ refers to a congestion control mechanism in which a congested node stops receiving data from the immediate upstream node or nodes.
 - a) backpressure
 - b) Choke packet
 - c) Implicit signaling
 - d) Explicit signaling
- 3) Which protocol works at the Internet layer and provides a connection service between hosts ?
 - a) IP
 - b) ARP
 - c) TCP
 - d) UDP
- 4) Which of the following standards used for CSMA/CD LAN ?
 - a) IEEE 802.3
 - b) IEEE 802.2
 - c) IEEE 802.5
 - d) IEEE 802.4

P.T.O.



Seat No.	
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B.E. (E&TC) (Part – I) (New) (CGPA) Examination, 2017
COMPUTER COMMUNICATION NETWORK

Day and Date : Tuesday, 28-11-2017

Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

- N. B. :** 1) *Figures to the **right** indicate **full** marks.*
2) **Use of calculator is allowed.**

SECTION – I

2. Attempt **any three** : **(4×3=12)**

- 1) Explain any two network topologies with their advantages and disadvantages.
- 2) If message to be transmitted is 1101011011 and $G(x) = X^3 + X + 1$. What is the transmitted bit pattern according to CRC ?
- 3) Describe TCP connection establishment, using three way handshaking.
- 4) Explain different classes of IP addresses along with their address ranges. Enlist four special IP address.

3. Attempt **any two** : **(8×2=16)**

- 1) Draw TCP header format and explain each field.
- 2) What are different mode transition commands ? Draw and explain mode transition diagram in HDLC.
- 3) Convert the IP address whose hexadecimal representation is C22F1582 to dotted decimal notation and identify its class.



SECTION – II

4. Attempt **any three** : **(4×3=12)**
- 1) Write a short note on Megabit LAN.
 - 2) Explain principle of Optimality with example.
 - 3) Explain the functionality of Switches and Bridges.
 - 4) How ARP resolves IP addresses into MAC addresses ?
5. Attempt **any two** : **(8×2=16)**
- 1) Draw and explain header format of DHCP. Explain various features of DHCP.
 - 2) What is Internet Domain Name System ? Draw and explain Domain Server message format.
 - 3) Explain in detail Link State routing.
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SLR-TJ – 214

Seat No.	
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Set

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**B.E. (Electronics and Telecommunication Engineering) (Part – I) (New)
(CGPA) Examination, 2017
VLSI DESIGN**

Day and Date : Thursday, 30-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Assume suitable data whenever necessary.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

- 1) _____ power dissipation occurs due to charging and discharging of load capacitance.
A) Static B) Dynamic C) Noise D) None of these
- 2) CMOS Circuit Consists of _____
A) Pull up network B) Pull down network
C) Both A) and B) D) None of above
- 3) In Std_logic, Don't care is represented by
A) 'Z' B) 'D' C) 'W' D) ' _ '
- 4) A process cannot have
A) Wait statement
B) Wait statement and sensitivity list together
C) Sensitivity list
D) None of these
- 5) Variables in VHDL can be used in
A) Process B) Procedure C) Function D) All of above
- 6) if A = "101", B = 100 then statement (not A) & B is
A) 101100 B) 000100 C) 111000 D) 010100

P.T.O.



- 7) In BCD adder, _____ is added in case the sum is not valid BCD number.
A) 001 B) 010 C) 110 D) 111
- 8) In Mealy circuit, the outputs depend on
A) Only Present State
B) Only Present Inputs
C) Both Present State and Present Input
D) None of above
- 9) Ring counter is _____ sequential circuit.
A) Synchronous B) Asynchronous
C) Both A) and B) D) None
- 10) Slices are available in
A) CPLD B) FPGA C) ASIC D) All of these
- 11) Logic Block of FPGA contains
A) Look-up-Table B) Macrocell C) Both A) and B) D) None
- 12) The PAL contain _____ array programmable and _____ array fixed.
A) AND, NOR B) OR, AND C) AND, OR D) NAND, OR
- 13) Built in self test contains
A) Shift Register B) Linear Feedback Shift Register
C) Comparator Circuit D) Both B) and C)
- 14) To test AND gate for Stuck-at-1 we apply _____ to the input being tested and _____ to other input.
A) 0 and 1 B) 1 and 0 C) 1 and 1 D) 0 and 0
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Seat No.	
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**B.E. (Electronics and Telecommunication Engineering) (Part – I) (New)
(CGPA) Examination, 2017
VLSI DESIGN**

Day and Date : Thursday, 30-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any four** : **16**
- 1) Implement two input XOR Gate using CMOS Logic.
 - 2) Explain VHDL Entity and Architecture with example.
 - 3) Write VHDL program to realize 4 bit binary Adder.
 - 4) Explain syntax of function and explain operator overloading in VHDL.
 - 5) Write VHDL program to realize 4 bit Up/Down Counter.
3. Attempt **any two** : **12**
- 1) Explain in detail Power Dissipation in CMOS Inverter and Calculate Total Power Dissipation in CMOS Inverter for $V_{DD} = 3.3\text{ V}$, $C = 10\text{ pF}$, frequency = 100 MHz and Static Power Dissipation = $100\ \mu\text{ W}$.
 - 2) Write a VHDL code for common cathode BCD to 7 segment decoder.
 - 3) Explain with syntax and example.
 - a) Generic Statement
 - b) Generate Statement.



SECTION – II

4. Attempt **any four** : **16**
- 1) Design sequence detector to detect 1001 sequence.
 - 2) Explain in detail Macrocell.
 - 3) Write a test bench for 4 bit magnitude comparator.
 - 4) Write a short note on BIST.
 - 5) Compare CPLD and FPGA.
5. Solve **any two** : **12**
- 1) Draw and explain FPGA Architecture in detail.
 - 2) Write VHDL Code to realize Traffic Light Controller.
 - 3) Explain Testing of Combinational Devices.
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SLR-TJ – 214

Seat No.	
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Set

Q

**B.E. (Electronics and Telecommunication Engineering) (Part – I) (New)
(CGPA) Examination, 2017
VLSI DESIGN**

Day and Date : Thursday, 30-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Assume suitable data whenever necessary.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

- 1) In Mealy circuit, the outputs depend on
 - A) Only Present State
 - B) Only Present Inputs
 - C) Both Present State and Present Input
 - D) None of above
- 2) Ring counter is _____ sequential circuit.
 - A) Synchronous
 - B) Asynchronous
 - C) Both A) and B)
 - D) None
- 3) Slices are available in
 - A) CPLD
 - B) FPGA
 - C) ASIC
 - D) All of these
- 4) Logic Block of FPGA contains
 - A) Look-up-Table
 - B) Macrocell
 - C) Both A) and B)
 - D) None
- 5) The PAL contain _____ array programmable and _____ array fixed.
 - A) AND, NOR
 - B) OR, AND
 - C) AND, OR
 - D) NAND, OR
- 6) Built in self test contains
 - A) Shift Register
 - B) Linear Feedback Shift Register
 - C) Comparator Circuit
 - D) Both B) and C)

P.T.O.



- 7) To test AND gate for Stuck-at-1 we apply _____ to the input being tested and _____ to other input.
A) 0 and 1 B) 1 and 0 C) 1 and 1 D) 0 and 0
- 8) _____ power dissipation occurs due to charging and discharging of load capacitance.
A) Static B) Dynamic C) Noise D) None of these
- 9) CMOS Circuit Consists of _____
A) Pull up network B) Pull down network
C) Both A) and B) D) None of above
- 10) In Std_logic, Don't care is represented by
A) 'Z' B) 'D' C) 'W' D) ' _ '
- 11) A process cannot have
A) Wait statement
B) Wait statement and sensitivity list together
C) Sensitivity list
D) None of these
- 12) Variables in VHDL can be used in
A) Process B) Procedure C) Function D) All of above
- 13) if A = "101", B = 100 then statement (not A) & B is
A) 101100 B) 000100 C) 111000 D) 010100
- 14) In BCD adder, _____ is added in case the sum is not valid BCD number.
A) 001 B) 010 C) 110 D) 111
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Seat No.	
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**B.E. (Electronics and Telecommunication Engineering) (Part – I) (New)
(CGPA) Examination, 2017
VLSI DESIGN**

Day and Date : Thursday, 30-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any four** : **16**
- 1) Implement two input XOR Gate using CMOS Logic.
 - 2) Explain VHDL Entity and Architecture with example.
 - 3) Write VHDL program to realize 4 bit binary Adder.
 - 4) Explain syntax of function and explain operator overloading in VHDL.
 - 5) Write VHDL program to realize 4 bit Up/Down Counter.
3. Attempt **any two** : **12**
- 1) Explain in detail Power Dissipation in CMOS Inverter and Calculate Total Power Dissipation in CMOS Inverter for $V_{DD} = 3.3\text{ V}$, $C = 10\text{ pF}$, frequency = 100 MHz and Static Power Dissipation = $100\ \mu\text{ W}$.
 - 2) Write a VHDL code for common cathode BCD to 7 segment decoder.
 - 3) Explain with syntax and example.
 - a) Generic Statement
 - b) Generate Statement.



SECTION – II

4. Attempt **any four** : **16**
- 1) Design sequence detector to detect 1001 sequence.
 - 2) Explain in detail Macrocell.
 - 3) Write a test bench for 4 bit magnitude comparator.
 - 4) Write a short note on BIST.
 - 5) Compare CPLD and FPGA.
5. Solve **any two** : **12**
- 1) Draw and explain FPGA Architecture in detail.
 - 2) Write VHDL Code to realize Traffic Light Controller.
 - 3) Explain Testing of Combinational Devices.
-



SLR-TJ – 214

Seat No.	
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Set

R

**B.E. (Electronics and Telecommunication Engineering) (Part – I) (New)
(CGPA) Examination, 2017
VLSI DESIGN**

Day and Date : Thursday, 30-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to the **right** indicate **full** marks.
 - 3) **Assume** suitable data **whenever** necessary.
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

- 1) Variables in VHDL can be used in
A) Process B) Procedure C) Function D) All of above
- 2) if A = "101", B = 100 then statement (not A) & B is
A) 101100 B) 000100 C) 111000 D) 010100
- 3) In BCD adder, _____ is added in case the sum is not valid BCD number.
A) 001 B) 010 C) 110 D) 111
- 4) In Mealy circuit, the outputs depend on
A) Only Present State
B) Only Present Inputs
C) Both Present State and Present Input
D) None of above
- 5) Ring counter is _____ sequential circuit.
A) Synchronous B) Asynchronous
C) Both A) and B) D) None
- 6) Slices are available in
A) CPLD B) FPGA C) ASIC D) All of these

P.T.O.



- 7) Logic Block of FPGA contains
A) Look-up-Table B) Macrocell C) Both A) and B) D) None
- 8) The PAL contain _____ array programmable and _____ array fixed.
A) AND, NOR B) OR, AND C) AND, OR D) NAND, OR
- 9) Built in self test contains
A) Shift Register B) Linear Feedback Shift Register
C) Comparator Circuit D) Both B) and C)
- 10) To test AND gate for Stuck-at-1 we apply _____ to the input being tested and _____ to other input.
A) 0 and 1 B) 1 and 0 C) 1 and 1 D) 0 and 0
- 11) _____ power dissipation occurs due to charging and discharging of load capacitance.
A) Static B) Dynamic C) Noise D) None of these
- 12) CMOS Circuit Consists of _____
A) Pull up network B) Pull down network
C) Both A) and B) D) None of above
- 13) In Std_logic, Don't care is represented by
A) 'Z' B) 'D' C) 'W' D) ' - '
- 14) A process cannot have
A) Wait statement
B) Wait statement and sensitivity list together
C) Sensitivity list
D) None of these
-



Seat No.	
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**B.E. (Electronics and Telecommunication Engineering) (Part – I) (New)
(CGPA) Examination, 2017
VLSI DESIGN**

Day and Date : Thursday, 30-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any four** : **16**
- 1) Implement two input XOR Gate using CMOS Logic.
 - 2) Explain VHDL Entity and Architecture with example.
 - 3) Write VHDL program to realize 4 bit binary Adder.
 - 4) Explain syntax of function and explain operator overloading in VHDL.
 - 5) Write VHDL program to realize 4 bit Up/Down Counter.
3. Attempt **any two** : **12**
- 1) Explain in detail Power Dissipation in CMOS Inverter and Calculate Total Power Dissipation in CMOS Inverter for $V_{DD} = 3.3\text{ V}$, $C = 10\text{ pF}$, frequency = 100 MHz and Static Power Dissipation = $100\ \mu\text{ W}$.
 - 2) Write a VHDL code for common cathode BCD to 7 segment decoder.
 - 3) Explain with syntax and example.
 - a) Generic Statement
 - b) Generate Statement.



SECTION – II

4. Attempt **any four** : **16**
- 1) Design sequence detector to detect 1001 sequence.
 - 2) Explain in detail Macrocell.
 - 3) Write a test bench for 4 bit magnitude comparator.
 - 4) Write a short note on BIST.
 - 5) Compare CPLD and FPGA.
5. Solve **any two** : **12**
- 1) Draw and explain FPGA Architecture in detail.
 - 2) Write VHDL Code to realize Traffic Light Controller.
 - 3) Explain Testing of Combinational Devices.
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Set

S

**B.E. (Electronics and Telecommunication Engineering) (Part – I) (New)
(CGPA) Examination, 2017
VLSI DESIGN**

Day and Date : Thursday, 30-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Assume suitable data whenever necessary.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

- 1) Slices are available in
A) CPLD B) FPGA C) ASIC D) All of these
- 2) Logic Block of FPGA contains
A) Look-up-Table B) Macrocell C) Both A) and B) D) None
- 3) The PAL contain _____ array programmable and _____ array fixed.
A) AND, NOR B) OR, AND C) AND, OR D) NAND, OR
- 4) Built in self test contains
A) Shift Register B) Linear Feedback Shift Register
C) Comparator Circuit D) Both B) and C)
- 5) To test AND gate for Stuck-at-1 we apply _____ to the input being tested and _____ to other input.
A) 0 and 1 B) 1 and 0 C) 1 and 1 D) 0 and 0
- 6) _____ power dissipation occurs due to charging and discharging of load capacitance.
A) Static B) Dynamic C) Noise D) None of these

P.T.O.



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**B.E. (Electronics and Telecommunication Engineering) (Part – I) (New)
(CGPA) Examination, 2017
VLSI DESIGN**

Day and Date : Thursday, 30-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Attempt **any four** : **16**
- 1) Implement two input XOR Gate using CMOS Logic.
 - 2) Explain VHDL Entity and Architecture with example.
 - 3) Write VHDL program to realize 4 bit binary Adder.
 - 4) Explain syntax of function and explain operator overloading in VHDL.
 - 5) Write VHDL program to realize 4 bit Up/Down Counter.
3. Attempt **any two** : **12**
- 1) Explain in detail Power Dissipation in CMOS Inverter and Calculate Total Power Dissipation in CMOS Inverter for $V_{DD} = 3.3\text{ V}$, $C = 10\text{ pF}$, frequency = 100 MHz and Static Power Dissipation = $100\ \mu\text{ W}$.
 - 2) Write a VHDL code for common cathode BCD to 7 segment decoder.
 - 3) Explain with syntax and example.
 - a) Generic Statement
 - b) Generate Statement.



SECTION – II

4. Attempt **any four** : **16**
- 1) Design sequence detector to detect 1001 sequence.
 - 2) Explain in detail Macrocell.
 - 3) Write a test bench for 4 bit magnitude comparator.
 - 4) Write a short note on BIST.
 - 5) Compare CPLD and FPGA.
5. Solve **any two** : **12**
- 1) Draw and explain FPGA Architecture in detail.
 - 2) Write VHDL Code to realize Traffic Light Controller.
 - 3) Explain Testing of Combinational Devices.
-



SLR-TJ – 215

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Set

P

**B.E. (E&TC) (Part – I) (CGPA) Examination, 2017
SATELLITE COMMUNICATION (New)**

Day and Date : Monday, 4-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(14×1=14)**
- 1) Frequency range of C-band is
a) 16 – 32 GHz b) 8 – 16 GHz c) 4 – 8 GHz d) 1 – 2 GHz
 - 2) Iridium satellites are _____ satellites.
a) GEO b) MEO
c) LEO d) Equatorial orbiting satellites
 - 3) Teledesic constellation consist of _____ number of satellites.
a) 844 b) 288 c) 66 d) 40
 - 4) What is the bandwidth of communication satellite ?
a) 8 – 16 GHz b) 4 – 6 GHz c) 1 – 2 GHz d) 500 MHz
 - 5) The moon circles the earth with an inclination of _____ to the equatorial plane of the earth.
a) 23° b) 5° c) 7.3° d) 0.86°
 - 6) At the Greenwich meridian the line drawn from the
a) East to West b) Equator
c) North to South pole d) None
 - 7) Velocity of the satellite
a) $(\mu/r)^{1/2}$ b) $(\mu/r)^2$ c) $(r/\mu)^{1/2}$ d) $(r/\mu)^2$
 - 8) Apogee of the molniya orbit at an altitude of
a) 39,152 Km b) 35,786 Km c) 10,355 Km d) 500 Km

P.T.O.



- 9) Aperture efficiency of parabolic reflector antenna is
a) 100% b) 55 – 68% c) 65 – 80% d) 50%
- 10) Orbital period of GPS satellite is
a) 23H 56M 4.1S b) 11H 58M c) 24H d) 2H
- 11) If C/N values of uplink and downlink are same i.e. 15 dB then over all C/N value is
a) 18 dB b) 15 dB c) 12 dB d) 12.4 dB
- 12) Bent pipe is a type of
a) Waveguide b) LNB c) Transponder d) Antenna
- 13) Apparent orbital time period is
a) Greater than true orbital time period
b) Less than true orbital time period
c) Equal to true orbital time period
d) Infinite time
- 14) The one way propagation time delay of MEO satellite is
a) 2.7 ms b) 34.5 ms c) 110 ms d) 119.3 ms
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Seat No.	
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**B.E. (E&TC) (Part – I) (CGPA) Examination, 2017
SATELLITE COMMUNICATION (New)**

Day and Date : Monday, 4-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

SECTION – I

2. Answer **any four** of the following : **(4×4=16)**

- 1) A quasi-GEO satellite is in a circular equatorial orbit close to geosynchronous altitude. The quasi GEO satellite does not have a period of one side real day, its orbital period is exactly 24 hour, i.e. one solar day. Calculate
 - i) The radius of the orbit.
 - ii) The rate of drift around the equator of the subsatellite point in degrees per solar day.
 - iii) The satellite is drifting across the sky, is the satellite moving toward the East or toward the West.
- 2) The low earth orbit satellite is in a circular polar orbit with an altitude of 1000 km. A transmitter on the satellite has a frequency of 2.65 GHz, find
 - i) The velocity of the satellite in orbit.
 - ii) The component of velocity toward an observer at an earth station as the satellite appears over the horizon, for an observer who is in the plane of the satellite orbit.
 - iii) Find the Doppler shift of the received signal at the earth station.
 - iv) Find the Doppler shift of the 20 GHz signal when it is receiver by the same observer.
- 3) A satellite is in elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Using a mean radius of earth 6378. 14 km, find the period of the orbit in hours, minutes and seconds, eccentricity of the orbit.
- 4) Develop the equation of orbit.
- 5) Explain orbital perturbations in details.



3. Answer **any two** of the following : **(2×6=12)**
- 1) Explain Telemetry, Tracking, Command and Monitoring (TTC&M) subsystem of satellite.
 - 2) What is equipment reliability and redundancy in satellites ?
 - 3) Explain the procedure of Azimuth angle calculation and what is visibility test.

SECTION – II

4. Answer **any four** of the following : **(4×4=16)**
- 1) Explain elevation angle considerations in Non-Geostationary satellite system.
 - 2) Explain number of beam per coverage provided by Iridium and New ICO Satellite system.
 - 3) Explain earth station testing.
 - 4) Describe the concept of GPS time.
 - 5) Describe network architecture of VSAT system.
5. Answer **any two** of the following : **(2×6=12)**
- 1) Explain the types of earth stations.
 - 2) Write short notes on equatorial orbits, inclined orbits and elliptical orbits.
 - 3) Describe molniya orbit and sun synchronous orbits in details.
-



SLR-TJ – 215

Seat No.	
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Set

Q

**B.E. (E&TC) (Part – I) (CGPA) Examination, 2017
SATELLITE COMMUNICATION (New)**

Day and Date : Monday, 4-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) Apogee of the molniya orbit at an altitude of
a) 39,152 Km b) 35,786 Km c) 10,355 Km d) 500 Km
- 2) Aperture efficiency of parabolic reflector antenna is
a) 100% b) 55 – 68% c) 65 – 80% d) 50%
- 3) Orbital period of GPS satellite is
a) 23H 56M 4.1S b) 11H 58M c) 24H d) 2H
- 4) If C/N values of uplink and downlink are same i.e. 15 dB then over all C/N value is
a) 18 dB b) 15 dB c) 12 dB d) 12.4 dB
- 5) Bent pipe is a type of
a) Waveguide b) LNB c) Transponder d) Antenna
- 6) Apparent orbital time period is
a) Greater than true orbital time period
b) Less than true orbital time period
c) Equal to true orbital time period
d) Infinite time
- 7) The one way propagation time delay of MEO satellite is
a) 2.7 ms b) 34.5 ms c) 110 ms d) 119.3 ms

P.T.O.



- 8) Frequency range of C-band is
a) 16 – 32 GHz b) 8 – 16 GHz c) 4 – 8 GHz d) 1 – 2 GHz
- 9) Iridium satellites are _____ satellites.
a) GEO b) MEO
c) LEO d) Equatorial orbiting satellites
- 10) Teledesic constellation consist of _____ number of satellites.
a) 844 b) 288 c) 66 d) 40
- 11) What is the bandwidth of communication satellite ?
a) 8 – 16 GHz b) 4 – 6 GHz c) 1 – 2 GHz d) 500 MHz
- 12) The moon circles the earth with an inclination of _____ to the equatorial plane of the earth.
a) 23° b) 5° c) 7.3° d) 0.86°
- 13) At the Greenwich meridian the line drawn from the
a) East to West b) Equator
c) North to South pole d) None
- 14) Velocity of the satellite
a) $(\mu/r)^{1/2}$ b) $(\mu/r)^2$ c) $(r/\mu)^{1/2}$ d) $(r/\mu)^2$
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Seat No.	
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**B.E. (E&TC) (Part – I) (CGPA) Examination, 2017
SATELLITE COMMUNICATION (New)**

Day and Date : Monday, 4-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

SECTION – I

2. Answer **any four** of the following : **(4×4=16)**

- 1) A quasi-GEO satellite is in a circular equatorial orbit close to geosynchronous altitude. The quasi GEO satellite does not have a period of one side real day, its orbital period is exactly 24 hour, i.e. one solar day. Calculate
 - i) The radius of the orbit.
 - ii) The rate of drift around the equator of the subsatellite point in degrees per solar day.
 - iii) The satellite is drifting across the sky, is the satellite moving toward the East or toward the West.
- 2) The low earth orbit satellite is in a circular polar orbit with an altitude of 1000 km. A transmitter on the satellite has a frequency of 2.65 GHz, find
 - i) The velocity of the satellite in orbit.
 - ii) The component of velocity toward an observer at an earth station as the satellite appears over the horizon, for an observer who is in the plane of the satellite orbit.
 - iii) Find the Doppler shift of the received signal at the earth station.
 - iv) Find the Doppler shift of the 20 GHz signal when it is receiver by the same observer.
- 3) A satellite is in elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Using a mean radius of earth 6378. 14 km, find the period of the orbit in hours, minutes and seconds, eccentricity of the orbit.
- 4) Develop the equation of orbit.
- 5) Explain orbital perturbations in details.



3. Answer **any two** of the following : **(2×6=12)**
- 1) Explain Telemetry, Tracking, Command and Monitoring (TTC&M) subsystem of satellite.
 - 2) What is equipment reliability and redundancy in satellites ?
 - 3) Explain the procedure of Azimuth angle calculation and what is visibility test.

SECTION – II

4. Answer **any four** of the following : **(4×4=16)**
- 1) Explain elevation angle considerations in Non-Geostationary satellite system.
 - 2) Explain number of beam per coverage provided by Iridium and New ICO Satellite system.
 - 3) Explain earth station testing.
 - 4) Describe the concept of GPS time.
 - 5) Describe network architecture of VSAT system.
5. Answer **any two** of the following : **(2×6=12)**
- 1) Explain the types of earth stations.
 - 2) Write short notes on equatorial orbits, inclined orbits and elliptical orbits.
 - 3) Describe molniya orbit and sun synchronous orbits in details.
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SLR-TJ – 215

Seat No.	
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Set **R**

**B.E. (E&TC) (Part – I) (CGPA) Examination, 2017
SATELLITE COMMUNICATION (New)**

Day and Date : Monday, 4-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) The moon circles the earth with an inclination of _____ to the equatorial plane of the earth.
a) 23° b) 5° c) 7.3° d) 0.86°
- 2) At the Greenwich meridian the line drawn from the
a) East to West b) Equator
c) North to South pole d) None
- 3) Velocity of the satellite
a) $(\mu/r)^{1/2}$ b) $(\mu/r)^2$ c) $(r/\mu)^{1/2}$ d) $(r/\mu)^2$
- 4) Apogee of the molniya orbit at an altitude of
a) 39,152 Km b) 35,786 Km c) 10,355 Km d) 500 Km
- 5) Aperture efficiency of parabolic reflector antenna is
a) 100% b) 55 – 68% c) 65 – 80% d) 50%
- 6) Orbital period of GPS satellite is
a) 23H 56M 4.1S b) 11H 58M c) 24H d) 2H
- 7) If C/N values of uplink and downlink are same i.e. 15 dB then over all C/N value is
a) 18 dB b) 15 dB c) 12 dB d) 12.4 dB
- 8) Bent pipe is a type of
a) Waveguide b) LNB c) Transponder d) Antenna

P.T.O.



Seat No.	
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**B.E. (E&TC) (Part – I) (CGPA) Examination, 2017
SATELLITE COMMUNICATION (New)**

Day and Date : Monday, 4-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

SECTION – I

2. Answer **any four** of the following : **(4×4=16)**

- 1) A quasi-GEO satellite is in a circular equatorial orbit close to geosynchronous altitude. The quasi GEO satellite does not have a period of one side real day, its orbital period is exactly 24 hour, i.e. one solar day. Calculate
 - i) The radius of the orbit.
 - ii) The rate of drift around the equator of the subsatellite point in degrees per solar day.
 - iii) The satellite is drifting across the sky, is the satellite moving toward the East or toward the West.
- 2) The low earth orbit satellite is in a circular polar orbit with an altitude of 1000 km. A transmitter on the satellite has a frequency of 2.65 GHz, find
 - i) The velocity of the satellite in orbit.
 - ii) The component of velocity toward an observer at an earth station as the satellite appears over the horizon, for an observer who is in the plane of the satellite orbit.
 - iii) Find the Doppler shift of the received signal at the earth station.
 - iv) Find the Doppler shift of the 20 GHz signal when it is receiver by the same observer.
- 3) A satellite is in elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Using a mean radius of earth 6378. 14 km, find the period of the orbit in hours, minutes and seconds, eccentricity of the orbit.
- 4) Develop the equation of orbit.
- 5) Explain orbital perturbations in details.



3. Answer **any two** of the following : **(2×6=12)**
- 1) Explain Telemetry, Tracking, Command and Monitoring (TTC&M) subsystem of satellite.
 - 2) What is equipment reliability and redundancy in satellites ?
 - 3) Explain the procedure of Azimuth angle calculation and what is visibility test.

SECTION – II

4. Answer **any four** of the following : **(4×4=16)**
- 1) Explain elevation angle considerations in Non-Geostationary satellite system.
 - 2) Explain number of beam per coverage provided by Iridium and New ICO Satellite system.
 - 3) Explain earth station testing.
 - 4) Describe the concept of GPS time.
 - 5) Describe network architecture of VSAT system.
5. Answer **any two** of the following : **(2×6=12)**
- 1) Explain the types of earth stations.
 - 2) Write short notes on equatorial orbits, inclined orbits and elliptical orbits.
 - 3) Describe molniya orbit and sun synchronous orbits in details.
-



SLR-TJ – 215

Seat No.	
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Set

S

**B.E. (E&TC) (Part – I) (CGPA) Examination, 2017
SATELLITE COMMUNICATION (New)**

Day and Date : Monday, 4-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.**
4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(14×1=14)

- 1) Orbital period of GPS satellite is
a) 23H 56M 4.1S b) 11H 58M c) 24H d) 2H
- 2) If C/N values of uplink and downlink are same i.e. 15 dB then over all C/N value is
a) 18 dB b) 15 dB c) 12 dB d) 12.4 dB
- 3) Bent pipe is a type of
a) Waveguide b) LNB c) Transponder d) Antenna
- 4) Apparent orbital time period is
a) Greater than true orbital time period
b) Less than true orbital time period
c) Equal to true orbital time period
d) Infinite time
- 5) The one way propagation time delay of MEO satellite is
a) 2.7 ms b) 34.5 ms c) 110 ms d) 119.3 ms
- 6) Frequency range of C-band is
a) 16 – 32 GHz b) 8 – 16 GHz c) 4 – 8 GHz d) 1 – 2 GHz
- 7) Iridium satellites are _____ satellites.
a) GEO b) MEO
c) LEO d) Equatorial orbiting satellites

P.T.O.



- 8) Teledesic constellation consist of _____ number of satellites.
a) 844 b) 288 c) 66 d) 40
- 9) What is the bandwidth of communication satellite ?
a) 8 – 16 GHz b) 4 – 6 GHz c) 1 – 2 GHz d) 500 MHz
- 10) The moon circles the earth with an inclination of _____ to the equatorial plane of the earth.
a) 23° b) 5° c) 7.3° d) 0.86°
- 11) At the Greenwich meridian the line drawn from the
a) East to West b) Equator
c) North to South pole d) None
- 12) Velocity of the satellite
a) $(\mu/r)^{1/2}$ b) $(\mu/r)^2$ c) $(r/\mu)^{1/2}$ d) $(r/\mu)^2$
- 13) Apogee of the molniya orbit at an altitude of
a) 39,152 Km b) 35,786 Km c) 10,355 Km d) 500 Km
- 14) Aperture efficiency of parabolic reflector antenna is
a) 100% b) 55 – 68% c) 65 – 80% d) 50%
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Seat No.	
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**B.E. (E&TC) (Part – I) (CGPA) Examination, 2017
SATELLITE COMMUNICATION (New)**

Day and Date : Monday, 4-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

Instructions : 1) *All questions are compulsory.*
2) *Figures to the right indicate full marks.*

SECTION – I

2. Answer **any four** of the following : **(4×4=16)**

- 1) A quasi-GEO satellite is in a circular equatorial orbit close to geosynchronous altitude. The quasi GEO satellite does not have a period of one side real day, its orbital period is exactly 24 hour, i.e. one solar day. Calculate
 - i) The radius of the orbit.
 - ii) The rate of drift around the equator of the subsatellite point in degrees per solar day.
 - iii) The satellite is drifting across the sky, is the satellite moving toward the East or toward the West.
- 2) The low earth orbit satellite is in a circular polar orbit with an altitude of 1000 km. A transmitter on the satellite has a frequency of 2.65 GHz, find
 - i) The velocity of the satellite in orbit.
 - ii) The component of velocity toward an observer at an earth station as the satellite appears over the horizon, for an observer who is in the plane of the satellite orbit.
 - iii) Find the Doppler shift of the received signal at the earth station.
 - iv) Find the Doppler shift of the 20 GHz signal when it is receiver by the same observer.
- 3) A satellite is in elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Using a mean radius of earth 6378. 14 km, find the period of the orbit in hours, minutes and seconds, eccentricity of the orbit.
- 4) Develop the equation of orbit.
- 5) Explain orbital perturbations in details.



3. Answer **any two** of the following : **(2×6=12)**
- 1) Explain Telemetry, Tracking, Command and Monitoring (TTC&M) subsystem of satellite.
 - 2) What is equipment reliability and redundancy in satellites ?
 - 3) Explain the procedure of Azimuth angle calculation and what is visibility test.

SECTION – II

4. Answer **any four** of the following : **(4×4=16)**
- 1) Explain elevation angle considerations in Non-Geostationary satellite system.
 - 2) Explain number of beam per coverage provided by Iridium and New ICO Satellite system.
 - 3) Explain earth station testing.
 - 4) Describe the concept of GPS time.
 - 5) Describe network architecture of VSAT system.
5. Answer **any two** of the following : **(2×6=12)**
- 1) Explain the types of earth stations.
 - 2) Write short notes on equatorial orbits, inclined orbits and elliptical orbits.
 - 3) Describe molniya orbit and sun synchronous orbits in details.
-



SLR-TJ – 216

Seat No.	
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Set	P
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**B.E. (E & TC) (Part – I) (CGPA) Examination, 2017
CODING THEORY (New)**

Day and Date : Wednesday, 6-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) Figures to the **right** indicate **full** marks.
4) **Assume** suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) The stationary process has
 - A) Ensemble average equal to time average
 - B) All the statistical properties dependent on time
 - C) All the statistical properties independent on time
 - D) Zero variance
 - 2) Which of the following cannot be a member of the matrix P ?
 - A) 011
 - B) 101
 - C) 000
 - D) 111
 - 3) It is sometimes convenient to represent a universal set, sets and subsets with the help of geometric diagrams known as
 - A) State diagram
 - B) Tree diagram
 - C) Venn diagram
 - D) Trellis diagram
 - 4) A random variable that takes on a finite number of values is known as a
 - A) Continuous random variable
 - B) Discrete random variable
 - C) Can be A) or B)
 - D) None of these
 - 5) Cyclic code is a subclass of
 - A) Convolution code
 - B) Turbo code
 - C) Block code
 - D) None of these

P.T.O.



Seat No.	
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**B.E. (E & TC) (Part – I) (CGPA) Examination, 2017
CODING THEORY (New)**

Day and Date : Wednesday, 6-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. A) Attempt **any three** : 12

- a) What are the properties of Poisson probability distribution function ?
- b) The generator matrix of (6, 3) block code is given by

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

Find all possible code words for this code.

- c) Explain briefly time average and ergodicity of random process.
- d) Explain decoder for cyclic codes ?

B) The generator polynomial for a (15, 7) cyclic code is $g(x) = 1 + x^4 + x^6 + x^7 + x^8$. 8

- i) Find the code vector in systematic form for the message polynomial $D(x) = x + x^3 + x^4$
- ii) Find the code vector in non systematic form for the message polynomial $D(x) = x + x^2 + x^4$.

3. Attempt **any two** : 8

- a) With suitable example explain the significance of Syndrome in linear block code.
- b) What are different types of random variables ?
- c) Design a block code with minimum distance of 3 and block size of 8 bits. Hence find generator matrix.



SECTION – II

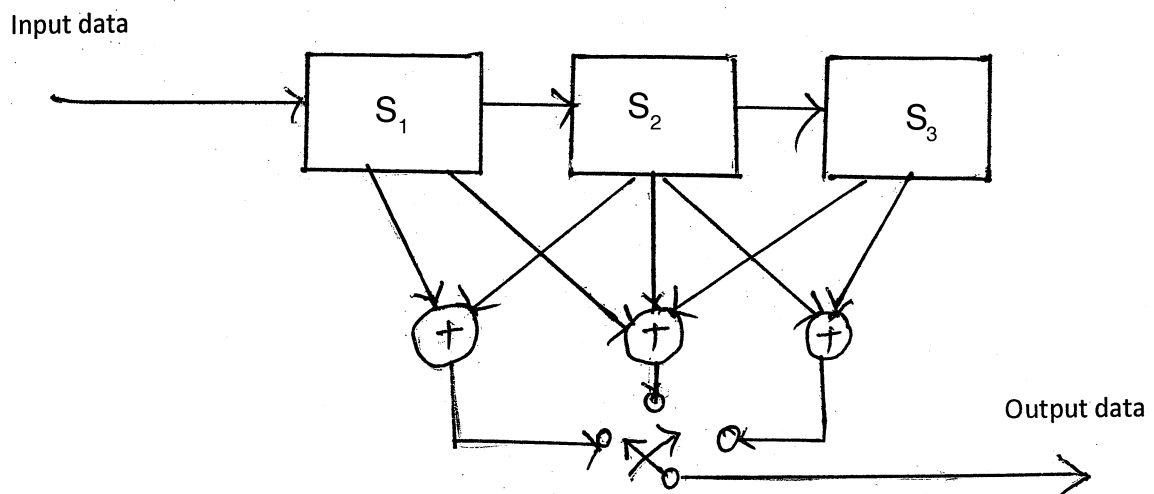
4. A) Attempt **any three** :

12

- Explain likelihood function used in turbo code concepts.
- Briefly explain state diagram and its representation of convolution code.
- What is impulse response of convolution code ? Explain with suitable example.
- Explain basic block diagram of turbo encoder.

B) For given encoder construct code tree and find the output sequence for message 11010.

8



5. Attempt **any two** :

8

- Draw convolutional coder for $k = 3$, rate = $1/2$, with connection $g_1 = 101$ and $g_2 = 111$. Find output for the data input 101.
- What is interleaver ? Explain types of interleaver.
- List out the properties of convolution codes.



SLR-TJ – 216

Seat No.	
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Set	Q
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**B.E. (E & TC) (Part – I) (CGPA) Examination, 2017
CODING THEORY (New)**

Day and Date : Wednesday, 6-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Figures to the **right** indicate **full** marks.
 - 4) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

14

- 1) The probability of the decoder in cyclic code depends on the complexity of the combinational logic circuit in the
A) Memory
B) Syndrome register
C) Buffer register
D) Error detector
- 2) The starting point on the code tree is at the _____ and corresponding to the situation before the arrival of the first message bit.
A) Extreme left
B) Extreme right
C) At Middle
D) None of these
- 3) The sequential decoding method is _____ times faster than the exhaustive method for $k = 4$.
A) 128
B) 25
C) 21
D) 12
- 4) The total area under the probability distribution curve is
A) 1
B) 0
C) Depends on the nature of distribution
D) None of the above
- 5) A box contains 4 white and 3 black balls. Three balls are drawn from the box successively. What is the probability that the first two balls are white and third is black ?
A) $5/35$
B) $3/35$
C) $2/25$
D) $6/35$

P.T.O.



- 6) The tree diagram adds the dimensions of _____ to the state diagram.
A) Time B) Branches C) Direction D) Weight
- 7) The _____ algorithm is used to estimate the most likely message bit to have been transmitted in the coded sequence.
A) Viterbi B) Map
C) Trellis D) Maximum likely hood
- 8) The stationary process has
A) Ensemble average equal to time average
B) All the statistical properties dependent on time
C) All the statistical properties independent on time
D) Zero variance
- 9) Which of the following cannot be a member of the matrix P ?
A) 011 B) 101 C) 000 D) 111
- 10) It is sometimes convenient to represent a universal set, sets and subsets with the help of geometric diagrams known as
A) State diagram B) Tree diagram
C) Venn diagram D) Trellis diagram
- 11) A random variable that takes on a finite number of values is known as a
A) Continuous random variable B) Discrete random variable
C) Can be A) or B) D) None of these
- 12) Cyclic code is a subclass of
A) Convolution code B) Turbo code
C) Block code D) None of these
- 13) It is more practical to consider maximum likelihood decoding with _____
A) Tree structure B) State representation
C) Polynomial representation D) Trellis structure
- 14) Exhaustive search method of decoding for a Convolution Code is preferred over sequential decoding method. This statement is
A) Always true B) Always false
C) May be true or false D) None of these
-



Seat No.	
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**B.E. (E & TC) (Part – I) (CGPA) Examination, 2017
CODING THEORY (New)**

Day and Date : Wednesday, 6-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. A) Attempt **any three** : 12

- a) What are the properties of Poisson probability distribution function ?
- b) The generator matrix of (6, 3) block code is given by

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

Find all possible code words for this code.

- c) Explain briefly time average and ergodicity of random process.
- d) Explain decoder for cyclic codes ?

B) The generator polynomial for a (15, 7) cyclic code is $g(x) = 1 + x^4 + x^6 + x^7 + x^8$. 8

- i) Find the code vector in systematic form for the message polynomial $D(x) = x + x^3 + x^4$
- ii) Find the code vector in non systematic form for the message polynomial $D(x) = x + x^2 + x^4$.

3. Attempt **any two** : 8

- a) With suitable example explain the significance of Syndrome in linear block code.
- b) What are different types of random variables ?
- c) Design a block code with minimum distance of 3 and block size of 8 bits. Hence find generator matrix.



SECTION – II

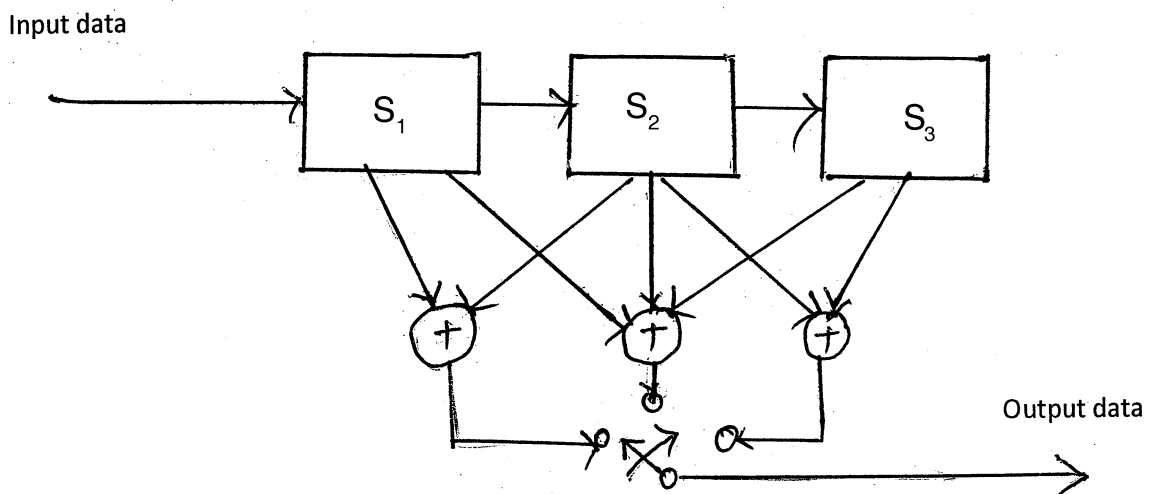
4. A) Attempt **any three** :

12

- Explain likelihood function used in turbo code concepts.
- Briefly explain state diagram and its representation of convolution code.
- What is impulse response of convolution code ? Explain with suitable example.
- Explain basic block diagram of turbo encoder.

B) For given encoder construct code tree and find the output sequence for message 11010.

8



5. Attempt **any two** :

8

- Draw convolutional coder for $k = 3$, rate = $1/2$, with connection $g_1 = 101$ and $g_2 = 111$. Find output for the data input 101.
- What is interleaver ? Explain types of interleaver.
- List out the properties of convolution codes.



SLR-TJ – 216

Seat No.	
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Set	R
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**B.E. (E & TC) (Part – I) (CGPA) Examination, 2017
CODING THEORY (New)**

Day and Date : Wednesday, 6-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Figures to the **right** indicate **full** marks.
 - 4) **Assume** suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) Cyclic code is a subclass of
 - A) Convolution code
 - B) Turbo code
 - C) Block code
 - D) None of these
 - 2) It is more practical to consider maximum likelihood decoding with _____
 - A) Tree structure
 - B) State representation
 - C) Polynomial representation
 - D) Trellis structure
 - 3) Exhaustive search method of decoding for a Convolution Code is preferred over sequential decoding method. This statement is
 - A) Always true
 - B) Always false
 - C) May be true or false
 - D) None of these
 - 4) The probability of the decoder in cyclic code depends on the complexity of the combinational logic circuit in the
 - A) Memory
 - B) Syndrome register
 - C) Buffer register
 - D) Error detector
 - 5) The starting point on the code tree is at the _____ and corresponding to the situation before the arrival of the first message bit.
 - A) Extreme left
 - B) Extreme right
 - C) At Middle
 - D) None of these

P.T.O.



- 6) The sequential decoding method is _____ times faster than the exhaustive method for $k = 4$.
A) 128 B) 25 C) 21 D) 12
- 7) The total area under the probability distribution curve is
A) 1
B) 0
C) Depends on the nature of distribution
D) None of the above
- 8) A box contains 4 white and 3 black balls. Three balls are drawn from the box successively. What is the probability that the first two balls are white and third is black ?
A) $5/35$ B) $3/35$ C) $2/25$ D) $6/35$
- 9) The tree diagram adds the dimensions of _____ to the state diagram.
A) Time B) Branches C) Direction D) Weight
- 10) The _____ algorithm is used to estimate the most likely message bit to have been transmitted in the coded sequence.
A) Viterbi B) Map
C) Trellis D) Maximum likely hood
- 11) The stationary process has
A) Ensemble average equal to time average
B) All the statistical properties dependent on time
C) All the statistical properties independent on time
D) Zero variance
- 12) Which of the following cannot be a member of the matrix P ?
A) 011 B) 101 C) 000 D) 111
- 13) It is sometimes convenient to represent a universal set, sets and subsets with the help of geometric diagrams known as
A) State diagram B) Tree diagram
C) Venn diagram D) Trellis diagram
- 14) A random variable that takes on a finite number of values is known as a
A) Continuous random variable B) Discrete random variable
C) Can be A) or B) D) None of these
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Seat No.	
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**B.E. (E & TC) (Part – I) (CGPA) Examination, 2017
CODING THEORY (New)**

Day and Date : Wednesday, 6-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. A) Attempt **any three** : 12

- a) What are the properties of Poisson probability distribution function ?
- b) The generator matrix of (6, 3) block code is given by

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

Find all possible code words for this code.

- c) Explain briefly time average and ergodicity of random process.
- d) Explain decoder for cyclic codes ?

B) The generator polynomial for a (15, 7) cyclic code is $g(x) = 1 + x^4 + x^6 + x^7 + x^8$. 8

- i) Find the code vector in systematic form for the message polynomial $D(x) = x + x^3 + x^4$
- ii) Find the code vector in non systematic form for the message polynomial $D(x) = x + x^2 + x^4$.

3. Attempt **any two** : 8

- a) With suitable example explain the significance of Syndrome in linear block code.
- b) What are different types of random variables ?
- c) Design a block code with minimum distance of 3 and block size of 8 bits. Hence find generator matrix.



SECTION – II

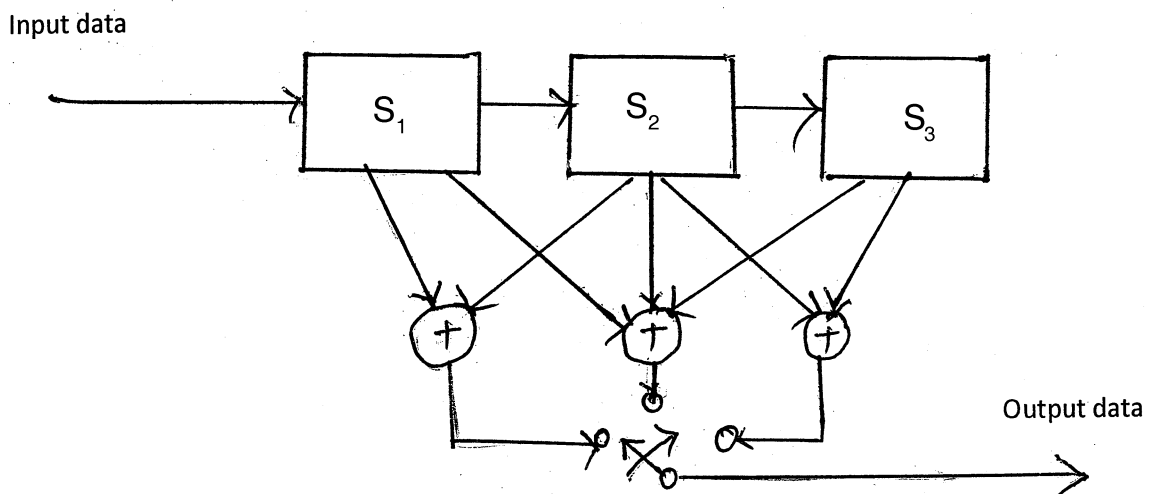
4. A) Attempt **any three** :

12

- Explain likelihood function used in turbo code concepts.
- Briefly explain state diagram and its representation of convolution code.
- What is impulse response of convolution code ? Explain with suitable example.
- Explain basic block diagram of turbo encoder.

B) For given encoder construct code tree and find the output sequence for message 11010.

8



5. Attempt **any two** :

8

- Draw convolutional coder for $k = 3$, rate = $1/2$, with connection $g_1 = 101$ and $g_2 = 111$. Find output for the data input 101.
- What is interleaver ? Explain types of interleaver.
- List out the properties of convolution codes.



SLR-TJ – 216

Seat No.	
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Set	S
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**B.E. (E & TC) (Part – I) (CGPA) Examination, 2017
CODING THEORY (New)**

Day and Date : Wednesday, 6-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) Figures to the **right** indicate **full** marks.
4) **Assume** suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**

- 1) The sequential decoding method is _____ times faster than the exhaustive method for $k = 4$.
A) 128 B) 25 C) 21 D) 12
- 2) The total area under the probability distribution curve is
A) 1
B) 0
C) Depends on the nature of distribution
D) None of the above
- 3) A box contains 4 white and 3 black balls. Three balls are drawn from the box successively. What is the probability that the first two balls are white and third is black ?
A) $5/35$ B) $3/35$ C) $2/25$ D) $6/35$
- 4) The tree diagram adds the dimensions of _____ to the state diagram.
A) Time B) Branches C) Direction D) Weight
- 5) The _____ algorithm is used to estimate the most likely message bit to have been transmitted in the coded sequence.
A) Viterbi B) Map
C) Trellis D) Maximum likely hood

P.T.O.



- 6) The stationary process has
- A) Ensemble average equal to time average
 - B) All the statistical properties dependent on time
 - C) All the statistical properties independent on time
 - D) Zero variance
- 7) Which of the following cannot be a member of the matrix P ?
- A) 011
 - B) 101
 - C) 000
 - D) 111
- 8) It is sometimes convenient to represent a universal set, sets and subsets with the help of geometric diagrams known as
- A) State diagram
 - B) Tree diagram
 - C) Venn diagram
 - D) Trellis diagram
- 9) A random variable that takes on a finite number of values is known as a
- A) Continuous random variable
 - B) Discrete random variable
 - C) Can be A) or B)
 - D) None of these
- 10) Cyclic code is a subclass of
- A) Convolution code
 - B) Turbo code
 - C) Block code
 - D) None of these
- 11) It is more practical to consider maximum likelihood decoding with _____
- A) Tree structure
 - B) State representation
 - C) Polynomial representation
 - D) Trellis structure
- 12) Exhaustive search method of decoding for a Convolution Code is preferred over sequential decoding method. This statement is
- A) Always true
 - B) Always false
 - C) May be true or false
 - D) None of these
- 13) The probability of the decoder in cyclic code depends on the complexity of the combinational logic circuit in the
- A) Memory
 - B) Syndrome register
 - C) Buffer register
 - D) Error detector
- 14) The starting point on the code tree is at the _____ and corresponding to the situation before the arrival of the first message bit.
- A) Extreme left
 - B) Extreme right
 - C) At Middle
 - D) None of these
-



Seat No.	
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**B.E. (E & TC) (Part – I) (CGPA) Examination, 2017
CODING THEORY (New)**

Day and Date : Wednesday, 6-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. A) Attempt **any three** : 12

- a) What are the properties of Poisson probability distribution function ?
- b) The generator matrix of (6, 3) block code is given by

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

Find all possible code words for this code.

- c) Explain briefly time average and ergodicity of random process.
- d) Explain decoder for cyclic codes ?

B) The generator polynomial for a (15, 7) cyclic code is $g(x) = 1 + x^4 + x^6 + x^7 + x^8$. 8

- i) Find the code vector in systematic form for the message polynomial $D(x) = x + x^3 + x^4$
- ii) Find the code vector in non systematic form for the message polynomial $D(x) = x + x^2 + x^4$.

3. Attempt **any two** : 8

- a) With suitable example explain the significance of Syndrome in linear block code.
- b) What are different types of random variables ?
- c) Design a block code with minimum distance of 3 and block size of 8 bits. Hence find generator matrix.



SECTION – II

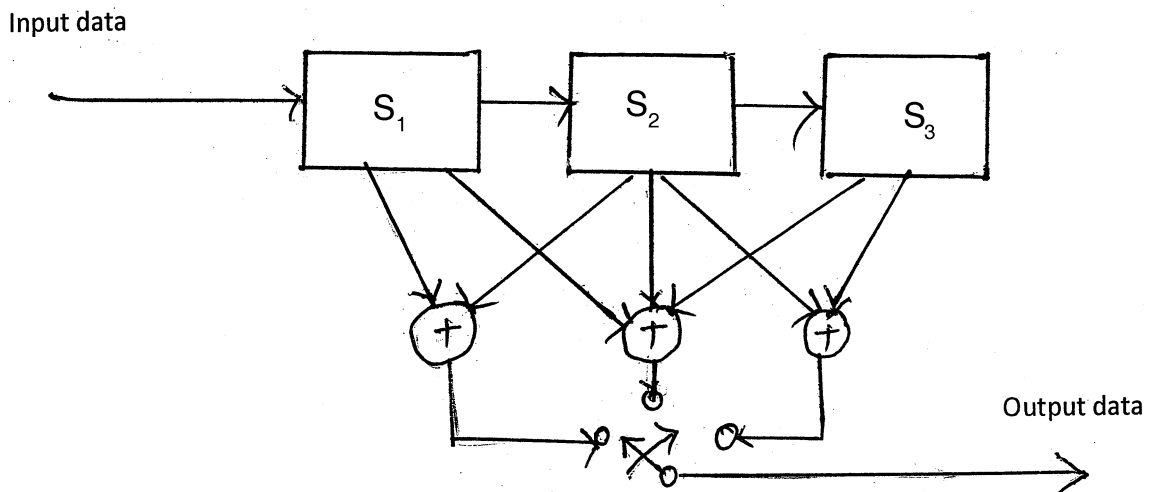
4. A) Attempt **any three** :

12

- Explain likelihood function used in turbo code concepts.
- Briefly explain state diagram and its representation of convolution code.
- What is impulse response of convolution code ? Explain with suitable example.
- Explain basic block diagram of turbo encoder.

B) For given encoder construct code tree and find the output sequence for message 11010.

8



5. Attempt **any two** :

8

- Draw convolutional coder for $k = 3$, rate = $1/2$, with connection $g_1 = 101$ and $g_2 = 111$. Find output for the data input 101.
- What is interleaver ? Explain types of interleaver.
- List out the properties of convolution codes.



SLR-TJ – 218

Seat
No.

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Set

P

**B.E. (Electronics and Telecommunication) (Part – I) (New CGPA)
Examination, 2017
IMAGE PROCESSING (Elective – I)**

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **All questions are compulsory.**
4) **Figures to the right indicate full marks.**
5) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer.

- 1) The smallest discernible detail in an image is called
 - a) Spatial resolution
 - b) Gray level resolution
 - c) Multi resolution
 - d) None
- 2) In distance measurement, connectivity does not matter
 - a) True
 - b) False
- 3) D_4 distance is also called as
 - a) Euclidean distance
 - b) City-block distance
 - c) Chess-board distance
 - d) None
- 4) $s = L - |r|$; where $s = o/p$ gray level and $r = i/p$ gray level; means
 - a) image negative
 - b) image positive
 - c) power law
 - d) log
- 5) In case of alpha-trimmed mean filter, if $d = (mn - 1)$ then filter reduces to
 - a) min filter
 - b) median filter
 - c) arithmetic mean filter
 - d) max filter
- 6) Contrast stretching, gray level slicing and bit plane slicing are the example of
 - a) piecewise linear transformation function
 - b) point processing
 - c) mask processing
 - d) none

P.T.O.



- 7) In morphology the thinning is denoted as
 a) $A \oplus B$ b) $A \ominus B$ c) $A \otimes B$ d) $A \circ B$
- 8) If only LL sub-band is decomposed in every level then it is called as
 a) Pyramidal DWT b) Tree structured DWT
 c) Wavelet packet decomposition d) None
- 9) Entropy is measured in terms of
 a) bytes/pixel b) bits/pixel
 c) both a and b d) none
- 10) $G_x = (z_7 + 2z_8 + z_9) - (z_1 + 2z_2 + z_3)$ and $G_y = (z_3 + 2z_6 + z_9) - (z_1 + 2z_4 + z_7)$ are
 a) Sobel operator b) Prewitt operator
 c) Robert-cross Gradient operator d) None
- 11) Fixed Window size is drawback of
 a) DWT b) DFT c) PS-DWT d) None
- 12) _____ measure gradients in a selected no. of directions.
 a) Gradient operators b) Laplace operators
 c) Compass operators d) None
- 13) Minutia based features are used in
 a) tumour detection b) remote sensing
 c) face detection d) finger printing
- 14) Response of mask is given by
 a) $\sum_{i=1}^n w_i z_i$ b) $\prod_{i=1}^n w_i z_i$ c) $\sum_{i=0}^n w_i z_i$ d) $\prod_{i=0}^n w_i z_i$
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Seat No.	
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**B.E. (Electronics and Telecommunication) (Part – I) (New CGPA)
Examination, 2017
IMAGE PROCESSING (Elective – I)**

Day and Date : Friday, 8-12-2017

Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Answer **any four** : **(4×4=16)**

- a) Write a short note on CMY color model.
- b) State algorithm to find the skeleton of a binary object.
- c) Explain contrast stretching and intensity level slicing piece wise linear transformation.
- d) Find the Euclidean distance between the two pixel p and q in the image represented below.

	c = 0	1	2	3
r = 0	10	10	35q	25
1	35	25	40	35
2	40p	35	10	10
3	35	10	25	10

- e) What is Laplace operator for image enhancement ?

3. Answer **any two** : **(2×6=12)**

- a) Apply Erosion on any one binary object and derive the output.
- b) Explain adaptive median filtering.
- c) State applications of digital image processing.

Set P



SECTION – II

4. Answer **any four** : **(4×4=16)**
- a) Compare coding redundancy with inter-pixel redundancy.
 - b) Explain region growing with reference to region based segmentation.
 - c) Calculate memory required to represent a 1 hour full color HD movie with 30 frames per second.
 - d) What is Wavelet transform ? Explain pyramid structured wavelet transform.
 - e) Explain image processing application in tumour detection.
5. Answer the following : **(2×6=12)**
- a) Explain Boundary extraction using graph heuristic searching.
 - b) Derive 4×4 Haar matrix.
 - c) What is image compression model ? Explain Block transform coding.
-



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**B.E. (Electronics and Telecommunication) (Part – I) (New CGPA)
Examination, 2017
IMAGE PROCESSING (Elective – I)**

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **All questions are compulsory.**
4) **Figures to the right indicate full marks.**
5) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer.

- 1) If only LL sub-band is decomposed in every level then it is called as
 - a) Pyramidal DWT
 - b) Tree structured DWT
 - c) Wavelet packet decomposition
 - d) None
- 2) Entropy is measured in terms of
 - a) bytes/pixel
 - b) bits/pixel
 - c) both a and b
 - d) none
- 3) $G_x = (z_7 + 2z_8 + z_9) - (z_1 + 2z_2 + z_3)$ and $G_y = (z_3 + 2z_6 + z_9) - (z_1 + 2z_4 + z_7)$ are
 - a) Sobel operator
 - b) Prewitt operator
 - c) Robert-cross Gradient operator
 - d) None
- 4) Fixed Window size is drawback of
 - a) DWT
 - b) DFT
 - c) PS-DWT
 - d) None
- 5) _____ measure gradients in a selected no. of directions.
 - a) Gradient operators
 - b) Laplace operators
 - c) Compass operators
 - d) None
- 6) Minutia based features are used in
 - a) tumour detection
 - b) remote sensing
 - c) face detection
 - d) finger printing

P.T.O.



- 7) Response of mask is given by
- a) $\sum_{i=1}^n w_i z_i$ b) $\prod_{i=1}^n w_i z_i$ c) $\sum_{i=0}^n w_i z_i$ d) $\prod_{i=0}^n w_i z_i$
- 8) The smallest discernible detail in an image is called
- a) Spatial resolution b) Gray level resolution
c) Multi resolution d) None
- 9) In distance measurement, connectivity does not matter
- a) True b) False
- 10) D_4 distance is also called as
- a) Euclidean distance b) City-block distance
c) Chess-board distance d) None
- 11) $s = L - l - r$; where $s = o/p$ gray level and $r = i/p$ gray level; means
- a) image negative b) image positive
c) power law d) log
- 12) In case of alpha-trimmed mean filter, if $d = (mn - 1)$ then filter reduces to
- a) min filter b) median filter
c) arithmetic mean filter d) max filter
- 13) Contrast stretching, gray level slicing and bit plane slicing are the example of
- a) piecewise linear transformation function
b) point processing
c) mask processing
d) none
- 14) In morphology the thinning is denoted as
- a) $A \oplus B$ b) $A \ominus B$ c) $A \otimes B$ d) $A \circ B$
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**B.E. (Electronics and Telecommunication) (Part – I) (New CGPA)
Examination, 2017
IMAGE PROCESSING (Elective – I)**

Day and Date : Friday, 8-12-2017

Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Answer **any four** : **(4×4=16)**

- a) Write a short note on CMY color model.
- b) State algorithm to find the skeleton of a binary object.
- c) Explain contrast stretching and intensity level slicing piece wise linear transformation.
- d) Find the Euclidean distance between the two pixel p and q in the image represented below.

	c = 0	1	2	3
r = 0	10	10	35q	25
1	35	25	40	35
2	40p	35	10	10
3	35	10	25	10

- e) What is Laplace operator for image enhancement ?

3. Answer **any two** : **(2×6=12)**

- a) Apply Erosion on any one binary object and derive the output.
- b) Explain adaptive median filtering.
- c) State applications of digital image processing.

Set Q



SECTION – II

4. Answer **any four** : **(4×4=16)**
- a) Compare coding redundancy with inter-pixel redundancy.
 - b) Explain region growing with reference to region based segmentation.
 - c) Calculate memory required to represent a 1 hour full color HD movie with 30 frames per second.
 - d) What is Wavelet transform ? Explain pyramid structured wavelet transform.
 - e) Explain image processing application in tumour detection.
5. Answer the following : **(2×6=12)**
- a) Explain Boundary extraction using graph heuristic searching.
 - b) Derive 4×4 Haar matrix.
 - c) What is image compression model ? Explain Block transform coding.
-



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R

**B.E. (Electronics and Telecommunication) (Part – I) (New CGPA)
Examination, 2017
IMAGE PROCESSING (Elective – I)**

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **All questions are compulsory.**
4) **Figures to the right indicate full marks.**
5) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer.

- 1) In case of alpha-trimmed mean filter, if $d = (mn - 1)$ then filter reduces to
 - a) min filter
 - b) median filter
 - c) arithmetic mean filter
 - d) max filter
- 2) Contrast stretching, gray level slicing and bit plane slicing are the example of
 - a) piecewise linear transformation function
 - b) point processing
 - c) mask processing
 - d) none
- 3) In morphology the thinning is denoted as
 - a) $A \oplus B$
 - b) $A \ominus B$
 - c) $A \otimes B$
 - d) $A \circ B$
- 4) If only LL sub-band is decomposed in every level then it is called as
 - a) Pyramidal DWT
 - b) Tree structured DWT
 - c) Wavelet packet decomposition
 - d) None
- 5) Entropy is measured in terms of
 - a) bytes/pixel
 - b) bits/pixel
 - c) both a and b
 - d) none

P.T.O.



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**B.E. (Electronics and Telecommunication) (Part – I) (New CGPA)
Examination, 2017
IMAGE PROCESSING (Elective – I)**

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Answer **any four** : **(4×4=16)**

- a) Write a short note on CMY color model.
- b) State algorithm to find the skeleton of a binary object.
- c) Explain contrast stretching and intensity level slicing piece wise linear transformation.
- d) Find the Euclidean distance between the two pixel p and q in the image represented below.

	c = 0	1	2	3
r = 0	10	10	35q	25
1	35	25	40	35
2	40p	35	10	10
3	35	10	25	10

- e) What is Laplace operator for image enhancement ?

3. Answer **any two** : **(2×6=12)**

- a) Apply Erosion on any one binary object and derive the output.
- b) Explain adaptive median filtering.
- c) State applications of digital image processing.



SECTION – II

4. Answer **any four** : **(4×4=16)**
- a) Compare coding redundancy with inter-pixel redundancy.
 - b) Explain region growing with reference to region based segmentation.
 - c) Calculate memory required to represent a 1 hour full color HD movie with 30 frames per second.
 - d) What is Wavelet transform ? Explain pyramid structured wavelet transform.
 - e) Explain image processing application in tumour detection.
5. Answer the following : **(2×6=12)**
- a) Explain Boundary extraction using graph heuristic searching.
 - b) Derive 4×4 Haar matrix.
 - c) What is image compression model ? Explain Block transform coding.
-



SLR-TJ – 218

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**B.E. (Electronics and Telecommunication) (Part – I) (New CGPA)
Examination, 2017
IMAGE PROCESSING (Elective – I)**

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **All questions are compulsory.**
4) **Figures to the right indicate full marks.**
5) **Assume suitable data if necessary.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer.

- 1) $G_x = (z_7 + 2z_8 + z_9) - (z_1 + 2z_2 + z_3)$ and $G_y = (z_3 + 2z_6 + z_9) - (z_1 + 2z_4 + z_7)$ are
a) Sobel operator
b) Prewitt operator
c) Robert-cross Gradient operator
d) None
- 2) Fixed Window size is drawback of
a) DWT
b) DFT
c) PS-DWT
d) None
- 3) _____ measure gradients in a selected no. of directions.
a) Gradient operators
b) Laplace operators
c) Compass operators
d) None
- 4) Minutia based features are used in
a) tumour detection
b) remote sensing
c) face detection
d) finger printing
- 5) Response of mask is given by
a) $\sum_{i=1}^n w_i z_i$
b) $\prod_{i=1}^n w_i z_i$
c) $\sum_{i=0}^n w_i z_i$
d) $\prod_{i=0}^n w_i z_i$
- 6) The smallest discernible detail in an image is called
a) Spatial resolution
b) Gray level resolution
c) Multi resolution
d) None

P.T.O.



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**B.E. (Electronics and Telecommunication) (Part – I) (New CGPA)
Examination, 2017
IMAGE PROCESSING (Elective – I)**

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

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

SECTION – I

2. Answer **any four** : **(4×4=16)**

- a) Write a short note on CMY color model.
- b) State algorithm to find the skeleton of a binary object.
- c) Explain contrast stretching and intensity level slicing piece wise linear transformation.
- d) Find the Euclidean distance between the two pixel p and q in the image represented below.

	c = 0	1	2	3
r = 0	10	10	35q	25
1	35	25	40	35
2	40p	35	10	10
3	35	10	25	10

- e) What is Laplace operator for image enhancement ?

3. Answer **any two** : **(2×6=12)**

- a) Apply Erosion on any one binary object and derive the output.
- b) Explain adaptive median filtering.
- c) State applications of digital image processing.



SECTION – II

4. Answer **any four** : **(4×4=16)**
- a) Compare coding redundancy with inter-pixel redundancy.
 - b) Explain region growing with reference to region based segmentation.
 - c) Calculate memory required to represent a 1 hour full color HD movie with 30 frames per second.
 - d) What is Wavelet transform ? Explain pyramid structured wavelet transform.
 - e) Explain image processing application in tumour detection.
5. Answer the following : **(2×6=12)**
- a) Explain Boundary extraction using graph heuristic searching.
 - b) Derive 4×4 Haar matrix.
 - c) What is image compression model ? Explain Block transform coding.
-



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P

B.E. (Electronics and Telecommunication Engg.) (Part – I)
(New – CGPA) Examination, 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(Elective – I)

Day and Date : Friday, 8-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **right** indicates **full** marks.
 - 3) Assume suitable data **if required.**
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(1×14=14)**
- 1) Product of two even or two odd functions is
a) even b) odd c) prime d) aliasing
 - 2) If $x(n)$ and $X(k)$ are an N -point DFT pair, then $X(k + N) = ?$
a) $X(-k)$ b) $-X(k)$
c) $X(k)$ d) None of the mentioned
 - 3) Downsampler is usually preceded by a LPF. This combination is called
a) Decimator
b) Interpolator
c) Rational sampling rate converter
d) None of these
 - 4) Decimation is used to
a) Decrease the sampling rate of a signal
b) Increase the sampling rate of a signal
c) Decrease the amplitude of a signal
d) Increase the amplitude of a signal

P.T.O.



- 5) Upsampler is usually followed by a LPF. This combination is called
- Decimator
 - Interpolator
 - Rational sampling rate converter
 - None of these
- 6) Interpolation is used to
- Decrease the sampling rate of a signal
 - Increase the sampling rate of a signal
 - Decrease the amplitude of a signal
 - Increase the amplitude of a signal
- 7) Analysis filter banks are used for
- Separating a signal to several frequency bands
 - Combining the processed subband signals to one signal
 - Removing the noise in the signal
 - Removing the image frequencies
- 8) In matrix form, the Wiener-Hopf equation is
- $R_x h = r_{dx}$
 - $R_x v r_{dx} = h$
 - $R_{dx} h = R_x$
 - $R_x h = 0$
- 9) The algorithms acquired for adaptive equalization are
- Zero forcing algorithm
 - Least mean squares algorithm
 - Recursive least squares algorithm
 - All of these
- 10) The architecture that employs instruction level parallelism is
- Von Neuman architecture
 - Harvard architecture
 - Modified Harvard architecture
 - VLIW architecture
- 11) FFT may be used to calculate
- DFT
 - IDFT
 - Both a) and b)
 - Direct Z transform
- 12) The discrete time systems in upsampler and the downsampler are
- Linear and time-varying
 - Linear and time-invariant
 - Non-linear and time-varying
 - Non-linear and time-invariant
- 13) Cascade of a factor of L upsampler and a factor of M downsampler is interchangeable with no change in the input-output relation if and only if L and M are relatively
- Non-prime
 - Natural numbers
 - Prime
 - None of these
- 14) Upsampler is usually followed by a LPF to avoid
- Images
 - Aliasing
 - Noise
 - None of these



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B.E. (Electronics and Telecommunication Engg.) (Part – I)
(New – CGPA) Examination, 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(Elective – I)

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**
2) **Figures to right indicates full marks.**
3) **Assume suitable data if required.**

SECTION – I

2. Solve **any two** : **(7×2=14)**
1) Explain sampling rate reduction using decimation by integer factors.
2) Explain DFT in brief.
3) Derive the relation between scaling and wavelet function coefficients.
3. Solve **any two** : **(7×2=14)**
1) Explain Haar Wavelet scaling function.
2) Explain application of Wavelet Transform in image compression.
3) Explain software implementation of sampling rate converters by decimators.

SECTION – II

4. Solve **any two** : **(7×2=14)**
1) Draw and explain block diagram of an adaptive filter as a noise canceller.
2) Explain Basic Wiener Filter theory.
3) Explain principles of spectrum estimation.
5. Solve **any two** : **(7×2=14)**
1) Explain modified periodogram methods in spectrum estimation.
2) Draw and explain computer architecture for signal processing.
3) Explain recursive least squares algorithm.



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Seat No.	
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Set **Q**

B.E. (Electronics and Telecommunication Engg.) (Part – I)
(New – CGPA) Examination, 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(Elective – I)

Day and Date : Friday, 8-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **right** indicates **full** marks.
 - 3) Assume suitable data **if required.**
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(1×14=14)**
- 1) In matrix form, the Wiener-Hopf equation is
 - a) $R_x h = r_{dx}$
 - b) $R_x v r_{dx} = h$
 - c) $R_{dx} h = R_x$
 - d) $R_x h = 0$
 - 2) The algorithms acquired for adaptive equalization are
 - a) Zero forcing algorithm
 - b) Least mean squares algorithm
 - c) Recursive least squares algorithm
 - d) All of these
 - 3) The architecture that employs instruction level parallelism is
 - a) Von Neuman architecture
 - b) Harvard architecture
 - c) Modified Harvard architecture
 - d) VLIW architecture
 - 4) FFT may be used to calculate
 - a) DFT
 - b) IDFT
 - c) Both a) and b)
 - d) Direct Z transform
 - 5) The discrete time systems in upsampler and the downsampler are
 - a) Linear and time-varying
 - b) Linear and time-invariant
 - c) Non-linear and time-varying
 - d) Non-linear and time-invariant

P.T.O.



- 6) Cascade of a factor of L upsampler and a factor of M downsampler is interchangeable with no change in the input-output relation if and only if L and M are relatively
- a) Non-prime
 - b) Natural numbers
 - c) Prime
 - d) None of these
- 7) Upsampler is usually followed by a LPF to avoid
- a) Images
 - b) Aliasing
 - c) Noise
 - d) None of these
- 8) Product of two even or two odd functions is
- a) even
 - b) odd
 - c) prime
 - d) aliasing
- 9) If $x(n)$ and $X(k)$ are an N-point DFT pair, then $X(k + N) = ?$
- a) $X(-k)$
 - b) $-X(k)$
 - c) $X(k)$
 - d) None of the mentioned
- 10) Downsampler is usually preceded by a LPF. This combination is called
- a) Decimator
 - b) Interpolator
 - c) Rational sampling rate converter
 - d) None of these
- 11) Decimation is used to
- a) Decrease the sampling rate of a signal
 - b) Increase the sampling rate of a signal
 - c) Decrease the amplitude of a signal
 - d) Increase the amplitude of a signal
- 12) Upsampler is usually followed by a LPF. This combination is called
- a) Decimator
 - b) Interpolator
 - c) Rational sampling rate converter
 - d) None of these
- 13) Interpolation is used to
- a) Decrease the sampling rate of a signal
 - b) Increase the sampling rate of a signal
 - c) Decrease the amplitude of a signal
 - d) Increase the amplitude of a signal
- 14) Analysis filter banks are used for
- a) Separating a signal to several frequency bands
 - b) Combining the processed subband signals to one signal
 - c) Removing the noise in the signal
 - d) Removing the image frequencies
-



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B.E. (Electronics and Telecommunication Engg.) (Part – I)
(New – CGPA) Examination, 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(Elective – I)

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**
2) **Figures to right indicates full marks.**
3) **Assume suitable data if required.**

SECTION – I

2. Solve **any two** : **(7×2=14)**
1) Explain sampling rate reduction using decimation by integer factors.
2) Explain DFT in brief.
3) Derive the relation between scaling and wavelet function coefficients.
3. Solve **any two** : **(7×2=14)**
1) Explain Haar Wavelet scaling function.
2) Explain application of Wavelet Transform in image compression.
3) Explain software implementation of sampling rate converters by decimators.

SECTION – II

4. Solve **any two** : **(7×2=14)**
1) Draw and explain block diagram of an adaptive filter as a noise canceller.
2) Explain Basic Wiener Filter theory.
3) Explain principles of spectrum estimation.
5. Solve **any two** : **(7×2=14)**
1) Explain modified periodogram methods in spectrum estimation.
2) Draw and explain computer architecture for signal processing.
3) Explain recursive least squares algorithm.



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Set **R**

B.E. (Electronics and Telecommunication Engg.) (Part – I)
(New – CGPA) Examination, 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(Elective – I)

Day and Date : Friday, 8-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **right** indicates **full** marks.
 - 3) Assume suitable data **if required.**
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) Upsampler is usually followed by a LPF. This combination is called
 - a) Decimator
 - b) Interpolator
 - c) Rational sampling rate converter
 - d) None of these
- 2) Interpolation is used to
 - a) Decrease the sampling rate of a signal
 - b) Increase the sampling rate of a signal
 - c) Decrease the amplitude of a signal
 - d) Increase the amplitude of a signal
- 3) Analysis filter banks are used for
 - a) Separating a signal to several frequency bands
 - b) Combining the processed subband signals to one signal
 - c) Removing the noise in the signal
 - d) Removing the image frequencies
- 4) In matrix form, the Wiener-Hopf equation is
 - a) $R_x h = r_{dx}$
 - b) $R_x v r_{dx} = h$
 - c) $R_{dx} h = R_x$
 - d) $R_x h = 0$

P.T.O.



- 5) The algorithms acquired for adaptive equalization are
 - a) Zero forcing algorithm
 - b) Least mean squares algorithm
 - c) Recursive least squares algorithm
 - d) All of these
 - 6) The architecture that employs instruction level parallelism is
 - a) Von Neuman architecture
 - b) Harvard architecture
 - c) Modified Harvard architecture
 - d) VLIW architecture
 - 7) FFT may be used to calculate
 - a) DFT
 - b) IDFT
 - c) Both a) and b)
 - d) Direct Z transform
 - 8) The discrete time systems in upsampler and the downsampler are
 - a) Linear and time-varying
 - b) Linear and time-invariant
 - c) Non-linear and time-varying
 - d) Non-linear and time-invariant
 - 9) Cascade of a factor of L upsampler and a factor of M downsampler is interchangeable with no change in the input-output relation if and only if L and M are relatively
 - a) Non-prime
 - b) Natural numbers
 - c) Prime
 - d) None of these
 - 10) Upsampler is usually followed by a LPF to avoid
 - a) Images
 - b) Aliasing
 - c) Noise
 - d) None of these
 - 11) Product of two even or two odd functions is
 - a) even
 - b) odd
 - c) prime
 - d) aliasing
 - 12) If $x(n)$ and $X(k)$ are an N-point DFT pair, then $X(k + N) = ?$
 - a) $X(-k)$
 - b) $-X(k)$
 - c) $X(k)$
 - d) None of the mentioned
 - 13) Downsampler is usually preceded by a LPF. This combination is called
 - a) Decimator
 - b) Interpolator
 - c) Rational sampling rate converter
 - d) None of these
 - 14) Decimation is used to
 - a) Decrease the sampling rate of a signal
 - b) Increase the sampling rate of a signal
 - c) Decrease the amplitude of a signal
 - d) Increase the amplitude of a signal
-



Seat No.	
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B.E. (Electronics and Telecommunication Engg.) (Part – I)
(New – CGPA) Examination, 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(Elective – I)

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**
2) **Figures to right indicates full marks.**
3) **Assume suitable data if required.**

SECTION – I

2. Solve **any two** : **(7×2=14)**
1) Explain sampling rate reduction using decimation by integer factors.
2) Explain DFT in brief.
3) Derive the relation between scaling and wavelet function coefficients.
3. Solve **any two** : **(7×2=14)**
1) Explain Haar Wavelet scaling function.
2) Explain application of Wavelet Transform in image compression.
3) Explain software implementation of sampling rate converters by decimators.

SECTION – II

4. Solve **any two** : **(7×2=14)**
1) Draw and explain block diagram of an adaptive filter as a noise canceller.
2) Explain Basic Wiener Filter theory.
3) Explain principles of spectrum estimation.
5. Solve **any two** : **(7×2=14)**
1) Explain modified periodogram methods in spectrum estimation.
2) Draw and explain computer architecture for signal processing.
3) Explain recursive least squares algorithm.



SLR-TJ – 219

Seat No.	
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Set **S**

B.E. (Electronics and Telecommunication Engg.) (Part – I)
(New – CGPA) Examination, 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(Elective – I)

Day and Date : Friday, 8-12-2017

Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) Figures to **right** indicates **full** marks.
 - 3) Assume suitable data **if required.**
 - 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.
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **(1×14=14)**
- 1) The architecture that employs instruction level parallelism is
 - a) Von Neuman architecture
 - b) Harvard architecture
 - c) Modified Harvard architecture
 - d) VLIW architecture
 - 2) FFT may be used to calculate
 - a) DFT
 - b) IDFT
 - c) Both a) and b)
 - d) Direct Z transform
 - 3) The discrete time systems in upsampler and the downsampler are
 - a) Linear and time-varying
 - b) Linear and time-invariant
 - c) Non-linear and time-varying
 - d) Non-linear and time-invariant
 - 4) Cascade of a factor of L upsampler and a factor of M downsampler is interchangeable with no change in the input-output relation if and only if L and M are relatively
 - a) Non-prime
 - b) Natural numbers
 - c) Prime
 - d) None of these
 - 5) Upsampler is usually followed by a LPF to avoid
 - a) Images
 - b) Aliasing
 - c) Noise
 - d) None of these

P.T.O.



- 6) Product of two even or two odd functions is
a) even b) odd c) prime d) aliasing
- 7) If $x(n)$ and $X(k)$ are an N-point DFT pair, then $X(k + N) = ?$
a) $X(-k)$ b) $-X(k)$
c) $X(k)$ d) None of the mentioned
- 8) Downsampler is usually preceded by a LPF. This combination is called
a) Decimator
b) Interpolator
c) Rational sampling rate converter
d) None of these
- 9) Decimation is used to
a) Decrease the sampling rate of a signal
b) Increase the sampling rate of a signal
c) Decrease the amplitude of a signal
d) Increase the amplitude of a signal
- 10) Upsampler is usually followed by a LPF. This combination is called
a) Decimator b) Interpolator
c) Rational sampling rate converter d) None of these
- 11) Interpolation is used to
a) Decrease the sampling rate of a signal
b) Increase the sampling rate of a signal
c) Decrease the amplitude of a signal
d) Increase the amplitude of a signal
- 12) Analysis filter banks are used for
a) Separating a signal to several frequency bands
b) Combining the processed subband signals to one signal
c) Removing the noise in the signal
d) Removing the image frequencies
- 13) In matrix form, the Wiener-Hopf equation is
a) $R_x h = r_{dx}$ b) $R_x v r_{dx} = h$ c) $R_{dx} h = R_x$ d) $R_x h = 0$
- 14) The algorithms acquired for adaptive equalization are
a) Zero forcing algorithm
b) Least mean squares algorithm
c) Recursive least squares algorithm
d) All of these
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Seat No.	
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B.E. (Electronics and Telecommunication Engg.) (Part – I)
(New – CGPA) Examination, 2017
ADVANCE DIGITAL SIGNAL PROCESSING
(Elective – I)

Day and Date : Friday, 8-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**
2) **Figures to right indicates full marks.**
3) **Assume suitable data if required.**

SECTION – I

2. Solve **any two** : **(7×2=14)**
1) Explain sampling rate reduction using decimation by integer factors.
2) Explain DFT in brief.
3) Derive the relation between scaling and wavelet function coefficients.
3. Solve **any two** : **(7×2=14)**
1) Explain Haar Wavelet scaling function.
2) Explain application of Wavelet Transform in image compression.
3) Explain software implementation of sampling rate converters by decimators.

SECTION – II

4. Solve **any two** : **(7×2=14)**
1) Draw and explain block diagram of an adaptive filter as a noise canceller.
2) Explain Basic Wiener Filter theory.
3) Explain principles of spectrum estimation.
5. Solve **any two** : **(7×2=14)**
1) Explain modified periodogram methods in spectrum estimation.
2) Draw and explain computer architecture for signal processing.
3) Explain recursive least squares algorithm.



SLR-TJ – 220

Seat No.	
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Set

P

**B.E. (E&TC) (Part – II) Examination, 2017
BROAD BAND COMMUNICATION**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Note :**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Assume suitable data if necessary.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : 20
- 1) The use of _____ allows multiple logical connections to be multiplexed over the same channel.
A) Multiplexing B) DLCI C) LAPF D) LAPD
 - 2) Multiplexing of virtual circuits takes place at layer
A) 1 B) 2 C) 3 D) 4
 - 3) _____ series classifies services into lower level bearer services and higher level services.
A) I-200 B) I-100 C) I-300 D) I-400
 - 4) At the data link layer, _____ is used to provide data link control service with error control and flow control.
A) LAPF B) DLCI C) LAPB D) LAPD
 - 5) Which of the following recommendations for frame relay was developed by ITU-T ?
A) FRF.2 B) FRF.6 C) FRF.10.1 D) Q.933
 - 6) _____ devices are end systems that communicate across the X.25 network.
A) DTE B) TE C) DCE D) PSE
 - 7) ISDN integrates speech and data on
A) Different lines B) Same lines C) Both A) and B) D) None of these

P.T.O.



- 8) U-interface is the two wire interface between
- A) Computing device and terminal adapter
 - B) Terminal adapter and exchange unit
 - C) Exchange unit and network terminating unit
 - D) Computing device and exchange unit
- 9) Attributes of ISDN have
- A) Definition
 - B) Allowable values
 - C) Both A) and B)
 - D) None of these
- 10) _____ includes function that may be regarded as belonging to OSI layer 1.
- A) NT1
 - B) NT2
 - C) TE
 - D) TA
- 11) Which of the following is not ISDN Interactive service ?
- A) Video telephony
 - B) TV program distribution
 - C) LAN-WAN networking
 - D) Document transfer
- 12) Which traffic type is used by internet access ?
- A) Constant Bit Rate (CBR)
 - B) Variable Bit Rate (VBR)
 - C) Available Bit Rate (ABR)
 - D) Unspecified Bit Rate (UBR)
- 13) ATM standard defines _____ layers.
- A) 2
 - B) 3
 - C) 4
 - D) 5
- 14) Telecommuting application is example of
- A) Unspecified bit rate
 - B) Available bit rate
 - C) Real time variable bit rate
 - D) Constant bit rate
- 15) _____ provides for user information transfer, along with associated controls.
- A) Control plane
 - B) User plane
 - C) Management plane
 - D) None of these
- 16) _____ is a service for transmission and reproduction of graphics and handwritten and printed material.
- A) Videotext
 - B) Teletex
 - C) Facsimile
 - D) Videoconferencing
- 17) Services in this category are referred to as broadcast services.
- A) Distribution services
 - B) Messaging services
 - C) Retrieval services
 - D) All of these
- 18) How many bits does the cell loss priority field of an ATM cell header have ?
- A) 1
 - B) 4
 - C) 8
 - D) 3
- 19) This field is used in only UNI
- A) Payload type
 - B) Virtual path identifier
 - C) Generic flow control
 - D) Cell loss priority
- 20) The _____ is used for routing to and from the end users.
- A) Virtual path identifier
 - B) Payload
 - C) Virtual channel identifier
 - D) None of these



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
BROAD BAND COMMUNICATION**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

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

SECTION – I

2. Answer **any four** : **20**
- 1) What are three different phases in communication via circuit switching ? Explain.
 - 2) With the help of diagram explain which protocols are implemented in the TE and NT equipment for user data transfer for frame mode bearer service.
 - 3) How ISDN is benefited to customers, network providers, manufacturers and enhanced service providers ?
 - 4) Explain ISDN address structure.
 - 5) Write a note on virtual circuits and frame relay virtual connections with respect to packet switching and frame relay.
3. Answer **any two** : **20**
- 1) a) Compare circuit and packet switching with respect to propagation delay, transmission time and mode delay using a diagram. **6**
b) What are the different services provided by X.25 ? Explain how multiplexing is achieved in X.25. **4**
 - 2) a) Explain LAPF Core protocol format. **6**
b) State the characteristics of Frame Mode Bearer Service with respect to frame relaying and frame switching. **4**
 - 3) a) Explain in detail transmission structure of ISDN. **6**
b) What are standards ? List the importance of standards. **4**



SECTION – II

4. Answer **any four** : **20**
- 1) What are different broadband services ? Explain distribution services in detail.
 - 2) With the help of block diagram explain functional architecture of B-ISDN.
 - 3) Describe SONET frame format.
 - 4) Describe the requirements of ATM switch.
 - 5) Explain matrix type switch used in ATM.
5. Answer **any two** : **20**
- 1) a) With diagram explain ATM Cell format for User-Network and Network-Network interface. **6**
b) How HEC operation at the receiver is controlled in ATM ? **4**
 - 2) a) What are the significance of SONET ? Explain SONET System Hierarchy. **6**
b) Define the following terminologies. **4**
 - i) Virtual channel and virtual channel identifier.
 - ii) Virtual path and virtual path identifier.
 - 3) a) Write a note on AAL services and protocols. **6**
b) How transmission of ATM cells is achieved using cell based physical layer ? **4**
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SLR-TJ – 220

Seat No.	
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Set

Q

**B.E. (E&TC) (Part – II) Examination, 2017
BROAD BAND COMMUNICATION**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Note :**
- 1) **All questions are compulsory.**
 - 2) **Figures to the right indicate full marks.**
 - 3) **Assume suitable data if necessary.**
 - 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.**
 - 5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : 20
- 1) _____ is a service for transmission and reproduction of graphics and handwritten and printed material.
A) Videotext
B) Teletex
C) Facsimile
D) Videoconferencing
 - 2) Services in this category are referred to as broadcast services.
A) Distribution services
B) Messaging services
C) Retrieval services
D) All of these
 - 3) How many bits does the cell loss priority field of an ATM cell header have ?
A) 1
B) 4
C) 8
D) 3
 - 4) This field is used in only UNI
A) Payload type
B) Virtual path identifier
C) Generic flow control
D) Cell loss priority
 - 5) The _____ is used for routing to and from the end users.
A) Virtual path identifier
B) Payload
C) Virtual channel identifier
D) None of these
 - 6) The use of _____ allows multiple logical connections to be multiplexed over the same channel.
A) Multiplexing
B) DLCI
C) LAPF
D) LAPD
 - 7) Multiplexing of virtual circuits takes place at layer
A) 1
B) 2
C) 3
D) 4

P.T.O.



- 8) _____ series classifies services into lower level bearer services and higher level services.
A) I-200 B) I-100 C) I-300 D) I-400
- 9) At the data link layer, _____ is used to provide data link control service with error control and flow control.
A) LAPF B) DLCI C) LAPB D) LAPD
- 10) Which of the following recommendations for frame relay was developed by ITU-T ?
A) FRF.2 B) FRF.6 C) FRF.10.1 D) Q.933
- 11) _____ devices are end systems that communicate across the X.25 network.
A) DTE B) TE C) DCE D) PSE
- 12) ISDN integrates speech and data on
A) Different lines B) Same lines C) Both A) and B) D) None of these
- 13) U-interface is the two wire interface between
A) Computing device and terminal adapter
B) Terminal adapter and exchange unit
C) Exchange unit and network terminating unit
D) Computing device and exchange unit
- 14) Attributes of ISDN have
A) Definition B) Allowable values
C) Both A) and B) D) None of these
- 15) _____ includes function that may be regarded as belonging to OSI layer 1.
A) NT1 B) NT2 C) TE D) TA
- 16) Which of the following is not ISDN Interactive service ?
A) Video telephony B) TV program distribution
C) LAN-WAN networking D) Document transfer
- 17) Which traffic type is used by internet access ?
A) Constant Bit Rate (CBR) B) Variable Bit Rate (VBR)
C) Available Bit Rate (ABR) D) Unspecified Bit Rate (UBR)
- 18) ATM standard defines _____ layers.
A) 2 B) 3 C) 4 D) 5
- 19) Telecommuting application is example of
A) Unspecified bit rate B) Available bit rate
C) Real time variable bit rate D) Constant bit rate
- 20) _____ provides for user information transfer, along with associated controls.
A) Control plane B) User plane
C) Management plane D) None of these
-



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
BROAD BAND COMMUNICATION**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

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

SECTION – I

2. Answer **any four** : **20**
- 1) What are three different phases in communication via circuit switching ? Explain.
 - 2) With the help of diagram explain which protocols are implemented in the TE and NT equipment for user data transfer for frame mode bearer service.
 - 3) How ISDN is benefited to customers, network providers, manufacturers and enhanced service providers ?
 - 4) Explain ISDN address structure.
 - 5) Write a note on virtual circuits and frame relay virtual connections with respect to packet switching and frame relay.
3. Answer **any two** : **20**
- 1) a) Compare circuit and packet switching with respect to propagation delay, transmission time and mode delay using a diagram. **6**
b) What are the different services provided by X.25 ? Explain how multiplexing is achieved in X.25. **4**
 - 2) a) Explain LAPF Core protocol format. **6**
b) State the characteristics of Frame Mode Bearer Service with respect to frame relaying and frame switching. **4**
 - 3) a) Explain in detail transmission structure of ISDN. **6**
b) What are standards ? List the importance of standards. **4**



SECTION – II

4. Answer **any four** : **20**
- 1) What are different broadband services ? Explain distribution services in detail.
 - 2) With the help of block diagram explain functional architecture of B-ISDN.
 - 3) Describe SONET frame format.
 - 4) Describe the requirements of ATM switch.
 - 5) Explain matrix type switch used in ATM.
5. Answer **any two** : **20**
- 1) a) With diagram explain ATM Cell format for User-Network and Network-Network interface. **6**
b) How HEC operation at the receiver is controlled in ATM ? **4**
 - 2) a) What are the significance of SONET ? Explain SONET System Hierarchy. **6**
b) Define the following terminologies. **4**
 - i) Virtual channel and virtual channel identifier.
 - ii) Virtual path and virtual path identifier.
 - 3) a) Write a note on AAL services and protocols. **6**
b) How transmission of ATM cells is achieved using cell based physical layer ? **4**
-



SLR-TJ – 220

Seat No.	
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Set

R

**B.E. (E&TC) (Part – II) Examination, 2017
BROAD BAND COMMUNICATION**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Note :** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data if necessary.**
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.**
5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : 20
- 1) Which of the following is not ISDN Interactive service ?
A) Video telephony
B) TV program distribution
C) LAN-WAN networking
D) Document transfer
 - 2) Which traffic type is used by internet access ?
A) Constant Bit Rate (CBR)
B) Variable Bit Rate (VBR)
C) Available Bit Rate (ABR)
D) Unspecified Bit Rate (UBR)
 - 3) ATM standard defines _____ layers.
A) 2
B) 3
C) 4
D) 5
 - 4) Telecommuting application is example of
A) Unspecified bit rate
B) Available bit rate
C) Real time variable bit rate
D) Constant bit rate
 - 5) _____ provides for user information transfer, along with associated controls.
A) Control plane
B) User plane
C) Management plane
D) None of these
 - 6) _____ is a service for transmission and reproduction of graphics and handwritten and printed material.
A) Videotext
B) Teletex
C) Facsimile
D) Videoconferencing
 - 7) Services in this category are referred to as broadcast services.
A) Distribution services
B) Messaging services
C) Retrieval services
D) All of these

P.T.O.



- 8) How many bits does the cell loss priority field of an ATM cell header have ?
A) 1 B) 4 C) 8 D) 3
- 9) This field is used in only UNI
A) Payload type B) Virtual path identifier
C) Generic flow control D) Cell loss priority
- 10) The _____ is used for routing to and from the end users.
A) Virtual path identifier B) Payload
C) Virtual channel identifier D) None of these
- 11) The use of _____ allows multiple logical connections to be multiplexed over the same channel.
A) Multiplexing B) DLCI C) LAPF D) LAPD
- 12) Multiplexing of virtual circuits takes place at layer
A) 1 B) 2 C) 3 D) 4
- 13) _____ series classifies services into lower level bearer services and higher level services.
A) I-200 B) I-100 C) I-300 D) I-400
- 14) At the data link layer, _____ is used to provide data link control service with error control and flow control.
A) LAPF B) DLCI C) LAPB D) LAPD
- 15) Which of the following recommendations for frame relay was developed by ITU-T ?
A) FRF.2 B) FRF.6 C) FRF.10.1 D) Q.933
- 16) _____ devices are end systems that communicate across the X.25 network.
A) DTE B) TE C) DCE D) PSE
- 17) ISDN integrates speech and data on
A) Different lines B) Same lines C) Both A) and B) D) None of these
- 18) U-interface is the two wire interface between
A) Computing device and terminal adapter
B) Terminal adapter and exchange unit
C) Exchange unit and network terminating unit
D) Computing device and exchange unit
- 19) Attributes of ISDN have
A) Definition B) Allowable values
C) Both A) and B) D) None of these
- 20) _____ includes function that may be regarded as belonging to OSI layer 1.
A) NT1 B) NT2 C) TE D) TA
-



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
BROAD BAND COMMUNICATION**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

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

SECTION – I

2. Answer **any four** : **20**
- 1) What are three different phases in communication via circuit switching ? Explain.
 - 2) With the help of diagram explain which protocols are implemented in the TE and NT equipment for user data transfer for frame mode bearer service.
 - 3) How ISDN is benefited to customers, network providers, manufacturers and enhanced service providers ?
 - 4) Explain ISDN address structure.
 - 5) Write a note on virtual circuits and frame relay virtual connections with respect to packet switching and frame relay.
3. Answer **any two** : **20**
- 1) a) Compare circuit and packet switching with respect to propagation delay, transmission time and mode delay using a diagram. **6**
b) What are the different services provided by X.25 ? Explain how multiplexing is achieved in X.25. **4**
 - 2) a) Explain LAPF Core protocol format. **6**
b) State the characteristics of Frame Mode Bearer Service with respect to frame relaying and frame switching. **4**
 - 3) a) Explain in detail transmission structure of ISDN. **6**
b) What are standards ? List the importance of standards. **4**



SECTION – II

4. Answer **any four** : **20**
- 1) What are different broadband services ? Explain distribution services in detail.
 - 2) With the help of block diagram explain functional architecture of B-ISDN.
 - 3) Describe SONET frame format.
 - 4) Describe the requirements of ATM switch.
 - 5) Explain matrix type switch used in ATM.
5. Answer **any two** : **20**
- 1) a) With diagram explain ATM Cell format for User-Network and Network-Network interface. **6**
b) How HEC operation at the receiver is controlled in ATM ? **4**
 - 2) a) What are the significance of SONET ? Explain SONET System Hierarchy. **6**
b) Define the following terminologies. **4**
 - i) Virtual channel and virtual channel identifier.
 - ii) Virtual path and virtual path identifier.
 - 3) a) Write a note on AAL services and protocols. **6**
b) How transmission of ATM cells is achieved using cell based physical layer ? **4**
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SLR-TJ – 220

Seat No.	
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Set

S

**B.E. (E&TC) (Part – II) Examination, 2017
BROAD BAND COMMUNICATION**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Note :** 1) **All questions are compulsory.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data if necessary.**
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.**
5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : **20**
- 1) _____ devices are end systems that communicate across the X.25 network.
A) DTE B) TE C) DCE D) PSE
 - 2) ISDN integrates speech and data on
A) Different lines B) Same lines C) Both A) and B) D) None of these
 - 3) U-interface is the two wire interface between
A) Computing device and terminal adapter
B) Terminal adapter and exchange unit
C) Exchange unit and network terminating unit
D) Computing device and exchange unit
 - 4) Attributes of ISDN have
A) Definition B) Allowable values
C) Both A) and B) D) None of these
 - 5) _____ includes function that may be regarded as belonging to OSI layer 1.
A) NT1 B) NT2 C) TE D) TA
 - 6) Which of the following is not ISDN Interactive service ?
A) Video telephony B) TV program distribution
C) LAN-WAN networking D) Document transfer
 - 7) Which traffic type is used by internet access ?
A) Constant Bit Rate (CBR) B) Variable Bit Rate (VBR)
C) Available Bit Rate (ABR) D) Unspecified Bit Rate (UBR)

P.T.O.



- 8) ATM standard defines _____ layers.
A) 2 B) 3 C) 4 D) 5
- 9) Telecommuting application is example of
A) Unspecified bit rate B) Available bit rate
C) Real time variable bit rate D) Constant bit rate
- 10) _____ provides for user information transfer, along with associated controls.
A) Control plane B) User plane
C) Management plane D) None of these
- 11) _____ is a service for transmission and reproduction of graphics and handwritten and printed material.
A) Videotext B) Teletex
C) Facsimile D) Videoconferencing
- 12) Services in this category are referred to as broadcast services.
A) Distribution services B) Messaging services
C) Retrieval services D) All of these
- 13) How many bits does the cell loss priority field of an ATM cell header have ?
A) 1 B) 4 C) 8 D) 3
- 14) This field is used in only UNI
A) Payload type B) Virtual path identifier
C) Generic flow control D) Cell loss priority
- 15) The _____ is used for routing to and from the end users.
A) Virtual path identifier B) Payload
C) Virtual channel identifier D) None of these
- 16) The use of _____ allows multiple logical connections to be multiplexed over the same channel.
A) Multiplexing B) DLCI C) LAPF D) LAPD
- 17) Multiplexing of virtual circuits takes place at layer
A) 1 B) 2 C) 3 D) 4
- 18) _____ series classifies services into lower level bearer services and higher level services.
A) I-200 B) I-100 C) I-300 D) I-400
- 19) At the data link layer, _____ is used to provide data link control service with error control and flow control.
A) LAPF B) DLCI C) LAPB D) LAPD
- 20) Which of the following recommendations for frame relay was developed by ITU-T ?
A) FRF.2 B) FRF.6 C) FRF.10.1 D) Q.933



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
BROAD BAND COMMUNICATION**

Day and Date : Tuesday, 21-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

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

SECTION – I

2. Answer **any four** : **20**
- 1) What are three different phases in communication via circuit switching ? Explain.
 - 2) With the help of diagram explain which protocols are implemented in the TE and NT equipment for user data transfer for frame mode bearer service.
 - 3) How ISDN is benefited to customers, network providers, manufacturers and enhanced service providers ?
 - 4) Explain ISDN address structure.
 - 5) Write a note on virtual circuits and frame relay virtual connections with respect to packet switching and frame relay.
3. Answer **any two** : **20**
- 1) a) Compare circuit and packet switching with respect to propagation delay, transmission time and mode delay using a diagram. **6**
b) What are the different services provided by X.25 ? Explain how multiplexing is achieved in X.25. **4**
 - 2) a) Explain LAPF Core protocol format. **6**
b) State the characteristics of Frame Mode Bearer Service with respect to frame relaying and frame switching. **4**
 - 3) a) Explain in detail transmission structure of ISDN. **6**
b) What are standards ? List the importance of standards. **4**



SECTION – II

4. Answer **any four** : **20**
- 1) What are different broadband services ? Explain distribution services in detail.
 - 2) With the help of block diagram explain functional architecture of B-ISDN.
 - 3) Describe SONET frame format.
 - 4) Describe the requirements of ATM switch.
 - 5) Explain matrix type switch used in ATM.
5. Answer **any two** : **20**
- 1) a) With diagram explain ATM Cell format for User-Network and Network-Network interface. **6**
b) How HEC operation at the receiver is controlled in ATM ? **4**
 - 2) a) What are the significance of SONET ? Explain SONET System Hierarchy. **6**
b) Define the following terminologies. **4**
 - i) Virtual channel and virtual channel identifier.
 - ii) Virtual path and virtual path identifier.
 - 3) a) Write a note on AAL services and protocols. **6**
b) How transmission of ATM cells is achieved using cell based physical layer ? **4**
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Seat No.	
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B.E. (Electronics & Telecommunication) (Part – II) Examination, 2017
MULTIMEDIA COMMUNICATION TECHNIQUES

Day and Date : Wednesday, 22-11-2017

Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :** 1) **All the questions are compulsory.**
2) **Figures to the right indicate full marks.**

SECTION – I

2. Attempt **any four** : **(4×5=20)**
- 1) Write about satellite TV system in brief.
 - 2) Explain working of AFT stage in TV receiver with neat block diagram.
 - 3) Explain the terms : Hue and Saturation. What is the difference between luminance and chrominance ?
 - 4) Draw and explain the color composite video signal.
 - 5) Explain what do you mean by magnetic recording and reproduction. Explain in detail.
3. Attempt **any two** : **(2×10=20)**
- 1) Explain Video IF amplifier and video detector of color TV system.
 - 2) With the help block diagram explain PAL encoder and PAL decoder in detail.
 - 3) Discuss advantage of using A.M. for video signals and F.M for audio signals and also explain AMVSB transmission techniques.

Set P



SECTION – II

4. Attempt **any four** : **(4×5=20)**
- 1) Explain communication modes in multimedia.
 - 2) What are types of multipoint conferencing ? Explain any one type in brief.
 - 3) What are different video compression techniques ? Compare them.
 - 4) What is audio compression ? Explain CD quality audio in detail.
 - 5) What are video applications of multimedia ?
5. Attempt **any two** : **(2×10=20)**
- 1) Explain broadband multi service network in detail.
 - 2) Explain digital video 4 : 2 : 2 format and 4 : 2 : 0 format in detail.
 - 3) Define multimedia. Explain elements of multimedia. Explain entertainment application related to multimedia communication.
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SLR-TJ – 221

Seat No.	
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Set **Q**

**B.E. (Electronics & Telecommunication) (Part – II) Examination, 2017
MULTIMEDIA COMMUNICATION TECHNIQUES**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) **All the questions are compulsory.**
 - 4) **Figures to the right indicate full marks.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) The technique of removing the repetition of pattern within each frame is _____
 - a) Temporal redundancy
 - b) Spatial redundancy
 - c) Video capture
 - d) Audio capture
- 2) I signal in NTSC colour TV system is located at 57° with respect to _____
 - a) Colour burst
 - b) R – Y
 - c) B – Y
 - d) G – Y
- 3) The length of tape magnetized by one cycle of audio signal is called recorded _____
 - a) Bar magnet
 - b) Wavelength
 - c) Tape length
 - d) Head gap
- 4) The outdoor unit is connected to indoor DTH received by _____
 - a) Wave Guide
 - b) Coaxial cable
 - c) Twin flat feeder
 - d) Optical fiber
- 5) Which of the following TV uses CCFL as back lighting ?
 - a) LCD
 - b) LED
 - c) OLED
 - d) CRT
- 6) A _____ on each packet is required for real-time traffic.
 - a) timestamp
 - b) sequence number
 - c) both a and b
 - d) none of these
- 7) Real-time traffic needs the support of _____
 - a) broadcasting
 - b) multicasting
 - c) both a and b
 - d) none of these
- 8) _____ means changing the encoding of a payload to a lower quality to match the bandwidth of the receiving network.
 - a) Translation
 - b) Mixing
 - c) Both a and b
 - d) None of these

P.T.O.



- 9) _____ is a standard to allow telephones on the public telephone network to talk to computers connected to the Internet.
a) SIP b) H.323 c) Q.991 d) None of these
- 10) Hardware that creates sound from a mathematical representation _____
a) Sound Synthesizer b) Stampers
c) Speaker d) Set top box
- 11) In internet each document comprises a linked set of pages and linkage between the pages is known as _____
a) Home page b) Hyperlink c) UTP d) None of these
- 12) NMOD is a term related to
a) Telephony services b) Entertainment application
c) Both a and b d) None of these
- 13) The most common compression technique that is used to create CD quality audio is based on perceptual encoding technique is called _____
a) JPEG b) H.323
c) SIP d) Predictive encoding
- 14) 1080 active scanning lines per frame are used in
a) HDTV b) Analog TV c) CATV d) MATV
- 15) In Audio and Video compression, each frame is divided into small grids called picture element or
a) Frame b) Packet c) Pixel d) Mega pixel
- 16) Video capture means _____
a) Creating video on desktop b) Converting video for computer
c) Real time video d) All of these
- 17) As brightness increases the size of chromacity diagram _____
a) Reduces b) Increases c) Remains same d) Both a and b
- 18) Maximum bandwidth necessary for transmission of colour signal is around _____
a) 1.5 MHz b) 1.3 MHz c) 3 MHz d) None of these
- 19) Compact disc surface does not wear out because the sensor is
a) Electrical b) Mechanical c) Electronic d) Optical
- 20) Duration of vertical blanking pulse used in India is _____
a) 64 microsec b) 100 microsec c) 1280 microsec d) 160 microsec



Seat No.	
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B.E. (Electronics & Telecommunication) (Part – II) Examination, 2017
MULTIMEDIA COMMUNICATION TECHNIQUES

Day and Date : Wednesday, 22-11-2017

Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

- Instructions:** 1) **All the questions are compulsory.**
2) **Figures to the right indicate full marks.**

SECTION – I

2. Attempt **any four** : **(4×5=20)**
- 1) Write about satellite TV system in brief.
 - 2) Explain working of AFT stage in TV receiver with neat block diagram.
 - 3) Explain the terms : Hue and Saturation. What is the difference between luminance and chrominance ?
 - 4) Draw and explain the color composite video signal.
 - 5) Explain what do you mean by magnetic recording and reproduction. Explain in detail.
3. Attempt **any two** : **(2×10=20)**
- 1) Explain Video IF amplifier and video detector of color TV system.
 - 2) With the help block diagram explain PAL encoder and PAL decoder in detail.
 - 3) Discuss advantage of using A.M. for video signals and F.M for audio signals and also explain AMVSB transmission techniques.

Set Q



SECTION – II

4. Attempt **any four** : **(4×5=20)**
- 1) Explain communication modes in multimedia.
 - 2) What are types of multipoint conferencing ? Explain any one type in brief.
 - 3) What are different video compression techniques ? Compare them.
 - 4) What is audio compression ? Explain CD quality audio in detail.
 - 5) What are video applications of multimedia ?
5. Attempt **any two** : **(2×10=20)**
- 1) Explain broadband multi service network in detail.
 - 2) Explain digital video 4 : 2 : 2 format and 4 : 2 : 0 format in detail.
 - 3) Define multimedia. Explain elements of multimedia. Explain entertainment application related to multimedia communication.
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SLR-TJ – 221

Seat No.	
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Set	R
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**B.E. (Electronics & Telecommunication) (Part – II) Examination, 2017
MULTIMEDIA COMMUNICATION TECHNIQUES**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) **All the questions are compulsory.**
 - 4) **Figures to the right indicate full marks.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) Video capture means _____
 - a) Creating video on desktop
 - b) Converting video for computer
 - c) Real time video
 - d) All of these
- 2) As brightness increases the size of chromacity diagram _____
 - a) Reduces
 - b) Increases
 - c) Remains same
 - d) Both a and b
- 3) Maximum bandwidth necessary for transmission of colour signal is around _____
 - a) 1.5 MHz
 - b) 1.3 MHz
 - c) 3 MHz
 - d) None of these
- 4) Compact disc surface does not wear out because the sensor is _____
 - a) Electrical
 - b) Mechanical
 - c) Electronic
 - d) Optical
- 5) Duration of vertical blanking pulse used in India is _____
 - a) 64 microsec
 - b) 100 microsec
 - c) 1280 microsec
 - d) 160 microsec
- 6) The technique of removing the repetition of pattern within each frame is _____
 - a) Temporal redundancy
 - b) Spatial redundancy
 - c) Video capture
 - d) Audio capture
- 7) I signal in NTSC colour TV system is located at 57° with respect to _____
 - a) Colour burst
 - b) R – Y
 - c) B – Y
 - d) G – Y
- 8) The length of tape magnetized by one cycle of audio signal is called recorded _____
 - a) Bar magnet
 - b) Wavelength
 - c) Tape length
 - d) Head gap

P.T.O.



- 9) The outdoor unit is connected to indoor DTH received by
a) Wave Guide b) Coaxial cable c) Twin flat feeder d) Optical fiber
- 10) Which of the following TV uses CCFL as back lighting ?
a) LCD b) LED c) OLED d) CRT
- 11) A _____ on each packet is required for real-time traffic.
a) timestamp b) sequence number
c) both a and b d) none of these
- 12) Real-time traffic needs the support of _____
a) broadcasting b) multicasting c) both a and b d) none of these
- 13) _____ means changing the encoding of a payload to a lower quality to match the bandwidth of the receiving network.
a) Translation b) Mixing c) Both a and b d) None of these
- 14) _____ is a standard to allow telephones on the public telephone network to talk to computers connected to the Internet.
a) SIP b) H.323 c) Q.991 d) None of these
- 15) Hardware that creates sound from a mathematical representation _____
a) Sound Synthesizer b) Stammers
c) Speaker d) Set top box
- 16) In internet each document comprises a linked set of pages and linkage between the pages is known as _____
a) Home page b) Hyperlink c) UTP d) None of these
- 17) NMOD is a term related to
a) Telephony services b) Entertainment application
c) Both a and b d) None of these
- 18) The most common compression technique that is used to create CD quality audio is based on perceptual encoding technique is called _____
a) JPEG b) H.323
c) SIP d) Predictive encoding
- 19) 1080 active scanning lines per frame are used in
a) HDTV b) Analog TV c) CATV d) MATV
- 20) In Audio and Video compression, each frame is divided into small grids called picture element or
a) Frame b) Packet c) Pixel d) Mega pixel
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Seat No.	
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B.E. (Electronics & Telecommunication) (Part – II) Examination, 2017
MULTIMEDIA COMMUNICATION TECHNIQUES

Day and Date : Wednesday, 22-11-2017

Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

- Instructions:** 1) **All the questions are compulsory.**
2) **Figures to the right indicate full marks.**

SECTION – I

2. Attempt **any four** : **(4×5=20)**
- 1) Write about satellite TV system in brief.
 - 2) Explain working of AFT stage in TV receiver with neat block diagram.
 - 3) Explain the terms : Hue and Saturation. What is the difference between luminance and chrominance ?
 - 4) Draw and explain the color composite video signal.
 - 5) Explain what do you mean by magnetic recording and reproduction. Explain in detail.
3. Attempt **any two** : **(2×10=20)**
- 1) Explain Video IF amplifier and video detector of color TV system.
 - 2) With the help block diagram explain PAL encoder and PAL decoder in detail.
 - 3) Discuss advantage of using A.M. for video signals and F.M for audio signals and also explain AMVSB transmission techniques.

Set R



SECTION – II

4. Attempt **any four** : **(4×5=20)**
- 1) Explain communication modes in multimedia.
 - 2) What are types of multipoint conferencing ? Explain any one type in brief.
 - 3) What are different video compression techniques ? Compare them.
 - 4) What is audio compression ? Explain CD quality audio in detail.
 - 5) What are video applications of multimedia ?
5. Attempt **any two** : **(2×10=20)**
- 1) Explain broadband multi service network in detail.
 - 2) Explain digital video 4 : 2 : 2 format and 4 : 2 : 0 format in detail.
 - 3) Define multimedia. Explain elements of multimedia. Explain entertainment application related to multimedia communication.
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SLR-TJ – 221

Seat No.	
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Set	S
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**B.E. (Electronics & Telecommunication) (Part – II) Examination, 2017
MULTIMEDIA COMMUNICATION TECHNIQUES**

Day and Date : Wednesday, 22-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) **All the questions are compulsory.**
 - 4) **Figures to the right indicate full marks.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : **(20×1=20)**
- 1) In internet each document comprises a linked set of pages and linkage between the pages is known as _____
a) Home page b) Hyperlink c) UTP d) None of these
 - 2) NMOD is a term related to
a) Telephony services b) Entertainment application
c) Both a and b d) None of these
 - 3) The most common compression technique that is used to create CD quality audio is based on perceptual encoding technique is called _____
a) JPEG b) H.323
c) SIP d) Predictive encoding
 - 4) 1080 active scanning lines per frame are used in
a) HDTV b) Analog TV c) CATV d) MATV
 - 5) In Audio and Video compression, each frame is divided into small grids called picture element or
a) Frame b) Packet c) Pixel d) Mega pixel
 - 6) Video capture means _____
a) Creating video on desktop b) Converting video for computer
c) Real time video d) All of these
 - 7) As brightness increases the size of chromacity diagram _____
a) Reduces b) Increases c) Remains same d) Both a and b

P.T.O.



- 8) Maximum bandwidth necessary for transmission of colour signal is around _____
a) 1.5 MHz b) 1.3 MHz c) 3 MHz d) None of these
- 9) Compact disc surface does not wear out because the sensor is
a) Electrical b) Mechanical c) Electronic d) Optical
- 10) Duration of vertical blanking pulse used in India is _____
a) 64 microsec b) 100 microsec c) 1280 microsec d) 160 microsec
- 11) The technique of removing the repetition of pattern within each frame is _____
a) Temporal redundancy b) Spatial redundancy
c) Video capture d) Audio capture
- 12) I signal in NTSC colour TV system is located at 57° with respect to _____
a) Colour burst b) R – Y c) B – Y d) G – Y
- 13) The length of tape magnetized by one cycle of audio signal is called recorded _____
a) Bar magnet b) Wavelength c) Tape length d) Head gap
- 14) The outdoor unit is connected to indoor DTH received by
a) Wave Guide b) Coaxial cable c) Twin flat feeder d) Optical fiber
- 15) Which of the following TV uses CCFL as back lighting ?
a) LCD b) LED c) OLED d) CRT
- 16) A _____ on each packet is required for real-time traffic.
a) timestamp b) sequence number
c) both a and b d) none of these
- 17) Real-time traffic needs the support of _____
a) broadcasting b) multicasting c) both a and b d) none of these
- 18) _____ means changing the encoding of a payload to a lower quality to match the bandwidth of the receiving network.
a) Translation b) Mixing c) Both a and b d) None of these
- 19) _____ is a standard to allow telephones on the public telephone network to talk to computers connected to the Internet.
a) SIP b) H.323 c) Q.991 d) None of these
- 20) Hardware that creates sound from a mathematical representation _____
a) Sound Synthesizer b) Stampers
c) Speaker d) Set top box



Seat No.	
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B.E. (Electronics & Telecommunication) (Part – II) Examination, 2017
MULTIMEDIA COMMUNICATION TECHNIQUES

Day and Date : Wednesday, 22-11-2017

Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :** 1) **All the questions are compulsory.**
2) **Figures to the right indicate full marks.**

SECTION – I

2. Attempt **any four** : **(4×5=20)**
- 1) Write about satellite TV system in brief.
 - 2) Explain working of AFT stage in TV receiver with neat block diagram.
 - 3) Explain the terms : Hue and Saturation. What is the difference between luminance and chrominance ?
 - 4) Draw and explain the color composite video signal.
 - 5) Explain what do you mean by magnetic recording and reproduction. Explain in detail.
3. Attempt **any two** : **(2×10=20)**
- 1) Explain Video IF amplifier and video detector of color TV system.
 - 2) With the help block diagram explain PAL encoder and PAL decoder in detail.
 - 3) Discuss advantage of using A.M. for video signals and F.M for audio signals and also explain AMVSB transmission techniques.

Set S



SECTION – II

4. Attempt **any four** : **(4×5=20)**
- 1) Explain communication modes in multimedia.
 - 2) What are types of multipoint conferencing ? Explain any one type in brief.
 - 3) What are different video compression techniques ? Compare them.
 - 4) What is audio compression ? Explain CD quality audio in detail.
 - 5) What are video applications of multimedia ?
5. Attempt **any two** : **(2×10=20)**
- 1) Explain broadband multi service network in detail.
 - 2) Explain digital video 4 : 2 : 2 format and 4 : 2 : 0 format in detail.
 - 3) Define multimedia. Explain elements of multimedia. Explain entertainment application related to multimedia communication.
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SLR-TJ – 222

Seat No.	
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Set

P

**B.E. (E and TC) (Part – II) Examination, 2017
EMBEDDED SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **Assume suitable data if required.**
4) **Figure to right indicate full marks.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : **20**
- 1) The memory which is similar to EEPROMed erased and programmed in blocks instead of one byte at a time is called as
a) PROM b) Flash memory c) ROM d) RAM
 - 2) Which bus is used in Automobile electronics ?
a) I2C b) PCI c) SPI d) CAN
 - 3) The ARM7TDMI-S supports _____, _____ and _____ data types.
a) char, int, float b) char, int, byte
c) byte, half-word, word d) int, char, word
 - 4) Swap instruction in the instruction set of ARM processor is a special case of _____ instruction.
a) Arithmetical b) Logical c) Load-store d) Branch
 - 5) USB 1.1 standard supports _____ data rate.
a) 12 Mbps b) 10 Mbps c) 20 Mbps d) None
 - 6) The address space in ARM is
a) 2^{24} b) 2^{64} c) 2^{16} d) 2^{32}
 - 7) When there is a fail attempt to memory access, the processor enters _____ mode.
a) Abort b) Supervisor
c) User d) Fast interrupt request

P.T.O.



Seat No.	
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**B.E. (E and TC) (Part – II) Examination, 2017
EMBEDDED SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) Assume suitable data **if required**.
2) Figure to **right** indicate **full** marks.

SECTION – I

2. Solve **any four** questions : **(5×4=20)**
- 1) Define Embedded System. Write different applications of embedded systems.
 - 2) Explain embedded system design challenges.
 - 3) Explain concept of three stage pipe line of ARM 7 processor.
 - 4) Explain communication protocol SPI and SSP bus.
 - 5) Explain bus architecture in ARM7.
3. Solve **any two** questions : **(10×2=20)**
- 1) What are operating modes of ARM7 processor ? Draw and explain CPSR format.
 - 2) Describe operation with example of following ARM instructions.
 - a) STR
 - b) MRS
 - c) MOV
 - d) SUB
 - e) BX
 - 3) Explain the concept of following peripherals in LPC2148.
 - a) PLL
 - b) Interrupt controller.



SECTION – II

4. Solve **any four** questions : **(5×4=20)**
- 1) Write different features of RTOS.
 - 2) Difference between micro kernel and monolithic kernel architecture.
 - 3) Explain concept of semaphore with example.
 - 4) Explain Mobile Internet Device (MID).
 - 5) Draw interfacing diagram of relay to LPC2148 and write an embedded C program to change relay switch from NO to NC.
5. Solve **any two** questions : **(10×2=20)**
- 1) What are the types of scheduling algorithm ? Explain the concepts of round time slicing scheduling method for RTOS.
 - 2) Explain task states in RTOS. Explain synchronization in μ cos II RTOS.
 - 3) Interface a stepper motor with LPC2148 for the following specification :
 - i) The motor is connected to port pins P0.4, P0.5, P0.6, P0.7.
 - ii) Rotate motor in clockwise direction.
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SLR-TJ – 222

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Set

Q

**B.E. (E and TC) (Part – II) Examination, 2017
EMBEDDED SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
- 3) **Assume suitable data if required.**
- 4) **Figure to right indicate full marks.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

20

- 1) A semaphore is a protocol mechanism used to
 - a) Control access to a shared resource
 - b) Signal the occurrence of an event
 - c) Allow two tasks to synchronize their activities
 - d) All of above
- 2) The _____ is the part of the kernel responsible for determining which task will run next.
 - a) Scheduler
 - b) Semaphore
 - c) Mailbox
 - d) Mutex
- 3) _____ software allows the system activities to be divided into multiple independent elements called tasks.
 - a) Kernel
 - b) Shell
 - c) Processor
 - d) Device driver
- 4) Information about a task is maintained in a
 - a) Stack
 - b) Translation look aside buffer
 - c) Task control block
 - d) Task condition block
- 5) Cellular handset market is growing at
 - a) 30% per year
 - b) 35% per year
 - c) 40% per year
 - d) 45% per year
- 6) The memory which is similar to EEPROMed erased and programmed in blocks instead of one byte at a time is called as
 - a) PROM
 - b) Flash memory
 - c) ROM
 - d) RAM

P.T.O.



- 7) Which bus is used in Automobile electronics ?
a) I2C b) PCI c) SPI d) CAN
- 8) The ARM7TDMI-S supports _____, _____ and _____ data types.
a) char, int, float b) char, int, byte
c) byte, half-word, word d) int, char, word
- 9) Swap instruction in the instruction set of ARM processor is a special case of _____ instruction.
a) Arithmetical b) Logical c) Load-store d) Branch
- 10) USB 1.1 standard supports _____ data rate.
a) 12 Mbps b) 10 Mbps c) 20 Mbps d) None
- 11) The address space in ARM is
a) 2^{24} b) 2^{64} c) 2^{16} d) 2^{32}
- 12) When there is a fail attempt to memory access, the processor enters _____ mode.
a) Abort b) Supervisor
c) User d) Fast interrupt request
- 13) The SPI bus can operate with a _____ master device/s and with _____ slave device/s.
a) Single, one b) Single, one or more
c) Two, single d) Two, two
- 14) ARM7 architecture support total _____ interrupt sources.
a) 20 b) 30 c) 32 d) 10
- 15) The address system supported by ARM systems is/are
a) Little Endian b) Big Endian c) X-Little Endian d) Both a) and b)
- 16) The interval between the occurrence of an interrupt and start of execution of the ISR is called
a) dead line b) latency c) rest d) none
- 17) Which of the different types multi tasking present in operating system ?
a) Co-operative b) Preemptive
c) Non-preemptive d) All of these
- 18) Which is the core of the OS ?
a) Shell b) Kernel c) Commands d) Scripts
- 19) Inter-task or inter process communication in μC / OS takes place using
a) Semaphores b) Message mailbox
c) Message queues d) All
- 20) Real time systems must have
a) Preemptive kernels b) Non-preemptive kernels
c) Both a) and b) d) Neither a) nor b)



Seat No.	
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**B.E. (E and TC) (Part – II) Examination, 2017
EMBEDDED SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) Assume suitable data **if required**.
2) Figure to **right** indicate **full** marks.

SECTION – I

2. Solve **any four** questions : **(5×4=20)**
- 1) Define Embedded System. Write different applications of embedded systems.
 - 2) Explain embedded system design challenges.
 - 3) Explain concept of three stage pipe line of ARM 7 processor.
 - 4) Explain communication protocol SPI and SSP bus.
 - 5) Explain bus architecture in ARM7.
3. Solve **any two** questions : **(10×2=20)**
- 1) What are operating modes of ARM7 processor ? Draw and explain CPSR format.
 - 2) Describe operation with example of following ARM instructions.
 - a) STR
 - b) MRS
 - c) MOV
 - d) SUB
 - e) BX
 - 3) Explain the concept of following peripherals in LPC2148.
 - a) PLL
 - b) Interrupt controller.



SECTION – II

4. Solve **any four** questions : **(5×4=20)**
- 1) Write different features of RTOS.
 - 2) Difference between micro kernel and monolithic kernel architecture.
 - 3) Explain concept of semaphore with example.
 - 4) Explain Mobile Internet Device (MID).
 - 5) Draw interfacing diagram of relay to LPC2148 and write an embedded C program to change relay switch from NO to NC.
5. Solve **any two** questions : **(10×2=20)**
- 1) What are the types of scheduling algorithm ? Explain the concepts of round time slicing scheduling method for RTOS.
 - 2) Explain task states in RTOS. Explain synchronization in μ cos II RTOS.
 - 3) Interface a stepper motor with LPC2148 for the following specification :
 - i) The motor is connected to port pins P0.4, P0.5, P0.6, P0.7.
 - ii) Rotate motor in clockwise direction.
-



SLR-TJ – 222

Seat No.	
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Set **R**

**B.E. (E and TC) (Part – II) Examination, 2017
EMBEDDED SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
- 3) **Assume suitable data if required.**
- 4) **Figure to right indicate full marks.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : **20**
- 1) The interval between the occurrence of an interrupt and start of execution of the ISR is called
a) dead line b) latency c) rest d) none
 - 2) Which of the different types multi tasking present in operating system ?
a) Co-operative b) Preemptive
c) Non-preemptive d) All of these
 - 3) Which is the core of the OS ?
a) Shell b) Kernel c) Commands d) Scripts
 - 4) Inter-task or inter process communication in $\mu C / OS$ takes place using
a) Semaphores b) Message mailbox
c) Message queues d) All
 - 5) Real time systems must have
a) Preemptive kernels b) Non-preemptive kernels
c) Both a) and b) d) Neither a) nor b)
 - 6) A semaphore is a protocol mechanism used to
a) Control access to a shared resource
b) Signal the occurrence of an event
c) Allow two tasks to synchronize their activities
d) All of above

P.T.O.



- 7) The _____ is the part of the kernel responsible for determining which task will run next.
a) Scheduler b) Semaphore c) Mailbox d) Mutex
- 8) _____ software allows the system activities to be divided into multiple independent elements called tasks.
a) Kernel b) Shell c) Processor d) Device driver
- 9) Information about a task is maintained in a
a) Stack b) Translation look aside buffer
c) Task control block d) Task condition block
- 10) Cellular handset market is growing at
a) 30% per year b) 35% per year c) 40% per year d) 45% per year
- 11) The memory which is similar to EEPROMed erased and programmed in blocks instead of one byte at a time is called as
a) PROM b) Flash memory c) ROM d) RAM
- 12) Which bus is used in Automobile electronics ?
a) I2C b) PCI c) SPI d) CAN
- 13) The ARM7TDMI-S supports _____, _____ and _____ data types.
a) char, int, float b) char, int, byte
c) byte, half-word, word d) int, char, word
- 14) Swap instruction in the instruction set of ARM processor is a special case of _____ instruction.
a) Arithmetical b) Logical c) Load-store d) Branch
- 15) USB 1.1 standard supports _____ data rate.
a) 12 Mbps b) 10 Mbps c) 20 Mbps d) None
- 16) The address space in ARM is
a) 2^{24} b) 2^{64} c) 2^{16} d) 2^{32}
- 17) When there is a fail attempt to memory access, the processor enters _____ mode.
a) Abort b) Supervisor
c) User d) Fast interrupt request
- 18) The SPI bus can operate with a _____ master device/s and with _____ slave device/s.
a) Single, one b) Single, one or more
c) Two, single d) Two, two
- 19) ARM7 architecture support total _____ interrupt sources.
a) 20 b) 30 c) 32 d) 10
- 20) The address system supported by ARM systems is/are
a) Little Endian b) Big Endian c) X-Little Endian d) Both a) and b)



Seat No.	
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**B.E. (E and TC) (Part – II) Examination, 2017
EMBEDDED SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) Assume suitable data **if required**.
2) Figure to **right** indicate **full** marks.

SECTION – I

2. Solve **any four** questions : **(5×4=20)**
- 1) Define Embedded System. Write different applications of embedded systems.
 - 2) Explain embedded system design challenges.
 - 3) Explain concept of three stage pipe line of ARM 7 processor.
 - 4) Explain communication protocol SPI and SSP bus.
 - 5) Explain bus architecture in ARM7.
3. Solve **any two** questions : **(10×2=20)**
- 1) What are operating modes of ARM7 processor ? Draw and explain CPSR format.
 - 2) Describe operation with example of following ARM instructions.
 - a) STR
 - b) MRS
 - c) MOV
 - d) SUB
 - e) BX
 - 3) Explain the concept of following peripherals in LPC2148.
 - a) PLL
 - b) Interrupt controller.



SECTION – II

4. Solve **any four** questions : **(5×4=20)**
- 1) Write different features of RTOS.
 - 2) Difference between micro kernel and monolithic kernel architecture.
 - 3) Explain concept of semaphore with example.
 - 4) Explain Mobile Internet Device (MID).
 - 5) Draw interfacing diagram of relay to LPC2148 and write an embedded C program to change relay switch from NO to NC.
5. Solve **any two** questions : **(10×2=20)**
- 1) What are the types of scheduling algorithm ? Explain the concepts of round time slicing scheduling method for RTOS.
 - 2) Explain task states in RTOS. Explain synchronization in μ cos II RTOS.
 - 3) Interface a stepper motor with LPC2148 for the following specification :
 - i) The motor is connected to port pins P0.4, P0.5, P0.6, P0.7.
 - ii) Rotate motor in clockwise direction.
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SLR-TJ – 222

Seat No.	
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Set

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**B.E. (E and TC) (Part – II) Examination, 2017
EMBEDDED SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
3) **Assume suitable data if required.**
4) **Figure to right indicate full marks.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : **20**
- 1) The address space in ARM is
a) 2^{24} b) 2^{64} c) 2^{16} d) 2^{32}
 - 2) When there is a fail attempt to memory access, the processor enters _____ mode.
a) Abort b) Supervisor
c) User d) Fast interrupt request
 - 3) The SPI bus can operate with a _____ master device/s and with _____ slave device/s.
a) Single, one b) Single, one or more
c) Two, single d) Two, two
 - 4) ARM7 architecture support total _____ interrupt sources.
a) 20 b) 30 c) 32 d) 10
 - 5) The address system supported by ARM systems is/are
a) Little Endian b) Big Endian c) X-Little Endian d) Both a) and b)
 - 6) The interval between the occurrence of an interrupt and start of execution of the ISR is called
a) dead line b) latency c) rest d) none
 - 7) Which of the different types multi tasking present in operating system ?
a) Co-operative b) Preemptive
c) Non-preemptive d) All of these

P.T.O.



- 8) Which is the core of the OS ?
a) Shell b) Kernel c) Commands d) Scripts
- 9) Inter-task or inter process communication in μC / OS takes place using
a) Semaphores b) Message mailbox
c) Message queues d) All
- 10) Real time systems must have
a) Preemptive kernels b) Non-preemptive kernels
c) Both a) and b) d) Neither a) nor b)
- 11) A semaphore is a protocol mechanism used to
a) Control access to a shared resource
b) Signal the occurrence of an event
c) Allow two tasks to synchronize their activities
d) All of above
- 12) The _____ is the part of the kernel responsible for determining which task will run next.
a) Scheduler b) Semaphore c) Mailbox d) Mutex
- 13) _____ software allows the system activities to be divided into multiple independent elements called tasks.
a) Kernel b) Shell c) Processor d) Device driver
- 14) Information about a task is maintained in a
a) Stack b) Translation look aside buffer
c) Task control block d) Task condition block
- 15) Cellular handset market is growing at
a) 30% per year b) 35% per year c) 40% per year d) 45% per year
- 16) The memory which is similar to EEPROMed erased and programmed in blocks instead of one byte at a time is called as
a) PROM b) Flash memory c) ROM d) RAM
- 17) Which bus is used in Automobile electronics ?
a) I2C b) PCI c) SPI d) CAN
- 18) The ARM7TDMI-S supports _____, _____ and _____ data types.
a) char, int, float b) char, int, byte
c) byte, half-word, word d) int, char, word
- 19) Swap instruction in the instruction set of ARM processor is a special case of _____ instruction.
a) Arithmetical b) Logical c) Load-store d) Branch
- 20) USB 1.1 standard supports _____ data rate.
a) 12 Mbps b) 10 Mbps c) 20 Mbps d) None



Seat No.	
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**B.E. (E and TC) (Part – II) Examination, 2017
EMBEDDED SYSTEMS**

Day and Date : Thursday, 23-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) Assume suitable data **if required**.
2) Figure to **right** indicate **full** marks.

SECTION – I

2. Solve **any four** questions : **(5×4=20)**
- 1) Define Embedded System. Write different applications of embedded systems.
 - 2) Explain embedded system design challenges.
 - 3) Explain concept of three stage pipe line of ARM 7 processor.
 - 4) Explain communication protocol SPI and SSP bus.
 - 5) Explain bus architecture in ARM7.
3. Solve **any two** questions : **(10×2=20)**
- 1) What are operating modes of ARM7 processor ? Draw and explain CPSR format.
 - 2) Describe operation with example of following ARM instructions.
 - a) STR
 - b) MRS
 - c) MOV
 - d) SUB
 - e) BX
 - 3) Explain the concept of following peripherals in LPC2148.
 - a) PLL
 - b) Interrupt controller.



SECTION – II

4. Solve **any four** questions : **(5×4=20)**
- 1) Write different features of RTOS.
 - 2) Difference between micro kernel and monolithic kernel architecture.
 - 3) Explain concept of semaphore with example.
 - 4) Explain Mobile Internet Device (MID).
 - 5) Draw interfacing diagram of relay to LPC2148 and write an embedded C program to change relay switch from NO to NC.
5. Solve **any two** questions : **(10×2=20)**
- 1) What are the types of scheduling algorithm ? Explain the concepts of round time slicing scheduling method for RTOS.
 - 2) Explain task states in RTOS. Explain synchronization in μ cos II RTOS.
 - 3) Interface a stepper motor with LPC2148 for the following specification :
 - i) The motor is connected to port pins P0.4, P0.5, P0.6, P0.7.
 - ii) Rotate motor in clockwise direction.
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SLR-TJ – 223

Seat No.	
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Set	P
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B.E. Electronics and Telecommunication Engineering (Part – II)
Examination, 2017
WIRELESS SENSOR NETWORKS (Elective – II)

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Select an appropriate option :

(20×1=20)

- 1) _____ is a basic unit with on board sensors, processor, memory, wireless modem and power supply.
 - a) sensor
 - b) sensor node
 - c) routing
 - d) none of the above
- 2) Sensor network is subject to a unique set of resource constraints such as
 - a) finite on board battery power
 - b) limited n/w connection bandwidth
 - c) both (a) and (b)
 - d) none of the above
- 3) Advantage of sensor network is
 - a) Energy
 - b) Detection
 - c) Both (a) and (b)
 - d) None of the above
- 4) In wireless adhoc network
 - a) access point is not required
 - b) access point is required
 - c) nodes are not required
 - d) none of the above
- 5) The network in which all the nodes are symmetric and there is no central control or hierarchy is
 - a) MANET
 - b) Client Server Technology
 - c) Peer to Peer
 - d) None of the above
- 6) In WSNs, _____ mobility is viewed.
 - a) Node
 - b) Sink
 - c) Event
 - d) All of the above
- 7) _____ is an ability to keep the network alive and maintain the network performance characteristics irrespective of size of the network.
 - a) Mobility
 - b) Scalability
 - c) Energy
 - d) None of above
- 8) _____ cross layer plane is required.
 - a) power management
 - b) mobility management
 - c) task management
 - d) all of above

P.T.O.



- 9) _____ is the main concern in designing time synchronization protocols.
- a) Energy efficiency
 - b) Power consumption
 - c) Both (a) and (b)
 - d) None of the above
- 10) Performance of time synchronization protocol is closely related with
- a) network topology
 - b) power
 - c) frames
 - d) none of the above
- 11) MAC stands for
- a) Medium Access Control
 - b) Medium Action Control
 - c) Medium Access Character
 - d) None of the above
- 12) _____ MAC protocol is widely used in modern cellular communication systems.
- a) TDMA
 - b) FDMA
 - c) CDMA
 - d) All of the above
- 13) _____ is the basic task of all MAC protocols.
- a) Collision avoidance
 - b) Energy Efficiency
 - c) Scalability
 - d) None of the above
- 14) Main role of time synchronization in distributed networks is to
- a) ensure common time scale for all network nodes
 - b) provide right temporal coordination among all nodes
 - c) both (a) and (b)
 - d) none of the above
- 15) BS stands for
- a) Base Station
 - b) Base Service
 - c) Best Station
 - d) None of the above
- 16) _____ is the ability of a system to function properly in an environment where other electromagnetic devices are used and not itself be a source of EMI.
- a) EMC
 - b) Selection
 - c) Both (a) and (b)
 - d) None of the above
- 17) _____ is the interference caused when radio waves of one device distorts the waves of another.
- a) EMI
 - b) EMC
 - c) Both (a) and (b)
 - d) None of the above
- 18) _____ tags have a no battery.
- a) Active RFID
 - b) Passive RFID
 - c) Both (a) and (b)
 - d) None of the above
- 19) _____ is the application of RFID.
- a) Identification and data capture
 - b) Health-care
 - c) Massive incidents
 - d) All of the above
- 20) RFID physical layer design automation allow _____ of new RFID specifications and standards.
- a) design
 - b) optimization
 - c) verification
 - d) all of the above



Seat No.	
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B.E. Electronics and Telecommunication Engineering (Part – II)
Examination, 2017
WIRELESS SENSOR NETWORKS (Elective – II)

Day and Date : Friday, 24-11-2017

Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

2. Solve **any four** : **20**
- a) What are the various applications of Mobile Adhoc Networks ?
 - b) Explain the various hardware components of Single Node architecture.
 - c) Explain Operating Systems and Execution Environments.
 - d) Write a note on clustering.
 - e) Explain the optimization goals of network architecture.
3. Solve **any two** of the following : **20**
- a) Explain localization and positioning.
 - b) Write a note on energy consumption of sensor nodes and gateway concept.
 - c) Explain the various Enabling Technologies for Wireless Sensor Networks. Mention the various applications of WSN.
4. Solve **any four** : **20**
- a) Explain the concept of wake-up in MAC protocol.
 - b) Write a note on Antenna directivity and gain.
 - c) Explain the use of RFID in massive incidents.
 - d) What are the EMC requirements for Electronic System ?
 - e) Explain any one schedule based protocol.
5. Solve **any two** of the following : **20**
- a) Explain IEEE 802.15.4 MAC protocol.
 - b) Explain RFID Controller Design Automation.
 - c) Explain the application of RFID in identification and data capture.



SLR-TJ – 223

Seat No.	
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Set	Q
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B.E. Electronics and Telecommunication Engineering (Part – II)
Examination, 2017
WIRELESS SENSOR NETWORKS (Elective – II)

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Select an appropriate option : **(20×1=20)**
- 1) _____ is the ability of a system to function properly in an environment where other electromagnetic devices are used and not itself be a source of EMI.
a) EMC
b) Selection
c) Both (a) and (b)
d) None of the above
 - 2) _____ is the interference caused when radio waves of one device distorts the waves of another.
a) EMI
b) EMC
c) Both (a) and (b)
d) None of the above
 - 3) _____ tags have a no battery.
a) Active RFID
b) Passive RFID
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d) All of the above
 - 5) RFID physical layer design automation allow _____ of new RFID specifications and standards.
a) design
b) optimization
c) verification
d) all of the above
 - 6) _____ is a basic unit with on board sensors, processor, memory, wireless modem and power supply.
a) sensor
b) sensor node
c) routing
d) none of the above
 - 7) Sensor network is subject to a unique set of resource constraints such as
a) finite on board battery power
b) limited n/w connection bandwidth
c) both (a) and (b)
d) none of the above
 - 8) Advantage of sensor network is
a) Energy
b) Detection
c) Both (a) and (b)
d) None of the above

P.T.O.



- 9) In wireless adhoc network
- a) access point is not required
 - b) access point is required
 - c) nodes are not required
 - d) none of the above
- 10) The network in which all the nodes are symmetric and there is no central control or hierarchy is
- a) MANET
 - b) Client Server Technology
 - c) Peer to Peer
 - d) None of the above
- 11) In WSNs, _____ mobility is viewed.
- a) Node
 - b) Sink
 - c) Event
 - d) All of the above
- 12) _____ is an ability to keep the network alive and maintain the network performance characteristics irrespective of size of the network.
- a) Mobility
 - b) Scalability
 - c) Energy
 - d) None of above
- 13) _____ cross layer plane is required.
- a) power management
 - b) mobility management
 - c) task management
 - d) all of above
- 14) _____ is the main concern in designing time synchronization protocols.
- a) Energy efficiency
 - b) Power consumption
 - c) Both (a) and (b)
 - d) None of the above
- 15) Performance of time synchronization protocol is closely related with
- a) network topology
 - b) power
 - c) frames
 - d) none of the above
- 16) MAC stands for
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 - b) Medium Action Control
 - c) Medium Access Character
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- 19) Main role of time synchronization in distributed networks is to
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 - c) both (a) and (b)
 - d) none of the above
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- a) Base Station
 - b) Base Service
 - c) Best Station
 - d) None of the above
-



Seat No.	
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B.E. Electronics and Telecommunication Engineering (Part – II)
Examination, 2017
WIRELESS SENSOR NETWORKS (Elective – II)

Day and Date : Friday, 24-11-2017

Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

2. Solve **any four** : **20**
- a) What are the various applications of Mobile Adhoc Networks ?
 - b) Explain the various hardware components of Single Node architecture.
 - c) Explain Operating Systems and Execution Environments.
 - d) Write a note on clustering.
 - e) Explain the optimization goals of network architecture.
3. Solve **any two** of the following : **20**
- a) Explain localization and positioning.
 - b) Write a note on energy consumption of sensor nodes and gateway concept.
 - c) Explain the various Enabling Technologies for Wireless Sensor Networks. Mention the various applications of WSN.
4. Solve **any four** : **20**
- a) Explain the concept of wake-up in MAC protocol.
 - b) Write a note on Antenna directivity and gain.
 - c) Explain the use of RFID in massive incidents.
 - d) What are the EMC requirements for Electronic System ?
 - e) Explain any one schedule based protocol.
5. Solve **any two** of the following : **20**
- a) Explain IEEE 802.15.4 MAC protocol.
 - b) Explain RFID Controller Design Automation.
 - c) Explain the application of RFID in identification and data capture.



SLR-TJ – 223

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Set	R
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B.E. Electronics and Telecommunication Engineering (Part – II)
Examination, 2017
WIRELESS SENSOR NETWORKS (Elective – II)

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Select an appropriate option :

(20×1=20)

- 1) MAC stands for
 - a) Medium Access Control
 - b) Medium Action Control
 - c) Medium Access Character
 - d) None of the above
- 2) _____ MAC protocol is widely used in modern cellular communication systems.
 - a) TDMA
 - b) FDMA
 - c) CDMA
 - d) All of the above
- 3) _____ is the basic task of all MAC protocols.
 - a) Collision avoidance
 - b) Energy Efficiency
 - c) Scalability
 - d) None of the above
- 4) Main role of time synchronization in distributed networks is to
 - a) ensure common time scale for all network nodes
 - b) provide right temporal coordination among all nodes
 - c) both (a) and (b)
 - d) none of the above
- 5) BS stands for
 - a) Base Station
 - b) Base Service
 - c) Best Station
 - d) None of the above
- 6) _____ is the ability of a system to function properly in an environment where other electromagnetic devices are used and not itself be a source of EMI.
 - a) EMC
 - b) Selection
 - c) Both (a) and (b)
 - d) None of the above
- 7) _____ is the interference caused when radio waves of one device distorts the waves of another.
 - a) EMI
 - b) EMC
 - c) Both (a) and (b)
 - d) None of the above
- 8) _____ tags have a no battery.
 - a) Active RFID
 - b) Passive RFID
 - c) Both (a) and (b)
 - d) None of the above

P.T.O.



- 9) _____ is the application of RFID.
- a) Identification and data capture
 - b) Health-care
 - c) Massive incidents
 - d) All of the above
- 10) RFID physical layer design automation allow _____ of new RFID specifications and standards.
- a) design
 - b) optimization
 - c) verification
 - d) all of the above
- 11) _____ is a basic unit with on board sensors, processor, memory, wireless modem and power supply.
- a) sensor
 - b) sensor node
 - c) routing
 - d) none of the above
- 12) Sensor network is subject to a unique set of resource constraints such as
- a) finite on board battery power
 - b) limited n/w connection bandwidth
 - c) both (a) and (b)
 - d) none of the above
- 13) Advantage of sensor network is
- a) Energy
 - b) Detection
 - c) Both (a) and (b)
 - d) None of the above
- 14) In wireless adhoc network
- a) access point is not required
 - b) access point is required
 - c) nodes are not required
 - d) none of the above
- 15) The network in which all the nodes are symmetric and there is no central control or hierarchy is
- a) MANET
 - b) Client Server Technology
 - c) Peer to Peer
 - d) None of the above
- 16) In WSNs, _____ mobility is viewed.
- a) Node
 - b) Sink
 - c) Event
 - d) All of the above
- 17) _____ is an ability to keep the network alive and maintain the network performance characteristics irrespective of size of the network.
- a) Mobility
 - b) Scalability
 - c) Energy
 - d) None of above
- 18) _____ cross layer plane is required.
- a) power management
 - b) mobility management
 - c) task management
 - d) all of above
- 19) _____ is the main concern in designing time synchronization protocols.
- a) Energy efficiency
 - b) Power consumption
 - c) Both (a) and (b)
 - d) None of the above
- 20) Performance of time synchronization protocol is closely related with
- a) network topology
 - b) power
 - c) frames
 - d) none of the above



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B.E. Electronics and Telecommunication Engineering (Part – II)
Examination, 2017
WIRELESS SENSOR NETWORKS (Elective – II)

Day and Date : Friday, 24-11-2017

Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

2. Solve **any four** : **20**
- a) What are the various applications of Mobile Adhoc Networks ?
 - b) Explain the various hardware components of Single Node architecture.
 - c) Explain Operating Systems and Execution Environments.
 - d) Write a note on clustering.
 - e) Explain the optimization goals of network architecture.
3. Solve **any two** of the following : **20**
- a) Explain localization and positioning.
 - b) Write a note on energy consumption of sensor nodes and gateway concept.
 - c) Explain the various Enabling Technologies for Wireless Sensor Networks. Mention the various applications of WSN.
4. Solve **any four** : **20**
- a) Explain the concept of wake-up in MAC protocol.
 - b) Write a note on Antenna directivity and gain.
 - c) Explain the use of RFID in massive incidents.
 - d) What are the EMC requirements for Electronic System ?
 - e) Explain any one schedule based protocol.
5. Solve **any two** of the following : **20**
- a) Explain IEEE 802.15.4 MAC protocol.
 - b) Explain RFID Controller Design Automation.
 - c) Explain the application of RFID in identification and data capture.



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Seat No.	
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Set	S
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B.E. Electronics and Telecommunication Engineering (Part – II)
Examination, 2017
WIRELESS SENSOR NETWORKS (Elective – II)

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Select an appropriate option :

(20×1=20)

- 1) In WSNs, _____ mobility is viewed.
 - a) Node
 - b) Sink
 - c) Event
 - d) All of the above
- 2) _____ is an ability to keep the network alive and maintain the network performance characteristics irrespective of size of the network.
 - a) Mobility
 - b) Scalability
 - c) Energy
 - d) None of above
- 3) _____ cross layer plane is required.
 - a) power management
 - b) mobility management
 - c) task management
 - d) all of above
- 4) _____ is the main concern in designing time synchronization protocols.
 - a) Energy efficiency
 - b) Power consumption
 - c) Both (a) and (b)
 - d) None of the above
- 5) Performance of time synchronization protocol is closely related with
 - a) network topology
 - b) power
 - c) frames
 - d) none of the above
- 6) MAC stands for
 - a) Medium Access Control
 - b) Medium Action Control
 - c) Medium Access Character
 - d) None of the above
- 7) _____ MAC protocol is widely used in modern cellular communication systems.
 - a) TDMA
 - b) FDMA
 - c) CDMA
 - d) All of the above
- 8) _____ is the basic task of all MAC protocols.
 - a) Collision avoidance
 - b) Energy Efficiency
 - c) Scalability
 - d) None of the above
- 9) Main role of time synchronization in distributed networks is to
 - a) ensure common time scale for all network nodes
 - b) provide right temporal coordination among all nodes
 - c) both (a) and (b)
 - d) none of the above

P.T.O.



- 10) BS stands for
a) Base Station
b) Base Service
c) Best Station
d) None of the above
- 11) _____ is the ability of a system to function properly in an environment where other electromagnetic devices are used and not itself be a source of EMI.
a) EMC
b) Selection
c) Both (a) and (b)
d) None of the above
- 12) _____ is the interference caused when radio waves of one device distorts the waves of another.
a) EMI
b) EMC
c) Both (a) and (b)
d) None of the above
- 13) _____ tags have a no battery.
a) Active RFID
b) Passive RFID
c) Both (a) and (b)
d) None of the above
- 14) _____ is the application of RFID.
a) Identification and data capture
b) Health-care
c) Massive incidents
d) All of the above
- 15) RFID physical layer design automation allow _____ of new RFID specifications and standards.
a) design
b) optimization
c) verification
d) all of the above
- 16) _____ is a basic unit with on board sensors, processor, memory, wireless modem and power supply.
a) sensor
b) sensor node
c) routing
d) none of the above
- 17) Sensor network is subject to a unique set of resource constraints such as
a) finite on board battery power
b) limited n/w connection bandwidth
c) both (a) and (b)
d) none of the above
- 18) Advantage of sensor network is
a) Energy
b) Detection
c) Both (a) and (b)
d) None of the above
- 19) In wireless adhoc network
a) access point is not required
b) access point is required
c) nodes are not required
d) none of the above
- 20) The network in which all the nodes are symmetric and there is no central control or hierarchy is
a) MANET
b) Client Server Technology
c) Peer to Peer
d) None of the above
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B.E. Electronics and Telecommunication Engineering (Part – II)
Examination, 2017
WIRELESS SENSOR NETWORKS (Elective – II)

Day and Date : Friday, 24-11-2017

Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

2. Solve **any four** : **20**
- a) What are the various applications of Mobile Adhoc Networks ?
 - b) Explain the various hardware components of Single Node architecture.
 - c) Explain Operating Systems and Execution Environments.
 - d) Write a note on clustering.
 - e) Explain the optimization goals of network architecture.
3. Solve **any two** of the following : **20**
- a) Explain localization and positioning.
 - b) Write a note on energy consumption of sensor nodes and gateway concept.
 - c) Explain the various Enabling Technologies for Wireless Sensor Networks. Mention the various applications of WSN.
4. Solve **any four** : **20**
- a) Explain the concept of wake-up in MAC protocol.
 - b) Write a note on Antenna directivity and gain.
 - c) Explain the use of RFID in massive incidents.
 - d) What are the EMC requirements for Electronic System ?
 - e) Explain any one schedule based protocol.
5. Solve **any two** of the following : **20**
- a) Explain IEEE 802.15.4 MAC protocol.
 - b) Explain RFID Controller Design Automation.
 - c) Explain the application of RFID in identification and data capture.



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Seat No.	
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Set **P**

**B.E. (E&TC) (Part – II) Examination, 2017
PATTERN RECOGNITION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Assume **suitable** data if required.
 - 4) Figures to the **right** indicate **full** marks.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct option from the following : (20×1=20)

- 1) The covariance matrix Σ is always
 - a) Non-symmetric and negative semidefinite
 - b) Symmetric and positive semidefinite
 - c) Non-symmetric and positive semidefinite
 - d) Symmetric and negative semidefinite
- 2) Classifier that places a pattern in one of only two categories is called
 - a) Chotomizer
 - b) Trichomizer
 - c) Economizer
 - d) Dichotomizer
- 3) A classifier that uses linear discriminant functions is called
 - a) Minimum-error-rate classifier
 - b) Linear machine
 - c) Hidden Markov model
 - d) All of the above
- 4) If a and b are vectors, the symmetry property is given as
 - a) $D(a, b) > 0$
 - b) $D(a, b) = 0$
 - c) $D(a, b) = D(b, a)$
 - d) All of the above
- 5) The value of discriminant function $g(x) < 0$, in two category classifier indicates that
 - a) Sample belongs to w_1
 - b) Sample belong to w_2
 - c) Sample on boundary
 - d) None
- 6) Bayes formula is given as
 - a) Posterior = (Likelihood * Prior)/Evidence
 - b) Posterior = (Prior * Evidence)/Likelihood
 - c) Posterior = (Likelihood * Evidence * Prior)
 - d) Posterior = (Likelihood * Evidence)/Prior
- 7) Determining transition probabilities for given hidden and visible states is called as
 - a) Evaluation problem
 - b) Decoding problem
 - c) Learning problem
 - d) None of the above

P.T.O.



- 8) The function $\lambda(\alpha_i | w_j)$ describes the loss incurred for taking action α_i when the state of the nature is w_j is called
- Loss function
 - Discriminant function
 - Gaussian function
 - None of the above
- 9) HMM have found greatest use in
- Character recognition
 - Speech recognition
 - Gesture recognition
 - Both b) and c)
- 10) If the sequence has the property that whenever two samples are in the same cluster at level K, they remain together at all higher levels, then sequence is said to be
- Hierarchical clustered
 - On-line clustered
 - Tree-clustered
 - All of the above
- 11) What gives on algebraic measure of the distance from x to the hyperplane ?
- Discriminant function
 - Nearest neighbor rule
 - Bayes rule
 - None of these
- 12) The input dependent information other than from the target itself is used to
- Improve our recognizer
 - To improve the patterns
 - To decide input
 - None of the above
- 13) Which of the following criterion function measures the clustering quality ?
- Perception criterion function
 - Sum-of-squared-error criterion function
 - Linear discriminant function
 - None of these
- 14) Newton's algorithm is not applicable if the Hessian matrix is
- Normal
 - Singular
 - Both a) and b)
 - None
- 15) Procedures that use unlabelled samples are said to be
- Supervised
 - Discriminant
 - Unsupervised
 - None of the above
- 16) Parzen-window classifier depends upon the choice of
- No. of sample points
 - Window function
 - Both a) and b)
 - None of the above
- 17) The solution vector exists on
- Negative side of every hyperplane
 - Positive side of every hyperplane
 - Both sides
 - None of the above
- 18) Parzen window method is used for
- Estimating error rate
 - Estimating nearest neighbour
 - Estimating density
 - All of the above
- 19) If the overlapping between component densities of normal mixture is small then the convergence is
- Slow
 - Fast
 - Moderate
 - Unchange
- 20) For the 'Salmon' and 'Sea bass' fish example length is a _____ factor.
- Impracticable
 - Strong
 - Poor
 - None of the above



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
PATTERN RECOGNITION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) Assume **suitable** data if required.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any four** : **(4×6=24)**

a) Find constant c so that the function f(x) is a density function. Also find P (2 < X < 3)

$$f(x) = c(x-1), \quad 1 < x < 4$$
$$= 0, \quad \text{otherwise}$$

b) Explain Bayes formula for classification.

c) Define :

a) Feature space

b) Risk

d) What is general principle estimation of maximum likelihood estimation ?

e) Obtain an expression for linear discriminant function for two category case.

3. Attempt **any two** : **(2×8=16)**

a) Explain Hidden Markov Models (HMM) and give HMM backward algorithm.

b) Briefly explain design cycle in Pattern Recognition systems.

c) The joint density function of two continuous random variables is given by

$$f(x, y) = Cxy, \quad 0 < x < 2, 1 < y < 3$$
$$= 0, \quad \text{otherwise}$$

Find :

a) Constant C

b) P(0 < X < 1, 1 < Y < 2)

c) Marginal Distribution function of X and Y

Set P



SECTION – II

4. Attempt **any four** : **(4×6=24)**
- a) Explain Wards method.
 - b) What do you mean by knowledge representations ?
 - c) What is nearest neighbour rule ?
 - d) Write a note on simulated annealing.
 - e) Explain feed-forward network.
5. Attempt **any two** : **(2×8=16)**
- a) Give an expression for linear discriminate function in multcategory cases.
 - b) Explain relaxation procedure as a criteria function for classifier design.
 - c) Write a note on hierarchichal clustering and partitional clustering.
-



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Seat No.	
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Set **Q**

**B.E. (E&TC) (Part – II) Examination, 2017
PATTERN RECOGNITION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Assume **suitable** data if required.
 - 4) Figures to the **right** indicate **full** marks.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct option from the following : **(20×1=20)**

- 1) Parzen-window classifier depends upon the choice of
 - a) No. of sample points
 - b) Window function
 - c) Both a) and b)
 - d) None of the above
- 2) The solution vector exists on
 - a) Negative side of every hyperplane
 - b) Positive side of every hyperplane
 - c) Both sides
 - d) None of the above
- 3) Parzen window method is used for
 - a) Estimating error rate
 - b) Estimating nearest neighbour
 - c) Estimating density
 - d) All of the above
- 4) If the overlapping between component densities of normal mixture is small then the convergence is
 - a) Slow
 - b) Fast
 - c) Moderate
 - d) Unchange
- 5) For the 'Salmon' and 'Sea bass' fish example length is a _____ factor.
 - a) Impracticable
 - b) Strong
 - c) Poor
 - d) None of the above
- 6) The covariance matrix Σ is always
 - a) Non-symmetric and negative semidefinite
 - b) Symmetric and positive semidefinite
 - c) Non-symmetric and positive semidefinite
 - d) Symmetric and negative semidefinite
- 7) Classifier that places a pattern in one of only two categories is called
 - a) Chotomizer
 - b) Trichomizer
 - c) Economizer
 - d) Dichotomizer
- 8) A classifier that uses linear discriminant functions is called
 - a) Minimum-error-rate classifier
 - b) Linear machine
 - c) Hidden Markov model
 - d) All of the above

P.T.O.



- 9) If a and b are vectors, the symmetry property is given as
- $D(a, b) \geq 0$
 - $D(a, b) = 0$
 - $D(a, b) = D(b, a)$
 - All of the above
- 10) The value of discriminant function $g(x) < 0$, in two category classifier indicates that
- Sample belongs to w_1
 - Sample belong to w_2
 - Sample on boundary
 - None
- 11) Bayes formula is given as
- Posterior = (Likelihood * Prior)/Evidence
 - Posterior = (Prior * Evidence)/Likelihood
 - Posterior = (Likelihood * Evidence * Prior)
 - Posterior = (Likelihood * Evidence)/Prior
- 12) Determining transition probabilities for given hidden and visible states is called as
- Evaluation problem
 - Decoding problem
 - Learning problem
 - None of the above
- 13) The function $\lambda(\alpha_i | w_j)$ describes the loss incurred for taking action α_i when the state of the nature is w_j is called
- Loss function
 - Discriminant function
 - Gaussian function
 - None of the above
- 14) HMM have found greatest use in
- Character recognition
 - Speech recognition
 - Gesture recognition
 - Both b) and c)
- 15) If the sequence has the property that whenever two samples are in the same cluster at level K , they remain together at all higher levels, then sequence is said to be
- Hierarchical clustered
 - On-line clustered
 - Tree-clustered
 - All of the above
- 16) What gives an algebraic measure of the distance from x to the hyperplane ?
- Discriminant function
 - Nearest neighbor rule
 - Bayes rule
 - None of these
- 17) The input dependent information other than from the target itself is used to
- Improve our recognizer
 - To improve the patterns
 - To decide input
 - None of the above
- 18) Which of the following criterion function measures the clustering quality ?
- Perception criterion function
 - Sum-of-squared-error criterion function
 - Linear discriminant function
 - None of these
- 19) Newton's algorithm is not applicable if the Hessian matrix is
- Normal
 - Singular
 - Both a) and b)
 - None
- 20) Procedures that use unlabelled samples are said to be
- Supervised
 - Discriminant
 - Unsupervised
 - None of the above



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
PATTERN RECOGNITION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) Assume **suitable** data if required.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any four** : **(4×6=24)**

a) Find constant c so that the function f(x) is a density function. Also find P (2 < X < 3)

$$f(x) = c(x-1), \quad 1 < x < 4$$
$$= 0, \quad \text{otherwise}$$

b) Explain Bayes formula for classification.

c) Define :

a) Feature space

b) Risk

d) What is general principle estimation of maximum likelihood estimation ?

e) Obtain an expression for linear discriminant function for two category case.

3. Attempt **any two** : **(2×8=16)**

a) Explain Hidden Markov Models (HMM) and give HMM backward algorithm.

b) Briefly explain design cycle in Pattern Recognition systems.

c) The joint density function of two continuous random variables is given by

$$f(x, y) = Cxy, \quad 0 < x < 2, 1 < y < 3$$
$$= 0, \quad \text{otherwise}$$

Find :

a) Constant C

b) P(0 < X < 1, 1 < Y < 2)

c) Marginal Distribution function of X and Y

Set Q



SECTION – II

4. Attempt **any four** : **(4×6=24)**
- a) Explain Wards method.
 - b) What do you mean by knowledge representations ?
 - c) What is nearest neighbour rule ?
 - d) Write a note on simulated annealing.
 - e) Explain feed-forward network.
5. Attempt **any two** : **(2×8=16)**
- a) Give an expression for linear discriminate function in multcategory cases.
 - b) Explain relaxation procedure as a criteria function for classifier design.
 - c) Write a note on hierarchichal clustering and partitional clustering.
-



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Seat No.	
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Set **R**

**B.E. (E&TC) (Part – II) Examination, 2017
PATTERN RECOGNITION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Assume **suitable** data if required.
 - 4) Figures to the **right** indicate **full** marks.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct option from the following : **(20×1=20)**
- 1) What gives an algebraic measure of the distance from x to the hyperplane ?
 - a) Discriminant function
 - b) Nearest neighbor rule
 - c) Bayes rule
 - d) None of these
 - 2) The input dependent information other than from the target itself is used to
 - a) Improve our recognizer
 - b) To improve the patterns
 - c) To decide input
 - d) None of the above
 - 3) Which of the following criterion function measures the clustering quality ?
 - a) Perception criterion function
 - b) Sum-of-squared-error criterion function
 - c) Linear discriminant function
 - d) None of these
 - 4) Newton's algorithm is not applicable if the Hessian matrix is
 - a) Normal
 - b) Singular
 - c) Both a) and b)
 - d) None
 - 5) Procedures that use unlabelled samples are said to be
 - a) Supervised
 - b) Discriminant
 - c) Unsupervised
 - d) None of the above
 - 6) Parzen-window classifier depends upon the choice of
 - a) No. of sample points
 - b) Window function
 - c) Both a) and b)
 - d) None of the above
 - 7) The solution vector exists on
 - a) Negative side of every hyperplane
 - b) Positive side of every hyperplane
 - c) Both sides
 - d) None of the above
 - 8) Parzen window method is used for
 - a) Estimating error rate
 - b) Estimating nearest neighbour
 - c) Estimating density
 - d) All of the above

P.T.O.



- 9) If the overlapping between component densities of normal mixture is small then the convergence is
 a) Slow b) Fast c) Moderate d) Unchange
- 10) For the 'Salmon' and 'Sea bass' fish example length is a _____ factor.
 a) Impracticable b) Strong
 c) Poor d) None of the above
- 11) The covariance matrix Σ is always
 a) Non-symmetric and negative semidefinite
 b) Symmetric and positive semidefinite
 c) Non-symmetric and positive semidefinite
 d) Symmetric and negative semidefinite
- 12) Classifier that places a pattern in one of only two categories is called
 a) Chotomizer b) Trichomizer c) Economizer d) Dichotomizer
- 13) A classifier that uses linear discriminant functions is called
 a) Minimum-error-rate classifier b) Linear machine
 c) Hidden Markov model d) All of the above
- 14) If a and b are vectors, the symmetry property is given as
 a) $D(a, b) \geq 0$ b) $D(a, b) = 0$
 c) $D(a, b) = D(b, a)$ d) All of the above
- 15) The value of discriminant function $g(x) < 0$, in two category classifier indicates that
 a) Sample belongs to w_1 b) Sample belong to w_2
 c) Sample on boundary d) None
- 16) Bayes formula is given as
 a) Posterior = (Likelihood * Prior)/Evidence
 b) Posterior = (Prior * Evidence)/Likelihood
 c) Posterior = (Likelihood * Evidence * Prior)
 d) Posterior = (Likelihood * Evidence)/Prior
- 17) Determining transition probabilities for given hidden and visible states is called as
 a) Evaluation problem b) Decoding problem
 c) Learning problem d) None of the above
- 18) The function $\lambda(\alpha_i | w_j)$ describes the loss incurred for taking action α_i when the state of the nature is w_j is called
 a) Loss function b) Discriminant function
 c) Gaussian function d) None of the above
- 19) HMM have found greatest use in
 a) Character recognition b) Speech recognition
 c) Gesture recognition d) Both b) and c)
- 20) If the sequence has the property that whenever two samples are in the same cluster at level K, they remain together at all higher levels, then sequence is said to be
 a) Hierarchical clustered b) On-line clustered
 c) Tree-clustered d) All of the above



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
PATTERN RECOGNITION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

- Instructions :** 1) Assume **suitable** data if required.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any four** : **(4×6=24)**
- a) Find constant c so that the function $f(x)$ is a density function. Also find $P(2 < X < 3)$
- $$f(x) = \begin{cases} c(x-1), & 1 < x < 4 \\ 0, & \text{otherwise} \end{cases}$$
- b) Explain Bayes formula for classification.
- c) Define :
- a) Feature space
- b) Risk
- d) What is general principle estimation of maximum likelihood estimation ?
- e) Obtain an expression for linear discriminant function for two category case.
3. Attempt **any two** : **(2×8=16)**
- a) Explain Hidden Markov Models (HMM) and give HMM backward algorithm.
- b) Briefly explain design cycle in Pattern Recognition systems.
- c) The joint density function of two continuous random variables is given by
- $$f(x, y) = \begin{cases} Cxy, & 0 < x < 2, 1 < y < 3 \\ 0, & \text{otherwise} \end{cases}$$
- Find :
- a) Constant C
- b) $P(0 < X < 1, 1 < Y < 2)$
- c) Marginal Distribution function of X and Y

Set R



SECTION – II

4. Attempt **any four** : **(4×6=24)**
- a) Explain Wards method.
 - b) What do you mean by knowledge representations ?
 - c) What is nearest neighbour rule ?
 - d) Write a note on simulated annealing.
 - e) Explain feed-forward network.
5. Attempt **any two** : **(2×8=16)**
- a) Give an expression for linear discriminate function in multcategory cases.
 - b) Explain relaxation procedure as a criteria function for classifier design.
 - c) Write a note on hierarchichal clustering and partitional clustering.
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SLR-TJ – 224

Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
PATTERN RECOGNITION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
 - 2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.**
 - 3) Assume **suitable** data if required.
 - 4) Figures to the **right** indicate **full** marks.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct option from the following : (20×1=20)
- 1) Bayes formula is given as
 - a) Posterior = (Likelihood * Prior)/Evidence
 - b) Posterior = (Prior * Evidence)/Likelihood
 - c) Posterior = (Likelihood * Evidence * Prior)
 - d) Posterior = (Likelihood * Evidence)/Prior
 - 2) Determining transition probabilities for given hidden and visible states is called as
 - a) Evaluation problem
 - b) Decoding problem
 - c) Learning problem
 - d) None of the above
 - 3) The function $\lambda(\alpha_i | w_j)$ describes the loss incurred for taking action α_i when the state of the nature is w_j is called
 - a) Loss function
 - b) Discriminant function
 - c) Gaussian function
 - d) None of the above
 - 4) HMM have found greatest use in
 - a) Character recognition
 - b) Speech recognition
 - c) Gesture recognition
 - d) Both b) and c)
 - 5) If the sequence has the property that whenever two samples are in the same cluster at level K, they remain together at all higher levels, then sequence is said to be
 - a) Hierarchical clustered
 - b) On-line clustered
 - c) Tree-clustered
 - d) All of the above
 - 6) What gives an algebraic measure of the distance from x to the hyperplane ?
 - a) Discriminant function
 - b) Nearest neighbor rule
 - c) Bayes rule
 - d) None of these
 - 7) The input dependent information other than from the target itself is used to
 - a) Improve our recognizer
 - b) To improve the patterns
 - c) To decide input
 - d) None of the above

P.T.O.



- 8) Which of the following criterion function measures the clustering quality ?
- Perception criterion function
 - Sum-of-squared-error criterion function
 - Linear discriminant function
 - None of these
- 9) Newton's algorithm is not applicable if the Hessian matrix is
- Normal
 - Singular
 - Both a) and b)
 - None
- 10) Procedures that use unlabelled samples are said to be
- Supervised
 - Discriminant
 - Unsupervised
 - None of the above
- 11) Parzen-window classifier depends upon the choice of
- No. of sample points
 - Window function
 - Both a) and b)
 - None of the above
- 12) The solution vector exists on
- Negative side of every hyperplane
 - Positive side of every hyperplane
 - Both sides
 - None of the above
- 13) Parzen window method is used for
- Estimating error rate
 - Estimating nearest neighbour
 - Estimating density
 - All of the above
- 14) If the overlapping between component densities of normal mixture is small then the convergence is
- Slow
 - Fast
 - Moderate
 - Unchange
- 15) For the 'Salmon' and 'Sea bass' fish example length is a _____ factor.
- Impracticable
 - Strong
 - Poor
 - None of the above
- 16) The covariance matrix Σ is always
- Non-symmetric and negative semidefinite
 - Symmetric and positive semidefinite
 - Non-symmetric and positive semidefinite
 - Symmetric and negative semidefinite
- 17) Classifier that places a pattern in one of only two categories is called
- Chotomizer
 - Trichomizer
 - Economizer
 - Dichotomizer
- 18) A classifier that uses linear discriminant functions is called
- Minimum-error-rate classifier
 - Linear machine
 - Hidden Markov model
 - All of the above
- 19) If a and b are vectors, the symmetry property is gievn as
- $D(a, b) > = 0$
 - $D(a, b) = 0$
 - $D(a, b) = D(b, a)$
 - All of the above
- 20) The value of discriminant function $g(x) < 0$, in two category classifier indicates that
- Sample belongs to w_1
 - Sample belong to w_2
 - Sample on boundary
 - None



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
PATTERN RECOGNITION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) Assume **suitable** data if required.
2) Figures to the **right** indicate **full** marks.

SECTION – I

2. Attempt **any four** : **(4×6=24)**

a) Find constant c so that the function $f(x)$ is a density function. Also find $P(2 < X < 3)$

$$f(x) = c(x-1), \quad 1 < x < 4$$
$$= 0, \quad \text{otherwise}$$

b) Explain Bayes formula for classification.

c) Define :

a) Feature space

b) Risk

d) What is general principle estimation of maximum likelihood estimation ?

e) Obtain an expression for linear discriminant function for two category case.

3. Attempt **any two** : **(2×8=16)**

a) Explain Hidden Markov Models (HMM) and give HMM backward algorithm.

b) Briefly explain design cycle in Pattern Recognition systems.

c) The joint density function of two continuous random variables is given by

$$f(x, y) = Cxy, \quad 0 < x < 2, 1 < y < 3$$
$$= 0, \quad \text{otherwise}$$

Find :

a) Constant C

b) $P(0 < X < 1, 1 < Y < 2)$

c) Marginal Distribution function of X and Y

Set S



SECTION – II

4. Attempt **any four** : **(4×6=24)**
- a) Explain Wards method.
 - b) What do you mean by knowledge representations ?
 - c) What is nearest neighbour rule ?
 - d) Write a note on simulated annealing.
 - e) Explain feed-forward network.
5. Attempt **any two** : **(2×8=16)**
- a) Give an expression for linear discriminate function in multcategory cases.
 - b) Explain relaxation procedure as a criteria function for classifier design.
 - c) Write a note on hierarchichal clustering and partitional clustering.
-



- 8) The C6X processors have an execution speed of _____ million instructions per sec.
a) 100 b) 200 c) 1600 d) 6400
- 9) The no. of registers which can be used for accessing data using indirect addressing mode is
a) 16, 16 b) 16, 8 c) 8, 8 d) 8, 16
- 10) The L2 cache of _____ K word is shared by both program and data memory space.
a) 4 b) 8 c) 16 d) 64
- 11) The multipliers multiply _____ × _____ numbers.
a) 16, 16 b) 17, 17 c) 24, 24 d) 32, 32
- 12) The ARAU stands for
a) Ancillary register ALU b) Auxiliary register ALU
c) Anchor register ALU d) None
- 13) _____ independent buses for dual data fetch, instruction fetch and nonintrusive I/O.
a) 4 b) 8 c) 6 d) 16
- 14) The 320c54 DSP are said to have advanced Harvard architecture because
a) They have separate memory bus structure for data and program
b) They have instruction the enable data transfer between the program and data
c) They have same memory bus structure for data and program
d) The contents of program memory cannot copy into data memory or vice versa
- 15) SRAM and integrated input output peripheals in ADSP-21061 are
a) Single ported b) Dual ported
c) Single/dual ported d) Both a) and c)
- 16) L1P and L1D caches are each of _____, _____ K-Byte.
a) 32, 64 b) 16, 16 c) 16, 32 d) 32, 80
- 17) The _____ permits execution of logical operation on data without affecting the contents of ACC.
a) Parallel logic unit b) Auxiliary ALU
c) Central ALU d) None
- 18) The AR ALU (ARAU) performs _____ arithmetic on _____ numbers.
a) Unsigned, 16 b) Signed, 16 c) Signed, 32 d) Unsigned, 32
- 19) The TMS320C6X fixed point processors execute up to _____, _____ bit per instruction cycle.
a) 8, 32 b) 32, 8 c) 16, 16 d) 16, 8
- 20) The no. of 32 bit general purpose registers in C6X is _____
a) 4 b) 8 c) 16 d) 32



Seat No.	
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**B.E. (Electronics and Telecommunication) (Part – II) Examination, 2017
DSP PROCESSORS AND APPLICATION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Attempt **any four** : **(5×4=20)**
- 1) List out the features of ADSP-21061.
 - 2) Explain floating point DSPs with its use.
 - 3) Explain the various register used with the ARAU.
 - 4) What are the applications of TI DSPs ? Explain.
 - 5) Explain flags in the status register of TMS 320C54X.
3. Attempt **any two** : **(10×2=20)**
- 1) What are the various interrupts supported by 54X DSPs and explain in detail ?
 - 2) Draw the architecture of ADSP-21061 and explain in detail.
 - 3) List relative demerits and merits of RISC and CISC processors.

SECTION – II

4. Attempt **any four** : **(5×4=20)**
- 1) Explain addressing modes in 6X DSPs.
 - 2) Explain IIR implementation using TMS 320C5X DSP processor.
 - 3) List the functional units in C6X and explain.
 - 4) Explain the operation of L2 cache controller.
 - 5) Draw Cache Configuration Register (CCFG).
5. Attempt **any two** : **(10×2=20)**
- 1) Discuss the implementation of FFT algorithms using TMS 320C54X DSP processor.
 - 2) Draw and explain TMS320C6X with peripherals.
 - 3) Draw and explain TMS320C6X CPU data paths.



SLR-TJ – 225

Seat No.	
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Set	Q
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**B.E. (Electronics and Telecommunication) (Part – II) Examination, 2017
DSP PROCESSORS AND APPLICATION (Elective – II)**

Day and Date : Friday, 24-11-2017

Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : **(20×1=20)**

- 1) L1P and L1D caches are each of _____, _____ K-Byte.
a) 32, 64 b) 16, 16 c) 16, 32 d) 32, 80
- 2) The _____ permits execution of logical operation on data without affecting the contents of ACC.
a) Parallel logic unit b) Auxiliary ALU
c) Central ALU d) None
- 3) The AR ALU (ARAU) performs _____ arithmetic on _____ numbers.
a) Unsigned, 16 b) Signed, 16 c) Signed, 32 d) Unsigned, 32
- 4) The TMS320C6X fixed point processors execute up to _____, _____ bit per instruction cycle.
a) 8, 32 b) 32, 8 c) 16, 16 d) 16, 8
- 5) The no. of 32 bit general purpose registers in C6X is _____.
a) 4 b) 8 c) 16 d) 32
- 6) The register used for which holds the address of the current data memory page is
a) DP b) ARP c) ARB d) None
- 7) In TMS320C6X internal memory is organized as _____.
a) Separate program and data b) Not separate program and data
c) Only program d) Only data
- 8) The result of operation performed in central ALU are stored into _____.
a) ACC b) ACCB c) TREG0 d) PREG

P.T.O.



Seat No.	
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**B.E. (Electronics and Telecommunication) (Part – II) Examination, 2017
DSP PROCESSORS AND APPLICATION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Attempt **any four** : **(5×4=20)**
- 1) List out the features of ADSP-21061.
 - 2) Explain floating point DSPs with its use.
 - 3) Explain the various register used with the ARAU.
 - 4) What are the applications of TI DSPs ? Explain.
 - 5) Explain flags in the status register of TMS 320C54X.
3. Attempt **any two** : **(10×2=20)**
- 1) What are the various interrupts supported by 54X DSPs and explain in detail ?
 - 2) Draw the architecture of ADSP-21061 and explain in detail.
 - 3) List relative demerits and merits of RISC and CISC processors.

SECTION – II

4. Attempt **any four** : **(5×4=20)**
- 1) Explain addressing modes in 6X DSPs.
 - 2) Explain IIR implementation using TMS 320C5X DSP processor.
 - 3) List the functional units in C6X and explain.
 - 4) Explain the operation of L2 cache controller.
 - 5) Draw Cache Configuration Register (CCFG).
5. Attempt **any two** : **(10×2=20)**
- 1) Discuss the implementation of FFT algorithms using TMS 320C54X DSP processor.
 - 2) Draw and explain TMS320C6X with peripherals.
 - 3) Draw and explain TMS320C6X CPU data paths.



SLR-TJ – 225

Seat No.	
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Set	R
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**B.E. (Electronics and Telecommunication) (Part – II) Examination, 2017
DSP PROCESSORS AND APPLICATION (Elective – II)**

Day and Date : Friday, 24-11-2017

Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) The multipliers multiply _____ × _____ numbers.
a) 16, 16 b) 17, 17 c) 24, 24 d) 32, 32
- 2) The ARAU stands for
a) Ancillary register ALU b) Auxiliary register ALU
c) Anchor register ALU d) None
- 3) _____ independent buses for dual data fetch, instruction fetch and nonintrusive I/O.
a) 4 b) 8 c) 6 d) 16
- 4) The 320c54 DSP are said to have advanced Harvard architecture because
a) They have separate memory bus structure for data and program
b) They have instruction the enable data transfer between the program and data
c) They have same memory bus structure for data and program
d) The contents of program memory cannot copy into data memory or vice versa
- 5) SRAM and integrated input output peripheals in ADSP-21061 are
a) Single ported b) Dual ported
c) Single/dual ported d) Both a) and c)
- 6) L1P and L1D caches are each of _____, _____ K-Byte.
a) 32, 64 b) 16, 16 c) 16, 32 d) 32, 80
- 7) The _____ permits execution of logical operation on data without affecting the contents of ACC.
a) Parallel logic unit b) Auxiliary ALU
c) Central ALU d) None

P.T.O.



- 8) The AR ALU (ARAU) performs _____ arithmetic on _____ numbers.
a) Unsigned, 16 b) Signed, 16 c) Signed, 32 d) Unsigned, 32
- 9) The TMS320C6X fixed point processors execute up to _____, _____ bit per instruction cycle.
a) 8, 32 b) 32, 8 c) 16, 16 d) 16, 8
- 10) The no. of 32 bit general purpose registers in C6X is _____
a) 4 b) 8 c) 16 d) 32
- 11) The register used for which holds the address of the current data memory page is
a) DP b) ARP c) ARB d) None
- 12) In TMS320C6X internal memory is organized as _____
a) Separate program and data b) Not separate program and data
c) Only program d) Only data
- 13) The result of operation performed in central ALU are stored into _____
a) ACC b) ACCB c) TREG0 d) PREG
- 14) The TMS320C6X is _____ processor.
a) Floating point b) Fixed point
c) Floating/fixed point d) All above
- 15) Only data ADSP-21061 is _____ bit processor.
a) 8 b) 16 c) 32 d) 64
- 16) ADSP-21061 is _____
a) Harvard architecture b) Advanced Harvard architecture
c) Super Harvard architecture d) Both b) and c)
- 17) The data move (DMOV) instruction can use
a) Either direct and indirect addressing mode
b) Either direct or indirect addressing mode
c) Indirect addressing
d) All above
- 18) The C6X processors have an execution speed of _____ million instructions per sec.
a) 100 b) 200 c) 1600 d) 6400
- 19) The no. of registers which can be used for accessing data using indirect addressing mode is
a) 16, 16 b) 16, 8 c) 8, 8 d) 8, 16
- 20) The L2 cache of _____ K word is shared by both program and data memory space.
a) 4 b) 8 c) 16 d) 64
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Seat No.	
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**B.E. (Electronics and Telecommunication) (Part – II) Examination, 2017
DSP PROCESSORS AND APPLICATION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Attempt **any four** : **(5×4=20)**
- 1) List out the features of ADSP-21061.
 - 2) Explain floating point DSPs with its use.
 - 3) Explain the various register used with the ARAU.
 - 4) What are the applications of TI DSPs ? Explain.
 - 5) Explain flags in the status register of TMS 320C54X.
3. Attempt **any two** : **(10×2=20)**
- 1) What are the various interrupts supported by 54X DSPs and explain in detail ?
 - 2) Draw the architecture of ADSP-21061 and explain in detail.
 - 3) List relative demerits and merits of RISC and CISC processors.

SECTION – II

4. Attempt **any four** : **(5×4=20)**
- 1) Explain addressing modes in 6X DSPs.
 - 2) Explain IIR implementation using TMS 320C5X DSP processor.
 - 3) List the functional units in C6X and explain.
 - 4) Explain the operation of L2 cache controller.
 - 5) Draw Cache Configuration Register (CCFG).
5. Attempt **any two** : **(10×2=20)**
- 1) Discuss the implementation of FFT algorithms using TMS 320C54X DSP processor.
 - 2) Draw and explain TMS320C6X with peripherals.
 - 3) Draw and explain TMS320C6X CPU data paths.



SLR-TJ – 225

Seat No.	
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Set	S
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**B.E. (Electronics and Telecommunication) (Part – II) Examination, 2017
DSP PROCESSORS AND APPLICATION (Elective – II)**

Day and Date : Friday, 24-11-2017

Total Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) ADSP-21061 is _____
 - a) Harvard architecture
 - b) Advanced Harvard architecture
 - c) Super Harvard architecture
 - d) Both b) and c)
- 2) The data move (DMOV) instruction can use
 - a) Either direct and indirect addressing mode
 - b) Either direct or indirect addressing mode
 - c) Indirect addressing
 - d) All above
- 3) The C6X processors have an execution speed of _____ million instructions per sec.
 - a) 100
 - b) 200
 - c) 1600
 - d) 6400
- 4) The no. of registers which can be used for accessing data using indirect addressing mode is
 - a) 16, 16
 - b) 16, 8
 - c) 8, 8
 - d) 8, 16
- 5) The L2 cache of _____ K word is shared by both program and data memory space.
 - a) 4
 - b) 8
 - c) 16
 - d) 64
- 6) The multipliers multiply _____ × _____ numbers.
 - a) 16, 16
 - b) 17, 17
 - c) 24, 24
 - d) 32, 32
- 7) The ARAU stands for
 - a) Ancillary register ALU
 - b) Auxiliary register ALU
 - c) Anchor register ALU
 - d) None

P.T.O.



- 8) _____ independent buses for dual data fetch, instruction fetch and nonintrusive I/O.
a) 4 b) 8 c) 6 d) 16
- 9) The 320c54 DSP are said to have advanced Harvard architecture because
a) They have separate memory bus structure for data and program
b) They have instruction the enable data transfer between the program and data
c) They have same memory bus structure for data and program
d) The contents of program memory cannot copy into data memory or vice versa
- 10) SRAM and integrated input output peripherals in ADSP-21061 are
a) Single ported b) Dual ported
c) Single/dual ported d) Both a) and c)
- 11) L1P and L1D caches are each of _____, _____ K-Byte.
a) 32, 64 b) 16, 16 c) 16, 32 d) 32, 80
- 12) The _____ permits execution of logical operation on data without affecting the contents of ACC.
a) Parallel logic unit b) Auxiliary ALU
c) Central ALU d) None
- 13) The AR ALU (ARAU) performs _____ arithmetic on _____ numbers.
a) Unsigned, 16 b) Signed, 16 c) Signed, 32 d) Unsigned, 32
- 14) The TMS320C6X fixed point processors execute up to _____, _____ bit per instruction cycle.
a) 8, 32 b) 32, 8 c) 16, 16 d) 16, 8
- 15) The no. of 32 bit general purpose registers in C6X is _____
a) 4 b) 8 c) 16 d) 32
- 16) The register used for which holds the address of the current data memory page is
a) DP b) ARP c) ARB d) None
- 17) In TMS320C6X internal memory is organized as _____
a) Separate program and data b) Not separate program and data
c) Only program d) Only data
- 18) The result of operation performed in central ALU are stored into _____
a) ACC b) ACCB c) TREG0 d) PREG
- 19) The TMS320C6X is _____ processor.
a) Floating point b) Fixed point
c) Floating/fixed point d) All above
- 20) Only data ADSP-21061 is _____ bit processor.
a) 8 b) 16 c) 32 d) 64



Seat No.	
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**B.E. (Electronics and Telecommunication) (Part – II) Examination, 2017
DSP PROCESSORS AND APPLICATION (Elective – II)**

Day and Date : Friday, 24-11-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

Instructions : 1) *All questions are compulsory.*
2) *Assume suitable data if necessary.*

SECTION – I

2. Attempt **any four** : **(5×4=20)**
- 1) List out the features of ADSP-21061.
 - 2) Explain floating point DSPs with its use.
 - 3) Explain the various register used with the ARAU.
 - 4) What are the applications of TI DSPs ? Explain.
 - 5) Explain flags in the status register of TMS 320C54X.
3. Attempt **any two** : **(10×2=20)**
- 1) What are the various interrupts supported by 54X DSPs and explain in detail ?
 - 2) Draw the architecture of ADSP-21061 and explain in detail.
 - 3) List relative demerits and merits of RISC and CISC processors.

SECTION – II

4. Attempt **any four** : **(5×4=20)**
- 1) Explain addressing modes in 6X DSPs.
 - 2) Explain IIR implementation using TMS 320C5X DSP processor.
 - 3) List the functional units in C6X and explain.
 - 4) Explain the operation of L2 cache controller.
 - 5) Draw Cache Configuration Register (CCFG).
5. Attempt **any two** : **(10×2=20)**
- 1) Discuss the implementation of FFT algorithms using TMS 320C54X DSP processor.
 - 2) Draw and explain TMS320C6X with peripherals.
 - 3) Draw and explain TMS320C6X CPU data paths.



SLR-TJ – 226

Seat No.	
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Set

P

**B.E. (E&TC) (Part – II) Examination, 2017
FUZZY LOGIC (Old)**

Day and Date : Wednesday, 13-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(1×20=20)

- 1) Fuzzy union is referred as
 - a) t-conorms
 - b) t-norms
 - c) both (a) and (b)
 - d) none
- 2) Intuition involves _____ knowledge about an issue.
 - a) contextual
 - b) semantic
 - c) both (a) and (b)
 - d) none
- 3) The IF-THEN rule based form generally is referred as
 - a) Inductive form
 - b) Deductive form
 - c) Both (a) and (b)
 - d) None
- 4) The DSW algorithm makes use of _____ of Fuzzy sets.
 - a) α cut levels
 - b) Fuzzy number
 - c) Crisp number
 - d) None
- 5) A key difference between Crisp and Fuzzy set is
 - a) Extreme points
 - b) Membership grades
 - c) Binary no
 - d) None
- 6) The Fuzzy C-means algorithm uses
 - a) Absolute distance
 - b) Square distance
 - c) Euclidean distance
 - d) None
- 7) In Fuzzy logic all truth are
 - a) Partial
 - b) Precise
 - c) Logical proposition
 - d) None
- 8) Mean max membership is also called as
 - a) middle of minimum
 - b) middle of maximum
 - c) both (a) and (b)
 - d) None

P.T.O.



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
FUZZY LOGIC (Old)**

Day and Date : Wednesday, 13-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** :

(4×5=20)

- a) The continuous form of MOSFET and Transistor are shown in figure below.
The discretized membership function is given by the following equation

$$\mu_m = \left\{ \frac{0}{0} + \frac{0.5}{2} + \frac{0.65}{4} + \frac{0.75}{6} + \frac{0.85}{8} + \frac{0.9}{10} \right\}$$

$$\mu_T = \left\{ \frac{0.5}{0} + \frac{0.15}{2} + \frac{0.25}{4} + \frac{0.35}{5} + \frac{0.4}{6} + \frac{0.5}{10} \right\}$$

for these two fuzzy sets calculate the following

- a) $\mu_m \cup \mu_T$
 - b) $\mu_m \cap \mu_T$
 - c) $\overline{\mu_m}$
 - d) $\overline{\mu_T}$
- b) Perform the following operations on intervals.
- i) $[4, 6] \div [1, 2]$
 - ii) $[5, 2] \times [4, 3]$
- c) Write a short note on FCM clustering.
- d) Explain image enhancement using fuzzy.
- e) Using the inference approach, find the membership values for each of the triangular shapes (L, R, LR, E, T) for the following triangle : 55°, 65°, 60°.

Set P



3. Answer the following :

10

a) A set T of water temperatures from a lake on the following discrete universe of temperatures in degree Fahrenheit $T = \{50, 55, 60\}$. A universe O of oxygen content values in the water, as percent of volume $O = \{1, 2, 3\}$ fuzzy sets are

$$T = \left\{ \frac{1}{50} + \frac{0.55}{55} + \frac{0.35}{60} \right\} \quad O = \left\{ \frac{0.55}{1} + \frac{0.75}{2} + \frac{0.2}{3} \right\}.$$

i) Find the Cartesian product $R = T \times O$

ii) Now suppose we define another fuzzy set of Temperature “about 55°F”, with the following membership values.

$$I = \left\{ \frac{1}{50} + \frac{0.55}{55} + \frac{0.53}{60} \right\}$$

• Using max-min composition find $S = I \circ (T \times O)$

• Using max-product composition find $S = I \circ (T \times O)$.

b) In fuzzy automata, generate fuzzy input and output states under following conditions

$$\text{Output Relation } R = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0.5 & 1 & 0.7 \end{bmatrix} \text{ and state transition relation.}$$

$$S = \begin{bmatrix} 0 & 0.3 & 0.9 & 1 \\ 0.5 & 1 & 0 & 0.2 \\ 0.6 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0.2 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 0.4 & 0 & 0.6 \end{bmatrix}$$

with initial state $C^1 = [1 \ 0.8 \ 0.6 \ 0.4]$

Inputs $A1 = [0.4 \ 0]$ $A2 = [1 \ 0]$ $A3 = [1 \ 0.7]$

OR

b) Explain classification by crisp and fuzzy relation.

10

Set P



SECTION – II

4. Answer the following : 10

- a) IA manufacturing company is planning to purchase a lathe and is assessing the proposals from four lathe manufacturers. The company has developed a reciprocal relation for the four manufacturers based on the speed of delivery

of the lathes and the cost. The relation is $\tilde{R} = \begin{bmatrix} 0 & 0.1 & 0.7 & 0.2 \\ 0.9 & 0 & 0.6 & 1 \\ 0.3 & 0.4 & 0 & 0.5 \\ 0.8 & 0 & 0.5 & 0 \end{bmatrix}$

Calculate the degree of preference measures and the distance to Type I, Type II consensus. Explain the differences between the distances to the three consensuses.

OR

- a) Explain following :
i) Fuzzy ordering
ii) Multiobjective decision.
- b) Explain FSPC for measurement and attribute SPC. 10

5. Answer **any four** : (4×5=20)

- a) Explain simple fuzzy control system.
b) Explain application of genetic algorithm.
c) Explain in detail syntactic recognition.
d) Explain application of fuzzy for diagnosis in medicine.
e) Explain nontransitive ranking.
-



SLR-TJ – 226

Seat No.	
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Set

Q

**B.E. (E&TC) (Part – II) Examination, 2017
FUZZY LOGIC (Old)**

Day and Date : Wednesday, 13-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(1×20=20)

- 1) At the origin of concept variable is a
 - a) effect variable
 - b) cause variable
 - c) casual variable
 - d) none
- 2) Th uncertainty in rank arises because of
 - a) Random variable
 - b) Imprecision
 - c) Ambiguity
 - d) None
- 3) Unanimous agreement by all those in the group concerning choice is called as
 - a) Fuzzy ordering
 - b) Preferences
 - c) Consensus
 - d) None
- 4) Regression analysis is used to model the relationship between
 - a) coefficient
 - b) coefficient of input to output
 - c) dependent and independent variable
 - d) none
- 5) A common SPC technique uses ____ charts for measurement data.
 - a) P
 - b) $\bar{X} - R$
 - c) $X - \bar{R}$
 - d) None
- 6) Fuzzy union is referred as
 - a) t-conorms
 - b) t-norms
 - c) both (a) and (b)
 - d) none
- 7) Intuition involves _____ knowledge about an issue.
 - a) contextual
 - b) semantic
 - c) both (a) and (b)
 - d) none

P.T.O.



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
FUZZY LOGIC (Old)**

Day and Date : Wednesday, 13-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** :

(4×5=20)

a) The continuous form of MOSFET and Transistor are shown in figure below.

The discretized membership function is given by the following equation

$$\mu_m = \left\{ \frac{0}{0} + \frac{0.5}{2} + \frac{0.65}{4} + \frac{0.75}{6} + \frac{0.85}{8} + \frac{0.9}{10} \right\}$$

$$\mu_T = \left\{ \frac{0.5}{0} + \frac{0.15}{2} + \frac{0.25}{4} + \frac{0.35}{5} + \frac{0.4}{6} + \frac{0.5}{10} \right\}$$

for these two fuzzy sets calculate the following

- a) $\mu_m \cup \mu_T$
 - b) $\mu_m \cap \mu_T$
 - c) $\overline{\mu_m}$
 - d) $\overline{\mu_T}$
- b) Perform the following operations on intervals.
- i) $[4, 6] \div [1, 2]$
 - ii) $[5, 2] \times [4, 3]$
- c) Write a short note on FCM clustering.
- d) Explain image enhancement using fuzzy.
- e) Using the inference approach, find the membership values for each of the triangular shapes (L, R, LR, E, T) for the following triangle : $55^\circ, 65^\circ, 60^\circ$.

Set Q



3. Answer the following :

10

a) A set T of water temperatures from a lake on the following discrete universe of temperatures in degree Fahrenheit $T = \{50, 55, 60\}$. A universe O of oxygen content values in the water, as percent of volume $O = \{1, 2, 3\}$ fuzzy sets are

$$T = \left\{ \frac{1}{50} + \frac{0.55}{55} + \frac{0.35}{60} \right\} \quad O = \left\{ \frac{0.55}{1} + \frac{0.75}{2} + \frac{0.2}{3} \right\}.$$

i) Find the Cartesian product $R = T \times O$

ii) Now suppose we define another fuzzy set of Temperature “about 55°F”, with the following membership values.

$$I = \left\{ \frac{1}{50} + \frac{0.55}{55} + \frac{0.53}{60} \right\}$$

• Using max-min composition find $S = I \circ (T \times O)$

• Using max-product composition find $S = I \circ (T \times O)$.

b) In fuzzy automata, generate fuzzy input and output states under following conditions

$$\text{Output Relation } R = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0.5 & 1 & 0.7 \end{bmatrix} \text{ and state transition relation.}$$

$$S = \begin{bmatrix} 0 & 0.3 & 0.9 & 1 \\ 0.5 & 1 & 0 & 0.2 \\ 0.6 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0.2 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 0.4 & 0 & 0.6 \end{bmatrix}$$

with initial state $C^1 = [1 \ 0.8 \ 0.6 \ 0.4]$

Inputs $A1 = [0.4 \ 0]$ $A2 = [1 \ 0]$ $A3 = [1 \ 0.7]$

OR

b) Explain classification by crisp and fuzzy relation.

10

Set Q



SECTION – II

4. Answer the following : 10

- a) IA manufacturing company is planning to purchase a lathe and is assessing the proposals from four lathe manufacturers. The company has developed a reciprocal relation for the four manufacturers based on the speed of delivery

of the lathes and the cost. The relation is $\tilde{R} = \begin{bmatrix} 0 & 0.1 & 0.7 & 0.2 \\ 0.9 & 0 & 0.6 & 1 \\ 0.3 & 0.4 & 0 & 0.5 \\ 0.8 & 0 & 0.5 & 0 \end{bmatrix}$

Calculate the degree of preference measures and the distance to Type I, Type II consensus. Explain the differences between the distances to the three consensuses.

OR

- a) Explain following :
i) Fuzzy ordering
ii) Multiobjective decision.
- b) Explain FSPC for measurement and attribute SPC. 10

5. Answer **any four** : (4×5=20)

- a) Explain simple fuzzy control system.
b) Explain application of genetic algorithm.
c) Explain in detail syntactic recognition.
d) Explain application of fuzzy for diagnosis in medicine.
e) Explain nontransitive ranking.
-



SLR-TJ – 226

Seat No.	
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Set

R

**B.E. (E&TC) (Part – II) Examination, 2017
FUZZY LOGIC (Old)**

Day and Date : Wednesday, 13-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : (1×20=20)
- 1) In linear programming problem, the function to be minimized is called as
 - a) constraint matrix
 - b) objective function
 - c) linear function
 - d) none
 - 2) Cognitive maps can be used for
 - a) Strategic planning
 - b) Prediction
 - c) Engineering concept development
 - d) All
 - 3) Fuzzy relation R, the accumulated medical experience can be used to specify the relation between
 - a) Symptoms and patient
 - b) Symptoms and disease
 - c) Disease and Patient
 - d) All
 - 4) In multiobjective decision making, if there is numerical tie between two or more alternatives, we use method of
 - a) Min
 - b) Max
 - c) Min-max
 - d) Max-min
 - 5) Genetic algorithm search for the _____ through chromosomes evaluation.
 - a) One alternative
 - b) Optimal output
 - c) Best alternative
 - d) All
 - 6) At the origin of concept variable is a
 - a) effect variable
 - b) cause variable
 - c) casual variable
 - d) none
 - 7) Th uncertainty in rank arises because of
 - a) Random variable
 - b) Imprecision
 - c) Ambiguity
 - d) None

P.T.O.



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
FUZZY LOGIC (Old)**

Day and Date : Wednesday, 13-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** :

(4×5=20)

- a) The continuous form of MOSFET and Transistor are shown in figure below.
The discretized membership function is given by the following equation

$$\mu_m = \left\{ \frac{0}{0} + \frac{0.5}{2} + \frac{0.65}{4} + \frac{0.75}{6} + \frac{0.85}{8} + \frac{0.9}{10} \right\}$$

$$\mu_T = \left\{ \frac{0.5}{0} + \frac{0.15}{2} + \frac{0.25}{4} + \frac{0.35}{5} + \frac{0.4}{6} + \frac{0.5}{10} \right\}$$

for these two fuzzy sets calculate the following

- a) $\mu_m \cup \mu_T$
b) $\mu_m \cap \mu_T$
c) $\overline{\mu_m}$
d) $\overline{\mu_T}$
- b) Perform the following operations on intervals.
- i) $[4, 6] \div [1, 2]$
ii) $[5, 2] \times [4, 3]$
- c) Write a short note on FCM clustering.
d) Explain image enhancement using fuzzy.
e) Using the inference approach, find the membership values for each of the triangular shapes (L, R, LR, E, T) for the following triangle : $55^\circ, 65^\circ, 60^\circ$.

Set R



3. Answer the following :

10

a) A set T of water temperatures from a lake on the following discrete universe of temperatures in degree Fahrenheit $T = \{50, 55, 60\}$. A universe O of oxygen content values in the water, as percent of volume $O = \{1, 2, 3\}$ fuzzy sets are

$$T = \left\{ \frac{1}{50} + \frac{0.55}{55} + \frac{0.35}{60} \right\} \quad O = \left\{ \frac{0.55}{1} + \frac{0.75}{2} + \frac{0.2}{3} \right\}.$$

i) Find the Cartesian product $R = T \times O$

ii) Now suppose we define another fuzzy set of Temperature “about 55°F”, with the following membership values.

$$I = \left\{ \frac{1}{50} + \frac{0.55}{55} + \frac{0.53}{60} \right\}$$

• Using max-min composition find $S = I \circ (T \times O)$

• Using max-product composition find $S = I \circ (T \times O)$.

b) In fuzzy automata, generate fuzzy input and output states under following conditions

$$\text{Output Relation } R = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0.5 & 1 & 0.7 \end{bmatrix} \text{ and state transition relation.}$$

$$S = \begin{bmatrix} 0 & 0.3 & 0.9 & 1 \\ 0.5 & 1 & 0 & 0.2 \\ 0.6 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0.2 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 0.4 & 0 & 0.6 \end{bmatrix}$$

with initial state $C^1 = [1 \ 0.8 \ 0.6 \ 0.4]$

Inputs $A1 = [0.4 \ 0]$ $A2 = [1 \ 0]$ $A3 = [1 \ 0.7]$

OR

b) Explain classification by crisp and fuzzy relation.

10

Set R



SECTION – II

4. Answer the following : 10

- a) IA manufacturing company is planning to purchase a lathe and is assessing the proposals from four lathe manufacturers. The company has developed a reciprocal relation for the four manufacturers based on the speed of delivery

of the lathes and the cost. The relation is $\tilde{R} = \begin{bmatrix} 0 & 0.1 & 0.7 & 0.2 \\ 0.9 & 0 & 0.6 & 1 \\ 0.3 & 0.4 & 0 & 0.5 \\ 0.8 & 0 & 0.5 & 0 \end{bmatrix}$

Calculate the degree of preference measures and the distance to Type I, Type II consensus. Explain the differences between the distances to the three consensuses.

OR

- a) Explain following :
i) Fuzzy ordering
ii) Multiobjective decision.
- b) Explain FSPC for measurement and attribute SPC. 10

5. Answer **any four** : (4×5=20)

- a) Explain simple fuzzy control system.
b) Explain application of genetic algorithm.
c) Explain in detail syntactic recognition.
d) Explain application of fuzzy for diagnosis in medicine.
e) Explain nontransitive ranking.
-



SLR-TJ – 226

Seat No.	
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Set	S
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**B.E. (E&TC) (Part – II) Examination, 2017
FUZZY LOGIC (Old)**

Day and Date : Wednesday, 13-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

Instructions : 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
2) **Answer MCQ/Objective type questions on Page No. 3 only.**
Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Select correct answer :

(1×20=20)

- 1) The Fuzzy C-means algorithm uses
 - a) Absolute distance
 - b) Square distance
 - c) Euclidean distance
 - d) None
- 2) In Fuzzy logic all truth are
 - a) Partial
 - b) Precise
 - c) Logical proposition
 - d) None
- 3) Mean max membership is also called as
 - a) middle of minimum
 - b) middle of maximum
 - c) both (a) and (b)
 - d) None
- 4) Transformation T_1 for the membership values of brightness for an image is
 - a) $2\mu_{mn}^2$
 - b) $1 - 2(1 - \mu_{mn})^2$
 - c) both (a) and (b)
 - d) None
- 5) Fuzzy arithmetic operation are
 - a) Fuzzy
 - b) Not Fuzzy
 - c) Binary
 - d) None
- 6) In linear programming problem, the function to be minimized is called as
 - a) constraint matrix
 - b) objective function
 - c) linear function
 - d) none
- 7) Cognitive maps can be used for
 - a) Strategic planning
 - b) Prediction
 - c) Engineering concept development
 - d) All
- 8) Fuzzy relation R, the accumulated medical experience can be used to specify the relation between
 - a) Symptoms and patient
 - b) Symptoms and disease
 - c) Disease and Patient
 - d) All

P.T.O.



- 9) In multiobjective decision making, if there is numerical tie between two or more alternatives, we use method of
a) Min b) Max c) Min-max d) Max-min
- 10) Genetic algorithm search for the _____ through chromosomes evaluation.
a) One alternative b) Optimal output
c) Best alternative d) All
- 11) At the origin of concept variable is a
a) effect variable b) cause variable
c) casual variable d) none
- 12) Th uncertainty in rank arises because of
a) Random variable b) Imprecision
c) Ambiguity d) None
- 13) Unanimous agreement by all those in the group concerning choice is called as
a) Fuzzy ordering b) Preferences c) Consensus d) None
- 14) Regression analysis is used to model the relationship between
a) coefficient
b) coefficient of input to output
c) dependent and independent variable
d) none
- 15) A common SPC technique uses _____ charts for measurement data.
a) P b) $\bar{X} - R$ c) $X - \bar{R}$ d) None
- 16) Fuzzy union is referred as
a) t-conorms b) t-norms
c) both (a) and (b) d) none
- 17) Intuition involves _____ knowledge about an issue.
a) contextual b) semantic
c) both (a) and (b) d) none
- 18) The IF-THEN rule based form generally is referred as
a) Inductive form b) Deductive form
c) Both (a) and (b) d) None
- 19) The DSW algorithm makes use of _____ of Fuzzy sets.
a) α cut levels b) Fuzzy number
c) Crisp number d) None
- 20) A key difference between Crisp and Fuzzy set is
a) Extreme points b) Membership grades
c) Binary no d) None



Seat No.	
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**B.E. (E&TC) (Part – II) Examination, 2017
FUZZY LOGIC (Old)**

Day and Date : Wednesday, 13-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** :

(4×5=20)

- a) The continuous form of MOSFET and Transistor are shown in figure below.
The discretized membership function is given by the following equation

$$\mu_m = \left\{ \frac{0}{0} + \frac{0.5}{2} + \frac{0.65}{4} + \frac{0.75}{6} + \frac{0.85}{8} + \frac{0.9}{10} \right\}$$

$$\mu_T = \left\{ \frac{0.5}{0} + \frac{0.15}{2} + \frac{0.25}{4} + \frac{0.35}{5} + \frac{0.4}{6} + \frac{0.5}{10} \right\}$$

for these two fuzzy sets calculate the following

- a) $\mu_m \cup \mu_T$
 - b) $\mu_m \cap \mu_T$
 - c) $\overline{\mu_m}$
 - d) $\overline{\mu_T}$
- b) Perform the following operations on intervals.
- i) $[4, 6] \div [1, 2]$
 - ii) $[5, 2] \times [4, 3]$
- c) Write a short note on FCM clustering.
- d) Explain image enhancement using fuzzy.
- e) Using the inference approach, find the membership values for each of the triangular shapes (L, R, LR, E, T) for the following triangle : 55°, 65°, 60°.

Set S



3. Answer the following :

10

a) A set T of water temperatures from a lake on the following discrete universe of temperatures in degree Fahrenheit $T = \{50, 55, 60\}$. A universe O of oxygen content values in the water, as percent of volume $O = \{1, 2, 3\}$ fuzzy sets are

$$T = \left\{ \frac{1}{50} + \frac{0.55}{55} + \frac{0.35}{60} \right\} \quad O = \left\{ \frac{0.55}{1} + \frac{0.75}{2} + \frac{0.2}{3} \right\}.$$

i) Find the Cartesian product $R = T \times O$

ii) Now suppose we define another fuzzy set of Temperature “about 55°F”, with the following membership values.

$$I = \left\{ \frac{1}{50} + \frac{0.55}{55} + \frac{0.53}{60} \right\}$$

• Using max-min composition find $S = I \circ (T \times O)$

• Using max-product composition find $S = I \circ (T \times O)$.

b) In fuzzy automata, generate fuzzy input and output states under following conditions

$$\text{Output Relation } R = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0.5 & 1 & 0.7 \end{bmatrix} \text{ and state transition relation.}$$

$$S = \begin{bmatrix} 0 & 0.3 & 0.9 & 1 \\ 0.5 & 1 & 0 & 0.2 \\ 0.6 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 & 0 & 1 & 0 \\ 0.2 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 0.4 & 0 & 0.6 \end{bmatrix}$$

with initial state $C^1 = [1 \ 0.8 \ 0.6 \ 0.4]$

Inputs $A1 = [0.4 \ 0]$ $A2 = [1 \ 0]$ $A3 = [1 \ 0.7]$

OR

b) Explain classification by crisp and fuzzy relation.

10

Set S



SECTION – II

4. Answer the following : 10

- a) IA manufacturing company is planning to purchase a lathe and is assessing the proposals from four lathe manufacturers. The company has developed a reciprocal relation for the four manufacturers based on the speed of delivery

of the lathes and the cost. The relation is $\tilde{R} = \begin{bmatrix} 0 & 0.1 & 0.7 & 0.2 \\ 0.9 & 0 & 0.6 & 1 \\ 0.3 & 0.4 & 0 & 0.5 \\ 0.8 & 0 & 0.5 & 0 \end{bmatrix}$

Calculate the degree of preference measures and the distance to Type I, Type II consensus. Explain the differences between the distances to the three consensuses.

OR

- a) Explain following : 10
- i) Fuzzy ordering
 - ii) Multiobjective decision.
- b) Explain FSPC for measurement and attribute SPC.

5. Answer **any four** : (4×5=20)

- a) Explain simple fuzzy control system.
 - b) Explain application of genetic algorithm.
 - c) Explain in detail syntactic recognition.
 - d) Explain application of fuzzy for diagnosis in medicine.
 - e) Explain nontransitive ranking.
-

