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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Electronic Science**  
**COMMUNICATION & DIGITAL ELECTRONICS**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Q.1 and Q. 2 are compulsory.  
 2) Answer any three questions from Q.3 to Q.7.  
 3) All questions carry equal marks.  
 4) Use of nonprogrammable calculator is allowed.

**Q.1 A) Select the correct alternative: 06**

- 1) Audio frequency range is \_\_\_\_\_.
 

a) 20 to 20 KHz	b) 20 to 30 KHz
c) 20 to 40 KHz	d) 20 to 50 KHz
- 2) In AM \_\_\_\_\_.
  - a) carrier signal is varied by the modulating signal
  - b) modulating signal is varied by the carrier signal
  - c) carrier and modulating signals are varied simultaneously
  - d) none of above
- 3) In PAM the amplitude of the pulses are varied in accordance with the \_\_\_\_\_.
 

a) modulating signal	b) carrier signal
c) amplitude signal	d) frequency signal
- 4) The satellite will follow an elliptical path in its orbit around the primary body. This law is Kepler's \_\_\_\_\_.
 

a) first	b) second
c) third	d) fourth
- 5) Long form of Wi-Fi is \_\_\_\_\_.
 

a) wireless fidelity	b) wireless frequency
c) wide frequency	d) wired frequency
- 6) The base hexadecimal number system is \_\_\_\_\_.
 

a) 16	b) 10
c) 8	d) 4

**B) State true or False: 04**

- 1) FM is low noise communication system than AM.
- 2) Up and down link techniques are used in satellite communication.
- 3) Mobile base station commonly use microwave signals.
- 4) Computer accepts the data in binary form.

**C) Fill in the blanks: 04**

- 1) Number of side bands in AM is \_\_\_\_\_.
- 2) The ASK modulation constitutes one of two elementary signals such as \_\_\_\_\_ and \_\_\_\_\_.
- 3) In GPS system four satellites are used. The number of orbits required is \_\_\_\_\_.
- 4)  $Y=A.B$  this the output equation of two input \_\_\_\_\_ gate.

- Q.2 Write short notes:**
- a) What is limiter? Explain types of limiter. **05**
  - b) Satellite transponder. **05**
  - c) Bluetooth **04**
- Q.3**
- a) Discuss amplitude modulation with suitable mathematical expressions. List out the types of AM's. **10**
  - b) Discuss the advantages of FM over AM. **04**
- Q.4**
- a) With a neat block diagram explain the working of FM transmitter. **10**
  - b) Explain the features of GSM technology. **04**
- Q.5**
- a) Define FDM and with a neat diagram, and illustrate the mechanism of FDMA access. **08**
  - b) Write a note on types of satellite orbits. **06**
- Q.6**
- a) With a neat block diagram explain the working of a satellite communication system. **08**
  - b) Write a note on cellular concept. **06**
- Q.7**
- a) State and prove De-Morgans theorems and realize the same using NAND and NOR gates. **10**
  - b) Simplify the following Boolean expression. **04**

$$[A\bar{B}(C + BD) + \bar{A}\bar{B}]C$$

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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Physics (Applied Electronics)**  
**INTRODUCTION TO MATLAB AND LABVIEW**

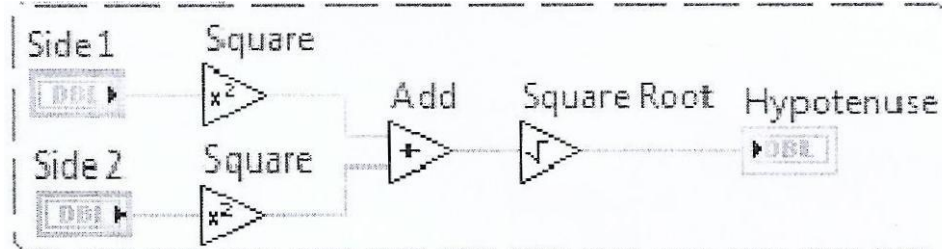
Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Q.1 and Q.2 are compulsory.  
 2) Attempt any three questions from Q. 3 to 7.  
 3) All questions carry equal marks.

**Q.1 A) Select the correct alternative:****08**

- 1) Which one of the following is a legitimate variable name in MATLAB?
  - a) 4var
  - b) exam1.1
  - c) \_input
  - d) sin
- 2) Which of the following MATLAB expression gives -1?
  - a) cos(180)
  - b) sind(3\*pi/2)
  - c) sin(-pi/2)
  - d) None of the above
- 3) Which of the following expressions generates an evenly spaced vector x containing 15 values between 4 and 20?
  - a) x=linspace(4,15,20)
  - b) x= linspace(15,4,20)
  - c) x=linspace(4,20,15)
  - d) x=4:15:20
- 4) Which of the following is printed to standard output when the following expression is executed `fprintf('max temp is %.2f degree',100.2345)`
  - a) max temp is 100.23 degree
  - b) max temp is %.2f degree 100.2345
  - c) 'max temp is %.2f degree',100.2345
  - d) max temp is 100.2345 degree
- 5) What is the correct order of execution of this code?



- a) Square Root, Add, Square Functions in Parallel
  - b) Square Functions in Parallel, Add, Square Root
  - c) Add, Square Root, Square Functions in Parallel
  - d) None of the above
- 6) When placing a *new* function, control, indicator, or constant, the \_\_\_\_\_ feature wires the terminals together if placed within close enough proximity.
    - a) Automatic Wiring
    - b) Block Diagram Cleanup
    - c) Automatic Error Handling
    - d) Retain Wire Values
  - 7) For Loops have auto-index output tunnels, which automatically create \_\_\_\_\_ of data at the tunnel.
    - a) Containers
    - b) Graphs
    - c) Clusters
    - d) Arrays

- 8) A \_\_\_\_\_ allows a VI to run until a certain condition is met, such as pressing a Stop button on the front panel.
- a) For Loop
  - b) While Loop
  - c) Case Structure
  - d) Event Structure

<b>Q.1</b>	<b>B) State true and false:</b>	<b>06</b>
	1) Format long g command in MATLAB displays best of 15-digital fixed or floating point.	
	2) ones(m,n) command in MATLAB creates a square matrix with <i>m</i> rows and <i>n</i> columns in which the diagonal elements are equal to 1 and the rest of the elements are 0.	
	3) Function length(A) in MATLAB returns the number of elements in the vector A.	
	4) The cluster data structure in LabVIEW can be compared to a purse or wallet because a purse or wallet can hold many different things just as this data structure can hold multiple data types.	
	5) Use NI Example Finder within the LabVIEW environment to see a quick description of any object on the block diagram or front panel.	
	6) The operate Tool in LabVIEW is typically used during run time to change the value of a control.	
<b>Q.2</b>	<b>Attempt the following:-</b>	
	a) Explain load and save commands in MATLAB.	<b>04</b>
	b) What is the difference between text based programming and graphical programming?	<b>05</b>
	c) Short note on Polymorphism concept in LabVIEW.	<b>05</b>
<b>Q.3</b>	a) Explain in detail virtual instrumentation and graphical system design model.	<b>08</b>
	b) Explain waveform chart, graph and XY graph in LabVIEW.	<b>06</b>
<b>Q.4</b>	a) Explain the conditional statement in MATLAB with their syntax.	<b>08</b>
	b) Explain input and fprintf command in MATLAB.	<b>06</b>
<b>Q.5</b>	a) Explain the while and for loop in LabVIEW using suitable example.	<b>08</b>
	b) Explain different function with their use available on LabVIEW toolbar.	<b>06</b>
<b>Q.6</b>	a) Explain various differentiation and integration function in MATLAB.	<b>08</b>
	b) How to create 1D and 2D array in MATLAB?	<b>06</b>
<b>Q.7</b>	a) Explain temperature monitoring system (0 <sup>0</sup> c To 100 <sup>0</sup> c) in LabVIEW with LM35 sensor with myDAQ card with G-code.	<b>07</b>
	b) Write a program in a script file in MATLAB that converts a quantity of energy (work) given in units of either joule, ft-lb, cal, or eV to the equivalent quantity in different units specified by the user. The program asks the user to enter the quantity of energy, its current units, and the desired new units. The output is the quantity of energy in the new units. The conversion factors are: 1J = 0.738 ft-lb = 0.239 cal = 6.24 X 10 <sup>18</sup> eV	<b>07</b>
	Use the program to:	
	1) Convert 150 J to ft-lb	
	2) Convert 2,800 cal to J	
	3) Convert 2.7 eV to cal	

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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Organic Chemistry**  
**DRUGS AND HETEROCYCLES**

Time: 2½ Hours

Max. Marks: 70

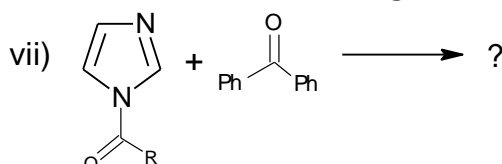
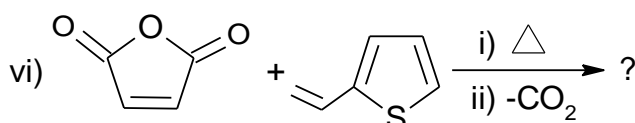
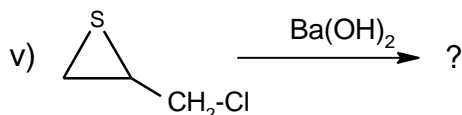
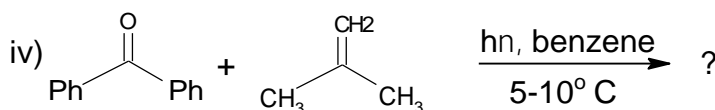
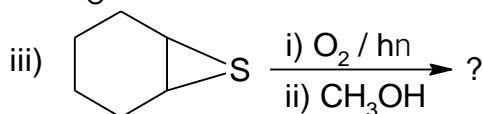
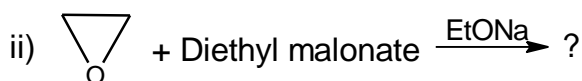
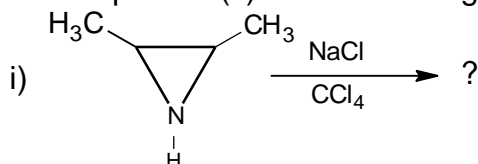
- Instructions:** 1) Attempt in all 5 questions.  
 2) Section I is compulsory.  
 3) Attempt any two questions from Section – II and any two from Section – III  
 4) Answers to all questions (Section I, II and III) should be written in the one answer book.  
 5) All questions carry equal marks.  
 6) Figures to the right indicate full marks.

**SECTION – I**

**Q.1 a) Define the pharmaceutical terms of the following. 07**

- 1) Cardiovascular drugs
- 2) Anti-neoplastic
- 3) AIDS
- 4) Histamine
- 5) NSAID
- 6) Prodrugs
- 7) Antiarrhythmic drugs

**b) Predict the product(s) of the following reactions: 07**



## SECTION – II

- Q.2** a) What are antibiotics? Explain the synthesis and uses of following antibiotics: **07**  
 1) Ampiciline  
 2) Cephalexin
- b) What are anti-tubercular drugs? Explain the synthesis and mechanism of action of following anti-tubercular drugs. **07**  
 1) Isoniazide  
 2) Ethambutol
- Q.3** a) Discuss the various synthesis methods of procaine and mechanism of nerve impulse transmission in action of Local anaesthetics. **07**
- b) What are antimalarials? Give the synthesis and mechanism of action of trimethoprim. **07**
- Q.4** a) What are analgesic and antipyretic drugs? Discuss the synthesis, applications and adverse effects of the following drugs. **07**  
 1) Paracetamol  
 2) Meperidine
- b) Explain the synthesis, applications and side effects of following anti-inflammatory drugs (any two): **07**  
 1) Dichlorophenac  
 2) Indomethacin  
 3) Arachidonic acid

## SECTION – III

- Q.5** a) Explain the synthesis of benzofuran from coumarin. What is the action of following on benzofuran: **05**  
 1)  $\text{Cl}_2/\text{CS}_2$   
 2) DMF/  $\text{POCl}_3$   
 3)  $\text{Ac}_2\text{O}$
- b) Explain the cyclization of open chain to aziridine ring is stereo specific. What is the reaction of following on aziridine: **05**  
 1) HCl  
 2)  $\text{CH}_3\text{COCl}$   
 3) Vinyl cyanide
- c) Synthesis of coumarin and chromones. **04**
- Q.6** a) Explain synthesis of oxazole derivatives from  $\alpha$ - acyl-amino ketones, esters and amides with suitable example. **05**
- b) Write various synthesis methods of quinoline and isoquinolines. **05**
- c) Explain Fisher- Indole synthesis with mechanism. **04**
- Q.7** Write notes on any three of the following:- **14**  
 a) Pyridazine  
 b) Purines  
 c) Quinoxalines  
 d) Pyrazoles

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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Mathematics**  
**NUMERICAL TECHNIQUES**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Question No.1 and 2 is compulsory.  
 2) Attempt any three questions from Question No.3 and Question No.7  
 3) Figures to the right indicate full marks.  
 4) Use of calculator is allowed.

**Q.1 A) Fill in the blanks:- (one mark each) 10**

- The Newton Raphson method when  $f'(x)$  is \_\_\_\_\_.
- The error in Simpson's 1/3 rule over  $[x_0x_2]$  is \_\_\_\_\_.
- Power method is used to find \_\_\_\_\_.
- The value of  $y$  at  $x = 0.02$  in solving  $y' = -y$  by Euler method with the condition  $y(0) = 1$  and  $h = 0.01$  is \_\_\_\_\_.
- Simpsons 3/8 rule for integration gives exact result when  $f(x)$  is a polynomial of degree \_\_\_\_\_.
- $n^{\text{th}}$  order finite difference of  $n^{\text{th}}$  order polynomial is \_\_\_\_\_.
- An approximate value of  $\pi$  is  $x_1 = 3.1428571$  and its true value is  $x = 3.1415926$ , then the absolute error  $E_A$  is \_\_\_\_\_.
- Lagrange's interpolating polynomial is \_\_\_\_\_.
- Householders method is used to obtain eigenvalues of \_\_\_\_\_ matrices.
- Newton Raphson method converges \_\_\_\_\_.

**Q.1 B) Choose the correct alternative:- (one mark each) 04**

- The backward difference operator is \_\_\_\_\_.  
 a)  $\nabla f(x_i) = f(x_i + h) - f(x_i)$       b)  $\nabla f(x_i) = f(x_i) - f(x_i - h)$   
 c)  $\nabla f(x_i) = f(x_i - h) - f(x_i)$       d)  $\nabla f(x_i) = f(x_i) + f(x_i - h)$
- If  $f(0) = 1, f(1) = 3$  and  $f(3) = 55$  then the Lagrange fundamental polynomial is \_\_\_\_\_.  
 a)  $(1/3)(x^2 - 4x + 3)$       b)  $x^2 - 4x - 3$   
 c)  $(1/2)(3x - x^2)$       d)  $(1/6)(x^2 - x)$
- The relation between  $\nabla$  and  $E$  is given \_\_\_\_\_.  
 a)  $E = (1 - \nabla)^{-1}$       b)  $E = (1 + \nabla)^{-1}$   
 c)  $\nabla = (1 + E)^{-1}$       d)  $\nabla = (E - 1)$
- In Gauss elimination method the coefficient matrix is reduced to \_\_\_\_\_.  
 a) Diagonal matrix      b) Zero matrix  
 c) Upper triangular matrix      d) None of these

**Q.2 a) Find the area bounded by the curve and the x-axis from  $x = 7.47$  to  $x = 7.52$  using following table 04**

X	7.47	7.48	7.49	7.50	7.51	7.52
F(x)	1.93	1.95	1.98	2.01	2.03	2.06

- Prove that  $\Delta^n u_{x-n} = u_x - nu_{x-1} + \frac{n(n-1)}{2}u_{x-2} + \dots + (-1)^n u_{x-n}$  **03**
- Find the cubic polynomial for the values  $y(1) = 24, y(3) = 120, y(5) = 336$  and  $y(7) = 720$  **03**
- Find the root of equation  $x^3 - 2x - 5 = 0$  using Newton Rashson method. **04**

- Q.3** a) Derive Newton's backward difference interpolation formula. **07**  
 b) Using the Householders transformation reduces the matrix  $\begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$  into **07**  
 tridiagonal matrix.
- Q.4** a) Find real root of  $x^2 - x - 1 = 0$  using bisection method. **07**  
 b) Solve  $I = \int_0^1 \frac{1}{1+x} dx$  correct to three decimal places by Simpsons 1/3 rule **07**  
 with  $h = 0.125$
- Q.5** a) Find a positive root between 0 and 1 of the equation  $xe^x = 1$  using iteration **07**  
 method  
 b) Solve the equation  $x_1 + x_2 + x_3 = 1, 4x_1 + 3x_2 - x_3 = 6, 3x_1 + 5x_2 + 3x_3 = 4$  **07**  
 using LU decomposition method.
- Q.6** a) Derive Lagrange interpolating formula. **07**  
 b) Using divided differences, find  $f(x)$  as polynomial in  $x$  from the following data **07**
- |      |    |    |    |     |      |
|------|----|----|----|-----|------|
| X    | -1 | 0  | 3  | 6   | 7    |
| F(x) | 3  | -6 | 39 | 822 | 1611 |
- Q.7** a) Solve the system of equation  $2x_1 - x_2 + 0x_3 = 1, -1x_1 + 2x_2 - x_3 = 1,$  **07**  
 $0x_1 - x_2 + 2x_3 = 1$  using Gauss Seidel method.  
 b) Use Secant method to determine the root of the equation  $\cos x - xe^x = 0$  **07**



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**M.Sc. (OET) (Semester III) (CBCS) Examination Mar/Apr-2018**

**Statistics**

**APPLIED STATISTICS**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Attempt five questions.  
 2) Q. No. (1) and Q. No. (2) are compulsory.  
 3) Attempt any three from Q. No. (3) to Q. No. (7)  
 4) Figures to the right indicate full marks.  
 5) Use of non-programmable/simple calculator is allowed.

**Q.1 A) Choose the correct alternative: 05**

- 1) Laspeyre's index formula uses the weights of the \_\_\_\_\_.
  - a) base year
  - b) current year
  - c) average weight of a number of years
  - d) none of these
- 2) The most important factor causing seasonal variations is \_\_\_\_\_.
  - a) growth of population
  - b) weather and social customs
  - c) depression in business
  - d) none of these
- 3) Gross reproduction rate is defined as \_\_\_\_\_.
 

a) $\frac{\text{Total fertility} \times \text{female births}}{\text{Total births}}$	b) $\frac{\text{Total births}}{\text{Female population}}$
c) $\frac{\text{Total Fertility} \times \text{total births}}{\text{Female births}}$	d) None of these
- 4) Choose an odd control chart from the set of following control charts:  
 {C-chart, p-chart, np-chart, R-chart}
  - a) C-chart
  - b) p-chart
  - c) np-chart
  - d) R-chart
- 5) Non sampling errors occur in \_\_\_\_\_.
  - a) only sample surveys
  - b) only complete enumeration
  - c) sample surveys as well as complete enumeration
  - d) none of these

**B) Fill in the blanks: 05**

- 1) Seasonal variations can occur in a time series within period of \_\_\_\_\_.
- 2) Fisher's ideal number is \_\_\_\_\_ mean of Laspeyre's and Paasche's index numbers.
- 3) \_\_\_\_\_ fertility rate is generally used to measure the fertility between two towns.
- 4) Under SRSWR, the sample unit can occur \_\_\_\_\_ times in the sample.
- 5) The variation due to \_\_\_\_\_ causes cannot be identified from the process.

**C) State whether the following statement are True or False 04**

- 1) Prices should be for the same unit of quantity in index number.
- 2) Under simple random sampling without replacement the same item can occur more than once in the sample.
- 3) Deseasonalisation of data means eliminating the seasonal component from the data.
- 4) The process operating with assignable causes of variation is said to be in statistical control.

- Q.2 A) Answer the following.** **06**  
 1) Describe the advantages of sampling over census method.  
 2) Define Fisher's index number. Why it is said to be an ideal index number?

- B) Write short notes on the following:** **08**  
 1) Reproduction rates  
 2) Seasonal and cycle variations in time series

- Q.3 A) Define cost of the living index number. State its uses. Describe the problems involved in the construction of cost of living index numbers.** **07**  
**B) Construct cost of living index number for year 1996 on the basis of 1993 using aggregate expenditure method from the following data.** **07**

Commodity	Quantity consumed	Price in	
		1993	1996
A	100	8	12
B	25	6	7
C	10	5	7
D	20	15	18

- Q.4 A) What is secular trend? Discuss moving method of isolating trend values in a time series.** **07**  
**B) Calculate 3-yearly moving averages from the following data and plot the actual and trend values on the same graph.** **07**

Year	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Value	21	22	23	25	24	22	25	26	27	26

- Q.5 A) Discuss the construction of p chart when all samples are of same size also explain the use of p chart.** **07**  
**B) A TV voltage stabilizer manufacturer checks the quality of 50 units of his product daily for 10 days and finds fraction of defective units as follows:** **07**

Days	1	2	3	4	5	6	7	8	9	10
Fraction defective	0.10	0.20	0.06	0.04	0.16	0.02	0.08	0.06	0.02	0.16

- Q.6 A) Define General Fertility rate (GFR) and Age specific fertility rate (ASFR). Describe methods for computing these fertility rates. Indicate why ASFR is considered as an improvement over GFR.** **07**

- B) Compute:** **07**  
 1) Crude birth rate  
 2) General fertility rate and  
 3) Total fertility rate for the following data.

Age - Group.	No. of women	No. of births
15-19	24000	800
20-24	20000	2400
25-29	15000	2000
30-34	12000	600
35-39	6000	120
40-44	4000	10

Total population is 186300

- Q.7 A) What are basic principles of sample survey? Write in brief advantages of sampling over census method.** **07**

- B) In order to determine whether or not a production of bronze castings is in control, 20 subgroups of size 6 are taken. The quality characteristic of interest is weight of casting and it is found that,  $\bar{\bar{X}} = 3.126$  gm and  $\bar{\bar{R}} = 0.009$  gm. Assume that process is in control, compute the upper and lower control limits for both  $\bar{X}$  and R charts. (Conversion factors for  $n = 6$ ,  $A_2 = 0.483$ ,  $D_3 = 0$ ,  $D_4 = 2.004$ )** **07**

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No.**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018****Geoinformatics  
URBAN GEOGRAPHY**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Answer any five questions.  
 2) All questions are equal marks.  
 3) Question 1 is compulsory and should be answered in the question paper  
 4) Answer any two essay questions from 2, 3, and 4  
 5) Answer any two short note questions from 5, 6 and 7  
 6) Draw neat and labeled diagrams wherever necessary.

**Q.1 Fill in the blanks with appropriate choice****14**

- 1) As per census 2011, India has \_\_\_\_\_ metropolitans.
  - a) 21
  - b) 32
  - c) 53
  - d) 65
- 2) Which religion is not included in the oriental cultural realm?
  - a) Hinduism
  - b) Buddhism
  - c) Confucianism
  - d) Taoism
- 3) The concept of Cultural landscape was promoted by \_\_\_\_\_.
  - a) Ratzel
  - b) Carl Sauer
  - c) Wilber Zelinsky
  - d) Aune Bultimer
- 4) As per census of India how many categories of urban settlements are identified?
  - a) 3
  - b) 4
  - c) 5
  - d) 6
- 5) The census of India (2011) states that maximum density of population is found in which of the following Union Territories?
  - a) Andaman and Nicobar Island
  - b) Dadra and Nagar Haveli
  - c) Daman and Diu
  - d) Lakshdweep Islands
- 6) Concentric Zone Theory of Urban growth is propounded by \_\_\_\_\_.
  - a) J. Gottmen
  - b) E. Burgess
  - c) M. Jefferson
  - d) C. Harris and E. Ullan
- 7) Megalopolis propounded by \_\_\_\_\_.
  - a) J. Gottmen
  - b) E. Burgess
  - c) M. Jefferson
  - d) C. Harris and E. Ullan
- 8) According to Munford, last stage of town is \_\_\_\_\_.
  - a) Polis
  - b) Eopolis
  - c) Metropolis
  - d) Megalopolis
- 9) Which year is called a "Great Divide" in the demographic history of India?
  - a) 1921
  - b) 1951
  - c) 1901
  - d) 1941

- 10) Urbanization denotes\_\_\_\_\_.  
 a) Increase in the number of towns  
 b) Increase in proportion of urban population  
 c) Increase in urban population  
 d) All of the above
- 11) Rural – urban Fringe lies in\_\_\_\_\_.  
 a) Central part of the city  
 b) Rural area  
 c) Between outer part of the city and adjacent rural area  
 d) None of the above
- 12) C.B.D. stands for\_\_\_\_\_.  
 a) Central Business Development                      b) Central Business District  
 c) Canal Business District                                d) Canal Business Development
- 13) Degradation of town starts due to war, drought and diseases is known as\_\_\_\_\_.  
 a) Polis    b) Eopolis  
 c) Nekropolis    d) Tyranopolis
- 14) The Planning Commission of India was set up in which year?  
 a) 1950    b) 1952  
 c) 1960    d) 1965

- Q.2** What is Town? Give the Functional Classification of Town. **14**
- Q.3** Elaborate the term over Urbanisation? Add a note on Multiple Nuclei Model. **14**
- Q.4** Describe in details ‘Conurbation Zone’. **14**
- Q.5 Write a short note on** **14**  
 a) Modern Town  
 b) Population Density
- Q.6 Write account on** **14**  
 a) Basic and ancillary functions of Urban Settlements  
 b) Urban Settlement
- Q.7 Write brief note on** **14**  
 a) Types of Urban settlement  
 b) Stages of Urban Development

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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018  
Zoology**

**WILD LIFE AND CONSERVATION BIOLOGY**

Time: 2½ Hours

Max. Marks: 70

**Instructions:** 1) Q.1 and Q.2 and Q.6 are compulsory.

2) Attempt any two from questions from Q. 3, 4 and 5.

**Q.1 A) Choose the correct alternative given in the bracket: 14**

- 1) The intermediate transitional zone between two ecological communities is known as \_\_\_\_\_.
  - a) Ecology
  - b) Exobiology
  - c) Ecotone
  - d) Ecosphere
- 2) A local association of several populations of different species is known as \_\_\_\_\_.
  - a) Society
  - b) Community
  - c) Ecotomus
  - d) Biomass
- 3) The interconnected network of feeding relationship within an ecosystem is known as \_\_\_\_\_.
  - a) Food chain
  - b) Food web
  - c) Food box
  - d) Food mass
- 4) Earth Summit at Rio-de-Janeiro was related to \_\_\_\_\_.
  - a) Soil fertility
  - b) Survey of natural resources
  - c) Preservation of wild animals
  - d) Conservation of environment
- 5) Biodiversity is an abbreviation of \_\_\_\_\_.
  - a) Biological rhythm
  - b) Abiotic factor
  - c) Biotic factor
  - d) Biological diversity
- 6) In Ecological pyramid study each level of the pyramid is called \_\_\_\_\_.
  - a) Eco level
  - b) Bio level
  - c) Mass level
  - d) Tropical level
- 7) The basic level of the Ecological pyramid is \_\_\_\_\_.
  - a) Secondary consumer
  - b) Producers
  - c) Primary consumer
  - d) Tertiary consumer

**Q.2 Long answer type question 14**

Give and account on the Earthquake and its effect on ecosystem and community structure.

**Q.3 Answer the following**

- a) Describe in detail fishing methods. **07**
- b) Give an account on industrialization. **07**

**Q.4 Explain the following:**

- a) Environmental Impact assessment (EIA) **05**
- b) Definition and characteristics of community **05**
- c) Urbanization **04**

- Q.5 Explain in short**
- a) Ecological succession - Aquatic **07**
  - b) Structure and stratification of community **07**
- Q.6 Write short notes (any four)** **14**
- a) Classification of communities
  - b) Breaking of Food chain
  - c) Sanctuaries
  - d) National Parks in India
  - e) Renewable natural resources
  - f) Tsunami – Its effect on ecosystem

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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Biotechnology**  
**COMPUTATIONAL STRUCTURE BIOLOGY AND DRUG DESIGNING**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section I is compulsory.  
 2) Attempt any Four questions from Section – II  
 3) Figures to the right indicate full marks  
 4) Answers to the (Section I and II) are to be written in same answer Booklet only.

**SECTION – I****Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives: 07**

- 1) A schematic diagram of all interaction between Protein and Drug display is \_\_\_\_\_.  
 a) Ligplot  
 b) Nuclplot  
 c) Rotamer  
 d) PDB format
- 2) Hemoglobin is a \_\_\_\_\_ type of protein –protein interaction.  
 a) Homo-oligomeric  
 b) Hetero-oligomeric  
 c) Homo-dimeric  
 d) Hetero-dimeric
- 3) Major site of drug metabolism is \_\_\_\_\_.  
 a) Lung  
 b) Liver  
 c) Kidney  
 d) All of these
- 4) The RCSB protein data bank is updated on \_\_\_\_\_.  
 a) Daily  
 b) Weekly  
 c) Monthly  
 d) Yearly
- 5) Drugs combine with receptor and elicit appropriate response are called \_\_\_\_\_.  
 a) Antagonist  
 b) Agonist  
 c) Affinity  
 d) Efficacy
- 6) DIP is a \_\_\_\_\_ interaction database.  
 a) DNA-DNA  
 b) Protein-Lipid  
 c) Protein-protein  
 d) Protein-Ligand
- 7) The temple for 3D structure can be selected as \_\_\_\_\_ sequence identity.  
 a) >20  
 b) >25  
 c) >30  
 d) >15

**B) Definitions****07**

- 1) NMR clust
- 2) Chemoinformatics
- 3) PSSM
- 4) Pharmacodynamics
- 5) PDBe Fold
- 6) Potency
- 7) β stand

**SECTION – II**

- Q.2** What is docking? Explain docking process using AutoDock. **14**
- Q.3** Explain Protein-Carbohydrate and Protein –DNA interaction with their importance in drug discovery. **14**
- Q.4** What is Secondary Structure and Explain the Chou-Fasman & GOR secondary structure prediction method in detail. **14**
- Q.5** **Answer any two from the following** **14**
- a) Explain different phase of clinical trials.
  - b) Explain process of homology modeling in details.
  - c) Protein-Ligand interaction
- Q.7** **Write notes on any two of the following:-** **14**
- a) Protein Folding
  - b) Y2H
  - c) CSA



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**M.Sc. (OET) (Semester III) (CBCS) Examination Mar/Apr-2018**  
**Botany**  
**PLANT GROWTH AND DEVELOPMENT**

Time: 2½ Hours

Max. Marks: 70

**Instructions:** All Questions are compulsory.**Q.1 Choose correct answer from given alternatives.****14**

- 1) Loss of chlorophyll and decline in chloroplast enzymes are the common indicator of \_\_\_\_\_.
  - a) Senescence
  - b) Photo periodism
  - c) Transpiration
  - d) Respiration
- 2) During seed germination enzymes are synthesized from \_\_\_\_\_.
  - a) Starch
  - b) Lipids
  - c) Proteins
  - d) None of these
- 3) The term phytochrome was coined by \_\_\_\_\_.
  - a) Borthwick
  - b) Moore
  - c) Garner and Allard
  - d) Borthwick and Hendricks
- 4) Following gaseous growth hormone stimulates fruit ripening \_\_\_\_\_.
  - a) Ethylene
  - b) Auxin
  - c) Kinetin
  - d) None of these
- 5) Which of the following cell organelle may persist till the final stage of senescence?
  - a) ER
  - b) Chloroplast
  - c) Mitochondria
  - d) All of these
- 6) Process of morphogenesis require following main factor
  - a) Light
  - b) CO<sub>2</sub>
  - c) Shade
  - d) H<sub>2</sub>O
- 7) E.C.C. is inhibitor of \_\_\_\_\_.
  - a) G. A. biosynthesis
  - b) Kinetin biosynthesis
  - c) Auxin biosynthesis
  - d) None of these
- 8) PFr is nothing but \_\_\_\_\_.
  - a) Phytochrome for red
  - b) Phytochrome far red
  - c) Both a and b
  - d) None of these
- 9) Second messenger molecules involved in many signal transduction pathways in \_\_\_\_\_ plants.
  - a) CGMP
  - b) CAMP
  - c) Inositol triphosphate
  - d) All of these
- 10) Reduction in photosynthesis and storage activity occurs during \_\_\_\_\_.
  - a) Transpiration
  - b) Absorption of water and minerals
  - c) Senescence
  - d) Protein synthesis

- 11) Jasmonates plays role in \_\_\_\_\_.  
a) Elongation of stem                                      b) Promotion of photosynthesis  
c) Promotion of senescence                                d) Ripening of Fruits.
- 12) Sudden change in genetic material is known as \_\_\_\_\_.  
a) Transpiration    b) Mutation  
c) Guttation    d) None of these
- 13) Petal senescence causes to \_\_\_\_\_.  
a) Growth of petals    b) Death of petals  
c) Expansion of petals                                        d) Elongation of petals
- 14) Seed is nothing but \_\_\_\_\_.  
a) Immature ovary    b) Mature ovule  
c) Mature ovary     d) All of these

- Q.2 a)** Give an account of biochemical changes during senescence of petals.                                      **07**  
**b)** Write about involvement of  $\text{Ca}^{2+}$  in signal transduction in plants.                                      **07**
- Q.3 a)** Give on account of role of Paclobutrazol.    **07**  
**b)** Explain the role of mutant in physiological studies.    **07**
- Q.4 a)** What are the properties of Cryptochrome?    **07**  
**b)** Write about the possible mechanism of Brassinosteroids.    **07**
- Q.5 Describe**
- a)** cAMP as a second messenger in plants    **05**  
**b)** Senescence of leaves    **04**  
**c)** Physiology of seed development    **05**
- Q.6 Explain**
- a)** Properties of phytochrome    **04**  
**b)** Metabolism of stored seeds    **05**  
**c)** Role of polyamines in agriculture    **05**
- Q.7 Write short note on any three**    **14**
- a)** Programmed cell death  
**b)** Role of phytochrome  
**c)** Metabolism of stored leafy vegetables  
**d)** Mechanism of action of morphactins

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**M.Sc. (OET) (Semester III) (CBCS) Examination Mar/Apr-2018**  
**Agrochemicals And Pest Management**  
**ANALYSIS OF AGROCHEMICALS**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) All Sections are compulsory.  
 2) Attempt any Two questions from Section – II  
 3) Attempt any Two questions from Section – III  
 4) All questions carry equal marks.

**SECTION – I**

- Q.1** 1) \_\_\_\_\_ transition is more energetic.  
 a)  $\sigma - \sigma^*$     b)  $n - \sigma^*$   
 c)  $\pi - \pi^*$     d)  $n - \pi^*$
- 2) \_\_\_\_\_ is an example of chromophore.  
 a)  $\begin{array}{c} \text{O} \\ || \\ -\text{C}- \end{array}$     b) -OH  
 c) -NH<sub>2</sub>    d) -Cl
- 3) Functional group in the organic molecule is determined by \_\_\_\_\_ spectroscopy.  
 a) UV    b) IR  
 c) NMR    d) Mass
- 4) \_\_\_\_\_ of the following is IR active.  
 a) HCl    b) N<sub>2</sub>  
 c) Cl<sub>2</sub>    d) H<sub>2</sub>
- 5) For non-linear molecules the number of fundamental modes of vibrations are calculated by \_\_\_\_\_.  
 a) 3N    b) 3N - 5  
 c) 3N - 3    d) 3N - 6
- 6) M + 2 peak is observed in mass spectrum due to presence of \_\_\_\_\_ of the following.  
 a) C    b) Br  
 c) N    d) H
- 7) In 2-Butanone \_\_\_\_\_ numbers of sets of proton are observed.  
 a) 3    b) 6  
 c) 1    d) 2
- 8) \_\_\_\_\_ radiations are used in PMR spectroscopy.  
 a) IR    b) Radio  
 c) X-ray     d) Radar
- 9) The radioisotopes have \_\_\_\_\_.  
 a) Same atomic and mass number  
 b) Same atomic and different mass number  
 c) Different atomic and same mass number  
 d) Different atomic and mass number



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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Geography**  
**CULTURAL GEOGRAPHY**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.  
 2) All questions carry equal marks  
 3) Use of stencils is allowed.  
 4) Draw neat diagrams wherever necessary  
 5) Figures to the right indicate full marks.

**Q.1 A) Choose the correct alternative given in the bracket. 07**

- 1) \_\_\_\_\_ is a modern branch of Human Geography.  
 a) Economic Geography                      b) Oceanography  
 c) Cultural Geography                      d) Industrial Geography
- 2) \_\_\_\_\_ is holly book of Muslim religion.  
 a) Mahabharat                      b) Bible  
 c) Ramayan                      d) Kuran
- 3) \_\_\_\_\_ are inhabitants of Tundra region.  
 a) Bushmen                      b) Eskimo  
 c) Pigme                      d) Naga
- 4) The world cultural region is divided into \_\_\_\_\_ region.  
 a) 8                      b) 10  
 c) 11                      d) 13
- 5) \_\_\_\_\_ are mainly hunting occupation of tribal community.  
 a) Pigme                      b) Bushmen  
 c) Toda                      d) Masai
- 6) \_\_\_\_\_ economic activities provides agriculture and Fishers occupation  
 a) Tertiary                      b) Secondary  
 c) Quaternary                      d) Primary
- 7) \_\_\_\_\_ is biggest religion in the world.  
 a) Hindu                      b) Christian  
 c) Jain                      d) Sikh

**B) Fill in the blanks 07**

- 1) \_\_\_\_\_ and \_\_\_\_\_ are types of culture.
- 2) \_\_\_\_\_ is Dravidian Language.
- 3) The 'stop and go' determinism was put forth by \_\_\_\_\_.
- 4) \_\_\_\_\_ are inhabitants of Nilgiri region in India.
- 5) Sikhs population is more concentrated in \_\_\_\_\_ state of India.
- 6) Intellectual and personal services are \_\_\_\_\_ economic activity.
- 7) \_\_\_\_\_ and \_\_\_\_\_ are holly books of Hindu.

**Q.2 What is cultural Geography? Comment on its nature and evolution in brief. 14**

- Q.3** Describe in detailed on world cultural realms. 14
- OR**
- What is religion? Classify religion in various manners.
- Q.4 Write answers in brief. (Any two)** 14
- a) Describe components of culture.
  - b) Importance of Cultural Geography.
  - c) Write concept of Cultural Hearth
  - d) Explain distribution of Languages of India
- Q.5 Write short notes on. (Any two)** 14
- a) Scope of cultural Geography
  - b) Race
  - c) Bushmen
  - d) Cultural diffusion

## (मराठी रूपांतर)

सूचना: 1) सर्व प्रश्न अनिवार्य आहेत.

- 2) उजवीकडील अंक गुण दर्शवतात.
- 3) आवश्यक तेथे सुबक आकृत्या व नकाशे काढा.
- 4) नकाशा स्टेन्सिल वापरण्यास परवानगी आहे.
- 5) सर्व प्रश्नांना गुण समान आहेत.

प्र.1 अ) योग्य पर्याय निवडा व उत्तरे लिहा:

07

1. ——— ही आधुनिक मानवी भूगोलाची शाखा आहे.  
अ) आर्थिक भूगोल  
क) सांस्कृतिक भूगोल  
ब) सागरशास्त्र  
ड) औद्योगिक भूगोल
2. ——— हे मुस्लीम धर्माचे पवित्र ग्रंथ आहे.  
अ) महाभारत  
क) रामायण  
ब) बायबल  
ड) कुराण
3. ——— हे टुंड्रा प्रदेशातील रहिवाशी आहेत.  
अ) बुशमेन  
क) पिग्मी  
ब) एस्किमो  
ड) नागा
4. जागतिक सांस्कृतिक विभाग—— मध्ये विभागलेले आहेत.  
अ) 8  
क) 11  
ब) 10  
ड) 13
5. ——— जमातीचा शिकार करणे हा प्रमुख व्यवसाय आहे.  
अ) पिग्मी  
क) तोडा  
ब) बुशमेन  
ड) मसाई
6. ——— श्रेणीच्या आर्थिक क्रिया शेती आणि मासेमारी व्यवसाय पुरवितात.  
अ) तृतीय  
क) चतुर्थ  
ब) द्वितीय  
ड) प्राथमिक
7. ——— हा जगातील सर्वात मोठा धर्म आहे.  
अ) हिंदू  
क) जैन  
ब) ख्रिश्चन  
ड) शिख

ब) रिकाम्या जागा भरा.

07

1. संस्कृतीचे ———व—— प्रकार आहेत.
2. ——— ही द्रविडियन भाषा आहे.
3. 'थांबा व जा' हा निसर्गावर ——— यांनी मांडला.
4. ——— जमात भारताच्या निलगिरी प्रदेशात रहाते.
5. भारतातील ——— राज्यात शिखांचे केंद्रिकरण जास्त आढळते.
6. बौद्धीक व वैयक्तिक सेवा ——— श्रेणीच्या आर्थिक क्रियामध्ये येते.
7. ——— व—— हिंदूचे पवित्र ग्रंथ आहेत.

प्र.2 सांस्कृतिक भूगोल म्हणजे काय? सांस्कृतिक भूगोलाचे स्वरूप व विकासाची चर्चा करा.

14

प्र.3 जागतिक सांस्कृतिक मंडळाचे सविस्तर वर्णन करा.

14

किंवा

धर्म म्हणजे काय? विविध पध्दतीने धर्माचे वर्गीकरण करा.

प्र.4 थोडक्यात उत्तरे लिहा (कोणतेही दोन)

14

1. सांस्कृतिक घटकांचे वर्णन करा.
2. सांस्कृतिक भूगोलाचे महत्व लिहा.
3. संस्कृतीच्या उगमस्थानाची संकल्पना लिहा.
4. भारतातील भाषांचे वितरण स्पष्ट करा.

- प्र.5 टिपा लिहा (कोणत्याही दोन)
1. सांस्कृतिक भूगोलाची व्याप्ती
  2. वंश
  3. बुशमेन
  4. सांस्कृतिक प्रसार



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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Industrial Chemistry**  
**ADVANCED TOPICS IN INDUSTRIAL CHEMISTRY – II**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Attempt in all five questions.  
 2) Section – I is compulsory.  
 3) Attempt any two questions from section – II and two questions from section – III  
 4) Answer to all questions (section I, II, III) should be written in the one answer book.  
 5) All questions carry equal marks.  
 6) Figures to the right indicate full marks.

**Section – I**

- Q.1 Answer the following:** **14**
- a) Name the highest ranking coal. Give its approximate calorific value.
  - b) Give basic components of green chemistry approach.
  - c) Define cloud point and pour point.
  - d) Define lubricant.
  - e) Define prodrug.
  - f) What is meant by aniline point?
  - g) What is meant by pharmacokinetics?
  - h) What is the use of fertilizers?
  - i) Give the names of major fertilizer industries in India.
  - j) Define Disinfection.
  - k) Name any two green solvent uses in industrial process.
  - l) Define viscosity.
  - m) What is meant by antipyretic drug?
  - n) What are the characteristic factors of good fuel?

**Section – II**

- Q.2** a) Describe the Kjeldahl's method of the determination of total nitrogen in fertilizer sample. **07**
- b) Describe in details the Bomb's calorimeter to determine the calorific value of coal. **07**
- Q.3** a) Explain with suitable example Non aqueous titration for analgesic drug. **07**
- b) Define Pharmaceutics. Why do we convert drugs into medicine? **07**
- Q.4** a) Describe the synthesis and mode of action of ciprofloxacin. **07**
- b) What is atom economy? Give the principle of Green Chemistry. **07**

**Section – III**

- Q.5** a) Explain in detail the determination of viscosity by Redwood method. **05**  
b) Give the significance of LD<sub>50</sub> and ED<sub>50</sub>. **05**  
c) Describe in brief the analysis of potassium by sodium tetraphenyl borate method. **04**
- Q.6** a) Discuss the assay method for the drug containing phenolic group in it. **05**  
b) Give the manufacturing process of any one chemical with a help of Green chemistry. **05**  
c) Discuss in brief the Solid dosage forms. **04**
- Q.7** **Write notes on any three of the following.** **14**  
a) Ultimate and Proximate analysis of coal  
b) DNA as receptor  
c) Syrups  
d) Synthesis of Salbutamol

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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Polymer Chemistry**  
**SPECTRAL AND INSTRUMENTAL ANALYSIS OF POLYMERS**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Attempt in all five questions.  
 2) Section-I is compulsory.  
 3) Attempt any two questions from Section-II and any two questions from Section-III.  
 4) All question carry equal marks.  
 5) Figures to the right indicate full marks.  
 6) Use of log table and non programmable calculator is allowed.

**Section-I**

- Q.1 Answer the following.** **14**
- Calculate the wave number for the IR radiation whose wavelength is  $5\mu\text{m}$
  - List the causes of line broadening in solid state CMR of polymer.
  - List four applications of SEM analysis of polymers.
  - What is the meaning of term XPS?
  - Write down the formula used for determination of degree of crystallinity by XRD technique.
  - Schematically show  $n \rightarrow \pi^*$  and  $\pi \rightarrow \pi^*$  transition, for UV spectra and give example of compound showing these transitions.
  - List four advantages of FT-NMR technique.

**Section-II**

- Q.2**
  - Explain the use of powder crystal diffraction method to determine structure of polymers and list out advantages and limitations of this method. **07**
  - Discuss the applications of the SEM and AFM technique for microstructure analysis of polymers. **07**
- Q.3**
  - Explain the analysis of two stereo regular polypropylenes by solid state CMR. **07**
  - Define the terms hypsochromic, hyperchromic, hypochromic and bathochromic shifts and how % composition of styrene in copolymer styrene-butadiene (SBR) is determined by using UV spectroscopy technique? **07**
- Q.4**
  - Discuss the production of X-rays in laboratory using Coolidge X-ray tube and state the Bragg's law of diffraction and give meaning of terms involved. **07**
  - Draw TGA curve for Kapton polyimide and explain the use of this technique is to study the thermal stability of polyimide. **07**

**Section-III**

- Q.5**
  - Draw the schematic diagram for Pyrolysis GC-MS technique for polymer analysis and list advantages and limitation of this technique. **05**
  - Describe the solid state CMR of poly (phenylene sulfide) PPS. **05**
  - Compare the theory and applications of SAXS and WAXS. **04**

- Q.6** a) Discuss the principle and applications of the AFM technique for analysis of polymers. **05**
- b) 1) Identify the number of signals in CMR spectrum of (R)-4-methyl Pentan-2-ol. **05**  
2) How many signals obtained for deuterate hydrogen (HD) in H-1 NMR Spectrum?
- c) Discuss the various fundamental modes of vibration of molecule observed in IR. **04**
- Q.7** Write a note on any Three of the following. **14**
- a) Laue's photographic method for polymer analysis.
- b) FAB-MS principle and applications for polymer analysis.
- c) Applications of POM for polymer analysis.
- d) Survey of characterization technique for polymers.

Seat  
No.

**M.Sc. (OET) (Semester III) (CBCS) Examination Mar/Apr-2018**  
**Inorganic Chemistry**  
**ENVIRONMENTAL CHEMISTRY**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Attempt in all five questions  
 2) Section – I is Compulsory.  
 3) Attempt any Two questions from Section – II and any two from Section III.  
 4) Answer to all question (Section I, II and III) should be written in one and same answer book  
 5) All questions carry equal marks.  
 6) Figures to the right indicate full marks.  
 7) Use of log tables and calculator is allowed.

**SECTION – I**

- Q.1 Answer the following** **14**
- What are the powerful germicides produced by chlorine gas in water treatment process?
  - Why hardness of water is expressed in terms  $\text{CaCO}_3$  equivalent?
  - What is toxicology?
  - Write the full forms of TLV and VOC.
  - What is the range of pH value for most fertile soil?
  - Which compound is responsible for Bhopal gas disaster?
  - What are the sources of heavy toxic metals in the aquatic environment?
  - Define water softening?
  - Name the method used for monitoring of gaseous air pollutants.
  - Name the devices that use the liquid spray to remove pollutants from gas stream.
  - Name the acids present in the acid rain.
  - What is COD?
  - How high level radioactive waste disposed off?
  - Give major sources of air pollution.

**SECTION – II**

- Q.2**
- Give the classification of water pollutants and discuss the water pollution caused by various chemical industries and its overall effect on quality of life. **07**
  - Discuss the methods of analysis of following toxic metals in water sample and also mention their toxic effects: **07**
    - Chromium
    - Arsenic
- Q.3**
- What is radioactive fall-out? Give the hazards associated with nuclear fall-out. **07**
  - What is green house effect? How it is produced? Explain the consequences of green house effect on a global warming. **07**
- Q.4**
- Discuss the entry of pesticide residue in environment. Explain the degradation of pesticide residue by microorganism and sunlight. **07**
  - Discuss the coagulation and flocculation with respect to principle reactions involved and process which controls the water pollution. **07**

**SECTION – III**

- Q.5** a) What are the effects of ionizing radiation on human health? List the sources of radiation pollution. **05**  
b) Give the brief account on air pollution problem in industrial area **05**  
c) What are the sources of heavy toxic metals in the environment? Explain spectrophotometrically analysis of cadmium. **04**
- Q.6** a) Discuss the determination of oxygen content of water. **05**  
b) Explain the Chernobyl disaster. **05**  
c) What is demineralization of water? Explain the various reactions involved in the process. **04**
- Q.7 Write notes on any three of the following** **14**  
a) Ozone depletion  
b) Classification of radiation pollution  
c) Analysis of CO<sub>2</sub> and SO<sub>2</sub> in air  
d) Adsorption, absorption and condensation of gaseous effluent

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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Physical Chemistry**  
**SOLID STATE AND NUCLEAR CHEMISTRY**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Attempt in all five questions.  
 2) Section – I is compulsory.  
 3) Attempt any two questions from Section – II and two from section – III.  
 4) Answer to all questions (section I, II, III) should be written in the one answer book.  
 5) All questions carry equal marks.  
 6) Figures to the right indicate full marks.  
 7) Use of calculator and log-table is allowed.

**Section – I**

**Q.1 Solve the following:**

14

- a) How many threefold axes of symmetry does cubic crystal exhibit?
- b) Chain fission occurs when the fuel mass assembly is said to be \_\_\_\_\_.
  - i) critical
  - ii) subcritical
  - iii) hypocritical
  - iv) supercritical
- c) Name the crystal systems one exhibiting highest symmetry and other lowest symmetry.
- d) "Intensity of X-rays diffracted from an element depends upon the electron density of atom". State true or false.
- e) The distribution coefficient of impurity in solid and liquid phase is less than one. State whether the impurity is left in melt or solid phase in zone refining method.
- f) Define the term design parameter (F) as is used in designing of a nuclear reactor.
- g) "A long lived radioisotope emit alpha particles with shortest range and vice versa". State true of false.
- h) What is the advantage of using the seed crystal in single crystal growth?
- i) Name some important physical properties of nuclear radiations.
- j)  ${}_{92}\text{U}^{235} + {}_0\text{n}^1 = ? + {}_{36}\text{Kr}^{92} + ?$
- k) Give two examples of solid state structure sensitive reaction.
- l) Complete the following solid state reaction.
 
$$\text{MgO} + \text{Al}_2\text{O}_3 = ?$$
- m) What is hydrothermal growth of single crystal?
- n) Why  $\text{U}^{238}$  isotope is called fertile isotope?

## Section – II

- Q.2** a) State Bragg's condition and derive equation for the diffraction of X-ray from the set of parallel like lattice plane. **07**  
CsBr crystallizes in BCC lattice with the side of the unit cell  $4.29 \text{ \AA}$   
Calculate the angle at which first order reflection maxima may be expected from the planes (100) when X-ray of wavelength  $0.5 \text{ \AA}$  are used.
- b) State principle underlying the methods of single crystal growth from melt. **07**  
Give a brief account of Verneuil and flame fusion method of crystal growth.
- Q.3** a) Explain briefly the working of power reactor used for generation of electricity. **07**  
b) Mention various nuclear radiation detectors. Discuss scintillation detector. **07**
- Q.4** a) Give the principle underlying the single crystal growth from melt. Describe zone refining method of single crystal growth. **07**  
b) Write on inorganic and organic nano materials used for devices. **07**

## Section – III

- Q.5** a) Give a brief account on India's three phase nuclear energy programme. **05**  
b) State and explain law of isomorphism. Give applications of this law. **05**  
c) The half life  $^{232}\text{Th}$  is  $1.4 \times 10^{10}$  years. Calculate the time required for 10% of a sample of Th to decay. **04**
- Q.6** a) Discuss preparation conducting organic materials required for optoelectronic devices. **05**  
b) Explain with example solid state decomposition and phase transition reactions. **05**  
c) Show that the unit cell of face centered cubic crystal contains four molecules while primitive cubic crystal contains one molecule. **04**
- Q.7** Write notes on any three of the following. **14**
- a) Kinetics of solid state reaction  
b) Preparation methods of nano materials  
c) Semiconductor detector for nuclear radiations  
d) Kirkendall effect



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**M.Sc. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Analytical Chemistry**  
**ANALYTICAL SPECTROSCOPY**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Attempt in all 5 questions.  
 2) Section – I is compulsory.  
 3) Attempt any two questions from Section – II and any two from Section – III  
 4) Answers to all questions (Section I, II and III) should be written in the one answer book.  
 5) All questions carry equal marks.  
 6) Figures to the right indicate full marks  
 7) Use of log table and calculator is allowed.

**SECTION – I**

- Q.1 Answer the following** **14**
- Give the statement for Doppler effect.
  - If a non bonding electron is removed, there is virtually no change in bond length or bond strength [True/False]
  - How the energy of the electromagnetic radiation relates with wavelength and frequency?
  - What do you mean by the term binding energy?
  - What is the basis of photo acoustic spectroscopy?
  - Electron-nucleus coupling constants are very much bigger than those for nucleus-nucleus coupling constants [True/False]
  - Define isomer shift.
  - Mention different probes preferred in scanning probe microscopy.
  - Give the selection rule for pure rotational Raman spectra.
  - What is polarizability?
  - Write theoretical value of Linde's splitting factor (g) for an electron.
  - For NQR spectra the sample should be in \_\_\_\_\_ state.
  - How many peaks you expect for methyl radical in ESR spectrum?
  - Define Rayleigh scattering.

**SECTION – II**

- Q.2**
  - Outline the decay process of  $^{57}\text{Co}$  in  $^{57}\text{Fe}$ . **07**
  - Discuss the surface applications of photoacoustic spectroscopy. **07**
- Q.3**
  - Explain the use of chemical isomer shift in understanding molecular structure. **07**
  - Illustrate the quantum mechanical approach of Raman spectroscopy. **07**
- Q.4**
  - Explain with principle the ESR spectrometer. **07**
  - What do you understand by NQR group frequencies? Explain its use in molecular structure determination. **07**

**SECTION – III**

- Q.5** a) Explain with theory XPES and UPES. **05**  
b) Write on PAS gases. **05**  
c) Electron spin resonance is observed in atomic hydrogen at a magnetic field  $B=0.34\text{T}$ . Calculate 'g' value for an electron in the hydrogen atom, if operating frequency is 9.5 GHz. **04**
- Q.6** a) Explain the energy levels and transitions for the nucleus having spin  $I = 3/2$ . **05**  
b) Discuss various applications of Scanning Tunneling Microscopy (STM). **05**  
c) Illustrate pure rotational Raman spectrum. **04**
- Q.7** **Write notes on any three of the following:-** **14**  
a) Photoelectron spectrometer  
b) Atomic force microscopy  
c) Raman spectrometer  
d) Applications of Resonance Raman spectroscopy

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**M.A. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018  
Economics (Campus)  
HUMAN DEVELOPMENT**

Time : 2½ Hour

Max. Marks: 70

**Instructions:** All questions are compulsory.  
Figures to the right indicate full marks

- Q.1 Choose the correct alternative : 14**
- Disability Adjusted Life Year is developed in \_\_\_\_\_.  
a) 1970                                      b) 1980  
c) 1990                                      d) 2009
  - Significance of Human Development is \_\_\_\_\_.  
a) Process of Economic Growth      b) Develop the ability values  
c) Creating necessary skill              d) All of these
  - \_\_\_\_\_ is a component of NRHM.  
a) Janani Suraksha Yojna              b) Family Welfare Programme  
c) Both of them                              d) None of these
  - $YLL + YLD =$   
a) PQLI                                      b) DALY  
c) GEM                                         d) GDI
  - \_\_\_\_\_ are the important capabilities.  
a) Life                                         b) Emotions  
c) Practical reasons                      d) All of these
  - \_\_\_\_\_ is a component of political security.  
a) Diplomacy                              b) Negotiation  
c) Govt. intervention                      d) All of these
  - \_\_\_\_\_ is an Economic determinates of Human Capital.  
a) Life                                         b) Literacy  
c) Friends                                      d) Assets
- Q.2 Short Notes: (Any Four out of Five) 14**
- Importance of Human capital.
  - Explain significance of Sustainability in Human Development.
  - Explain components of Human Development.
  - Significance human resources.
  - Explain Economic Assets in Human Development.
- Q.3 Short Answer Type Questions: (Any Two out of Three) 14**
- Elaborate importance National Rural Health Mission.
  - Explain components of Quality of Life.
  - Explain which reasons for decline food grains.
- Q.4 Descriptive Type Questions with internal choice. (Any One) 14**
- Gender Empowerment Measure.
  - Elaborate Marshall Utility of a Commodity approach.
- Q.5 Descriptive type question 14**  
Introduction to other attempts of capability approach.

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**M.A. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018  
A.I.H.C. & A.  
INTRODUCTION TO MUSEOLOGY**

Time: 2½ Hours

Max. Marks: 70

**Instructions:** 1) All questions are compulsory.  
2) Figures to the right indicate full marks.

**Q.1 Select appropriate word: 14**

- 1) Royal Asiatic Society of Bengal was established at Kolkata in \_\_\_\_\_ A.D.
  - a) 1818
  - b) 1784
  - c) 1857
  - d) 1861
- 2) The word 'Museum' is derived from \_\_\_\_\_.
  - a) Muses
  - b) Musion
  - c) Musicon
  - d) None of these
- 3) \_\_\_\_\_ objects can be kept outside the museum.
  - a) Metal
  - b) Stone
  - c) Wooden
  - d) Glass
- 4) Salarjung Museum is located at \_\_\_\_\_.
  - a) Bangalore
  - b) Bhopal
  - c) Hyderabad
  - d) Raipur
- 5) \_\_\_\_\_ organizes the exhibition for creating cultural awareness among the people about museum's collection.
  - a) State Museum
  - b) Industrial Museum
  - c) Science Museum
  - d) Children Museum
- 6) 'A museum is a non- profit making, permanent institution in the society' this definition given by \_\_\_\_\_.
  - a) Museum Association (UK)
  - b) UNESCO
  - c) ICOM
  - d) Bhartiya Sanskriti Kosh
- 7) To remove blackness on silver \_\_\_\_\_ is used.
  - a) 10% of Formic cid
  - b) Rochelle salt
  - c) Sodium hydroxide
  - d) Acetone

**Q.2 Write short notes of the following (Any Four out of Five) 14**

- a) Aims & Scope of Museum
- b) Harappan Gallery in National Museum
- c) Curatorial Responsibilities
- d) Dioramas & Models
- e) Museum Publication

**Q.3 Write short notes of the following (Any Two out of Three) 14**

- a) Write in brief the administration in museum.
- b) Elucidate the educational role of museums.
- c) Discuss the Museum Communication inside the museum.

- Q.4 Write the answer any one:** **14**  
What are the reasons of deterioration of metal objects & describe its method of preservation.
- OR**
- Explain the different methods of acquisition of museum objects.
- Q.5** Give the detail information of Chatrapati Shivaji Maharaj Vastu Sangrahalaya. **14**

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**M.A. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Rural Development**  
**HUMAN DEVELOPMENT: CONCEPTS AND MEASUREMENT**

Time : 2½ Hour

Max. Marks: 70

**Instructions:** All questions are compulsory.  
Figures to the right indicate full marks

- Q.1 Choose the correct alternative :** **14**
- 1) Disability Adjusted Life Year is developed in \_\_\_\_\_.  
a) 1970  
b) 1980  
c) 1990  
d) 2009
  - 2) Significance of Human Development is \_\_\_\_\_.  
a) Process of Economic Growth  
b) Develop the ability values  
c) Creating necessary skill  
d) All of these
  - 3) \_\_\_\_\_ is a component of NRHM.  
a) Janani Suraksha Yojna  
b) Family Welfare Programme  
c) Both of them  
d) None of these
  - 4)  $YLL + YLD =$   
a) PQLI  
b) DALY  
c) GEM  
d) GDI
  - 5) \_\_\_\_\_ are the important capabilities.  
a) Life  
b) Emotions  
c) Practical reasons  
d) All of these
  - 6) \_\_\_\_\_ is a component of political security.  
a) Diplomacy  
b) Negotiation  
c) Govt. intervention  
d) All of these
  - 7) \_\_\_\_\_ is an Economic determinates of Human Capital.  
a) Life  
b) Literacy  
c) Friends  
d) Assets
- Q.2 Short Notes: (Any Four out of Five)** **14**
- a) Importance of Human capital.
  - b) Explain significance of Sustainability in Human Development.
  - c) Explain components of Human Development.
  - d) Significance human resources.
  - e) Explain Economic Assets in Human Development.
- Q.3 Short Answer Type Questions: (Any Two out of Three)** **14**
- a) Elaborate importance National Rural Health Mission.
  - b) Explain components of Quality of Life.
  - c) Explain which reasons for decline food grains.
- Q.4 Descriptive Type Questions with internal choice. (Any One)** **14**
- a) Gender Empowerment Measure.
  - b) Elaborate Marshall Utility of a Commodity approach.
- Q.5 Descriptive type question** **14**
- Introduction to other attempts of capability approach.

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**M.A. (OET) (Semester - III) (CBCS) Examination Mar/Apr-2018**  
**Mass Communication**  
**FILM STUDIES**

Time: 2½ Hours

Max. Marks: 70

**Instructions:** All questions are compulsory.

- Q.1 Multiple choice questions. (Each 2 Marks) 14**
- 1) \_\_\_\_\_ actor is main lead in Pinjara film.
    - a) Shreeram Lagoo
    - b) Chandrakant
    - c) Suryakant
    - d) All of these
  - 2) Court movie is directed by \_\_\_\_\_.
    - a) Sandeep Sawant
    - b) Chaitanya Tamhane
    - c) Paresh Mokashi
    - d) None of these
  - 3) \_\_\_\_\_ is an element of film review.
    - a) Music
    - b) Producer
    - c) Both a) and b)
    - d) None of these
  - 4) Indian Film Development Corporation was established in \_\_\_\_\_.
    - a) 1998
    - b) 1978
    - c) 1975
    - d) None of these
  - 5) \_\_\_\_\_ film is a first Indian movie.
    - a) Lanka Dahan
    - b) Raja Harishchandra
    - c) Ayodhyecha Raja
    - d) None of these
  - 6) FTI is located in \_\_\_\_\_.
    - a) Mumbai
    - b) Pune
    - c) Aurangabad
    - d) None of these
  - 7) Steven Spielberg is from \_\_\_\_\_.
    - a) U.K.
    - b) U.A.E.
    - c) U.S.
    - d) None of these
- Q.2 Short Notes: (Any Four out of Five) 14**
- a) Charles Chaplin
  - b) Film Appreciation
  - c) Documentary Film
  - d) Film Festivals
  - e) Jabbar Patel
- Q.3 Short Answer Type Questions: (Any Two out of Three) 14**
- a) Write about comedy cinema
  - b) Explain the stages of film making.
  - c) What is Censorship?
- Q.4 Descriptive Type Questions with internal choice. (Any One) 14**
- a) Discuss the history of Marathi Films.
  - b) Write down the importance Music in cinema. Give Examples.
- Q.5 Write an essay on topic 'Effect of cinema on children'. Give suitable title. 14**

## (मराठी रूपांतर)

सूचना : सर्व प्रश्न अनिवार्य आहेत.

- प्र. 1 योग्य पर्याय निवडा :** **14**
1. पिजंरा या चित्रपटात ——— हा अभिनेता प्रमुख नायकाच्या भूमिकेत आहे.  
 अ) श्रीराम लागू ब) चंद्रकांत  
 क) सुर्यकांत ड) यापैकी नाही
  2. कोर्ट चित्रपटाचे दिग्दर्शन——— यांनी केले आहे.  
 अ) संदीप सावंत ब) चैतन्य ताम्हाणे  
 क) परेश मोकाशी ड) यापैकी नाही
  3. ——— हा चित्रपट समीक्षेचा घटक आहे.  
 अ) संगीत ब) निर्माता  
 क) अ आणि ब दोन्ही ड) यापैकी नाही
  4. भारतीय चित्रपट विकास महामंडळची स्थापना ———साली झाली.  
 अ) इ.स.1998 ब) इ.स.1978  
 क) इ.स.1975 ड) यापैकी नाही
  5. ——— हा पहिला भारतीय चित्रपट आहे.  
 अ) लंका दहन ब) राजा हरिश्चंद्र  
 क) अयोध्येचा राजा ड) यापैकी नाही
  6. एफ.टी.आय.——— येथे आहे  
 अ) मुंबई ब) पुणे  
 क) औरंगाबाद ड) यापैकी नाही
  7. स्टीवन स्पीलबर्ग हे——— चे रहिवासी आहेत.  
 अ) यु.के. ब) यु.ए.ई.  
 क) यु.एस. ड) यापैकी नाही
- प्र. 2 संक्षिप्त टीपा लिहा. (कोणतेही पाच पैकी चार)** **14**
1. चार्लीस चॅप्लिन
  2. चित्रपट रसस्वाद
  3. माहितीपट
  4. चित्रपट महोत्सव
  5. जब्बार पटेल
- प्र. 3 लघुत्तरी प्रश्न सोडवा. (कोणतेही तीन पैकी दोन)** **14**
1. विनोदी चित्रपटांविषयी लिहा.
  2. चित्रपट निर्मितीचे टप्पे स्पष्ट करा.
  3. सेन्सॉरशिप म्हणजे काय?
- प्र. 4 दीर्घोत्तरी प्रश्न सोडवा. (कोणतेही दोन पैकी एक)** **14**
1. मराठी चित्रपटांच्या इतिहासाचे वर्णन करा.
  2. चित्रपटातील संगीताचे महत्त्व लिहा. उदाहरणे द्या.
- प्र. 5 'चित्रपटांचा लहान मुलांवरील परिणाम' या विषयावरती निबंध लिहा. योग्य शीर्षक द्या.** **14**



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**M.C.A. (OET) (Semester III) (CBCS) Examination Mar/Apr-2018  
Science**

**FUNDAMENTAL OF WEB DESIGNING**

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Question No.1 and 2 are compulsory.  
2) Attempt any 3 from Q. No.3 to Q.No.7.  
3) Figures to the right indicate full marks.

**Q.1 A) Choose correct alternatives: 10**

- 1) All elements are identified by their \_\_\_\_\_ and are marked up using either start tags and end tags or self-closing tags.
  - a) attribute name
  - b) tag name
  - c) class name
  - d) none of the mentioned
- 2) The \_\_\_\_\_ tag represents a bold of text formatting.
  - a) <b>text</b>
  - b) <bold> text</bold>
  - c) <ctr+b> text<ctr+b>
  - d) Option (b) and (c)
- 3) Attribute of valign tag is \_\_\_\_\_.
  - a) centre, left and right
  - b) middle, top and bottom
  - c) both (a) and(b)
  - d) none of these
- 4) \_\_\_\_\_ editor is used for web development.
  - a) Excel
  - b) Power Point
  - c) Google
  - d) Notepad
- 5) \_\_\_\_\_ Symbol must in email address. 07
  - a) @
  - b) \$
  - c) &
  - d) %
- 6) WWW stands \_\_\_\_\_.
  - a) World wide web
  - b) Windows web wave
  - c) Web world wide
  - d) None of these
- 7) \_\_\_\_\_ is the Html file extension.
  - a) .web
  - b) .txt
  - c) .html
  - d) .doc
- 8) Which element represents marked or highlighted text for reference purpose?
  - a) Highlight
  - b) Mark
  - c) Strong
  - d) Blink
- 9) The \_\_\_\_\_ tag will serve as a title or explanation for the table and it shows up at the top of the table.
  - a) <caption>
  - b) <title>
  - c) <table head="text">
  - d) <table>
- 10) In HTML \_\_\_\_\_ attribute merge two or more columns into single column.
  - a) rowspan
  - b) colspan
  - c) columnspan
  - d) colsmerge

- B) State True or False** **04**
- 1) HTML is web site development language.
  - 2) GATE means Google apps for education.
  - 3) <sm> tag defines smaller text.
  - 4) <table> tag defines emphasized text.

- Q.2 A) Write short note on the following.** **08**
- 1) <small> and <p> tag
  - 2) <Head> tag

- B) Explain the following terms** **06**
- 1) Home page
  - 2) Google sites

- Q.3 Answer the following**
- a) What is html? Explain the structure of html. **07**
  - b) Describe any five formatting tag with suitable example. **07**

- Q.4 Answer the following**
- a) What is internet? Explain application of internet. **07**
  - b) What is use of email? Explain the different function of email. **07**

- Q.5 Answer the following**
- a) Explain Google Classroom in details. **07**
  - b) Explain any five table tags. **07**

- Q.6 Answer the following**
- a) What are the difference between align and valign tag? Give suitable example. **07**
  - b) What is mean by hyperlink? Explain in details, How to create it in HTML. **07**

- Q.7 Answer the following**
- a) Create following table using HTML. **07**

**Table 1.1 Employee Time Tracker**

Sr. No.	Name	Time		Sign
		In Time	Out Time	
1	Sachin Mane	11.00 Am	12.00 Pm	
2	Sanjana Sale	11.05 AM	12.06 PM	
3	Ram Salgar	2.05 am	3.00pm	

- b) Describe the benefits of framesets in HTML, explain with example. **07**