

Roll No. ....

Total Pages : 3

GSE/M-22

1472

MATH.

Paper-BM-121

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each section.

### Compulsory Question

1. (a) If  $n$  is an integer, show that  $n(n^2 - 1)(3n + 2)$  is divisible by 24. 2
- (b) If  $n$  is a power of 2, then prove that  $\sigma(n)$  is odd. 2
- (c) If  $\tan \frac{x}{2} = \tanh \frac{x}{2}$ , prove that  $\cos x \cosh x = 1$ . 2
- (d) Prove that  $i^i = e^{-\frac{\pi}{(4x+1)2}}$ . 1
- (e) Prove that  $\sin^{-1} \frac{5}{13} + \sin^{-1} \frac{3}{5} = \sin^{-1} \left( \frac{56}{65} \right)$ . 1

### SECTION-I

2. (a) Prove that number of primes is infinite. 4
- (b) Find the general solution of  $70x + 112y = 168$ . 4

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[P.T.O.]

3. (a) Find the least non-negative remainder if  $3^{91}$  is divided by 23. 4

- (b) Using Wilson's theorem, show that  $(18)! + 1 \equiv 0 \pmod{23}$ . 4

### SECTION-II

4. (a) Find all integers that satisfy

$$x \equiv 2 \pmod{3}, x \equiv 3 \pmod{5}, x \equiv 5 \pmod{2} \text{ simultaneously.} \quad 4$$

- (b) Prove that  $\phi(n) = \frac{n}{2}$  if and only if  $n = 2^k$  for some integer  $k \geq 1$ . 4

5. (a) Find the highest power of 6 contained in  $500!$  4

- (b) Using Gauss Lemma, show that 2 is a quadratic non-residue  $\pmod{13}$ . 4

### SECTION-III

6. (a) If  $\theta_1, \theta_2, \theta_3$  be three values of  $\theta$  which satisfy the equation

$$\tan 2\theta = \lambda \tan (\theta + \alpha)$$

and if no two of these values differ by a multiple of  $\pi$ , show that  $(\theta_1 + \theta_2 + \theta_3 + \alpha)$  is a multiple of  $\pi$ . 4

- (b) Express  $\cos^6 \theta + \sin^4 \theta$  in a series of cosines of multiple of  $\theta$ . 4

7. (a) If  $z = x + iy$  where  $x$  and  $y$  are real, find real and

imaginary parts of  $\frac{\cos z}{z + 1}$ . 4

- (b) If  $\tanh (x + iy) = \cosh (\alpha + i\beta)$ , prove that

$$\tan \alpha \cdot \tan \beta = \operatorname{cosec} 2x \cdot \sinh 2y. \quad 4$$

### SECTION-IV

8. (a) If  $\cos (\theta + i\phi) = r(\cos \alpha + i \sin \alpha)$ , prove that

$$\phi = \frac{1}{2} \log \frac{\sin (\theta - \alpha)}{\sin (\theta + \alpha)}. \quad 4$$

- (b) Solve the equation

$$\tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{5} + \tan^{-1} \frac{1}{7} + \tan^{-1} x = \frac{\pi}{4}. \quad 4$$

9. (a) Separate  $\tanh^{-1}(x + iy)$  into real and imaginary parts. 4

- (b) Find the sum of the series :

$$\sin \alpha + \frac{1}{2} \sin 2\alpha + \left(\frac{1}{2}\right)^2 \sin 3\alpha + \dots \text{to } \infty. \quad 4$$

(b) Solve the simultaneous equation

$$\frac{dx}{xy} = \frac{dy}{y^2} = \frac{dz}{z(xy - 2x^2)}.$$

4

9. (a) Solve the differential equation

$$yz \log 2 \, dx - 2x \log z \, dy + xy \, dz = 0.$$

(b) Solve the differential equation

$$yz \log z \, dx - zx \log x \, dy + xy \, dz = 0.$$

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**GSEM-22**

**1473**

### ORDINARY DIFFERENTIAL EQUATION

Paper-BM-122

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each section.

#### Compulsory Question

1. (a) Write the condition for exactness of the differential equation

$$Mdx + Ndy = 0.$$

1

(b) Define Clairaut's equation.

1

(c) Find the complementary function of the differential equation

$$\frac{d^4 y}{dx^4} - m^4 y = \sin mx.$$

2

(d) Determine the complementary function of the differential equation  $x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + y = 2 \log x$ .

2

(e) Solve the equation

$$\frac{dx}{y} = \frac{dy}{-x} = \frac{dz}{yz}.$$

2

### SECTION-I

2. (a) Solve the differential equation  
 $(x^4 - 2xy^2 + y^4) dx - (2x^2y - 4xy^3 + \sin y) dy = 0.$  4
- (b) Solve  
 $x^2y dx - (x^3 + y^3) dy = 0.$
3. (a) Solve the differential equation.  
 $x^2 \left[ \frac{dy}{dx} \right]^2 - 2xy \frac{dy}{dx} + 2y^2 - x^2 = 0.$  4
- (b) Solve and find the complete primitive and singular solution of the equation  $3y = 2px - \frac{2p^2}{x}.$  4

### SECTION-II

4. (a) Find the orthogonal trajectories of the cardioid  $r = a (1 - \cos \theta)$ , where  $a$  is the parameter. 4
- (b) Solve the differential equation  
 $\frac{d^2y}{dx^2} - 4 \frac{dy}{dx} + 4y = x^2 + e^2 + \cos 2x.$  4

5. (a) Solve the differential equation  
 $x^2 \frac{d^2y}{dx^2} - 2y = x^2 + \frac{1}{x}.$  4

(b) Solve

$$x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} - 3y = x^2 \log x. \quad 4$$

### SECTION-III

6. (a) Solve the differential equation  
 $\frac{d^2y}{dx^2} - \cos x \frac{dy}{dx} - (1 - \cot x)y = e^x \sin x.$  4
- (b) Solve by removing the first derivative  
 $\frac{d^2y}{dx^2} + \frac{2}{x} \frac{dy}{dx} + n^2y = 0$  4

7. (a) Apply the method of variation of parameters to solve  
 $\frac{d^2y}{dx^2} + n^2y = \sec nx.$  4

- (b) Solve the differential equation by the method of undetermined coefficient :  
 $(D^2 - 2D + 5)y = 25x^2 + 12.$  4

### SECTION-IV

8. (a) Solve the simultaneous equations  
 $\frac{dx}{dt} + 2 \frac{dy}{dt} - 2x + 2y = 3e^t.$
- $3 \frac{dx}{dt} + \frac{dy}{dt} + 2x + y = 4e^{2t}.$

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Total Pages :3

**GSEM-22**

**1474**

**VECTOR CALCULUS**

Paper-BM-123

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *five* questions in all. Q. No. 1 is compulsory.  
Select *one* question from each section.

**Compulsory Question**

1. (a) Evaluate  $\hat{i} \cdot (\hat{j} \times \hat{k}) + (\hat{i} \times \hat{k}) \cdot \hat{j}$ . 2
- (b) If  $r = |\vec{r}|$ , where  $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ , prove that  
 $\nabla f(r) \times \vec{r} = \vec{0}$ . 2
- (c) Let  $u, v, w$  be orthogonal co-ordinates. Prove that  
 $\hat{e}_1 = \hat{E}_1, \hat{e}_2 = \hat{E}_2, \hat{e}_3 = \hat{E}_3$ . 2
- (d) If  $\vec{r} = 2t\hat{i} + 3t^2\hat{j} - t^3\hat{k}$ , evaluate  $\int_1^2 \left( \frac{d\vec{r}}{dt} \times \frac{d^2\vec{r}}{dt^2} \right) dt$ . 2

**SECTION-I**

2. (a) If  $\vec{a}, \vec{b}, \vec{c}$  are three unit vectors such that  
 $\vec{b} \times (\vec{c} \times \vec{a}) = \frac{1}{2} \vec{c}$ , find angles which  $\vec{b}$  makes with  
 $\vec{c}$  and  $\vec{a}$ ;  $\vec{c}$  and  $\vec{a}$  being non-parallel. 4

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[P.T.O.]

(b) Prove that  $(\vec{b} \times \vec{c}) \times (\vec{c} \times \vec{a}) = [\vec{a} \vec{b} \vec{c}] \vec{c}$ , and hence deduce that  $[\vec{b} \times \vec{c} \quad \vec{c} \times \vec{a} \quad \vec{a} \times \vec{b}] = [\vec{a} \vec{b} \vec{c}]^2$ . 4

3. (a) Show that  $[\vec{a} + \vec{b} \quad \vec{b} + \vec{c} \quad \vec{c} + \vec{a}] = 2[\vec{a} \vec{b} \vec{c}]$ . 4

(b) The necessary and sufficient condition for the vector function  $\vec{f}$  of a scalar variable  $t$  to have a constant magnitude is  $\vec{f} \cdot \frac{d\vec{f}}{dt} = 0$ . 4

## SECTION-II

4. (a) Find the directional derivative of  $f(x, y, z) = xy + yz + zx$  in the direction of the vector  $2\hat{i} + 3\hat{j} + 6\hat{k}$  at the point  $(3, 1, 2)$ . 4

(b) Show that  $r''\vec{r}$  is irrotational where  $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$  and  $|\vec{r}| = r$ . 4

5. (a) Explain geometrical interpretation of grad  $\phi$ . 4

(b) Prove that  $\nabla^2 f(r) = \frac{2}{r} f'(r) + f''(r)$ . 4

## SECTION-III

6. (a) Express the vector field  $2y\hat{i} - z\hat{j} + 3x\hat{k}$  in spherical polar co-ordinates. 4

(b) Prove that spherical co-ordinate system is self-reciprocal. 4

7. (a) Express  $\vec{f} = 3y\hat{i} + x^2\hat{j} - z^2\hat{k}$  in cylindrical coordinates. 4

(b) Prove that  $u = xy$ ,  $v = \frac{x^2 + y^2}{2}$ ,  $w = z$  are not orthogonal. 4

## SECTION-IV

8. (a) Evaluate by Green's theorem

$$\oint_C (\cos x \sin y - xy) dx + \sin x \cos y dy$$

where C is the circle  $x^2 + y^2 = 1$ . 4

(b) Evaluate by Stoke's theorem

$$\oint_C (e^x dx + 2y dy - dz),$$

where C is the curve  $x^2 + y^2 = 4$ ,  $z = 2$ . 4

9. (a) Evaluate  $\iint_S (x^3 dy dz + y^3 dz dx + z^3 dx dy)$  over the surface S of a cube bounded by the co-ordinate planes and the planes  $x = y = z = a$ . 4

(b) Show that the area bounded by a simple closed curve C is given by  $\frac{1}{2} \oint_C x dy - y dx$ . Hence find the area of the ellipse  $x = a \cos \theta$ ,  $y = b \sin \theta$ . 4

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**GSE/M-22**

**1477**

PROPERTIES OF MATTER AND KINETIC  
THEORY OF GASES  
Paper-Physics-I

Time : Three Hours]

[Maximum Marks : 40

**Note :** Question No. 1 is Compulsory. Attempt *five* questions by selecting *one* question from each unit.

**Compulsory Question**

1. (a) Discuss the Physical Significance of Moment of Inertia. 2
- (b) What are the limiting values of Poisson Ratio? 2
- (c) Under what conditions real gases behaves as ideal gas? 2
- (d) Define and write down the formulae for Most Probable Speed, Average Speed and Root mean Square Speed. 2

**UNIT-I**

2. State and Prove Theorem on Parallel axis and Perpendicular Axis. (4+4)
3. Derive an expression for moment of inertia of a solid cylinder of Radius 'R' and Length 'L' along the principal axis and along the axis passes through center and perpendicular to principal axis. 8

1477/3650/KD/515

[P.T.O.]

## UNIT-II

4. (a) Derive the relation between Young Modulus, Bulk modulus and Poisson Ratio. 6  
(b) Prove that the compressional strain and extension strain are equal to half of shearing strain. 2
5. What do you mean by Bending Moment? Derive an expression for Bending moment of beam clamped at one end and loaded at other (Ignoring the mass of beam). 8

## UNIT-III

6. (a) Derive expression for critical temperature, pressure and Volume in term of Vander-waal constants. 6  
(b) What is Kinetic energy of translation for oxygen molecule at  $27^{\circ}\text{C}$ ? 2

7. State the basic postulates of Kinetic Theory of gases and prove that the pressure exerted by the ideal gas is  $2/3$  of the translational Kinetic energy of the molecules per unit volume of the gas. 8

## UNIT-IV

8. (a) Discuss mean free path of a gas. Derive an expression for it and show that it is inversely proportional to density. 6

- (b) How the Maxwell distribution of velocity can be verified experimentally? 2

9. (a) Derive an expression for thermal conductivity from kinetic theory of gases. 6  
(b) Find the most probable speed for nitrogen at  $20^{\circ}\text{C}$ . Given that the molecular weight of nitrogen is 28,  $R = 8.315 \text{ J mol}^{-1} \text{ K}^{-1}$ .
-

Total Pages : 3

**GSE/M-22**

## SEMICONDUCTOR DEVICES

Paper : PH-202

Time : Three Hours]

**[Maximum Marks : 40]**

**Note :** Attempt five Questions in all. Selecting *one* question from each unit. Question No. 1 is compulsory.

### Compulsory Question

1.
  - (a) Why the mobility of electron is higher than hole? 2
  - (b) What is the importance of leakage current in a transistor? 2
  - (c) What is the best transistor configuration for amplifiers, and why? 2
  - (d) Explain Barkhausen criterion of sustained oscillations in an oscillator. 2

# UNIT-I

2. (a) What is Zener break down? Explain the working of Zener diode as voltage regulator. 5
- (b) What is Ideal diode? Why an ideal diode is called ideal? 3

1478/3650/KD/516

**IP.T.O.**

3. (a) What is LED? Describe its mechanism. In what way LED is superior to other lamps? How are different coloured LED made? 5
- (b) What is Hall effect? Why is the hall effect more effective in a semiconductor? 3

### UNIT-II

4. (a) What is a Transistor? Describe with the help of circuit diagram the input, output and transfer characteristics of a PNP transistor in C.E. configuration. 5
- (b) A transistor has a base current of 40  $\mu\text{A}$ . If  $\beta_{dc}$  is 100 and  $I_{CEO}$  is 5  $\mu\text{A}$ , find its current gain. 3
5. (a) Explain the term biasing. Why it is necessary to bias a transistor? What are the requirements of proper biasing? 5
- (b) What is Quiescent point? Why it is selected at the centre of active region? 3

### UNIT-III

6. Discuss working of an Resistance-Capacitance coupled amplifier and explain the frequency response for different ranges of frequency and band width. 8
7. (a) What do you mean by negative feedback in transistor amplifier? Explain how the negative feedback in an amplifier improves the input impedance, band width and gain stability. 5

- (b) The voltage gain of an amplifier is 100 and its band width is 100 kHz. If a negative feedback with feedback fraction 0.01 is applied, find the gain and band width of amplifier with feedback. 3

### UNIT-IV

8. (a) Discuss the basis principle of an oscillator. Draw the circuit diagram and explain the working of a Hartley Oscillator. 5
- (b) The L.C. tuned circuit of a tuned collector oscillator in a radio receiver has inductor of 50  $\mu\text{H}$  and capacity of 200 pF. What is the frequency of oscillations? 3
9. Draw the functional block diagram of Cathode Ray Oscilloscope. Explain the function of each block in brief. Describe also how the frequency of a wave is measured by a Cathode Ray Oscilloscope. 8

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**GSE/M-22**

**1479**

**CHEMISTRY**

Inorganic Chemistry (Theory)

Paper-IV (CH-104)

Time : Three Hours]

[Maximum Marks : 32

**Note :** Attempt *five* questions in all, selecting *two* questions from each Section. Question number 1 is compulsory.

**Compulsory Question**

1. (a) Draw the structure of beryllium oxalate.
- (b) What do you mean by crown ethers?
- (c) Which has more density : Water or Ice?
- (d) Why Xenon (Xe) has higher boiling point than Krypton (Kr)?
- (e) Write formula and draw the structure of Borazine.
- (f) Which out of the following is a monobasic acid and why?  $\text{H}_3\text{PO}_2$  or  $\text{H}_3\text{PO}_3$ .
- (g) Name the very first compound of noble gases which was synthesized by N. Bartlett in 1962?
- (h) What is aqua regia? (1×8=8)

1479/3050/KD/876

[P.T.O.]

### SECTION-A

2. (a) Explain, which has higher boiling point : o-nitrophenol or p-nitrophenol? (2)  
 (b) Why water has maximum density at 4°C? (2)  
 (c) Discuss n-type and p-type semiconductors with example. (2)
3. (a) Draw the structure of  $[\text{Ca}(\text{EDTA})]^{2-}$ . (2)  
 (b) Explain, why does Lithium form normal oxides, sodium form peroxides and potassium form superoxides? (2)  
 (c) Explain, why sodium metal cannot be stored in water? (2)
4. (a) Discuss biological importance of alkaline and alkaline earth elements. (2)  
 (b) Which alkali metal acts as strongest reducing agent and why? (2)  
 (c) Discuss the structures of  $\text{XeOF}_2$  &  $\text{XeF}_4$  molecules. (2)
5. (a) Why  $\text{H}_2\text{O}$  is a liquid whereas  $\text{H}_2\text{S}$  is a gas at room temperature? (2)  
 (b) Discuss Band Model of bonding in metals. (2)  
 (c) Write a short note on Van der Waals forces. (2)
6. (a) Compare acidic properties of  $\text{HClO}$  and  $\text{HClO}_4$ . (2)  
 (b) Explain amphoteric nature of  $\text{Al}_2\text{O}_3$ . (2)  
 (c) Define catenation. Why does carbon show higher catenation property than any other element? (2)
7. (a) Discuss structure and bonding in diborane. (2)  
 (b) What is back bonding? Explain it with reference to boron halides. (2)  
 (c) Discuss properties and uses of fluorocarbons. (2)
8. (a) Discuss the structures of  $\text{P}_4\text{O}_6$  and  $\text{P}_4\text{O}_{10}$ . (2)  
 (b) Out of  $\text{H}_2\text{O}$  and  $\text{H}_2\text{S}$ , which has higher bond angle and why? (2)  
 (c) Write about important uses of hydrogen peroxide ( $\text{H}_2\text{O}_2$ ). (2)
9. (a) Arrange the following acids in decreasing order of their acidic strength :  $\text{HF}$ ,  $\text{HBr}$ ,  $\text{HCl}$  and  $\text{HI}$ . (2)  
 (b) Why pentahalides are more covalent than trihalides? (2)  
 (c) Discuss the structure of  $\text{AlCl}_3$ . (2)

### SECTION-B

6. (a) Compare acidic properties of  $\text{HClO}$  and  $\text{HClO}_4$ . (2)  
 (b) Explain amphoteric nature of  $\text{Al}_2\text{O}_3$ . (2)  
 (c) Define catenation. Why does carbon show higher catenation property than any other element? (2)

9. (a) Explain the type of titration curve obtained in the conductometric titration of :

- (i) HCl solution with  $\text{NH}_4\text{OH}$  solution.  
(ii)  $\text{CH}_3\text{COONa}$  solution with HCl solution. (3)  
(b) How conductance measurements can be used to find the solubility of a sparingly soluble salt? (3)

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**GSEM-22**

**1480**

**PHYSICAL CHEMISTRY**

Paper-V (CH-105)

Time : Three Hours]

[Maximum Marks : 32

**Note :** Attempt *five* questions in all, selecting *two* questions from each Section. Question No. 1 is compulsory. Use of Log-table and Non-programming calculator is allowed.

### **Compulsory Question**

1. (a) What is 'Half-life period' of a reaction? Write a general expression for half-life period of  $n$ th order reaction. (1½)  
(b) Write the unit of rate constant for third order reaction. (1)  
(c) What is Boltzmann factor? What does it tell? (1½)  
(d) What is the basic principle underlying conductometric titrations? (1)  
(e) Define molar conductivity. (1)  
(f) Why does the pH of the buffer solution consisting of acetic acid and sodium acetate not change when a few drops of HCl are added to it? (2)

### **SECTION-A**

2. (a) Derive an expression for the rate constant for a second order reaction of the type  $2A \rightarrow \text{Products}$ . (3)

- (b) What is a zero order reaction? Explain with suitable example. (2)
- (c) Does the rate of reaction remain constant throughout the reaction? Why or why not? (1)
3. (a) What is order of reaction? Discuss one method for determining the order of reaction. (3)
- (b) Show that in case of a first order reaction, the time required for 99.9 % of the reaction to take place is about ten times that required for half the reaction. (2)
- (c) Why reactions of higher order are rare? (1)
4. (a) Briefly describe Transition state theory of reaction rates. (3)
- (b) The rate constants of a reaction are  $1 \times 10^{-3} \text{ sec}^{-1}$  and  $2 \times 10^{-3} \text{ sec}^{-1}$  at  $27^\circ \text{C}$  and  $37^\circ \text{C}$  respectively. Calculate the activation energy of the reaction. (2)
- (c) What is the difference between average rate of reaction and instantaneous rate of reaction? (1)
5. (a) Briefly explain the effect of solvent on the rate of reaction. (2)
- (b) Express the rate of the following reaction in terms of different reactants and products :  
 $4 \text{NH}_3 (\text{g}) + 5 \text{O}_2 (\text{g}) \rightarrow 4 \text{NO} (\text{g}) + 6 \text{H}_2\text{O} (\text{g})$ .  
 If the rate of formation of NO is  $3.6 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$ , calculate.  
 (i) The rate of disappearance of  $\text{NH}_3$  (ii) rate of formation of  $\text{H}_2\text{O}$ . (3)
- (c) Why the rate of reaction becomes nearly double for  $10^\circ \text{C}$  rise in temperature? (1)

## SECTION-B

6. (a) Briefly explain three facts which lend support to Arrhenius theory. (3)
- (b) How do specific conductivity and equivalent conductivity vary with dilution and why? (2)
- (c) Solutions A and B have pH equal to 2 and 4 respectively. Which solution is more concentrated and how many times that of the other? (1)
7. (a) Write Debye-Huckel Onsager equation in complete form. What do different symbols signify? How the equation can be verified to be correct? (3)
- (b) A buffer solution is prepared from an acid of dissociation constant  $2 \times 10^{-6}$  and its sodium salt. What will be the molar ratio of the salt to the acid per litre in buffer solution of pH 6.8? (2)
- (c) What are the units of specific conductivity and equivalent conductivity? (1)
8. (a) State and explain Ostwald's Dilution Law. (3)
- (b) At  $293 \text{ K}$ , the equivalent conductance at infinite dilution of  $\text{HCl}$ ,  $\text{CH}_3\text{COONa}$  and  $\text{NaCl}$  solutions are 383.5, 78.4 and  $102.0 \text{ ohm}^{-1} \text{ cm}^2 \text{ equiv}^{-1}$  respectively. If the equivalent conductance of  $\text{CH}_3\text{COOH}$  at some other dilution is  $100.0 \text{ ohm}^{-1} \text{ cm}^2 \text{ equiv}^{-1}$  at  $293 \text{ K}$ , calculate the degree of dissociation of acetic acid at that dilution. (2)
- (c) What is 'Buffer Capacity'? (1)

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**GSE/M-22**

**1481**

ORGANIC CHEMISTRY

Paper-CH-106

Time : Three Hours]

[Maximum Marks : 32

**Note :** Attempt *five* questions in all. Question No. 1 is compulsory. Select *two* questions from each Section.

### Compulsory Question

1. (a) Give IUPAC names of the following compounds :



- (b) Out of *cis* 2-Butene and *trans* 2-Butene, which has higher boiling point, and why?
- (c) Give the name and structure of electrophiles generated in Nitration and Friedel Craft Alkylation reactions in aromatic electrophilic substitution.
- (d) Give the preparation of Ethyl bromide by Hunsdiecker reaction. (2×4=8)

### SECTION-A

2. (a) Explain Saytzeff rule with the help of dehydrohalogenation of 2-Bromobutane with alc. KOH.

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[P.T.O.]

- (b) Explain in detail the rearrangement process occurring during the addition of HBr to 3-Methylbut-1-ene. (3,3)
3. (a) Write the reaction and mechanism of dehydration of 2-Butanol with conc.  $\text{H}_2\text{SO}_4$  to give alkene.
- (b) Discuss the reaction and mechanism of oxidation of 2-Methylbut-2-ene with perbenzoic acid. Also give the ring opening reaction of the resulting epoxide in basic medium. (3,3)
4. (a) Explain *o*, *p*-directing and activating nature of  $-\text{NH}_2$  group.
- (b) What is meant by Aromaticity? State Hückel Rule and explain with suitable examples. (3,3)
5. (a) What are Annulenes? Give *one* example each of an aromatic, antiaromatic and non-aromatic annulene.
- (b) Give the reaction and mechanism of Sulphonation of benzene. (3,3)

### SECTION-B

6. (a) What are Dienes? Give their classification with *one* example each.
- (b) Explain the acidic nature of terminal alkynes. (3,3)
7. (a) Explain the addition of HBr to 1,3-Butadiene along with mechanism.
- (b) Write the reaction and mechanism of Birch reduction of 2-Butyne with  $\text{Na-Liq.NH}_3$ . (3,3)

8. (a) Give Addition-Elimination mechanism of Nucleophilic Aromatic Substitution in Aryl halides.
- (b) Convert  $\text{CH}_3\text{Br}$  into (i)  $\text{CH}_3\text{NH}_2$  (ii)  $\text{CH}_3\text{CN}$  (iii)  $\text{CH}_3\text{OCH}_3$ . (3,3)
9. (a) Discuss the mechanism and stereochemistry of  $\text{S}_{\text{N}}1$  reactions.
- (b) Discuss the factors affecting  $\text{S}_{\text{N}}2$  reactions. (3,3)
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**GSE/M-22**

**1482**

**ENGLISH**

**Paper-II**

**Time : Three Hours]**

**[Maximum Marks : 40**

**Note : Attempt all questions :**

- 1. Read the following passage and answer the questions given at the end :**

This time-crunch is often held as the prime culprit. With syllabi overloaded with subject matter, harassed teachers addressing huge classes and many outside interruptions like bandhs and holidays, who has time to answer pupil's questions or to encourage a new line of thinking? It will take a long time for our law-makers to get their priorities right and encourage more schools, smaller classes and syllabi that emphasise comprehension rather than an excess of information.

- (i) Name the essay and its author.  
(ii) Why don't teachers have time to answer pupil's questions?

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[P.T.O.]

(iii) What outside interruptions are mentioned in the passage?

(iv) What should our law makers do to set our present education system right?

(v) Use the word 'huge' in a sentence of your own.

OR

Untouchability will vanish only when the whole of the Hindu social order, particularly the caste system will be dissolved. Is this possible? Every institution is sustained by some sort of a sanction. There are three kinds of sanction which supply life force to an institution. They are legal, social and religious. The vitality of the institution depends upon the nature of the sanction. What is the nature of the sanction behind the caste system? Unfortunately, the sanction behind the caste system is religious sanction.

(i) Name the essay and its author.

(ii) When will untouchability disappear from the Hindu social order?

(iii) What are the three kinds of sanction which supply life force to an institution?

(iv) What kind of sanction is working behind the caste system?

(v) Use the word 'vitality' in a sentence of your own. 5

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2

2. Explain with reference to the context : Most of the previous

civilization known to history came to end because vigorous but uncivilized peoples broke in upon them and destroyed them. This was the fate of Babylon and Assyria; it happened over and over again in India and China; it brought about the end of Greece and the fall of Rome.

OR

War becomes just a game or an exercise, even if it begins as a struggle fought for understandable aims. Symmetry and reciprocity disappear. One can produce death as one produces spark plugs or computer chips. No one feels the pain of automobile parts of electronic circuits. 3

3. Answer any *four* questions in about 30 words each :

(i) Why does C.E.M. Joad compare the modern civilization with previous ones? What does the comparison show?

OR

Which innovation did Narlikar introduce for autograph seekers?

(ii) What is Dr Barnard's view about apartheid?

OR

What does Dr Ambedkar say about untouchability and the caste system?

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3

[P.T.O.]

(iii) What are the three barriers in the matter of social intercourse which the ordinary uneducated Hindu must observe.

OR

How does Huck Gutman trace the growth of mechanization in warfare?

(iv) What is the point of comparison between Walt Whitman and Melville as war poets?

OR

Explain the far-reaching effects of unequal ownership of property for women.

6

4. What aspects of our civilization does C.E.M. Joad choose for its praise? Give a brief description.

OR

Summarise the main argument of Huck Gutman's essay "In humanisation of War".

6

5. Translate the following passage into Hindi.

We sometimes think it would be very nice to have no work to do. How we envy the rich people who have not to work for their living, but can do just what they please all the year round. Yet when we feel like this, we make a mistake. Sometimes, rich people are not as happy as we think they

are, because they are tired of having nothing to do. Most of us are happy when we have regular work to do for our living, especially if the work is what we like to do. The first thing work does for us is to give us happiness. Then work gives us self-respect. Lastly, regular work helps to build up character.

5

OR

(For non Hindi Speaking/Foreign students only)

Read the following passage and answer the questions that follow :

Discontentment is the root cause of all unhappiness. Contentment is a bliss whereas discontentment is a curse. The more discontented we are, the more unhappy we are. We may have large amounts of money in the bank, we may own vast farms or factories, we may be monopolists with a powerful control over sources of income, we will never be happy if we are discontented. A discontented man is always a slave to his desires. He acts as his own enemy. He doesn't care for position or prestige. He doesn't care for his mental and physical health. We want only the satisfaction of his desires. He can act as his own friend if he acquires contentment but he doesn't do so. It is in his own hands to be free or to be a slave. If he controls his desires, he becomes free, but if he is controlled by his desires, he becomes a slave.

*Questions :*

- (i) What is the root cause of all unhappiness?
- (ii) What is a blessing and what is a curse?
- (iii) What kind of a man is a slave to his desires?
- (iv) Give the meanings of the following words and use them in sentences of your own :

(a) Desires.

(b) Prestige.

5

6. Make a precis of the following passage and give it a suitable heading.

Freedom has assuredly given us new status and new opportunities. But it also implies that we should discard selfishness, laziness and narrowness of Outlook. Our freedom suggests toil and creation of new values for old ones. We should so discipline ourselves as to be able to discharge our new responsibilities satisfactorily. If there is any one thing that needs to be stressed more than any other in the new set-up, it is that we should put into action our full strength. Work, unceasing work, should be our watch-word. Work is wealth and service is happiness. The greatest crime in India today is idleness. If we root out idleness, all our difficulties, including even conflicts, will gradually disappear. Whether as a constable or high official of the state, whether as a

businessman or an industrialist, an artisan or a peasant, all of us should discharge our duties with dedication. Honest work is the sheet-anchor to which we should cling if we want to be saved from danger or difficulty. It is the fundamental law of progress.

7

7. Write a letter to the editor of a newspaper highlighting the evils of dowry system.

OR

Write a letter to the Deputy Commissioner of your district complaining about encroachments made by shopkeepers in your area.

8

Roll No. ....

Total Pages : 3

**GSEM-22                      1485**

**DIVERSITY OF ARCHEGONIATES**

**Paper-I**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt five questions in all. Select two Questions from each unit. Question No. 1 is Compulsory. Draw neat and well labelled diagrams.

**Compulsory Question**

**1.** Give short answer of the following :

- (a) Why bryophytes are known as Amphibious plants?
- (b) Zygotic Meiosis.
- (c) Appospory.
- (d) Protogyny and Protandry.
- (e) What is the function of Elaters?
- (f) Why Anthoceros is called Hornwort?
- (g) What are Resurrection Plants?
- (h) What type of stele is found in the Rhizophore of Selaginella?

(1×8=8)

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[P.T.O.

### SECTION-A

2. Write elaborate notes on following :
  - (a) Internal structure of Marchantia thallus with suitable diagram. (5)
  - (b) Describe the structure of sporophyte of Anthoceros with diagram. (3)
3. Explain the identifying characters of Marchantia and Anthoceros by comparing the external and internal structure of gametophyte. Draw suitable diagram if required. (8)
4.
  - (a) What is the significance of Mucilage cavities in the thallus of Anthoceros? (2)
  - (b) Discuss the evolutionary importance of the sporophytic generation of Anthoceros. (3)
  - (c) Write a short note on reproductive structure of Anthoceros. (3)
5. Discuss the following in FUNARIA :
  - (a) Primary and Secondary Protonema. (3)
  - (b) Ligule and its function. (2)
  - (c) Dehiscence of Capsule and dispersal of spores. (3)

### SECTION-B

6. Explain the locality and reconstruction of the sporophyte giving internal structure of the stem of RHYNIA. (8)

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2

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3

7. Describe the following :
  - (a) Significance of Heterospory in the lifecycle of Selaginella. (3)
  - (b) What characteristics indicate that Rhynia is a land plant? (2)
  - (c) Structure of Sporophyte of Pteris. (3)
8. Give a detailed account of Mature Gametophyte and process of fertilization in PTERIS. (8)
9. Describe the life history of Equisetum with suitable diagram. (8)

GSE/M-22

**1486**

GENETICS

Paper-II

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt five questions in all, selecting two questions from each unit. Question No. 1 is compulsory (short answer type). All questions carry equal marks.

**Compulsory Question****1. Answer the following :**

- (a) Differentiate between a nucleotide and a nucleoside.
  - (b) What do you mean by genetic code?
  - (c) Define Linkage.
  - (d) What are duplicate genes?
  - (e) Define transposons.
  - (f) What is transcription?
  - (g) What is operon concept?
  - (h) What are plasmids?
- (8×1=8)

**UNIT-I**

- 2. Discuss the process of DNA replication in prokaryotes. 8
- 3. How will you justify the statement, "The genetic code is triplet, commaless and non-overlapping"? 8

4. Write upon :  
(i) Law of independent assortment. 4  
(ii) Linkage maps 4

5. Write notes on :  
(i) Incomplete dominance. 4  
(ii) Inhibitory genes. 4

## UNIT-II

6. (a) Discuss various types of plasmids. 5  
(b) Write a note on DNA repair. 3

7. Explain the process of translation in protein synthesis. 8

8. How gene action is regulated in prokaryotes? 8

9. Write notes on :  
(i) 3-D structure of proteins. 3  
(ii) Role of mitochondria in cytoplasmic inheritance. 5
-

Roll No. ....

Total Pages : 3

**GSE/M-22                      1487**

**LIFE AND DIVERSITY FROM ANNELIDA TO  
ARTHROPODA AND GENETICS-I  
Paper-I**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *five* questions in all. Select *two* questions each from Section A and B. Draw diagrams wherever required.  
Question No. 1 is compulsory.

**Compulsory Question**

- 1.** Give short answers to the following questions :
- (a) Pygidium.
  - (b) Difference between metamerism in annelids and arthropods.
  - (c) Arthropoda.
  - (d) Difference between centipede and millipede.
  - (e) Ecdysis.
  - (f) Test cross.
  - (g) Compare epistasis and dominance.
  - (h) Recombinant progeny.
  - (i) A couple have a colour blind daughter and son with normal vision. What are the genotypes of the parent in this cross?
  - (j) Why is Cytoplasmic inheritance uniparental?

(1×10=10)

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☺☺☺ [P.T.O.]

## SECTION-A

2. Classify the Phylum Annelida upto order level listing the characters and examples of each group. 7½
3. Write notes on the following :
  - (a) Economic importance of Oligochaetes. 2½
  - (b) Mouth parts of Grasshopper. 2½
  - (c) Septal nephridia of Pheretima. 2½
4. Explain the following :
  - (a) Spiracles in Grasshopper. 2
  - (b) Difference between Pseudometamerism and Metamerism in Annelids. 2½
  - (c) Labelled diagram of Female reproductive system of Grasshopper. 3
5. (a) Explain the Respiratory system of Grasshopper in detail. 3½
  - (b) Describe the Male reproductive system of Grasshopper. 4

## SECTION-B

6. (a) Explain the Law of Independent Assortment with the help of a suitable example. 5½
  - (b) What is Linkage? State the Chromosome theory of linkage. 2
7. What is Dominance? Explain different patterns of dominance with suitable examples. 7½

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2

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3

8. Write notes on the following :

- (a) Inheritance of Sex-linked disorder haemophilia. 3½
- (b) Inheritance of Shell coiling in snail Limnaea. 4
9. (a) What is a chromosomal map? Give its significance. 2
  - (b) Give an account of XX-XY mode of sex determination. 3
  - (c) Discuss different types of Crossing over. 2½

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Total Pages : 3

1488

FROM MOLLUSCA  
AND GENETICS-II

Marks : 40

Answer any four questions. Question No. 1 is compulsory.  
Write your answers for each section A and B.

Section A

- (d) Codon.
  - (e) Rh factor.
  - (f) Redula of Pila.
  - (g) Turner's syndrome.
  - (h) Synapicula.
  - (i) Okazaki fragments.
  - (j) Tube feet.
- (10×1=10)

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### SECTION-A

2. (a) Make a well labelled diagram of Pallial complex of Pila.  
(b) Describe the Bipinnaria larva of Echinoderm.  
(5+2½-7½)
3. (a) Describe the water vascular system of Asterias.  
(b) Give an account of Torsion and Detortion in Gastropods.  
(4+3½=7½)
4. (a) Write down about the general characters and classification of phylum Mollusca upto order level.  
(b) Make a list of various larvae of Echinoderms.  
(5+2½=7½)
5. (a) Describe the structure and metamorphosis of Tomaria larva.  
(b) Write down the various external characters of Balanoglossus.  
(5+2½-7½)
6. Give an account of human blood groups and their inheritance.  
7½

### SECTION-B

7. Describe the following abnormalities  
(a) Down Syndrome.  
(b) cri du chat Syndrome.  
(c) Supermales and Superfemales.  
2½×3=7½
8. Describe the structure and various types of RNA.  
7½
9. Explain the following :  
(i) Frame shift Mutation.  
(ii) Aneuploidy.  
(iii) DNA finger printing.  
2½×3=7½

Roll No. ....

Total Pages : 3

**GSE/M-22**

**1491**

**ELECTRONIC DEVICES AND CIRCUITS-II**

Paper-I

Time : Three Hours]

[Maximum Marks : 40

**Note :** (i) There are nine questions in this paper. All questions carry equal marks.

(ii) Attempt *five* questions in all.

(iii) Question No. 1 is compulsory.

(iv) Attempt remaining *four* questions by selecting only *one* question from each unit.

**Compulsory Question**

1. (a) What do you mean by transistor Biasing? 2
- (b) What are the requirements of a biasing network? 2
- (c) Why transformer coupling is not suitable for small frequency signal amplification? 2
- (d) What are the advantages of the FET over the conventional transistors? 2

**UNIT-1**

2. (a) Explain biasing arrangement in collector-to-base bias circuit. 5
- b) Where the operating point should lie in the characteristics and why? 3

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44 [P.T.O.]

3. (a) Explain with the help of circuit diagram, biasing arrangement in fixed biased circuit. 5
- (b) Discuss the selection criterion of operating point. 3

#### UNIT-II

4. (a) Explain voltage divider biasing arrangement in detail. 5
- (b) Discuss qualitatively why self-bias circuit is an improvement on the fixed bias circuit, as far as stability is concerned. 3
5. (a) What do you mean by Virtual ground? Under what conditions the emitter terminal is at virtual ground in emitter-bias circuit? 4
- (b) Discuss the gain in multi-stage amplifier. 4

#### UNIT-III

6. (a) With the help of circuit diagram, discuss direct coupled amplifier. 4
- (b) Explain frequency response of two stage R-C coupled amplifier. 4
7. (a) Discuss two stage R-C coupled amplifier in detail and calculate its overall gain. 5
- (b) Discuss advantages and disadvantages of transformer coupling. 3

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#### UNIT-IV

8. (a) Draw and explain the drain and transfer characteristics of N-channel enhancement MOSFET. 6
- (b) Define pinch off voltage in field effect transistor. 2
9. (a) Draw and explain the drain characteristics of N-channel JFET. 6
- (b) Why enhancement MOSFET cannot be used in depletion mode? 2

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Roll No. ....

Total Pages : 3

**GSEM-22**

**1492**

**DIGITAL ELECTRONICS-I**

**Paper-II**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *five* questions in all. Question No. 1 is compulsory. Select *one* question from each unit.

**Compulsory Question**

1. (a) What are the advantages of binary number system ? 1  
(b) Distinguish between 1's and 2's complement. 1  
(c) What is meant by SOP and POS form of Boolean expression ? Give examples. 2  
(d) Define Duality theorem. 1  
(e) Define Fan-in and Fan-out. 1  
(f) Define Parity and Parity bit. 2

**UNIT-I**

2. (a) Convert the following hexadecimal numbers to octal and decimal number :  
(i) B2F8 4  
(ii) 3C27.4D 4  
(b) Perform the following using 2's complement method :  
(i)  $-179 - 137$   
(ii)  $219 - 530$ . 4

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**uqP** [P.T.O.]

3. (a) Describe the Gray code. What are its peculiar characteristics ? Explain with an example conversion of Gray to binary code. 4
- (b) Explain Parity bit code. 2
- (c) What are BCD numbers ? Distinguish between a binary and a BCD code. Write  $8421$  codes for decimal numbers 0 to 9. 2

## UNIT-II

4. (a) Explain how AND, OR and NOT gates can be realized using NAND gate only. 2
- (b) Express the following in SOP form :
  - (i)  $f(x, y, z) = 1$ .
  - (ii)  $f(x, y, z) = (XY + Z)(Z + ZY)$ . 2
- (c) Prove the following :
  - (i)  $WX + X\bar{Y} + YZ + X\bar{Z} = X + YZ$ .
  - (ii)  $XY + \bar{X}Z + YZ = XY + \bar{X}Z$ . 4
5. (a) Minimize the following function using K-map and realize it with AND, OR and NOT logic gates :
 
$$f(x, y, z, w) = \sum m(1, 2, 3, 6, 8, 12, 14, 15)$$
 4
- (b) Reduce the following :
  - (i)  $F = AB + \overline{AC} + A\bar{B}C (AB + C)$
  - (ii)  $F = A\bar{C} + \bar{B}\bar{C}D + A\bar{B}C + ACD$ . 4

## UNIT-III

6. (a) Discuss RTL NOR gate. What are its limitations ? 4
- (b) Write a short note on Unipolar and Bipolar Logic families. 4
7. (a) Discuss MOS inverter circuit. 3
- (b) Explain the working of CMOS NOR gate with circuit diagram. 5

## UNIT-IV

8. (a) What is a Full-subtractor ? Draw and explain the circuit diagram of a full-subtractor using two half subtractors using NAND gates. 4
- (b) Draw and explain a 2's complement adder/subtractor. 4
9. Design a railway track switching circuit using AND, OR and NOT gates for the following operations :
 

“A railway station has three platforms A, B and C. The trains can come from either direction. The trains are to be routed to these platforms in order of preference A, B and in the last to C. Each platform has a switch which will be turned ON if it is occupied. There are two outer signals  $S_1$  and  $S_2$  on either side of the railway station which will be either green or red. There are two track changer switches  $S_A$  and  $S_B$  which allow changing the tracks.”

 8

Roll No. ....

Total Pages : 2

**GSE/M-22**

**1493**

**PROGRAMMING IN 'C'**

**Paper-I**

Time : Three Hours]

[Maximum Marks : 40

**Note :** A candidate will be required to answer *five* questions in all, selecting *one* question from each unit in addition to Compulsory Question No. 1. All questions carry equal marks.

**Compulsory Question**

1. (a) Write short note on assignment statement in 'C' language. 2
- (b) Explain the concept of type casting and conversion in 'C' language. 2
- (c) What is the purpose of break statement in 'C' language? Give example. 2
- (d) Differentiate between structure and union in 'C' language. 2

**UNIT-I**

2. What are the rules for writing constants and identifiers in 'C' language? Give at least *four* examples of valid constants and identifiers and *four* examples of invalid constants and identifiers. 8

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[P.T.O.]



3. Explain the purpose and syntax of scanf(), getchar(), gets(), printf(), putchar() and puts() functions in 'C' language. Give examples of each. 8

#### **UNIT-II**

4. Define operator. Explain various types of operators available in 'C'. Give suitable examples. 8
5. Explain various decision making control structures available in 'C' language. Write their syntax and give suitable examples. 8

#### **UNIT-III**

6. Explain different types of loop control statements available in 'C' language. Write their syntax and give suitable examples. 8
7. Define function along with its purpose. Elaborate the different parameter passing mechanisms in 'C' language. Give suitable examples. 8

#### **UNIT-IV**

8. Elaborate on the concept of auto, register and static storage classes in 'C'. Explain using appropriate examples. 8
9. What is the significance of arrays? Give its types. How the arrays are declared, initialized and processed in 'C'? Explain with the help of any 'C' program of your choice. 8

Roll No. ....

Total Pages : 3

**GSEM-22**

**1494**

**LOGICAL ORGANIZATION OF COMPUTERS**

**Paper-II**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *five* questions. Q. No. 1 is compulsory. Select *one* question from each unit.

**Compulsory Question**

1. (a) Write the full form of ASCII, EBCDIC.
- (b) Prove by induction  $(a + b) + c = a + (b + c)$ .
- (c) Make Venn diagram for OR and AND gate.
- (d) Define Hamming distance.

8

**UNIT-I**

2. (a) (i) Convert  $(10.3)_{10}$  to binary, octal and hexadecimal.
- (ii) What is number in binary and octal for 2AF7 ?
- (iii) Convert  $(101011101001)_2$  to octal and hexadecimal.
- (iv) What is number in binary and hexadecimal if register stores high low high low ?
- (b) Write two coding scheme for weighted code system.

8

3. (a) Write note on Fixed Point and Floating Point notation.
- (b) Perform 2's complement arithmetic  
-36-02 and -09-21. 8

### UNIT-II

4. (a) Define Boolean algebra, differentiate it from ordinary algebra and write its postulates.
- (b) Solve using Boolean algebra :
  - (i)  $\bar{x}y + yz + zx = \bar{x}y + xz$ .
  - (ii)  $abc + \bar{a}bc + a\bar{b}c + \bar{c}ab$ . 8

5. (a) Draw and label 3 Variable K-map and solve for four corners.
- (b) (i) Solve using K-Map  
 $Z = \Sigma 0, 1, 4, 5, 11 + \Sigma \emptyset 7, 10, 14, 15$ .
- (ii) Explain Full Adder using K-Map. 8

### UNIT-III

6. (a) Draw T.T. for 3 variable NOR and AND gates.
- (b) Prove using Induction (truth table) for  $\overline{a.b.c} = \bar{a} + \bar{b} + \bar{c}$ .
- (c) Draw circuit for  $Y = (a\bar{b} + \bar{a}b) + \overline{abc}$ .
- (d) Prove NOR and NAND are universal gates. 8

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2

7. (a) Make circuit 10 to 4 line encoder.
- (b) Make code convertor from 8421 to cyclic. 8

### UNIT-IV

8. Explain JKFF, its problem as race around and its solution. 8
9. (a) Make Mod-16 synchronous counter.
- (b) Make Shift register as Parallel in Parellet out. 8

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3

Roll No. ....

Total Pages : 03

**GSE/M-22 1803**

## HUMAN PHYSIOLOGY

Course : III

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. No. 9 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से कम से कम एक प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 9 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

### Unit I ( इकाई I )

1. Explain the importance and process of Mitosis with diagram. 8  
चित्र सहित सूत्री-विभाजन तथा इसके महत्त्व की व्याख्या कीजिए ।
2. Write short notes on the following : 8
  - (a) Liver working
  - (b) Pancreas.निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :
  - (अ) यकृत कार्य
  - (ब) अग्न्याशय ।
3. Explain various types of Bones present in human body. 8  
मानव शरीर में पाई जाने वाली विभिन्न प्रकार की अस्थियों की व्याख्या कीजिए ।

4. Explain the structure and function of Heart. 8  
हृदय की संरचना तथा कार्य करने की विधि का वर्णन कीजिए ।

### Unit II (इकाई II)

5. Define Excretory System. Explain the structure and functioning of kidney. 8

उत्सर्जन तन्त्र के बारे में बताइए । गुर्दे की संरचना व कार्य का वर्णन कीजिए ।

6. Enlist the functions of Lungs. Explain the structure of Lungs. 8

फेफड़ों के कार्य को सूचीबद्ध कीजिए । फेफड़ों की संरचना बताइए ।

7. Write short notes on the following : 8

- (a) Menstrual Cycle  
(b) Fertilization.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

- (अ) महावारी चक्र  
(ब) निषेचन ।

8. Write in detail about Peripheral Nervous System. 8

बाहरी तंत्रिका तन्त्र के बारे में विस्तारपूर्वक लिखिए ।

### Compulsory Question (अनिवार्य प्रश्न)

9. Write in 2-3 lines each about the following terms : 8

- (a) Neuron  
(b) Hinge joint  
(c) Nephron

(d) Trachea

(e) W.B.C. (White Blood Cells)

(f) A.N.S. (Autonomous Nervous System)

(g) Mitochondria

(h) Liver.

निम्नलिखित प्रत्येक तथ्य को 2-3 पंक्तियों में वर्णित करें :

- (अ) न्यूरोन  
(ब) कब्जेदार सन्धि  
(स) नेफ्रॉन  
(द) श्वासनली  
(इ) सफेद रक्त कोशिकाएँ  
(फ) रज्जायुत तंत्रिका प्रणाली  
(ग) माइटोकॉण्ड्रिया  
(ह) यकृत ।

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GSE M-22

1804

## NEONATE AND INFANT GROWTH AND

DEVELOPMENT

Page No. \_\_\_\_\_

Time : 1 hour

Maximum Marks : 40

Answer the questions in the following 700 questions  
from 200 to 299. All questions  
are compulsory. All questions  
are of equal marks.  
The marks for each question are  
indicated in the margin. All questions  
are compulsory.

### Compulsory Question (अनिवार्य प्रश्न)

1. Write short notes on the following : 2×4=8
- (i) Conception
  - (ii) Hand skills of infants
  - (iii) Instrument birth
  - (iv) Major adjustments neonate makes to service.
- निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :
- (i) गर्भाधान
  - (ii) शिशुओं के हस्त कौशल

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P.T.O.

Roll No. ....

Total Pages : 03

**GSE/M-22**

**1804**

**PRENATAL AND INFANT GROWTH AND**

**CARE**

**Paper 112**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

**Compulsory Question ( अनिवार्य प्रश्न )**

1. Write short notes on the following :

**2×4=8**

- (i) Conception
  - (ii) Hand skills of infants
  - (iii) Instrument birth
  - (iv) Major adjustments neonate makes to service.
- निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

- (i) गर्भाधान
- (ii) शिशुओं के हस्त कौशल

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- (iii) औजार की सहायता से जन्म  
(iv) जीवित रहने के लिए नवजात द्वारा किए गए प्रमुख  
समायोजन ।

### Unit I ( इकाई I )

2. Describe the physiological changes that occurs during pregnancy.  
गर्भावस्था में शारीरिक परिवर्तनों की व्याख्या कीजिए । 8
3. Describe the stages of delivery.  
प्रसव की अवस्थाओं की व्याख्या कीजिए । 8
4. Explain the discomforts during pregnancy.  
गर्भावस्था में होने वाली असुविधाओं की चर्चा कीजिए । 8
5. Describe the factors affecting prenatal development.  
गर्भाकालीन विकास को प्रभावित करने वाले कारकों की व्याख्या कीजिए । 8

### Unit II ( इकाई II )

6. Write short notes on the following physical characteristics of the newborn :  
(a) Reflex action 4  
(b) Hearing capacity. 4  
नवजात शिशु की शारीरिक विशेषताओं पर संक्षिप्त टिप्पणियाँ लिखिए :  
(अ) अनुक्रियाएँ  
(ब) श्रवण क्षमता ।

7. Discuss the social development of 0-2 years old.  
0-2 वर्ष के शिशु की सामाजिक विकास की चर्चा कीजिए । 8
8. Discuss child rearing practices-bathing and toilet training of an infant.  
बाल पोषण विधियाँ-स्नान और शौच सिखाने के विषय में चर्चा कीजिए । 8
9. Discuss any two respiratory diseases commonly occur during infancy.  
शैशवावस्था में सामान्यरूप में होने वाले प्रत्येक सांसक्री विकारों में चर्चा कीजिए । 8

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Total Pages : 03

**GSE/M-22 1805**

**LAUNDRY SCIENCE AND FINISHING OF  
FABRICS  
Paper 113**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 9 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 9 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

**Unit I (इकाई I)**

1. What do you understand by laundry ? Describe the laundry process. 8

धुलाई से आप क्या समझते हैं ? धुलाई की प्रक्रिया की व्याख्या कीजिए ।

2. Discuss laundry equipments and their use. 8

धुलाई के उपकरणों और उनके उपयोग की चर्चा कीजिए ।

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3. What is Soap ? Discuss the types of soaps and methods of manufacturing soap. 8

साबुन क्या है ? साबुन के प्रकारों और साबुन निर्माण की विधियों की चर्चा कीजिए ।

4. What do you understand by Bleaching ? Discuss the types of bleaching agents ? 8

विरंजक से आप क्या समझते हैं ? विरंजकों के प्रकारों की चर्चा कीजिए ।

## Unit II (इकाई II)

5. What are different types of stains ? How stains can be identified ? 8

दाग कितने प्रकार के होते हैं ? दागों की किस प्रकार पहचान की जाती है ?

6. Write in detail about the care and storage of silk clothes. 8

रेशमी वस्त्रों की सँभाल और संग्रह करते समय ध्यान देने योग्य बातों का वर्णन कीजिए ।

7. What is the importance of finishing processes ? Explain singeing, shearing, brushing and tentering. 8

परिसज्जा प्रक्रियाओं का क्या महत्त्व है ? झुलसाना, रोएँ को काटना, झाड़ना और टेंटरिंग का वर्णन कीजिए ।

8. Discuss special purpose finishes. Explain any two in detail. 8

विशेष उद्देश्य परिसज्जाओं की चर्चा कीजिए । किन्हीं दो विशेष प्रकार के विशेष विवरण दीजिए ।

## Compulsory Question (अनिवार्य प्रश्न)

9. Write briefly :

2 × 4 = 8

(a) Composition of Soap

(b) Sanforizing

(c) Fire proof finish

(d) Grease Absorbants.

संक्षेप में लिखिए :

(अ) साबुन का संगठन

(ब) सेन्कोराइजिंग

(स) अग्नि अभेद्य परिसज्जा

(द) चिकनाई अवशोषक ।

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Total Pages : 03

**GSE/M-22 1806**

**INTRODUCTORY HOME MANAGEMENT**

Paper : 114

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

**Compulsory Question ( अनिवार्य प्रश्न )**

1. Define the following :

4×2=8

- (a) Family life-cycle
- (b) Management
- (c) Standards
- (d) Goals.

निम्नलिखित को परिभाषित कीजिए :

- (अ) पारिवारिक जीवन-चक्र
- (ब) व्यवस्था
- (स) स्तर
- (द) लक्ष्य ।

## Unit I (इकाई I)

1. What is home management ? Explain its objectives. 8  
गृह व्यवस्था क्या है ? इसके उद्देश्य बताइए ।
3. What is the role of family life-cycle in home management ? 8  
गृह-व्यवस्था में पारिवारिक जीवन-चक्र की क्या भूमिका है ?

## Unit II (इकाई II)

4. Discuss the qualities of a good home maker. 8  
एक अच्छी गृहणी के गुणों की विवेचना कीजिए ।
5. What do you mean by managerial skills ? How can you develop these skills ? 8  
व्यवस्था संबंधी योग्यताओं से आप क्या समझते हैं ? आप इन योग्यताओं को कैसे विकसित कर सकते हैं ?

## Unit III (इकाई III)

6. Define Values. Discuss the characteristics of values. 8  
मूल्य क्या है ? इनकी विशेषताओं की विवेचना कीजिए ।
7. What do you mean by goals ? Discuss characteristics of goals. 8  
लक्ष्य क्या है ? इनकी विशेषताओं के बारे में बताइए ।

## Unit IV (इकाई IV)

8. Write down about different types of decisions. 8  
निर्णय के विभिन्न प्रकारों के बारे में बताइए ।

9. What are Resources ? Explain the common characteristics of resources. 8  
साधन क्या हैं ? इनकी सामान्य विशेषताओं के बारे में बताइए ।

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Total Pages : 03

**GSE/M-22** **1807**

**BASIC NUTRITION**

Paper : 115

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

1. Briefly describe the following :

2×4=8

- (i) Sources of Carbohydrates
  - (ii) Role of Vitamin K in blood clotting
  - (iii) Effect of deficiency of Iodine in body
  - (iv) Symptoms of Iron deficiency.
- निम्नलिखित का संक्षेप में वर्णन कीजिए :
- (i) कार्बोहाइड्रेट के स्रोत
  - (ii) रक्त का थक्का जमने में विटामिन K की भूमिका
  - (iii) आयोडीन की कमी का शरीर पर प्रभाव
  - (iv) शरीर में लौह तत्व की कमी के लक्षण ।

## Unit I (इकाई I)

2. What are 'Lipids'? Explain their functions in body. 8  
'लिपिड' क्या होते हैं ? शरीर में इनके कार्यों पर चर्चा कीजिए ।
3. What are the after effects of diet, deficient in fibre ? 8  
भोजन में आहारिय रेशों की कमी से होने वाले दुष्प्रभावों की जानकारी दीजिए ।
4. What do you understand by 'Marasmus' and 'Kwashiorkor'? Explain. 8  
'मरास्मस' तथा 'क्वाशियोरकर' से आप क्या समझते हैं ? उल्लेख कीजिए ।
5. Explain the sources and functions of water. 8  
जल के स्रोतों व कार्यों के बारे में विस्तारपूर्वक चर्चा कीजिए ।

## Unit II (इकाई II)

6. Explain sources and functions of Vitamin A. 8  
विटामिन A के स्रोतों तथा कार्यों के बारे में विस्तृत जानकारी दीजिए ।
7. Describe in detail about functions and effects of deficiency of 'Folic Acid'. 8  
'फॉलिक एसिड' के कार्यों तथा इसकी कमी से होने वाले प्रभावों पर चर्चा कीजिए ।
8. Write short notes on the following :  
(i) RDA of Iron for adult man, adult women, pregnant lady and lactating mother 4  
(ii) 'Fluorosis' and 'pellagra'. 4

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निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

- (i) एक वयस्क पुरुष, वयस्क महिला, गर्भवती माता तथा स्तनपान करने वाली महिला के आहार में 'आयरन' की प्रस्तावित मात्रा
  - (ii) 'फ्लोरोसिस' तथा 'पैलाग्रा' ।
9. Discuss in detail about the 'Rickets', 'Osteomalacia' and 'Osteoporosis'. 8  
'रिकेट्स', 'ऑस्टियोमलेसिया' तथा 'ऑस्टियोपोरोसिस' के बारे में विस्तृत जानकारी दीजिए ।

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9. Explain any two of the following :

- (a) Oxidoreductases and transferase enzyme
  - (b) Niacin : a water soluble vitamin
  - (c) Phosphorus as nutrient.
- निम्नलिखित में से किन्हीं दो का वर्णन कीजिए :
- (अ) ऑक्सिडोरिडक्टेस एवं ट्रांसफरेस एन्जाइम
  - (ब) नियासिन : एक घुलनशील विटामिन
  - (स) फॉस्फोरस : एक पोषक तत्व ।

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**GSE/M-22**  
**1808**

**NUTRITIONAL BIOCHEMISTRY**

Course 116

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt Five questions in all. Q. No. 1 is compulsory.

Attempt *four* more questions, selecting *two* questions from each Unit. All questions carry equal marks.

कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । प्रत्येक इकाई से दो प्रश्न चुनते हुए, चार अन्य प्रश्न कीजिए । सभी प्रश्नों के अंक समान हैं ।

1. (a) Draw the structures of the following : 1×4=4

- (i) Lactose
- (ii) Lysine
- (iii) Phosphatidyl serine
- (iv) Uracil.

निम्नलिखित की संरचना दीजिए :

- (i) लैक्टोस
- (ii) लायसिन
- (iii) फोस्फेटिडाइल सिरिन
- (iv) यूरेसिल

(b) Define the following :

1×4=4

- (i) Prospthetic group (ii) Iodine number  
(iii) Hypervitaminosis (iv) pH optima  
निम्नलिखित की परिभाषा दीजिए :  
(i) प्रोस्पैटिक समूह (ii) आयोडिन संख्या  
(iii) विटामिन अधिकता (iv) पी.एच. ओप्टिमा

### Unit I ( इकाई I )

2. (a) Differentiate between starch and cellulose. 4

स्टार्च और सैल्यूलोस में अंतर स्पष्ट कीजिए ।

(b) Define reducing sugar. Give names and draw structures of one reducing and one non-reducing sugar. 4

रिड्यूसिंग शर्करा को परिभाषित कीजिए । एक रिड्यूसिंग और एक नान-रिड्यूसिंग शर्करा का नाम एवं संरचना दीजिए ।

3. (a) What are the forces involved in three dimensional structure of proteins ? 4

प्रोटीन की तृतीयक संरचना के लिए उत्तरदायी विभिन्न कारकों का उल्लेख कीजिए ।

(b) Enlist various functions performed by proteins in biological system. 4

प्रोटीन्स के विभिन्न जैविक कार्यों की सूची बनाइए ।

4. (a) Explain the process of emulsification of lipids in small intestine. 4

छोटी आंत में वसा के पायसीकरण की प्रक्रिया समझाइए ।

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(b) What are essential fatty acids ? Give names and structures of any two. 4

आवश्यक वसीय अम्ल क्या हैं ? किन्हीं दो के नाम एवं संरचना दीजिए ।

5. (a) Differentiate between nucleosides and nucleotides. 4

Give examples and draw structures.

न्यूक्लियोसाइड और न्यूक्लियोटाइड का अन्तर स्पष्ट कीजिए । उदाहरण देकर उनकी संरचना दीजिए ।

(b) Discuss the structural features of B-DNA. 4

बी-डी.एन.ए. की संरचनात्मक विशेषताओं का वर्णन कीजिए ।

### Unit II ( इकाई II )

6. Discuss structure, functions and deficiency symptoms of Vitamin D and Vitamin E. 8

विटामिन 'डी' एवं विटामिन 'ई' की संरचना, कार्यों और कमी के लक्षणों की व्याख्या कीजिए ।

7. Discuss the biological functions and deficiency symptoms of Iron and Iodine. 8

लौह तत्त्व एवं आयोडिन के जैविक कार्यों और कमी के लक्षणों की व्याख्या कीजिए ।

8. Discuss various factors affecting enzyme activity. 8

एन्जाइम की कार्यक्षमता को प्रभावित करने वाले कारकों की व्याख्या कीजिए ।

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- (vii) Had he already abandoned writing ?  
(viii) Whom did he punish ?

#### Unit IV

8. Write a detailed note on vowels. 8
9. Transcribe the following words : 8
- (i) Call
  - (ii) Pull
  - (iii) Between
  - (iv) Boy
  - (v) Coin
  - (vi) Monkey
  - (vii) Also
  - (viii) Clerk.

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**BSIT/M-22 26094**

### COMMUNICATION SKILLS (ENGLISH-II)

BSIT-201

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all. Q. No. 1 is compulsory.

The remaining *four* questions are to be attempted by selecting *one* question from each Unit. All questions carry equal marks.

#### (Compulsory Question)

1. Write short notes on the following : 4×2=8
- (a) Importance of a business letter
  - (b) Aim of letter of reference
  - (c) Difference between Active voice and Passive voice
  - (d) Intonation.

#### Unit I

2. What is a Business Letter ? Define its objectives. 8
3. Describe the basic framework of a business letter. 8

#### Unit II

4. You are interested in the purchase of plastic goods. Write a letter to a wholesaler asking him to quote prices and supply samples. 8

5. Write a precis of the following passage and also assign it a suitable title : 8

Young people should be led to realize that it is a very serious matter to have a child, and that it should not be undertaken unless the child has a reasonable prospect of health and happiness. The traditional view was that, within marriage, it is always justifiable to have children, even if they come so fast that the mother's health is ruined, even if the children are diseased or insane, even if there is no prospect of their having enough to eat. This view is now only maintained by heartless dogmatists, who think that everything disgraceful to humanity rebounds to the glory of God. People who care for children, or do not enjoy inflicting misery upon the helpless, rebel against the ruthless dogmas which justify this cruelty. A care for the rights and importance of children, with all that is implied, should be an essential part of moral education. Girls should be taught to expect that one day they are likely to be mothers and they should acquire some rudiments of the knowledge that may be useful to them in that capacity. Of course, both boys and girls ought to learn something of physiology and something of hygiene. It should be made clear that no one can be a good parent without parental affection, but that even with parental affection a great deal of knowledge is required as well. Instinct without knowledge is as inadequate in dealing with

children as knowledge without instinct. The more the necessity of knowledge is understood, the more intelligent women will feel attracted to motherhood. At present, many highly educated women despise it, thinking that it does not give scope for the exercise of their intellectual faculties; this is a great misfortune, since they are capable of being the best mothers, if their thoughts were turned in that direction.

### Unit III

6. Fill in the blanks with correct form of verb : 8

- (i) He.....cricket before Ram wakes up. (play)
- (ii) He.....physics for two hours. (study)
- (iii) .....Ram.....Ravana in Ramayana ? (kill)
- (iv) .....the sun.....in the east ? (rise)
- (v) Two and two.....four. (make)
- (vi) He.....not.....yet. (sleep)
- (vii) He.....whenever he is in tension. (smoke)
- (viii) Ram.....lunch when I reached. (take)

7. Change the voice : 8

- (i) He does not like mangoes.
- (ii) Have you written the letters ?
- (iii) What do you want ?
- (iv) He will play cricket tomorrow.
- (v) Why did he hit you ?
- (vi) Has Ram been cheated by you ?

or Milne's method to solve  $\frac{dy}{dx} = x + y$  with initial

condition  $y(0) = 1$  from  $x = 0.20$  to  $x = 0.30$ .

4

#### Unit IV

The values of  $f(x)$  for  $x = 0, 1, 2, \dots, 6$  are given

by :

$x$	0	1	2	3	4	5	6
$f(x)$	2	4	10	16	20	24	38

Estimate the value of  $f(3.2)$  using only four of the given values.

4

(c) Using Newton's divided difference formula find

$f(1)$  as a polynomial in powers of  $(x-6)$  :

$x$	1	0	2	3	7	10
$f(x)$	11	1	1	1	141	561

4

The values of the function  $f(x)$  for values of  $x$  are

given as  $f(1) = 4$ ,  $f(2) = 5$ ,  $f(7) = 5$ ,  $f(8) = 4$ .

Find the value of  $f(6)$  and also the value of  $x$  for which  $f(x)$  is maximum or minimum.

4

(d) Using Chebyshev Polynomial  $T_n(x)$  obtain the least square approximation of second degree for

$y = 6x^2 - 5x + 3$  on  $[-1, 1]$ .

4

4

150

Roll No. ....

Total Pages : 04

**BSIT/M-22 26095**

### MATHEMATICAL FOUNDATION FOR INFORMATION TECHNOLOGY-II

BSIT-202

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

#### (Compulsory Question)

1. (a) Show that one of the roots of the equation lie in the intervals indicated against the equation  $x^2 = \cos x$ .  $(0, 1)$ .

2

(b) Define order of convergence of an Iterative Process.

2

(c) Define Runge-Kutta fourth order method to find an approximate value of  $y$ , when  $x = 0.2$ , given that  $\frac{dy}{dx} = x + y$  and  $y = 1$ , when  $x = 0$ .

2

(d) Find the third divided difference with arguments 2, 4, 9, 10 of the function  $f(x) = x^3 - 2x$ .

2

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P.T.O.

## Unit I

2. (a) Find real positive root of the equation  $x^2 - 37 = 0$  by bisection method correct to three places of decimal. 4
- (b) Find a real root of the equation  $x^4 - x - 10 = 0$  using Secant method. 4
3. (a) Find the real root of the equation  $x^3 - 9x + 1 = 0$  by Regula-Falsi method correct to three places of decimal. 4
- (b) Find the order of convergence of Newton-Raphson formula. 4

## Unit II

4. (a) Apply Gauss Elimination method to solve the equations :
 
$$\begin{aligned} 2x_1 + 4x_2 + x_3 &= 3 \\ 3x_1 + 2x_2 - 2x_3 &= -2 \\ x_1 - x_2 + x_3 &= 6. \end{aligned}$$
 4
- (b) Apply Triangularization method to solve the equations :
 
$$\begin{aligned} 3x + y + 2z &= 18 \\ 2x + 3y + z &= 9 \\ x + 4y + 3z &= 7. \end{aligned}$$
 4

5. (a) Solve the following equations by Cramer's rule method :
 
$$2x_1 + \frac{1}{2}x_2 + \frac{1}{3}x_3 = 10$$

$$\frac{1}{2}x_1 + \frac{1}{3}x_2 + \frac{1}{4}x_3 = 0$$

$$\frac{1}{3}x_1 + \frac{1}{4}x_2 + \frac{1}{5}x_3 = 0.$$

- (b) (i) Define Pivoting and its types
- (ii) Explain Ill-conditioned equations.

## Unit III

6. (a) Solve the following equations by Gauss-Seidel method :
 
$$\begin{aligned} 54x + y + z &= 110 \\ 2x + 15y + 6z &= 72 \\ -x + 6y + 27z &= 85. \end{aligned}$$

- (b) Using Euler's method solve the equation  $\frac{dy}{dx} = x + y$  with the condition  $y(0) = 1$  and taking  $h = 0.04$ , find  $y(0.04)$ .

7. (a) Using Runge-Kutta method find  $y$ , when  $x = 0.2$ , the equation  $\frac{dy}{dx} = \frac{y-x}{y+x}$ ,  $y(0) = 1$ , taking  $h = 0.2$ .

## Unit IV

8. (a) What is a Schottkey TTL logic ? Explain the working of Schottkey TTL logic with the help of circuit diagram. How is it different from TTL logic and what is its merit over simple TTL logic ? 5  
 (b) Define  $V_{IL}$  and  $V_{IH}$  with the help of voltage level diagram for a logic family. 3
9. (a) What is NMOS logic ? Explain the working NAND gate and NOR gate NMOS logic with the help of circuit diagrams. Compare NMOS logic and CMOS logic families ? 4  
 (b) Define the following terms for a logic family :  
 (i) Fan-out  
 (ii) Figure of Merit  
 (iii) Power Dissipation  
 (iv) Propagation Delay. 4

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Total Pages : 04

**BSIT/M-22 26097**

**ELECTRONICS**

**BSIT-204**

**Digital Electronics-I**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) Represent 12 and -12 in binary number system.  
 (b) What is an Exclusive-NOR gate ? Make its truth table.  
 (c) Why CMOS family is preferred over TTL logic family ?  
 (d) Can we increase the number of inputs to a logic gate upto any number ? Justify. 2×4=8

## Unit I

2. (a) Determine the values of P, Q, R and S :  
 (i)  $(110001)_2 = (P)_{10}$   
 (ii)  $(1110.101)_2 = (Q)_{10}$

(iii)  $(265)_{10} = (R)_2$   
 (iv)  $(96.25)_{10} = (S)_2$

4

- (b) Convert the following decimal numbers into OCTAL system numbers and then from OCTAL system number into binary system numbers :

4

- (i) 175  
 (ii) 349.

3. (a) Convert the following binary numbers into OCTAL system numbers and then from OCTAL system number into decimal system numbers :

4

- (i) 11010100  
 (ii) 01001011.010001.

- (b) Convert the following decimal numbers into BCD codes :

2

- (i) 716  
 (ii) 3327.67

- (c) What do you understand by weighted and non-weighted codes ? Give one example of each.

2

## Unit II

4. (a) Design a NOT gate (inverter) using transistor. Make its equivalent symbol and explain its working with the help of its truth table.

4

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2

- (b) Prove the following Boolean Identities :

4

- (i)  $A + BC = (A + B)(A + C)$   
 (ii)  $AB + A'C + BC = AB + A'C$

Note : A' represents complement of A.

5. (a) What is K-map ? Minimize the given Boolean expression using K-Map and implement the minimized function using NAND gates only :

$F(A, B, C, D) = \Sigma(0, 1, 2, 4, 5, 8, 12) + \phi(6, 13)$

6

- (b) Design AND gate and an INVERTER using NOR gate.

2

## Unit III

6. (a) What is a DTL logic ? Explain the working of DTL logic with the help of circuit diagram. What are its merits and demerits ?

5

- (b) Define  $V_{OL}$  and  $V_{OH}$  with the help of voltage level diagram for a logic family.

3

7. (a) What is a DCTL logic ? Explain the working of DCTL logic with the help of circuit diagram. What are its merits and demerits ?

5

- (b) What are Saturated and Non-Saturated logic families ? Explain in brief detail with examples and their respective advantages and disadvantages.

3

(2-29/4) L-26097

3

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Roll No. ....

Total Pages : 03

**BSIT/M-22      26098**

## **ELECTRONIC COMMUNICATION-II**

**BSIT-205**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

### **Compulsory Question**

1. (a) Define digital modulation. 2
- (b) Define Hamming distance and calculate its values for codes 11110 and 11001. 2
- (c) What is Syndrome in binary cyclic code ? 2
- (d) Define channel capacity. 2

### **Unit I**

2. (a) Define FSK modulation technique and discuss its generation. 4
- (b) Describe the coherent detection of binary PSK signal. 4

3. (a) What is QPSK ? Discuss the operation of QPSK transmitter. 4  
 (b) Discuss the modulation process of differential phase shift keying. 4

### Unit II

4. (a) Discuss linear block codes. How are these codes generated ? 4  
 (b) Consider a (6, 3) linear block code whose generator matrix is : 4

$$G = \begin{bmatrix} 1 & 0 & 0 & : & 0 & 1 & 1 \\ 0 & 1 & 0 & : & 1 & 0 & 1 \\ 0 & 0 & 1 & : & 1 & 1 & 0 \end{bmatrix}$$

Find all the code vectors of this code.

5. Design a linear block code with a minimum distance of three and message block of eight bits. 8

### Unit III

6. (a) A (15, 5) linear cyclic code has generator polynomial  $g(x) = 1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$ . Find the code polynomial for the message polynomial  $D(x) = 1 + x^2 + x^4$  in a systematic form. 4

- (b) Design an encoder for the (7, 4) binary cyclic code generated by  $g(x) = 1 + x + x^3$  and verify its operation using message vector (1101). 4

7. (a) How the syndrome calculation and error detection is performed in binary cyclic codes. 4

- (b) A (15, 5) linear cyclic code has generator polynomial  $g(x) = 1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$ . Draw the block code diagram of an encoder and syndrome calculator for this code. 4

### Unit IV

8. (a) Apply the Huffman coding method to the following message ensemble and determine the average length of encoded message.

- (b)  $[X] = [X_1 \ X_2 \ X_3 \ X_4 \ X_5 \ X_6 \ X_7]$   
 $[P] = [0.4 \ 0.2 \ 0.12 \ 0.08 \ 0.08 \ 0.08 \ 0.04]$   
 Take  $M = 2$ . 8

9. (a) Find the source entropy and information rate of a source that emits one of the three symbols A, B and C in a statistically independent sequences with probabilities 1/2, 1/4 and 1/4 respectively. 4  
 (b) Discuss the Information content of a message in detail. 4

Roll No. ....

Total Pages : 02

**BSIT/M-22      26099**

## **PROGRAMMING TECHNIQUES**

**BSIT-206**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) What are symbols used in Flowcharts ?
- (b) Write advantages of Pseudocode.
- (c) What is the difference between Move and Copy command in Excel ?
- (d) Name four types of Charts used in Excel.      8

### **Unit I**

2. (a) Define Flowchart and write Rules of Flowcharting.
- (b) Write advantages and limitations of Flowcharts. 8
3. (a) Define Decision Table and make a Decision table for OR Gate.
- (b) What is Program Planning, its meaning and use ?

8

Roll No. ....

Total Pages : 3

GSM/M-22

1612

## SEQUENCE AND SERIES

Paper-BM-241

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note :** Attempt five questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

### Compulsory Question

1. (a) Define limit point of a set and give an example of a set which has three limit points?
- (b) Give an example of a sequence which is bounded but not convergent.
- (c) Discuss the convergence of the series :

$$\sum_{n=1}^{\infty} \sin \frac{1}{n}.$$

- (d) Test the absolute convergence of the infinite series :

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

$$2 \times 4 = 8$$

### UNIT-I

2. (a) Define open set. Prove that arbitrary union of open sets is an open set.

4

1612/K/1048/3,700

P. T. O.

- (b) Prove that the set of rationals is not order complete. 4
3. (a) Define closure of a set. Prove that closure of a set is a closed set. 4
- (b) Show that a set having finite number of elements is compact. 4

### UNIT-II

4. (a) State and prove Cauchy's first theorem on limits. 4
- (b) Discuss the convergence of the sequence  $\langle a_n \rangle$  where  $a_n = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{n}$ . 4
5. (a) Discuss the convergence of the series : 
$$\sum_{n=1}^{\infty} \frac{x^n}{x^n + a^n}, x > 0.$$
 4

- (b) Discuss the convergence of the series : 4

$$\frac{\sqrt{3}}{1.2} + \frac{\sqrt{5}}{3.4} + \frac{\sqrt{7}}{5.6} + \dots$$

### UNIT-III

6. (a) State and prove Raabe's test for the convergence of an infinite series. 4
- (b) Test the convergence of infinite series : 4

$$\sum_{n=1}^{\infty} \frac{(n!)^2}{2n!} x^n, x > 0.$$

7. (a) State and prove Cauchy's Condensation test for the convergence of an infinite series. 4

- (b) Test the convergence of  $\sum_{n=2}^{\infty} \frac{1}{(\log n)^n}$ . 4

### UNIT-IV

8. (a) Discuss the absolute convergence of the series :

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n\sqrt{n}} (\cos nx)^2, x \text{ is real.} \quad 4$$

- (b) Discuss the convergence and absolute convergence of:

$$\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{\operatorname{cosec}\left(\frac{1}{n}\right)}. \quad 4$$

9. (a) Test the convergence of  $\sum_{n=1}^{\infty} \frac{\cos nx}{n^p}, p > 0.$  4

- (b) Test the convergence of infinite product  $\prod_{n=0}^{\infty} \left[1 - \frac{1}{n^2}\right].$  4

differential equation  $\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial x^2}$  with the boundary condition.

(i)  $u = u_0$  when  $x = 0, t > 0$  and the initial condition.

(ii)  $u = 0$  when  $t = 0, x > 0$ . 4

(b) Solve  $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ , given that :

(i)  $u(0, t) = 0$  (ii)  $u(\pi, t) = 0$  (iii)  $u(x, 0) = 2x$

when  $0 < x < \pi, t > 0$ . 4

GSM/M-22

1613

## SPECIAL FUNCTIONS AND INTEGRAL

## TRANSFORMS

Paper—BM-242

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note** : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

## Compulsory Question

1. (a) Prove that  $J_0''(x) = \frac{1}{2} [J_2(x) - J_0(x)]$ .

(b) Show that :  $\int_{-1}^1 P_n(x) dx = 2$  if  $n = 0$ .

(c) Find the Laplace Transform of  $\cosh$  at  $\sin$  at.

(d) Find the Fourier transform of  $f(x) = e^{-a|x|}$ , where  $a > 0$  and  $x \in (-\infty, \infty)$ .  $2 \times 4 = 8$

## UNIT-I

2. (a) Solve  $\frac{d^2 y}{dx^2} - x \frac{dy}{dx} = e^{-x}$  where  $y(0) = 2$  and  $y'(0) = -3$ . 4

(b) Show that  $J_{-n}(x) = (-1)^n J_n(x)$  where  $n$  is any integer. 4

3. (a) Find the solution of  $x \frac{d^2 y}{dx^2} + \frac{dy}{dx} + \frac{1}{4}y = 0$  in terms of Bessel's function. 4

(b) Verify that the Bessel's function  $J_{\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}} \cos x$  satisfies the Bessel's equation of order  $-\frac{1}{2}$ . 4

## UNIT-II

4. (a) Show that  $(1-2xt+t^2)^{-\frac{1}{2}} = \sum_{n=0}^{\infty} t^n P_n(x)$ ;  $x \leq 1, t < 1$  where  $P_n(x)$  is Legendre's function of order  $n$ . 4

(b) Prove that :

$$\int_{-1}^1 x^2 P_n^2(x) dx = \frac{1}{8(2n-1)} + \frac{2}{4(2n+1)} + \frac{1}{8(2n+3)}. \quad 4$$

5. (a) Show that  $H_n(x) = 2^n \left[ \exp \left( -\frac{1}{4} \frac{d^2}{dx^2} \right) \right] x^n$ . 4

(b) Prove that :

$$\int_{-\infty}^{\infty} x^2 e^{-x^2} [H_n(x)]^2 dx = \sqrt{\pi} 2^n n! \left( n + \frac{1}{2} \right). \quad 4$$

## UNIT-III

6. (a) Evaluate  $\int_0^{\infty} t e^{-t} \sin^2 t dt$ . 4

(b) Find  $L^{-1} \left[ \log \frac{s^2+1}{(s-1)^2} \right]$ . 4

7. (a) Using convolution theorem evaluate  $L^{-1} \left( \frac{s}{(s^2+a^2)^2} \right)$ . 4

(b) Solve the equation by transform method :

$$\frac{d^2 y}{dt^2} + 4 \frac{dy}{dt} + 3y = e^{-t} \quad \text{where } y(0) = y'(0) = 1. \quad 4$$

## UNIT-IV

8. (a) Find the Fourier transform of  $f(x)$

$$\text{if } f(x) = \begin{cases} \frac{1}{2} & |x| \leq \frac{1}{2} \\ 0 & |x| > \frac{1}{2} \end{cases}. \quad 4$$

(b) Using Parseval's identity, Prove :

$$\int_0^{\infty} \frac{dx}{(x^2+1)^2} = \frac{\pi}{4}. \quad 4$$

9. (a) Using the Fourier sine transform, solve the partial

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Total Pages : 3

**GSM/M-22**

**1614**

**PROGRAMMING IN C AND  
NUMERICAL METHODS**

Paper-BM-243

Time Allowed : 3 Hours]

[Maximum Marks : 30

**Note** : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

**Compulsory Question**

1. (a) What is a bit and byte?  
(b) Define character constants.  
(c) What is an escape sequence?  
(d) Define one-dimensional array.  
(e) Write down the flow chart of the else-if ladder.  
(f) Define Descartes's rule of signs. 1×6=6

**UNIT-I**

2. (a) Draw a flowchart to find roots of a quadratic equation. 3  
(b) Define variable in C and also discuss rules for defining a variable in C. 3

**1614/K1049/3,700**

**P. T. O.**

3. (a) What do you mean by data types? What are various data types in C language? Illustrate their declaration and usage? 3

- (b) What are operators? Chart various types of operators offered by C language and illustrate precedence of these operators. 3

### UNIT-II

4. (a) What is a nested if statement? 3

- (b) Differentiate between break and continue statement. 3

5. (a) Write a program to check whether a number is prime or not. 3

- (b) Distinguish between local and global variables. 3

### UNIT-III

6. (a) How is a string stored in an array in C? 3

- (b) What is a structure tag and what is its purpose? 3

7. (a) Show that the order of convergence of Regula-Falsi method is 1.618. 3

- (b) Prove the recurrence formula,  $X_{i+1} = \frac{1}{3} \left( 2X_i + \frac{N}{X_i^2} \right)$  for finding cube root of N. Hence find the cube root of 5, correct to three places of decimal. 3

### UNIT-IV

8. Solve the following equations by Gauss-Seidel method : 6

$$5x + y + 2z = 19$$

$$x + 4y - 2z = -2$$

$$2x + 3y + 8z = 39$$

9. Solve the following equations by Croust's method : 6

$$5x + 2y + z = -12$$

$$-x + 4y + 2z = 20$$

$$2x - 3y + 10z = 3$$

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Total Pages : 3

**GSM/M-22**

**1620**

**WAVE AND OPTICS-II**

Paper-VIII

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note :** Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks. Use of scientific (non-programmable) calculator is allowed.

**Compulsory Question**

1. (a) Define fourier cosine series.
- (b) Explain the term optical rotation and optically active substances.
- (c) What is spherical aberration?
- (d) What are unit planes and nodal planes?  $2 \times 4 = 8$

**UNIT-I**

2. (a) State and explain the law of Malus. 3
- (b) State the theory of a nicol prism to obtain plane polarised light. Explain how nicol prism can be used as polariser and analyser. 5
3. (a) Explain the term optical activity. Show how Fresnel theory explain the optical rotation. 4

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P. T. O.

- (b) Define specific rotation. Explain the construction and working of Laurent's half shade polarimeter. 4

#### UNIT-II

4. (a) State and prove fourier integral theorem. 6  
 (b) Define complex form of fourier series. 2
5. (a) Apply the fourier theorem to analyse a triangular wave in to its simple harmonic components. 4  
 (b) State fourier theorem and determine the value of fourier co-efficients. 4

#### UNIT-III

6. (a) Derive the convolution theorem for fourier transform. 4  
 (b) Find the fourier transform of  $f(x) = e^{-x^2/2}$ . 4
7. (a) Find the system matrix for a thin lens and derive thin lens formula. 5  
 (b) Show that refraction through a special surface can be characterised by a  $(2 \times 2)$  matrix  $R = \begin{pmatrix} 1 & -P \\ 0 & 1 \end{pmatrix}$ . 3

#### UNIT-IV

8. (a) What is chromatic aberration. Show that for chromatic aberration, two thin co-axial lens of same material can be placed at a distance equal to mean of their focal length. 5

- (b) Calculate the focal length of a lens of dispersive power 0.031 which should be placed in contact with a lens of focal length 0.88m and dispersive power 0.022 to make the combination a chromatic. 3

9. (a) What is an optical fiber? Define and explain the terms.  
 (i) Acceptance angle.  
 (ii) Acceptance cone.  
 (iii) Numerical aperture.  
 (iv) Relative refractive index difference. 5
- (b) What are two types of losses in optical fiber? 3

Roll No. ....

Total Pages : 3

GSM/M-22

1621

## INORGANIC CHEMISTRY

Paper-XI-CH-204

Time Allowed : 3 Hours]

[Maximum Marks : 32

**Note :** Attempt **five** questions in all, selecting **two** questions from each Unit. Question No. 1 is compulsory. Use of calculator and log table is allowed.

### Compulsory Question

1. (a) Why is Eu(II) more stable than Ce (II)? 2
- (b) What are transuranic elements? Give synthesis reaction of curium ( $Z = 96$ ) from plutonium ( $Z = 94$ ). 2
- (c) Why does lead appear in group I as well as in group II of qualitative analysis? 2
- (d) How will you detect the presence of  $\text{Ne}^{2+}$  ion in the solution? 2

### UNIT-I

2. (a) Discuss the following properties of lanthanides :
  - (i) Tendency to form complexes. 2
  - (ii) Double salt formation. 2
- (b) What happens when cerium (III) nitrate is treated with alkaline  $\text{KMnO}_4$ ? 2
3. (a) Why is chemistry of all lanthanides identical? 2

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P. T. O.

- (b) Cerium (IV) sulphate is used in redox reactions. Explain why? 2
- (c) Explain which is more basic and why  $Gd_2O_3$  or  $YbO_2$ ? 2
4. (a) What is Actinoid contraction? How do you account for it? 3
- (b) The electronic configurations and positions of most of actinides are controversial why? Justify your answer by giving suitable examples. 3
5. (a) Heavier actinides do not form oxocations. Explain. 2
- (b) Why are the ions of actinides coloured? 2
- (c)  $La^{3+}$  is diamagnetic while  $Sm^{3+}$  is paramagnetic, why? 2

## UNIT-II

6. Discuss chemistry of following tests :
- (a) Nessler's reagent test for  $NH_4^+$ . 2
- (b) Silver nitrate test for thiosulphate. 2
- (c) Sodium nitroprusside test for  $S^{2-}$ . 2
7. (a) Give reasons why group IV radicals are precipitated by passing  $H_2S$  gas in the presence of  $NH_4OH$ . 3
- (b) How is  $NO_3^-$  confirmed in the presence of  $Br^-$ ? 3
8. (a) What is effect of pH, temperature and solvent upon the solubility of a precipitate? 3

- (b) How will you detect presence of  $BO_3^{3-}$  ion in a mixture? 3
9. What happens when
- (a) Ammonium molybdate is added to sodium phosphate solution containing conc.  $HNO_3$ ? 2
- (b) Sodium iodide is heated with  $MnO_2$  and conc.  $H_2SO_4$ ? 2
- (c) Sodium cobaltinitrite reacts with aqueous solution of  $KCl$ ? 2
- Also give chemical reactions involved.

Roll No. ....

Total Pages : 3

GSM/M-22

**1623**

**ORGANIC CHEMISTRY (THEORY)**

Paper-XIII-CH-206

Time Allowed : 3 Hours]

[Maximum Marks : 32

**Note** : Attempt **five** questions in all, selecting **two** questions from each Unit. Question No. **1** is compulsory.

**Compulsory Question**

1. Attempt any **eight** of the following :  $8 \times 1 = 8$
- (a) Write the source of IR radiations in IR spectroscopy.
  - (b) Write expression for reduced mass used in Hooke's Law.
  - (c) What is the type of hybridization of Nitrogen atom in amines?
  - (d) Among primary, secondary and tertiary amines the substituted ammonium ion of which is most solvated.
  - (e) Write equation of conversion of benzene diazonium chloride into iodobenzene.
  - (f) What happens if the temperature rises above 283K in diazotization reaction of primary aromatic amines?
  - (g) Give advantages of oxidation of alcohols into aldehydes using special oxidizing agents.

1623/K/1056/3,350

P. T. O.

(h) What is haloform reaction?

(i) Prepare  $\text{CH}_3\text{COCH}_3$  using  $\text{CH}_3\text{COCl}$ .

### UNIT-I

2. (a) What are stretching vibrations? Give their types.

(b) Explain principle of IR spectroscopy.

(c) What are the factors upon which vibrational frequency depends?  
 $3 \times 2 = 6$

3. (a) Explain two important applications of IR spectroscopy.

(b) Calculate the number of fundamental absorption bands in  $\text{H}_2\text{O}$  molecule.

(c) What is vibrational coupling in IR spectroscopy?  
 $3 \times 2 = 6$

4. (a) How will you prepare pri. amine by Hofmann bromamide reaction?

(b) How will you distinguish Pri., Sec. and Tert. amines by Hinsberg's method.

(c) Aliphatic amines are more basic than aromatic amines, explain.  
 $3 \times 2 = 6$

5. (a) Convert Aniline into Sulphanilic acid. Write its zwitter ion structure.

(b) Write reaction of tert. aliphatic and aromatic amines with nitrous acid.

(c) Prepare pri. amine by reductive amination of aldehydes and ketones.  
 $3 \times 2 = 6$

1623/K/1056/3,350 2

### UNIT-II

6. (a) Write Blomstrand formula of benzene diazonium chloride. Give evidences in favour of this formula.

(b) Using benzene diazonium chloride prepare :

(i) Nitrobenzene (ii) Phenol.

(c) What is Gattermann reaction?  $3 \times 2 = 6$

7. (a) Convert Nitrobenzene into m-nitrophenol.

(b) Name the compound obtained by reduction of benzene diazonium chloride. Give reactions also.

(c) What is Rosenmund's reduction?  $3 \times 2 = 6$

8. (a) Write short note Meerwein-Ponndorf-Verley (MPV) reduction.

(b) What is aldol condensation? Write mechanism also.

(c) Explain structure of carbonyl group.  $3 \times 2 = 6$

9. (a) Write short note on Fehling or Benedict solution test for aldehydes.

(b) Convert  $\text{CH}_3\text{CHO}$  into its :  
(i) hydrazone (ii) semicarbazide.

(c) Write equation to convert acetone into methyl acetate by Baeyer-Villiger oxidation.  $3 \times 2 = 6$

1623/K/1056/3,350 3

Roll No. ....

Total Pages : 2

GSM/M-22

**1626**

## BIOLOGY AND DIVERSITY OF SEED

### PLANTS-II

Paper-I

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note** : Attempt **five** questions in all, selecting **two** questions from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

### Compulsory Question

1. Explain the following :

1×8=8

- (a) Actinomorphic flowers.
- (b) Effective publications.
- (c) Catkin inflorescence.
- (d) Gynoecium in Euphorbiaceae.
- (e) Taxonomy.
- (f) Hypogynous.
- (g) Neotype.
- (h) Phylogenetic system of classification.

### UNIT-I

2. Describe the role of taxometrics in relation to taxonomy. 8

**1626/K/1059/1,450**

**P. T. O.**

3. What do you mean by identification keys? Give an outline of various types of access keys used for the identification of plants. 8
4. What do you mean by racemose inflorescence? Describe its type by giving suitable diagram and examples. 8
5. Write brief notes on the following : 4×2=8
  - (a) Type concept.
  - (b) Principles of priority.

## UNIT-II

6. Give an outline of Engler and Prantl system of classification and also mention its merits and demerits. 8
7. Write the distinguishing features and economic importance of the following families : 4×2=8
  - (a) Rutaceae.
  - (b) Asteraceae.
8. Comment on the following : 2×4=8
  - (a) Androecium in Asclepiadaceae.
  - (b) Androecium in Malvaceae.
  - (c) Gynoecium in Apiaceae.
  - (d) Gynoecium in Ranunculaceae.
9. Write the diagnostic characteristics and economic importance of the following families : 4×2=8
  - (a) Brassicaceae.
  - (b) Solanaceae.

GSM/M-22

**1627****PLANT EMBRYOLOGY**

Paper-II

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note** : Attempt **five** questions in all, selecting **two** questions from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

**Compulsory Question**

1. Write short answers of the following : 8
  - (a) Name two essential whorls of the flower.
  - (b) What is the function of tapetum?
  - (c) Define palynology.
  - (d) What is Xenogamy?
  - (e) What is ventral suture.
  - (f) Define siphonogamy.
  - (g) What is funiculus.
  - (h) What is hesperidium.

**UNIT-I**

2. Comment and justify that “a flower is modified shoot. 8

**1627/K/1702/1,450****P. T. O.**

3. Write note on structure of an anther. 8
  4. Write notes on the following : 8
    - (a) Compound anther.
    - (b) Microsporogenesis.
  5. Write note on Entomophily. 8
- UNIT-II**
6. With suitable illustration explain the structure of various types of ovule found in Angiosperms. 8
  7. Write and explain in brief the types of endosperms of angiosperms. 8
  8. With suitable diagrams explain polyembryology. 8
  9. What is fruit? Define it and describe the various types of dry fruits in your syllabus. 8

**GSM/M-22**

**1628**

**LIFE AND DIVERSITY OF CHORDATES-II**

Paper-I

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note** : Attempt **five** questions in all, selecting **two** questions from each Unit. Question No. 1 is compulsory. Support your answer with neat and labelled diagrams wherever necessary.

**Compulsory Question**

1. Explain the following in about 20 words each :  $1 \times 10 = 10$ 
  - (a) Amplexusory Pad.
  - (b) Conus Papillaris.
  - (c) Vibrissae.
  - (d) Gizzard.
  - (e) Organ of Corti.
  - (f) Jacobson's organs.
  - (g) Preen gland.
  - (h) Pons varolli.
  - (i) Reflex Action.
  - (j) Therapsids.

**1628/K/1060/1,450**

**P. T. O.**

## UNIT-I

2. Describe the internal structure of heart of Frog. 7½
3. (a) Describe poison apparatus of poisonous snakes. 4  
(b) Write a note on Buccopharyngeal respiration of Frog. 3½
4. Describe in detail the digestive system of Hemidactylus. 7½
5. (a) Describe evolutionary tree of reptiles. 3  
(b) Draw well labelled diagram of V.S. Eye of Frog. 4½

## UNIT-II

6. Give a detailed account of respiratory system of Rat. 7½
7. Write notes on the following :
  - (a) Quill feathers in Pigeon. 4½
  - (b) Dentition in mammals. 3
8. (a) Give a brief account of female reproductive system of Rat. 5  
(b) Write a note on Syrinx of Pigeon. 2½
9. What are volant adaptations? Enumerate morphological, anatomical and physiological adaptations of flight in Birds. 7½

Roll No. ....

Total Pages : 2

GSM/M-22

1629

## MAMMALIAN PHYSIOLOGY

Paper-II

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note** : Attempt **five** questions in all, selecting **two** questions from each Unit. Question No. 1 is compulsory. Support your answer with neat and labelled diagrams wherever necessary.

### Compulsory Question

1. Explain the following in about 20 words each :  $1\frac{1}{2} \times 10 = 15$ 
  - (a) Electrocardiogram.
  - (b) Erythropoiesis.
  - (c) Tidal Volume.
  - (d) Bohr's effect.
  - (e) Nephron.
  - (f) Ammonotelism.
  - (g) Synaptic fatigue.
  - (h) Saltatory conduction.
  - (i) Adrenal virilism.
  - (j) Spermiogenesis.

1629/K/1061/1,450

P. T. O.



## UNIT-I

2. What is cardiac cycle? Describe different phases of cardiac cycle. 6¼
3. (a) Explain transport of respiratory gases in the blood. 3¼  
(b) Differentiate between aerobic and anaerobic respiration. 3
4. What is blood clotting? Describe the mechanism of blood clotting. 6¼
5. Write short notes on the following :
  - (a) Role of rennin-angiotensinogen system in osmoregulation. 3¼
  - (b) Micturition. 3

## UNIT-II

6. What is nerve impulse? Explain origin and propagation of nerve impulse along a non-medullated nerve fibre. 6¼
7. Explain the functions and disorders of hormones of thyroid gland. 6¼
8. What is menstrual cycle? Describe the different phases of menstrual cycle. 6¼
9. Write short notes on the following :
  - (a) Structure of human sperm. 3¼
  - (b) Hormones of Hypothalamus. 3

**OSCILLATORS AND MULTIVIBRATORS**

Paper-I

Time Allowed : 3 Hours]

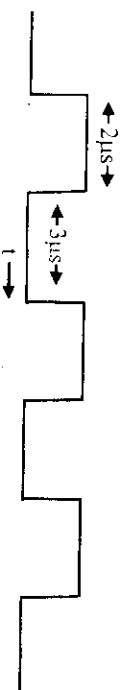
[Maximum Marks : 40

**Note :** Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

**Compulsory Question**

1. (a) What are different feedback topologies? Make the diagram for voltage series feedback topology.
- (b) Define the power efficiency of power amplifier. Does really a power amplifier amplifies the AC power?
- (c) What is Barkhausen criterion?
- (d) Calculate the duty cycle for the given waveform

$$2 \times 4 = 8$$

**UNIT-I**

2. (a) What should be the value of  $R_i$  and  $R_o$  with respect to  $R_S$  and  $R_L$  for a voltage amplifier. Justify it with the help of equivalent circuit diagram.

4

- (b) Drive an expression for the effect of negative feedback on output impedance ( $R_o$ ) of voltage series feedback topology. 4
3. (a) What should be the value of  $R_i$  and  $R_o$  with respect to  $R_S$  and  $R_L$  for a current amplifier. Justify it with the help of equivalent circuit diagram. 4
- (b) Drive an expression for the effect of negative feedback on output impedance ( $R_o$ ) of current shunt feedback topology. 4

### UNIT-II

4. Explain the working of Push-Pull amplifier with the help of circuit diagram. What are its merits over single ended power amplifier? 8
5. (a) Explain with the help of an expression that second harmonics and other higher even harmonics are disappeared in the output of Push-Pull amplifier. 6
- (b) Power amplifier is always preceded by a voltage amplifier. Why? 2

### UNIT-III

6. What is RC phase shift oscillator? Explain its working and derive an expression for its frequency with the help of circuit diagram. 8
7. What is Hartley oscillator? Explain its working and derive an expression for its frequency with the help of circuit diagram. 8

### UNIT-IV

8. What is a multivibrator? Explain the working monostable multivibrator using transistor with the help of its circuit diagram. Write its atleast two applications. 8
9. (a) Explain, how 555 IC Timer is used as Astable multivibrator. Draw its various waveforms. 6
- (b) What is a SCR? Make its transistor equivalent diagram. 2

Roll No. ....

Total Pages : 3

GSM/M-22

**1633**

## ADVANCE DIGITAL ELECTRONICS

Paper-II

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note :** Attempt five questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

### Compulsory Question

1. Write short notes on the following:  $4 \times 2 = 8$
- (a) A 5-bit resistive divider network has 10 volts full scale output in a D/A Converter. Find the output voltage for a binary input 10111.
  - (b) Name the specification on which performance of a A/D converter depends upon.
  - (c) What are the size of MAR and MBR for a (16K $\times$ 64) bit memory ?
  - (d) What are Destructive and Non-destructive read out in memories ?

### UNIT-I

2. (a) Using the resistive network draw the circuit of a 4-bit D/A converter and explain its operation. What are the drawbacks of this D/A converter ? 6
- (b) Explain basic principle of Switched Capacitor type DAC. 2

**1633/K/2471/250**

**P.T.O.**

3. (a) What are the various performance characteristic and their importance is selecting a D/A converter ? 6
- (b) Explain the working of the switched current source type DAC. 2

#### UNIT-II

4. (a) Draw the circuit diagram of Successive Approximation ADC and explain its working. 6
- (b) Name and explain the specification on which performance of a ADC depends. 2
5. (a) Explain the working of Flash type ADC which converts analog voltage to 3 bit digital output. What are the disadvantages of this type of ADC ? 5
- (b) A 16 bit counter-type ADC converter is driven by 400 KHz clock. Calculate the maximum conversion time, the average conversion time and the maximum conversion rate. 3

#### UNIT-III

6. (a) What is a Memory unit ? Using Block diagram of a memory system. Describe the important parameters related to memory unit. 5
- (b) What is the difference between ROM and PROM ? Describe programmable Read only memory (PROM) using bipolar ROM cells. 3
7. (a) What are Random Access Memories (RAMs)? Describe the relative merits and demerits of a dynamic RAM cell over static RAM. 6
- (b) Explain how RAM size  $16 \times 4$  can be increased to  $16 \times 8$ . 2

#### UNIT-IV

8. (a) Explain Programmable Array Logic (PALs) with the help logic circuit. Briefly explain EX-OR PALs. 6
- (b) Explain how (PALs) are advantageous in comparison with fixed function ICs. 2
9. (a) Explain Field Programmable Gate Array (FPGA). List various available FPGA in respect of their architectures, technologies and programming techniques. 6
- (b) List various features of PLDs. 2

Roll No. ....

Total Pages : 2

GSM/M-22

**1634**

**OBJECT ORIENTED PROGRAMMING WITH C++**

Paper-I

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note** : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

**Compulsory Question**

1. (a) Define this pointer.
- (b) What is the purpose of static Data Member and static member function?
- (c) List the name of operators which cannot be overloaded.
- (d) Explain the use of endl and setw function.  $4 \times 2 = 8$

**UNIT-I**

2. Explain all the characteristics of object oriented programming in detail by giving examples. 8
3. Explain following and give examples for each :
  - (a) Member functions inside the class. 3
  - (b) Member functions outside the class. 3
  - (c) Nested classes. 2

1634/K/1064/1,650

P. T. O.

## UNIT-II

4. Define constructors and their purpose. Explain various types of constructors in detail available in C++. 8
5. Define and give examples for :
  - (a) Formatted I/O. 4
  - (b) Un-formatted I/O. 4

## UNIT-III

6. (a) What do you mean by dynamic memory management? Explain various operators available in C++ for managing memory. 4
- (b) Write a program which implements the concept of array of pointers to objects. 4
7. (a) Define friend class. How a friend class is created and used? Explain with suitable programming example. 5
- (b) Write a friend function to print largest of two numbers. 3

## UNIT-IV

8. (a) Define polymorphism. What do you mean by static polymorphism. 4
- (b) Write program for overloading area function to calculate area of circle, square and triangle in C++. 4
9. Define and explain :
  - (a) Inline function. 4
  - (b) Operator overloading. 4

Roll No. ....

Total Pages : 3

**GSM/M-22**

**1636**

**WEB DESIGNING USING ADVANCED TOOLS**

Paper-I

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note :** Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

**Compulsory Question**

1. (a) What is CSS?
- (b) What is the difference between static and dynamic HTML?
- (c) Why XML is used?
- (d) What is a Flow object?
- (e) State whether JavaScript is a client-side language or server-side language.
- (f) How can you generate a random number in JavaScript?
- (g) What is an associative array in JavaScript?
- (h) Discuss the syntax and purpose of for each in loop in JavaScript.  
8×1=8

**UNIT-I**

2. (a) How document linking and embedding of CSS is done in HTML? Explain.  
4

1636/K/1066/50

P. T. O.

(b) What do you understand by style sheet? How can you create such sheets? Explain with suitable examples. 4

3. Write short notes on the following w.r.t. CSS :

(a) Adding sounds

(b) Mouseovers.

8

## UNIT-II

4. (a) What is XML? What are its major features? How it is compatible with others? Discuss. 4

(b) Explain structure of XML using suitable examples. 4

5. How can you work with (i) Text, (ii) Font, (iii) Color, (iv) Background properties in XML? Explain using suitable examples. 8

## UNIT-III

6. (a) Discuss the major features of Java Script. 4

(b) Describe various data type and variables using JavaScript. 4

7. Explain the purpose of following functions in JavaScript :

(i) substring ()

(ii) concat()

(iii) setTimeOut()

(iv) parseInt()

(v) eval()

(vi) cell()

(vii) floor ()

(viii) setInterval().

8

## UNIT-IV

8. Describe the various pre-defined objects in JavaScript with the help of suitable examples. 8

9. Explain following in detail :

(i) Java Server Pages

(ii) Event Handling in Java.

8

Roll No. ....

Total Pages : 2

**GSM/M-22**

**1637**

## **PROGRAMMING IN VISUAL BASIC**

Paper-II

Time Allowed : 3 Hours]

[Maximum Marks : 40

**Note** : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. **1** is compulsory. All questions carry equal marks.

### **Compulsory Question**

1. (a) Define the modes of VB application.
- (b) Explain predefined dialog boxes.
- (c) What is the function of command button controls in VB?
- (d) What is event handler? How is it related to subroutines?  
 $2 \times 4 = 8$

### **UNIT-I**

2. What do you mean by Event Driven programming? Explain with examples. 8
3. Define visual basic IDE and also define its components. 8

### **UNIT-II**

4. Explain the various controls for I/O in VB. 8
5. Design an application. to display the working of calculator. 8

**1637/K/1067/50**

**P. T. O.**

### UNIT-III

6. Explain various decision statements with their syntax and give examples. 8
7. Explain collection with its methods and properties with the help of examples. 8

### UNIT-IV

8. How many types of functions are in VB? What are the built in functions? Describe three each, mathematical, string and date and time functions with syntax and examples. 8
9. Explain with an example use of optional argument and use of naming argument in procedure. 8

Roll No. ....

Total Pages : 2

GSM/M-22

1650

**HINDI (COMPULSORY)**

Time Allowed : 3 Hours]

[Maximum Marks : 40

नोट: सभी प्रश्न अनिवार्य हैं।

1. निम्नलिखित में से किन्हीं दो गद्यांशों की सप्रसंग व्याख्या कीजिए:

6×2=12

(क) इससे ज्यादा और क्या खराब होगी, जीनत! जब हम मौत के दरवाजे पर खड़े होकर दस्तक दे रहे हैं। चाहे जब खुल जाए! और आलमगीर के लिए जल्द ही खुलेगा। देर नहीं हो सकती। मौत भी जरूरी होगी कि देर हो जाने से कहीं आलमगीर सजा न दें।

(ख) तुम्हीं ने तो कहा था कि जरा ठीक-ठाक करके नीचे आना। आजकल तो लड़की कितनी ही सुंदर हो, बिना टीमटाम के भला कौन पूछता है? इसी मारे मैंने तो पोंडर-बौंडर उसके सामने रखा था। पर उसे तोइन चीजों से न जाने किस जनम की नफरत है। मेरा कहना कि आंचुल से मुँह लपेटकर लेट गई।

(ग) मैं जानता था, तुम वहाँ नहीं जा सकोगी और जाने से भी क्या होता है। जब तक तुम नीची श्रेणी की विजातीय भाभी को घर नहीं ला सकती, तब तक प्रेम और ममता की दुहाई व्यर्थ है। तुम सब निर्मम हो, निर्मम.....

(घ) केवल इतना कहना कि निम्न स्तर की वृत्ति से छुटकारा पाने के लिए हमें प्रस्ताव यह पास करना चाहिए कि आज से हम कहीं भी, किसी भी रूप में अपने साथ

इस शब्द का प्रयोग नहीं करेंगे। इसलिए सबसे पहले हम अपनी संस्था का नाम बदलकर.....

2. मोहन राकेश अथवा जगदीश चन्द्र माथुर में से किसी एक एकांकीकार का साहित्यिक परिचय दीजिए। 6
3. निम्नलिखित में से किसी एक विषय पर निबंध लिखिए। 8  
(क) महिलाधिकार (ख) गांधी दर्शन  
(ग) आकाशवाणी (घ) जनसंख्या विस्फोट  
(ङ) विश्व-विख्यात वैज्ञानिक और उनके अविष्कार।
4. रजिस्ट्रार चौ. बंसीलाल यूनिवर्सिटी, भिवानी की ओर से प्राचार्य, राजकीय महाविद्यालय लोहारू को एक अर्द्धसरकारी पत्र लिखकर उनके द्वारा राजकीय महाविद्यालय में स्नातकोत्तर कक्षाएँ खोलने के बारे में की जा रही कार्यवाही के बारे में अवगत कराएँ। 9

#### अथवा

आपने क्वालिटि वुक सेन्टर, चण्डीगढ़ को अर्थशास्त्र विषय की पुस्तकें भेजने का आदेश दिया है, परन्तु पुस्तकें प्राप्त नहीं हुई, आप तार द्वारा सूचित कीजिए।

5. किन्हीं 16 शब्दों में से किन्हीं दस शब्दों के हिन्दी तकनीकी अर्थ लिखिए: 5

(i) Inlection	(ii) Inertia	(iii) Orbital
(iv) Meeting point	(v) Theorem	(vi) Nutrition
(vii) Thermoscope	(viii) Plasma	(ix) Radiation
(x) Physiology	(xi) Projectile	(xii) Index
(xiii) Nucleus	(xiv) Relic	(xv) Orbital
(xvi) Obtuse angle.		

2. ਕਿਸੇ ਇਕ ਕਹਾਣੀ ਦੀ ਸਾਹਿਤਕ ਆਲੋਚਨਾ ਕਰੋ:

- (i) ਅਦੰਬਰਲੀ ਜੋਤ
- (ii) ਸ਼ੇਸ਼ਨਾਗ
- (iii) ਗੋਈ।

3. ਆਪਣੇ ਮਿੱਤਰ ਨੂੰ ਘਰ ਵਿੱਚ ਹੋ ਰਹੇ ਜਗਰਾਤੇ ਵਿੱਚ ਪਹੁੰਚਨ ਦੀ ਖੋਜਲ ਬਾਰੇ ਪੱਤਰ ਲਿਖੋ।

ਜਾਂ

ਆਪਣੇ ਮਿੱਤਰ ਨੂੰ ਉਸ ਦੀ ਮਾਤਾ ਜੀ ਦੇ ਸੁਰਗਵਾਸ ਹੋ ਜਾਣ 'ਤੇ ਉਸ ਨੂੰ ਹੋਸ਼ਲਾ ਦੇਣ ਤੇ ਅਫਸੋਸ ਕਰਨ ਲਈ ਪੱਤਰ ਲਿਖੋ।

4. ਹੇਠ ਲਿਖੇ ਸ਼ਬਦਾਂ ਵਿੱਚੋਂ ਦਸ ਸ਼ਬਦਾਂ ਦਾ ਪੰਜਾਬੀ ਵਿੱਚ ਅਨੁਵਾਦ ਕਰੋ:

ਲੇਖਾਕਾਰ, ਸਹਾਯਤਾ, ਵਾਜ਼ਰੀ, ਪ੍ਰਾਰਥਨਾ, ਸਕੂਲ, ਹਿੰਮਾਭ, ਕਲੰਕ, ਜਾਨ, ਬਕਾਯਾ, ਲੇਖਾ ਅਧਿਐਨਕ, ਦਿਵਾਡੀਦਾਰ, ਨਿਥਿ, ਗੁਪਤ।

5. ਹੇਠ ਲਿਖੇ ਸ਼ਬਦਾਂ ਵਿੱਚੋਂ ਦਸ ਸ਼ਬਦਾਂ ਤੇ ਵਿਪਰੀਤ ਸ਼ਬਦ ਲਿਖੋ:

ਪਾਪੀ, ਮਿੱਤਰ, ਨਵਾਂ, ਹਨੇਰਾ, ਪੂਰਾ ਹਾਜਰ, ਖੱਟਾ, ਬੁਰਾ, ਗਿੱਲਾ, ਰਾਤ, ਕੱਚਾ, ਕੁੜੀ, ਖਾਣੀ, ਕੌੜਾ, ਸੱਚ।

6. ਹੇਠ ਲਿਖੇ ਅੰਗ੍ਰੇਜੀ ਸ਼ਬਦਾਂ ਵਿੱਚੋਂ ਦਸ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਕਰੋ:

Action, Advance, Amount, Attendance, Arrears, Annual, Cashier, Book post, Audit, Claim, Damage, Compliance, Eligible, Evaluation, Document.

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**1651**

**PUNJABI COMPLESSORY**

Time Allowed : 3 Hours]

[Maximum Marks : 40

**ਨੋਟ:** ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹਨ।

1. ਹੇਠ ਲਿਖੇ ਕਾਵਿ ਟੋਟਿਆਂ ਵਿੱਚੋਂ ਦੋ ਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ ਕਰੋ: 5.5

(ੳ) ਮਨ ਕੰਚਰ ਮਕਮਤ ਮਰੈ ਤਿਉ ਮਾਰੀਐ॥

ਕਾਮ ਕਲੰਕ ਕਲੇਸ਼ ਟਰੈ ਤਿਉ ਟਾਰੀਐ॥

ਸਾਧ ਜਨਾ ਸਿਉਂ ਪ੍ਰੀਤ ਪਲੈ ਤਿਉ ਪਾਲੀਐ॥

ਬਾਜੀਜਾਂ ਰਾਮ ਭਜਨ ਸਿਉਂ ਕਰੇ ਗਲੈ ਤਿਉ ਗਾਲੀਐ॥

(ਅ) ਕੁਰੇ ਸ਼ਰ੍ਹਾਂ ਦੇ ਮਾਰ ਉਧੇੜ ਕੇਸਾਂ।

ਰਗ ਉਮਰ ਖਿਤਾਬ ਦਾ ਨਿਆਉਂ ਹੀਰੇ।

ਘੱਤ ਕੱਥਾ ਕੇ ਵਿੱਚ ਮੈਂ ਸਾੜ ਸੁੱਟਾਂ,

ਤੈਨੂੰ ਵੇਖਕੇ ਪਿੰਡ ਗਗਉਂ ਹੀਰੇ।

(ੲ) ਹੇ ਹਾਰ ਸਿੰਗਾਰ ਸਭ ਪਹਿਰ ਕੇ ਜੀ,

ਪੂਰਨ ਨਾਲ ਮਹੂਰਤਾਂ ਬਾਹਰ ਆਇਆ।

ਕੱਢ ਭੈਰਉਂ ਬਾਘ ਦਾ ਪੈਰ ਤਾਜੀ,

ਨਿਗ੍ਹਾ ਰੋਖ ਕੇ ਵਿੱਚ ਬਾਜ਼ਾਰ ਕਾਇਆ।

(ਸ) ਪਿੱਛੇ ਇੱਕ ਸਰਕਾਰ ਕੇ ਖੇੜ ਚਲੀ,

ਪਈ ਨਿੱਤ ਹੁੰਦੀ ਮਾਰੇ ਮਾਰ ਮੀਆ।

ਸਿੰਘ ਮਾਰ ਸਰਕਾਰਾਂ ਦਾ ਨਾਮ ਕੀਤਾ,

ਸੱਭੇ ਕਤਲ ਹੋਏ ਵਾਰੇ ਵਾਰ ਮੀਆਂ।

2. ਕਿਸੇ ਇਕ ਕਹਾਣੀ ਦੀ ਸਾਹਿਤਕ ਆਲੋਚਨਾ ਕਰੋ: 10

(i) ਅਦਰਲੀ ਜੋਤ

(ii) ਸ਼ੇਸ਼ਨਾਗ

(iii) ਗੋਈ।

3. ਆਪਣੇ ਮਿੱਤਰ ਨੂੰ ਘਰ ਵਿੱਚ ਹੋ ਰਹੇ ਜਗਰਾਏ ਵਿੱਚ ਪਹੁੰਚਨ ਦੀ ਖੋਜਲ ਬਾਰੇ ਪੱਤਰ ਲਿਖੋ।

ਜਾਂ

ਆਪਣੇ ਮਿੱਤਰ ਨੂੰ ਉਸ ਦੀ ਮਾਤਾ ਜੀ ਦੇ ਸੁਗਵਾਸ ਹੋ ਜਾਣ 'ਤੇ ਉਸ ਨੂੰ ਹੋਸ਼ਿਆ ਦੇਣ ਤੇ ਅਫਸੋਸ ਕਰਨ ਲਈ ਪੱਤਰ ਲਿਖੋ। 5

4. ਹੇਠ ਲਿਖੇ ਸ਼ਬਦਾਂ ਵਿੱਚੋਂ ਦਸ ਸ਼ਬਦਾਂ ਦਾ ਪੰਜਾਬੀ ਵਿੱਚ ਅਨੁਵਾਦ ਕਰੋ: 5

ਲੇਖਾਕਾਰ, ਸਹਾਯਾ, ਫਾਜ਼ਰੀ, ਪ੍ਰਾਰਥਨਾ, ਸਕੂਲ, ਹਿੰਮਾਭ, ਕਲੰਕ, ਨਗਦ, ਕਾਕਾਧਾ, ਲੇਖਾ ਅਚਾਨਕ, ਬਿਛਾਡੀਦਾਰ, ਗਿੱਥ, ਗੁਫਾ।

5. ਹੇਠ ਲਿਖੇ ਸ਼ਬਦਾਂ ਵਿੱਚੋਂ ਦਸ ਸ਼ਬਦਾਂ ਤੇ ਵਿਪਰੀਤ ਸ਼ਬਦ ਲਿਖੋ:

ਪਾਪੀ, ਮਿੱਤਰ, ਨਵਾਂ, ਹਨੇਰਾ, ਪੂਰਾ ਹਾਜਰ, ਖੱਟਾ, ਬੁਰਾ, ਗਿੱਲਾ, ਰਾਤ, ਕੱਚਾ, ਕੁੜੀ, ਖਾਣੀ, ਕੋੜਾ, ਸੱਚ। 5

6. ਹੇਠ ਲਿਖੇ ਅੰਗ੍ਰੇਜੀ ਸ਼ਬਦਾਂ ਵਿੱਚੋਂ ਦਸ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਕਰੋ: 5

Action. Advance. Amount. Attendance. Arrears. Annual. Cashier. Book post. Audit. Claim. Damage. Compliance. Eligible. Evaluation. Document.

Roll No. ....

Total Pages : 3

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1652

**SANSKRIT (COMPULSORY)**

Time Allowed : 3 Hours]

[Maximum Marks : 40

नोट: सभी प्रश्न अनिवार्य हैं।

1. निम्नलिखित प्रश्नों के उत्तर दीजिए:

4×2=8

(क) 'दण्डः शार्पस प्रज्ञाः मर्माः' पाठ मूल रूप से किस ग्रन्थ से लिया गया है? इसके रचयिता का नाम लिखिए।

(ख) 'नाऽशिष्यायोपदिश्यते' पाठ किस मूल ग्रन्थ से संकलित है? इसके लेखक कौन हैं?

(ग) 'अच् सन्धि' का अन्य नाम बताकर एक उदाहरण दीजिए।

(घ) 'पठामि' पद में कौन-सा लकार तथा वचन है?

2. निम्नलिखित श्लोकों में से किन्हीं दो श्लोकों का सरलार्थ लिखिए:  
4×2=8

(क) नाधनो धर्मकृत्यानि यथावदनुतिष्ठति।

धनाद्धि धर्मः स्रवति शैलादपि नदी यथा॥

(ख) प्रजहाति यदा कामास्र्वात्म्यार्थं मनोगतान्।

आत्मन्येवात्मना तुष्टः स्थितप्रज्ञस्तदेच्यते॥

(ग) केनाऽमृतमिदं सृष्टं मित्रमित्यक्षरद्वयम्।

आपदां च परित्राणं शोक-सन्ताप भेषजम्॥

(घ) दुर्जनस्य च सर्पस्य वरं सर्पो न दुर्जनः।

सर्पः दशति काले तु दुर्जनस्तु पदे पदे।।

3. निम्नलिखित गद्यांशों में से किन्हीं दो का सरलार्थ कीजिए:

4×2=8

(क) अस्ति वाराणस्यां कर्पूरपटको नाम रजकः। स राज्ञौ गाढनिद्रयां प्रसुप्तः। तदनन्तरं तद्गृहद्रव्याणि हर्तुं चौरः प्रविष्टः। तस्य प्राङ्गणे गर्दभो व्यद्धिस्तिष्ठति।

(ख) चटका प्राह-अस्त्वेतत्। परं दुष्टगजेन मदात्मम सन्तानक्षयः कृतः। तद्यदि मम त्वं सुहृदसत्यस्तदस्य गजापसदस्य कोऽपि वधोपायश्चिन्तयताम्, यस्यानुष्ठानेन मे सन्ततिनाशदुःखमपसरति। काष्ठकूट आह-भगवति! सत्यमभिहितं भवत्या।

(ग) अस्त्युज्जयिनीवर्त्मप्रान्तरे प्लक्षतरुः। तत्र हंस काकौ निवसतः। कदाचिद् ग्रीष्मसमये परिश्रान्तः करिचत्पथिकस्तत्र तरतले धनुष्काण्डं संनिधाय सुप्तः। तत्र क्षणान्तरे तन्मुखाद् बृहच्छायाऽपगता।

(घ) अस्ति कस्मिंश्चित्पर्वतैकदेशे वानरयूथम्। तच्च कदाचिद् हेमन्तसमयेऽतिकठोर-वातसंस्पर्श-वेपमान-कलेवरं तुषार-वर्षोद्धत-प्रवर्ष-धन-धरा-निपात-समाहतं न कथंचिच्छान्तिमगमत्।

4. निम्नलिखित धातुओं में से किन्हीं दो धातुओं के यथानिर्दिष्ट लकारों में रूप लिखिए:

4×2=8

(क) √ भू-लट् लकार

(ख) √ कृ-लङ् लकार

(ग) √ पठ्-लृट् लकार

(घ) √ गम्-लट् लकार।

5. निम्नलिखित पदों में से किन्हीं चार का सन्धि अथवा सन्धि-विच्छेद कीजिए:

4×2=8

(क) दिन + अंकः

(ख) विद्या + अर्थी

(ग) प्र + एजते

(घ) हरे + अत्र

(ङ) शिष्टाचारः

(च) प्रतीक्षा

(छ) साधू एतौ

(ज) कोऽपि

9. Write short notes on the following :

- (a) Storage of vegetables
- (b) Radiation.
- (c) रसायनिक द्रव्यों पर सूर्य की विकिरणों का लिखिए :
- (d) रसायनों का भंडारण
- (e) विकिरण ।

Roll No. ....

Total Pages : 04

**GSM/M-22**

**1809**

## APPLIED AND COMMUNITY NUTRITION

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से कम से कम एक प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

### Compulsory Question

( अनिवार्य प्रश्न )

1. (i) Write short answers of the following :

- (a) Odema
  - (b) Difference between height and length
  - (c) Freeze drying
  - (d) Name *two* chemical preservatives
- निम्नलिखित के संक्षिप्त उत्तर लिखिए :
- (अ) एडिमा
  - (ब) ऊँचाई और लंबाई के बीच अंतर
  - (स) फ्रीज सुखाने
  - (द) दो रासायनिक परिरक्षकों के नाम दीजिए ।
- (ii) Fill in the blanks :
- (e) Formula for BMI = .....

- (f) Name the vegetable which is from microbial origin .....
- (g) While pickling, food is preserved with the help of ....., ....., .....
- (h) ..... is a common adulterant found in black pepper.
- रिक्त स्थान भरिए :
- (इ) बी.एम.आई. के लिए सूत्र = ..... ।
- (फ) उस सब्जी का नाम बताइए जो माइक्रोबियल मूल से है ..... ।
- (ग) अचार बनाने समय अचार को ....., ....., ..... की सहायता से परिरक्षित किया जाता है ।
- (ह) ..... काली मिर्च में पाया जाने वाला एक सामान्य मिलावट है ।

### Unit I ( इकाई I )

- How can you assess the nutritional status of a community by using dietary assessment technique ?  
आहार मूल्यांकन तकनीक का उपयोग करके आप किसी समुदाय की पोषण स्थिति का आकलन कैसे कर सकते हैं ?
- Discuss the causes, symptoms, dietary modification and prevention of Vitamin A deficiency disorders.  
विटामिन ए की कमी से होने वाले विकारों के कारणों, लक्षणों, आहार संशोधन और रोकथाम की चर्चा कीजिए ।

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- Describe various types of microorganisms and the harmful effects on food.  
विभिन्न प्रकार के सूक्ष्मजीवों और भोजन पर उनके हानिकारक प्रभावों का वर्णन कीजिए ।
- Write short notes on the following :  
(a) Vitamin B12 deficiency anaemia  
(b) Beneficial effects of yeast.  
निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :  
(अ) विटामिन B12 की कमी से होने वाला रक्ताल्पता  
(ब) यीस्ट के लाभकारी प्रभाव ।

### Unit II ( इकाई II )

- Why is it important to preserve the food ? Describe the various methods by using high temperatures.  
भोजन को संरक्षित करना क्यों महत्वपूर्ण है ? उच्च तापों का उपयोग करते हुए इसकी विभिन्न विधियों का वर्णन कीजिए ।
- Explain common adulterants present in cereals, pulses and spices. How can you identify them ?  
अनाजों, दालों और मसालों में पाए जाने वाले सामान्य मिलावटियों का समझाइए । आप उन्हें कैसे पहचान सकते हैं ?
- Describe various causes of food spoilage ? How can we prevent it ?

भोजन खराब होने के विभिन्न कारणों का वर्णन कीजिए । हम इसे कैसे रोक सकते हैं ?

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P.T.O.

Roll No. ....

Total Pages : 03

**GSM/M-22 1810**

## **APPAREL DESIGNING AND SELECTION**

**Paper 212**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

### **Compulsory Question ( अनिवार्य प्रश्न )**

1. Write about the following :

2×4=8

- (a) Renovation
- (b) Importance of clothing
- (c) Proportion
- (d) Texture.

निम्नलिखित के बारे में लिखिए :

- (अ) नवीनीकरण
- (ब) कपड़ों का महत्त्व
- (स) अनुपात
- (द) विन्यास ।

## Unit I (इकाई I)

2. Give the comparison of home made, tailor made and readymade garments in detail. 8  
घर के सिले, दर्जी द्वारा निर्मित तथा रेडीमेड वस्त्रों की तुलना कीजिए ।
3. Write about the care of clothing in detail. 8  
वस्त्रों की सुरक्षा के बारे में विस्तार से लिखिए ।
4. What are the various factors that should be considered in the selection of clothing for children ? Explain. 8  
बच्चों के लिए वस्त्र खरीदते समय किन-किन तत्वों का ध्यान रखना चाहिए ? वर्णन कीजिए ।
5. Write about the clothing requirements of an adult female. 8  
एक वयस्क महिला के लिए पहनावे संबंधी आवश्यकताओं के बारे में लिखिए ।

## Unit II (इकाई II)

6. Write in detail about the various principles of design in relation to clothing. 8  
वस्त्रों से संबंधित डिजाइन के विभिन्न सिद्धांतों के बारे में विस्तार से लिखिए ।
7. Explain different colour schemes with colour wheel and relate it with your clothing. 8  
रंग चक्र की सहायता से विभिन्न रंग संयोजनों का वर्णन कीजिए । इन रंग संयोजनों का अपने वस्त्रों की डिजाइनिंग में किस प्रकार प्रयोग कर सकते हैं ?

L-1810

2

8. What is Texture Analysis ? Write its uses in relation to search, occasion and figure. 8  
गठन विश्लेषण क्या होता है ? मौसम, अवसर तथा आकृति संबंध में इसके उपयोग बताइए ।
9. How the proper use of lines in dress can improve the personality of a person ? 8  
वस्त्र निर्माण में लाइनों का प्रयोग किस प्रकार व्यक्तित्व के विकास में निखार ला सकता है ?

(3-05/4) L-1810

3

Roll No. ....

Total Pages : 03

**GSM/M-22**

**1811**

**CHILDHOOD AND ADOLESCENT  
DEVELOPMENT**

Paper : 213

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

**Compulsory Question ( अनिवार्य प्रश्न )**

I. (i) Joy

खुश होना

(ii) Pre-operational stage

पूर्व-सक्रियात्मक अवस्था

(iii) Hand skills

हाथ के कौशल

(iv) Bed wetting

बिस्तर गीला करना ।

2×4=8

(S-25/12)L-1811

P.T.O.

## Unit I (इकाई I)

2. Describe motor development during infancy and childhood. 8  
नवजात काल तथा बाल्यावस्था में क्रियात्मक विकास को समझाइए ।
3. What are the common emotions during childhood ? 8  
Discuss any *three* emotions in detail.  
बाल्यावस्था में कौनसे सामान्य संवेग हैं ? किन्हीं तीन को विस्तारपूर्वक चर्चा कीजिए ।
4. Discuss Piaget's theory of cognitive development. 8  
पियाजे के संज्ञानात्मक विकास सिद्धांत की चर्चा कीजिए ।
5. Write about Kohlberg's moral development theory. 8  
कोह्लबर्ग द्वारा बताए गए नैतिक विकास सिद्धांत की चर्चा कीजिए ।

## Unit II (इकाई II)

6. What do you understand by speech disorder ? Discuss some speech defects. 8  
वाणी विकार से आप क्या समझते हैं ? कुछ सामान्य वाणी विकारों की चर्चा कीजिए ।
7. Describe the importance and types of play. 8  
खेलों के महत्व व प्रकारों को विस्तार से समझाइए ।

8. Discuss common behavioural problems and their remedies 8  
सामान्य समस्यात्मक व्यवहारों और उनके उपचार की चर्चा कीजिए ।

9. What is the role of family and community in socialization of the child ? 8  
बच्चों के समाजीकरण में परिवार और समाज की क्या भूमिका है ?

#### Unit IV (इकाई IV)

8. Describe in detail in 'role of consumer in market'. 8  
'बाजार में उपभोक्ता की भूमिका' विस्तार से लिखिए ।
9. What do you mean by saving and investment ? What are the different types of savings and investment pattern ? 8  
बचत और निवेश से आप क्या समझते हैं ? विभिन्न प्रकार के बचत और निवेश पैटर्न कौन-कौनसे हैं ?

Roll No. ....

Total Pages : 06

GSM/M-22

1812

#### FAMILY RESOURCE MANAGEMENT

Paper : II (214)

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt Five questions in all, selecting one question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से एक प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

#### Compulsory Question (अनिवार्य प्रश्न)

1. Choose the correct option :

1×8=8

सही विकल्प चुनिए :

(a) Income from all sources is called :

- (i) Psychic income
  - (ii) Money income
  - (iii) Real income
- सभी साधनों से प्राप्त आय को कहते हैं :
- (i) मनोवैज्ञानिक आय
  - (ii) मौद्रिक आय
  - (iii) वास्तविक आय

(b) Best work curve is :

- (i) When our body is cool
- (ii) Body is hot
- (iii) No effect of these

सबसे अच्छा कार्य का मोड़ कब होता है ?

- (i) जब शरीर ठंडा होता है
- (ii) गर्म होता है
- (iii) इससे कोई प्रभाव नहीं होता

(c) When rest period is too long ?

- (i) Muscles becomes in active
- (ii) Muscles become active
- (iii) No effect on body

विश्राम काल अधिक लम्बा होने से क्या होता है ?

- (i) माँसपेशियाँ सुस्त हो जाती हैं
- (ii) चुस्ती बनी रहती है
- (iii) कोई प्रभाव नहीं होता

(d) What is the energy cost of light work in cal/min ?

- (i) 2-3.5
- (ii) 0.5 to 1
- (iii) 1.4-2.0

हल्के कार्यों का ऊर्जा मूल्य प्रायः कितनी कैलरी प्रति मिनट के बीच होता है ?

- (i) 2-3.5
- (ii) 0.5 से 1
- (iii) 1.4-2.0

(e) What happens to energy and time in work simplification ?

- (i) Saves time and energy
- (ii) Waste time and energy
- (iii) No effect

कार्य सरलीकरण से समय और शक्ति क क्या होता है ?

- (i) बचत होती है
- (ii) अपव्यय होता है
- (iii) कोई प्रभाव नहीं होता

(f) Estimation of expenditure according to income is called :

- (i) Budget
- (ii) Debit
- (iii) Evaluation

आय के अनुसार पहले ही व्यय का अनुमान लगा लेने को कहते हैं :

- (i) बजट
- (ii) डेबिट
- (iii) मूल्यांकन

(g) What is standardization mark on pressure cooker ?

- (i) AFPO
- (ii) ISI
- (iii) Agmark

प्रेसर कुकर पर कौनसा मानक चिह्न लगाया जाता है ?

- (i) ए.एफ.पी.ओ.
- (ii) आई.एस.आई.
- (iii) एगमार्क

(h) Standardized marks shows :

- (i) Good quality
- (ii) Costly products
- (iii) Cheap products.

मानकीकृत चिह्न निम्न बात के प्रतीक हैं :

- (i) उत्तम गुणवत्ता
- (ii) महँगे होने के
- (iii) सस्ते होने के ।

### Unit I (इकाई I)

2. What is time management ? Explain the need of time management in detail.

समय व्यवस्थापन से क्या अभिप्राय है ? समय व्यवस्थापन करने की क्या आवश्यकता है ? 8

3. Write short notes on the following :

2×4=8

- (a) Work curves
- (b) Peak load
- (c) Evaluation of time plan
- (d) Rest period.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

- (अ) कार्य मोड़
- (ब) अत्यधिक कार्यभार
- (स) समय व्यवस्था का मूल्यांकन
- (द) विश्राम काल ।

### Unit II (इकाई II)

4. What do you mean by Energy ? Explain the energy demands during different stages of family life-cycle.

ऊर्जा किसे कहते हैं ? विभिन्न पारिवारिक चक्र की अवस्थाओं में ऊर्जा की जरूरतों का विवरण दीजिए । 8

5. Explain various types of efforts in detail.

कार्य सरलीकरण में विभिन्न प्रयासों का उल्लेख कीजिए । 8

### Unit III (इकाई III)

6. Define the following :

2×4=8

- (a) Money Management
- (b) Budget
- (c) Income
- (d) Savings.

निम्नलिखित को परिभाषित कीजिए :

- (अ) धन व्यवस्थापन
- (ब) बजट
- (स) आय
- (द) बचत ।

7. Explain in detail various types of expenditure and factors affecting family expenditure.

8

व्यय के प्रकार कौन-कौनसे हैं तथा पारिवारिक व्यय को प्रभावित करने वाले कारकों के बारे में लिखिए ।

Roll No. ....

Total Pages : 03

**GSM/M-22 1813**

**COMMUNITY DEVELOPMENT AND  
EXTENSION EDUCATION-II**

Paper : 215

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

**Compulsory Question ( अनिवार्य प्रश्न )**

1. Explain each only 4-5 lines :

4×2=8

- (i) Community' Development
  - (ii) Critical Analysis
  - (iii) Non-projected Aids
  - (iv) Objectives of Extension Education.
- प्रत्येक की केवल 4-5 पंक्तियों में व्याख्या कीजिए :
- (i) सामुदायिक विकास
  - (ii) जटिल विश्लेषण
  - (iii) नॉन-प्रोजेक्टेड एड्स
  - (iv) प्रसार (विस्तार) शिक्षा के उद्देश्य ।

## Unit I (इकाई I)

2. Define Community Development. Explain their purpose and goals in detail. 8  
सामुदायिक विकास को परिभाषित कीजिए । इसके उद्देश्यों तथा लक्ष्यों की व्याख्या कीजिए ।
3. Explain Community Development Programmes in India in detail. 8  
भारत में सामुदायिक विकास प्रयोजना का विस्तार से वर्णन कीजिए ।
4. Explain the classification of audio-visual aids and its importance. 8  
दूरय-श्रव्य उपकरणों का वर्गीकरण कीजिए तथा इसकी विशेषताओं का वर्णन कीजिए ।
5. Differentiate between projected and non-projected aids. 8  
प्रोजेक्टेड तथा नॉन-प्रोजेक्टेड उपकरणों में क्या अन्तर है ?

## Unit II (इकाई II)

6. What do you mean by Extension Education ? Explain its principles in detail. 8  
प्रसार शिक्षा से आप क्या समझते हैं ? इसके सिद्धान्तों का विस्तार से वर्णन कीजिए ।
7. Explain the qualities of a good extension worker in extension education. 8  
प्रसार शिक्षा के एक अच्छे प्रसार (विस्तार) कार्यकर्ता के गुणों की व्याख्या कीजिए ।

8. What is the role of Home Scientists in Community Development ? Explain in detail. 8  
गृह वैज्ञानिकों की सामुदायिक विकास में क्या भूमिका है ? विस्तार से व्याख्या कीजिए ।
9. What is the meaning of programme planning ? Explain its importance in detail. 8  
कार्यक्रम प्रयोजना का क्या अर्थ है ? इसकी विशेषताओं की विस्तार से व्याख्या कीजिए ।

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Total Pages : 03

**GSM/M-22**

**1814**

## INTRODUCTORY PHYSICS

216

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory.  
प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है ।

### Compulsory Question ( अनिवार्य प्रश्न )

1. (a) What is Capillary Action ?  
केशिका क्रिया क्या है ?
- (b) What is the cause of atmospheric pressure ?  
वायुमंडलीय दबाव का कारण क्या है ?
- (c) How reverberations occur ?  
प्रतिध्वनि कैसे होती है ?
- (d) What are the disadvantages of an incandescent bulb ?  
एक गरमगरम बल्ब के नुकसान क्या हैं ?

### Unit I ( इकाई I )

2. (a) What is Archimedes principle and how is it useful ?

4

आर्किमिडीज सिद्धांत क्या है और यह कैसे उपयोगी है ?

(2-04/7) L-1814(TR)

P.T.O.

- (b) Explain the construction and working of a commercial barometer. 4  
 एक वाणिज्यिक बैरोमीटर के निर्माण और कार्य की व्याख्या कीजिए ।
3. (a) Explain hardness of solids. How one can measure the hardness practically ? 4  
 दोसों की कठोरता को व्याख्या कीजिए । व्यावहारिक रूप से कठोरता को कोई कैसे माप सकता है ?
- (b) Describe MKS units system. 4  
 एम.के.एस. इकाई प्रणाली का वर्णन कीजिए ।
4. Explain the principle, construction and working of scissors and egg beater. 8  
 कैंची और एग बीटर के सिद्धांत, निर्माण और कार्यप्रणाली की व्याख्या कीजिए ।
5. What are centripetal and centrifugal forces ? Explain the operation of spin dryer in a washing machine. 8  
 अभिकेन्द्री और अपकेन्द्री बल क्या हैं ? वॉशिंग मशीन में स्पिन ड्रायर के संचालन की व्याख्या कीजिए ।

## Unit II (इकाई II)

6. (a) Explain humidity and relative humidity. How these physical quantities can be measured ? 4  
 आर्द्रता और सापेक्ष आर्द्रता की व्याख्या कीजिए । इन भौतिक राशियों को कैसे माप जा सकता है ?

- (b) Describe the operation of a vacuum coffee maker. 4  
 वैक्यूम कॉफी मेकर के संचालन का वर्णन कीजिए ।
7. Define wavelength, frequency and amplitude phase and establish a relationship among them. 8  
 तरंग दैर्घ्य, आवृत्ति और आयाम चरण को परिभाषित कीजिए और उनके बीच संबंध स्थापित कीजिए ।

8. Describe the operation of ac and dc generators. 8  
 एसी और डीसी जनरेटर के संचालन का वर्णन कीजिए ।
9. (a) Explain the role of a fuse in electric appliances. 4  
 What should be features of a good fuse ? With what materials a commercial fuse is made of ?  
 बिजली के उपकरणों में फ्यूज की भूमिका की व्याख्या कीजिए । एक अच्छे फ्यूज की विशेषताएँ क्या होनी चाहिए ? व्यावसायिक फ्यूज किस सामग्री से बना होता है ?
- (b) What do you understand by conservation of energy and why it is needed ? 4  
 ऊर्जा के संरक्षण से आप क्या समझते हैं और इसकी आवश्यकता क्यों है ?

Roll No. ....

Total Pages : 03

**BSIT/M-22      26100**

**DIGITAL ELECTRONICS-III**

**BSIT-401**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) Differentiate between Asynchronous and Synchronous Counter.
- (b) What are shift registers ? Enlist various applications of shift registers.
- (c) State the difference between PROM and EPROM.
- (d) Define the terms :
  - (i) Resolution
  - (ii) Monotonicity.

**2×4=8**

**Unit I**

1. (a) Draw 4-bit Asynchronous counter and explain its working.
- (b) Discuss the procedure to design a synchronous counter.

**5+3**

3. (a) Design a 3 bit synchronous up down counter using JK flip-flop.

(b) Discuss any *two* applications of counters in digital circuits. **5+3**

## Unit II

4. (a) Draw the circuit and discuss the working of SISO shift register taking suitable example.

(b) Design a sequence generator for the sequence 1101001 using D flip-flop. **4+4**

5. Explain the working of Bidirectional shift register. Elaborate the circuit with suitable example. **8**

## Unit III

6. (a) Define the following terms :

(i) Memory Cell

(ii) Address Line

(iii) Data Line

(iv) Access Time.

- (b) Briefly state the difference between :

(i) PROM and EPROM

(ii) Bipolar and MOS RAM. **4+4**

7. (a) Design a  $1\text{ K} \times 8$  bit memory chip using  $1\text{ K} \times 4$  chips.

(b) Differentiate between Static RAM and Dynamic RAM. **4+4**

## Unit IV

8. (a) Explain the working of R-2R ladder type DAC.

(b) For a 10 bit ADC, full scale input is 10 V. Find the resolution. **6+2**

9. (a) Discuss the working of dual slope Analog to digital converter. Enlist its advantages over single slope ADC.

- (b) Define the terms :

(i) Quantization error

(ii) Setting Time

(iii) Stability. **5+3**

Roll No. ....

Total Pages : 03

**BSIT/M-22      26101**

## **OSCILLATORS & MULTIVIBRATORS**

**BSIT-402**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

### **Compulsory Question**

1. (a) Why input offset voltage exist in Op-amps ?      2
- (b) Can a negative feedback amplifier work as oscillators ?      2
- (c) Give two Barkhausen conditions to get sustained oscillations.      2
- (d) What are the applications of 555 Timer ?      2

### **Unit I**

2. (a) Draw the circuit of Op-amp Integrator and indicate how to apply initial conditions. How offset voltage and bias current affect its performance ?      4

- (b) Explain with the help of circuit diagram, how op-amp can be used to multiply two signals ? 4
3. (a) Draw and discuss the circuit of Schmitt trigger. 4
- (b) Discuss 1st order (First order) low pass active filter using op-amp. 4

### Unit II

4. (a) Explain, how the input resistance of an amplifier increases with negative feedback ? 4
- (b) What do you mean by feedback ? List two types of feedback. Which type is used for linear applications and why ? 4

5. (a) Explain, how negative feedback in an amplifier helps in reducing the distortion and noise ? 4
- (b) An amplifier has an input resistance of 1 k $\Omega$  and output resistance of 10 k $\Omega$  and a voltage gain of 10,000. If a negative feedback of  $\beta = 0.02$  is applied to it, determine the input and output resistances of the amplifier. 4

### Unit III

6. Draw the circuit of Hartley Oscillator and explain its operation. Find the expression of frequency of oscillations. 8

7. Draw the circuit of RC phase shift oscillator and explain its working and calculate the frequency of oscillations. 8

### Unit IV

8. (a) The 555 timer as an astable multivibrator has  $R_1 = 10 \text{ k}\Omega$  and  $R_2 = 50 \text{ k}\Omega$  and  $C = 0.05 \mu\text{f}$ . Calculate the frequency and duty cycle. 3
- (b) Draw and explain the circuit of monostable multivibrator by using 555 timer. 5
9. Draw and discuss transistorized Astable Multivibrator. Derive the expression for its frequency. 8

Roll No. ....

Total Pages : 03

**BSIT/M-22                      26102**

**TELECOMMUNICATION AND  
NETWORKING-II**

**BSIT-403**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

**((Compulsory Question))**

1. (a) What is network and why network devices are important ? 2
- (b) What is Handoff in cellular network ? 2
- (c) Why fiber optic cable is preferred over co-axial cable for data transmission ? 2
- (d) What are the sources of attenuation in fiber optic cable ? 2

**Unit I**

2. Explain the following network devices : 2×4=8
  - (i) HUB
  - (ii) Bridge
  - (iii) Switch
  - (iv) Gateway.

3. Name the two different categories of transmission medium  
Explain in detail. 8

### Unit II

4. (a) How the call is set-up in cellular network ? Explain  
with diagram. 4
- (b) Explain IS-95 architecture in cellular system. 4
5. (a) What is frequency reuse in cellular network ? What  
are its advantages and disadvantages ? 4
- (b) Explain GSM architecture for mobile network. 4

### Unit III

6. Draw the basic block diagram of fiber optic  
communication system and what are the applications of  
fiber optics. 8

7. (a) How is the optical fiber cable constructed ? Explain. 4

- (b) What is critical angle in optical fiber ? Discuss the  
propagation of light in optical fiber. 4

### Unit IV

8. (a) What is attenuation in fiber optic cable and how  
can it be improved ? 4
- (b) Explain different layers used in fiber optic cable  
with diagram. 4

9. (a) Discuss different types of indexing of fiber optic  
cable. 4

- (b) Explain optical transmitter used in fiber optic  
communication. 4

Roll No. ....

Total Pages : 03

**BSIT/M-22                      26103**

**MICROPROCESSOR ARCHITECTURE AND  
PROGRAMMING-II**

**BSIT-404**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

**(Compulsory Question)**

1. (a) Identify port address using  $\overline{CS}$ ,  $A_0$  and  $A_1$ .  $\overline{CS}$  is enabled when the address line  $A_{15}$  is high.                      2
- (b) Discuss control word register format of 8254.                      2
- (c) What is the operating frequency of 8253 ?                      1
- (d) How many address lines and data line are available in 8086 ?                      1
- (e) Discuss TRAP flag and Direction flag of 8086.                      2

**Unit I**

2. (a) Design an interface of ADC 0801 with the 8085 microprocessor using memory mapped I/O scheme and the interrupt RST 6.5.                      4

(5-35/5) L-26103

P.T.O.

- (b) Discuss the control logic signals and circuit of 8255. 4
3. (a) Discuss various handshake signals exchanged between microprocessor and 8255 used as input configuration prior to data transfer in model. Write control word and status word. 4
- (b) Write a control word to configure PPI 8255 in mode 2, where port B is used as output port in model. 6

## Unit II

4. (a) Discuss the block diagram of 8253 in detail. 4
- (b) Explain 8253 operated in mode 0 i.e. interrupt on terminal count and where this mode is useful. 4
5. (a) Discuss 8253 to design as software triggered strobe and hardware triggered strobe with timing diagram. 4
- (b) Write a program to generate a 10 kHz square wave from counter 1. 6

## Unit III

6. (a) Discuss the different segment registers with their uses and explain pointer and index register of 8086. 4
- (b) Discuss the function of each pin of 8086 in minimum and maximum mode. 4

L-26103

2

7. (a) Calculate the effective physical address of 8086 for the following instructions : 4
- (i) MOV AX, 70H[BX][SI]  
(ii) MOV AX, [BX][SI].  
Where [BX] = 2000 H, [SI] = 1050 H, DS = 3000 H.
- (b) Explain the following instruction in 8086 : 4
- (i) DAA  
(ii) CMP  
(iii) DIV  
(iv) INC.

## Unit IV

8. (a) Discuss the machine code template for IN AL, 05 H instruction. 4
- (b) Discuss the following jump instructions : 4
- (i) JNBE  
(ii) JNLE  
(iii) JNGE  
(iv) JNAE.
9. (a) Discuss multiple IF-THEN-ELSE structure using flow chart and implement it in the assembly language program. 4
- (b) How is REPEAT-UNTIL different from WHILE-DO structure ? Explain with assembly language program. 4

(5-35/6) L-26103

3

150

Roll No. ....

Total Pages : 02

**BSIT/M-22**

**26104**

**OPERATING SYSTEM-II**

**BSIT-405**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**Compulsory Question**

1. Write short notes on the following :
  - (a) Dynamic Linking Libraries
  - (b) Virtual Address Space
  - (c) File Operations
  - (d) User Authentication.

4×2

**Unit I**

2. Write short notes on the following :

- (a) Hierarchical paging
- (b) Hashed Page Tables.

4×2

3. What are the advantages and disadvantages of variable partitioned memory management scheme over fixed partitioned memory management scheme ?

8

(2-32/3) L-26104

P.T.O.

## Unit II

4. Discuss the least recently used algorithm with example. 8
5. What is the cause of Thrashing ? How does the system detect Thrashing ? Once it detects Thrashing, what can the system do to eliminate this problem ? 8

## Unit III

6. Write short notes on the following :
  - (a) Single-level Directory
  - (b) Two-level Directory. 4×2=8
7. Contrast the performance of the three techniques for allocating disk blocks (contiguous, linked and indexed) for both sequential and random access files. 8

## Unit IV

8. Compare symmetric and asymmetric encryption schemes. 8
9. Discuss general model of protection called access matrix. 8

**Total Pages : 02**

BSIT/M-22 26105

## COMPUTER PROGRAMMING WITH C-II

BSIT-406

**Maximum Marks : 40**

**Note :** Attempt *Five* questions in all. Q. No. 1 is compulsory and *one* question from each Unit. All questions carry equal marks.

1. (a) What is meant by preprocessor directive ? 2
- (b) What is meant by command line arguments ? 2
- (c) How would you declare and define a pointer variable ? 2
- (d) Explain different file operations in C. 2

# Unit I

2. What is macro substitution ? Explain its types in detail.

3. Explain compiler control directives using suitable examples.

**(2-32/4) L-26105**

**P.T.O.**

## Unit II

4. Distinguish between the following :
- (a) & and \* operator 2
  - (b) actual and formal parameters 3
  - (c) local and global variables. 3
5. What is Recursion ? Write a program to print the Fibonacci series using recursive function. 8

## Unit III

6. What do you mean by a pointer ? Explain various operations that can be performed on pointer C using suitable example. 8
7. What is meant by structure and union ? How these are used in C. Explain in detail by writing suitable program for both. 8

## Unit IV

8. Explain various storage classes in C in detail. 8
9. Write a program to read and write the content of a file using file I/O functions. 8

# Unit IV

8. (a) Find the image of the infinite strip  $\frac{1}{2} < y < \frac{1}{2}$  under

the transformation  $w = \frac{1}{z}$ . Show the region

graphically.

- (b) Find the image of region inside the circle  $|z|=1$  under the mapping  $w = \frac{z-i}{z+i}$  for the values  $z = 1, i, -1$  onto  $w = L, O, -L$ .

9. (a) Show that cross ratio is invariant under Mobius transformation.

- (b) Find the image of  $|z| \leq 1$  in the  $z$ -plane under the transformation  $w(z+i)^2, z=1$

Roll No. ....

Total Pages : 04

**GSO/M-22 1742**

## REAL AND COMPLEX ANALYSIS BM-361

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

### Compulsory Question

1. (a) Express the following integral as Beta Function : 2

$$\int_0^2 x^3 (8-x^3)^{-1/3} dx$$

- (b) Prove that real and imaginary parts of an analytic function are Harmonic functions. 2

- (c) Find the image of  $|z-3i|=3$  under the mapping

$$w = \frac{1}{z}, \quad 2$$

- (d) State Parseval's identity for Fourier series. 2

### Unit I

2. (a) Show that the functions  $u = \frac{x}{y^2+z^2}, v = \frac{y}{z^2+x^2},$

$u = \frac{z}{x-y}$  are independent of one another. Also,

find the relation between them. 4

(b) Show that  $B(m, n) = \int_0^1 \frac{x^{m-1} + x^{n-1}}{(1+x)^{m+n}} dx$ ;  $m > 0$ ,  $n > 0$ . 4

3. (a) Evaluate  $\iint \sqrt{a^2 - x^2 - y^2} dx dy$  over the semi-circle  $x^2 + y^2 = ax$  in the positive quadrant. 4

(b) Using Dirichlet's theorem, find the volume bounded by the surface  $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^4}{c^4} = 1$ . 4

### Unit II

4. (a) Find the Fourier Series for the function  $f(x) = |\sin x|$ ;  $-\pi < x < \pi$ . 4

(b) Obtain the Fourier Series expansion of the function defined by :

$$f(x) = \begin{cases} 1 + \frac{2x}{\pi} & \text{if } -\pi \leq x \leq 0 \\ 1 - \frac{2x}{\pi} & \text{if } 0 \leq x \leq \pi \end{cases}$$

Hence deduce that  $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$ . 4

5. (a) Find the Fourier Series expansion of  $f(x) = x \sin x$  in the interval  $[-\pi, \pi]$ . Hence, deduce that :

$$\frac{\pi}{4} = \frac{1}{2} + \frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \dots 4$$

(b) Obtain  $f(x) = x$  as half range cosine series in  $0 < x < 2$ . 4

### Unit III

6. (a) Show that the function  $f(z) = |z|^2$  is continuous everywhere but nowhere differentiable except at origin. 4

(b) If  $f(z) = u + iv$  is an analytic function of  $z$ , find  $f(z)$  if  $u - v = (x - y)(x^2 + 4xy + y^2)$ . 4

7. (a) Show that the function :

$$f(z) = \begin{cases} \frac{(z)^2}{z} & ; z \neq 0 \\ 0 & ; z = 0 \end{cases}$$

is not differentiable at origin, although the CR equations are satisfied at that point. 4

(b) If  $f(z)$  is a regular function, prove that :

$$\left( \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} \right) \left\{ |f(z)|^2 \right\} = 4 |f'(z)|^2. 4$$

(a) Let  $W$  be a subspace of  $\mathbb{R}^4$  ( $\mathbb{R}$ ) generated by the vectors  $w_1 = (1, 2, 3, -2)$  and  $w_2 = (2, 4, 5, -1)$ . Obtain a basis for  $W$ . 4

(b) Let  $T$  be a linear Operator on a Unitary space  $V(\alpha)$ . Prove that  $T = 0$  iff  $\langle T(\alpha), \alpha \rangle = 0 \forall \alpha \in V$ . 4

Roll No. ....

Total Pages : 04

**GSQ/M-22 1743**

**MATHEMATICS**

**BM-362**

**Linear Algebra**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

**(Compulsory Question)**

1. (a) Define Vector Space Isomorphism. 1
- (b) Define null space of a Linear Transformation. 1
- (c) Define self-adjoint operator. 1

$\frac{V}{\|v\|}$  is always a unit vector. 2½

- (c) Show that any field forms a vector space over itself. 2½

**Unit I**

2. (a) Intersection of two sub-spaces  $W_1$  and  $W_2$  of vector space  $V(F)$  is also a sub-space of  $V(F)$ . 4
- (b) Union of two subspaces need not be a subspace. Prove or disprove. 4

1-1743

1

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P.T.O.

3. (a) Show that the set of three vectors  $(1, 0, 1)$ ,  $(0, 3, 1)$  and  $(-1, 0, 1)$  of  $V_3(Q)$  is linearly independent, where  $Q$  is the field of rational numbers.

- (b) A non-empty set  $W$  of a vector space  $V$  is a subspace of  $V$  iff  $au + bv \in W$ , whenever  $u, v \in W$ ,  $a, b \in F$ , where  $F$  is a field and  $0$  is the zero vector in  $F$ .

## Unit II

4. (a) Find a linear transformation which maps  $(1, 1, 1)$ ,  $(1, 1, 0)$ ,  $(1, 0, 0)$  in  $\mathbb{R}^3$  to  $(2, 1, 1)$ ,  $(2, 1)$  in  $\mathbb{R}^2$ .
- (b) Find a Linear Transformation  $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ , whose range space is spanned by the vectors  $(1, 2, 3)$ ,  $(4, 5, 6)$ .

5. (a) Show that the transformation  $T: \mathbb{R}^3 \rightarrow \mathbb{R}^2$  defined by  $T(x_1, x_2, x_3) = (x_1, x_2)$  is a linear Transformation and is onto but not one-to-one.
- (b) If  $T: V \rightarrow V$  is a Linear Transformation, then the following statements are equivalent :
- $R(T) \cap N(T) = \{0\}$
  - If  $T(v) = 0 \forall v \in V$ .

L-1743

2

## Unit III

6. (a) If  $T_1: U \rightarrow V$  and  $T_2: V \rightarrow W$  be two invertible linear transformations, then prove that :
- $T_2 T_1$  is also invertible
  - $(T_2 T_1)^{-1} = T_1^{-1} T_2^{-1}$ .
- (b) Find the matrix representing the transformation  $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$  defined by :

$$T(x, y, z) = (x + y + z, 2x + z, 2y - z, 5y)$$

relative to the standard basis of  $\mathbb{R}^3$  and  $\mathbb{R}^4$

7. (a) Two matrices are similar iff they have same characteristic polynomial.
- (b) Find the characteristic and minimal polynomial of a linear transformation defined by :

$$T(x, y, z) = (2x - y, x + y + z, 2z)$$

where  $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$ .

## Unit IV

8. (a) Let  $V(F)$  be an inner Product Space. If  $u, v \in V$  such that  $\|u + v\|^2 = \|u\|^2 + \|v\|^2$ , then show that  $u$  and  $v$  are linearly dependent.
- (b) State and prove Bessel's Inequality.

(S-05/22) L-1743

1

P.T.O.

7. (a) The velocity at the maximum height of a projectile is half of its initial velocity  $u$ . Prove that range on the horizontal plane is  $\frac{\sqrt{3}u^2}{2g}$ . 4

- (b) A body is projected at an angle  $\alpha$  to the horizon so as to clear two walls of equal height  $a$  at a distance  $2a$  from each other. Show that the range is  $2a \cot \frac{\alpha}{2}$ . 4

#### Section IV

8. (a) To prove analytically that when the central acceleration varies as some integral power of the distance, there are at the most two apsidal distances. 4
- (b) A particle describes the curve  $r = a \sin n\theta$  under the force  $f$  to the pole. Find the law of force. 4
9. (a) Find the acceleration of a particle in terms of cylindrical polar co-ordinates. 4
- (b) The greatest and least velocities of a certain planet in its orbit round the sun are 30 km/h and 29.2 km/h respectively. Find eccentricity of the orbit. 4

L-1744

4

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Roll No. ....

Total Pages : 04

GSO/M-22

1744

MATHEMATICS

BM-363

Dynamics

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. **1** is compulsory.

1. (a) Define relative velocity and relative acceleration for two particles with respect to the same common frame of reference. 2
- (b) Define S.I.L.M. and write the expression for its time period. 2
- (c) A particle is projected with a velocity of 24.5 m/sec in a direction making an angle  $60^\circ$  with the horizontal. Find the horizontal range and the greatest height attained. 2
- (d) Define apse and apsidal distances. 1
- (e) Write down Kepler's Law of planetary motion. 1

#### Section I

2. (a) If the angular velocity of a point moving in a plane curve be constant about a fixed origin, show that its transverse acceleration varies as its radial velocity. 4

(3-03/9) L-1744

P.T.O.

- (c) At the end of three successive seconds, the distances of moving point with S.H.M. from its mean position measured in same direction are 1, 5, 5. Show that the period of complete oscillation is  $\frac{2\pi}{\theta}$  sec where

$$\cos \theta = \frac{3}{5}.$$

4

3. (a) A particle of mass  $m$  hangs in equilibrium from a fixed point O by an elastic string of natural length  $l$  and modulus of elasticity  $\lambda$ , the extension produced in the string being  $e$ . The mass is further pulled a length  $a$  ( $< e$ ) and let go. Discuss the motion. 4
- (b) A person going eastwards with a velocity of  $4 \text{ km/h}$  finds that the wind appears to blow directly from the north. He doubles his speed and wind appears to come from north-east. In what direction and with what velocity is the wind blowing ? 4

## Section II

4. (a) A load  $W$  is to be raised by a rope from rest to rest through a height  $h$  and the greatest tension which the rope can safely bear is  $nW$ . Show that the time in which the ascent can be made is  $\sqrt{\frac{2nh}{g(n-1)}}$ . 4

C-1744

2

- (b) Two heavy particles are attached together by a string passing over a pulley. If the string can only support a tension equal to one quarter of sum of two weights at its ends, show that the least possible acceleration be  $\frac{g}{\sqrt{2}}$ . 4

5. (a) In any displacement of a particle, the charge in K.E. is equal to the work done by the impressed forces acting on the particle. 4
- (b) Find the potential energy of an elastic string of natural length  $l$  and modulus of elasticity  $\lambda$ , when it is stretched so as to be of length  $l'$  ( $> l$ ). 4

## Section III

6. (a) If a particle starts from rest at a depth  $\frac{r}{2}$  below the highest point of a smooth verticle circle of radius  $r$ , prove that it will leave the circle at a distance  $\frac{r}{3}$  above the centre. 4
- (b) Two particles are let drop from the cusp of a cycloid down the curve at an interval of time  $t$ . Prove that they will meet in time  $2\pi\sqrt{\frac{a}{g} + \frac{t}{2}}$ . 4

(3-03/10)L-1744

3

P.T.O.

9. (a) Explain qualitatively how Raman lines originate ? 2  
 (b) Find the ratio of frequency of oscillation of the molecules  $\text{H}_2\text{Cl}^{35}$  and  $\text{H}^{35}\text{Cl}$ . 2  
 (c) Draw energy diagram for transverse Zeeman effect for  $\text{D}_2$  line of sodium  $3^2\text{P}_{3/2} \rightarrow 3^2\text{S}_{1/2}$ . 4

Roll No. ....

Total Pages : 04

GSO/M-22 1750

PHYSICS

Paper : XII

### Atomic and Molecular Spectroscopy

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in **all**, selecting *one* question from each Unit. Q. No. 1 is compulsory.

#### Compulsory Question

1. Supply brief answers :

- (a) Splitting of spectral lines in the Stark Effect depends on which quantum number ? 1  
 (b) Give example of two molecules which may **show** both IR and Raman spectra. 1  
 (c) Write down the possible values of total angular momentum quantum number  $J$  for L-S coupling of two atomic electrons whose orbital quantum number are 1 and 2. 1  
 (d) Name the molecular spectrum which is observed for the molecules  $\text{HCl}$ ,  $\text{HBr}$ ,  $\text{HI}$ . 1

(e) Name the series of spectral lines of lithium which is obtained by transitions between :

(i)  $nP$  and  $2S$ ,  $n > 2$

(ii)  $nF$  and  $3D$ ,  $n > 3$ .

(f) A beam of electrons bombards a sample of hydrogen through what potential difference must an electron have been accelerated if the first line of the Balmer series is to be emitted ?

### Unit I

2. (a) State and prove Bohr's correspondence principle. 4

(b) Explain the various quantum numbers associated with Vector Atom model. 4

3. (a) Deduce expression for the series spectra of hydrogen like atom taking into account Finite Mass of Nucleus. 6

(b) The wavelength of first Balmer line ( $H_\alpha$ ) of hydrogen is 6562.8 Å. Calculate the wavelength of the same line for Tritium ( $^3_1H$ ). 2

### Unit II

4. (a) Explain fine structure of hydrogen atom for  $H_\alpha$  line and  $H_\beta$  line. Also write down intensity selection rules. 6

(b) Find ground state term of boron. 2

5. (a) State and prove Larmor's theorem. 4  
(b) Discuss Sommerfeld's Relativity Correction. 4

### Unit III

6. (a) Write spectral terms for LS coupling in atoms with two equivalent electrons for ( $d^2$ ) configuration. 2

(b) Explain Hyperfine structure of spectral lines and its origin. 4

(c) What is Lande's Interval rule ? 2

7. (a) Write spectral terms in case of three non-equivalent electrons for (sp<sup>2</sup>) configuration. 3

(b) Derive expression for Interaction energy in JJ coupling (sp) configuration. 5

### Unit IV

8. (a) How can the pure rotation spectrum of  $H_2$  molecule be observed ? If the bond length of  $H_2$  molecule is 0.07417 nm, what would be the spacing of lines in its spectrum ? 4

(b) An atom having one valence electron is subjected to an external magnetic field which is stronger than the internal field. Show that under these conditions each energy level splits into  $2(2l + 1)$  levels with separation between term values  $(m_l + 2m_s)L$  (metre<sup>-1</sup>). Where L is Lorentz unit. 4

Roll No. ....

Total Pages : 03

**GSO/M-22**

**1751**

**CHEMISTRY**

Paper : XVIII CH-304

Inorganic Chemistry

Time : Three Hours]

[Maximum Marks : 32

**Note :** Attempt *Five* questions in all, selecting *two* questions each from Section A and Section B. Question No. 1 is compulsory.

1. (i) Give *one* example each of three electron donor and four electron donor. 1
- (ii) What is Zeigler-Natta Catalyst ? 1
- (iii) What is the shape of  $O_2$ -binding curve of Hb ? 1
- (iv) Give *two* examples of borderline Lewis acids. 1
- (v) Name any *two* free living bacteria. 1
- (vi) Write the formula of conjugate base of  $HSO_4^-$ . 1
- (vii) Name any *two* essential trace elements. 1
- (viii) Which disease is caused by excess of copper ? 1

**Section A**

2. (a) Discuss the factors that would be expected to provide more stable metal carbon sigma bonds. 3

(5-07/3) L-1751

P.T.O.

(b) Give any two reactions of Organo-aluminium compounds. 2

(c) Explain, why  $\text{Cl-OH}$  is an acid and  $\text{NaOH}$  is base ? 1

3. (a) Explain the structure and bonding in metal olefinic complexes. 3

(b) What are hard acids ? Give their important characteristics. 2

(c) Why do organolithium compounds prefer to oligomerise rather than exist as a single molecule ? 1

4. (a) How does HSAB principle governs the occurrence of minerals and poisoning of metal catalyst ? 3

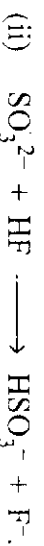
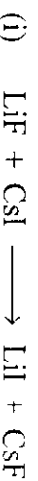
(b) What is Mercuration ? Give one example. 2

(c)  $\text{N}_2$  is isoelectronic with  $\text{CO}$ . It is a poor-donor than  $\text{CO}$ . Explain. 1

5. (a) What do you understand by Levelling and differentiating solvents ? Give example in each case. 2

(b) Discuss the relationship of electronegativity with hardness with special reference to Mulliken-Jaffe definition. 2

(c) Comment on the feasibility of the reaction : 2



## Section B

6. (a) What is porphyrin ? Draw the structure of Heme. 2

(b) What do you understand by Block and Graft copolymers ? 2

(c) Discuss the biological role of Na and K ions. 2

7. (a) What is Cooperativity in Hemoglobin ? How is it conveyed ? 2

(b) State fundamental requirements for biological nitrogen fixation. 3

(c) What is the biological function of  $\text{Zn}^{2+}$  ? 1

8. (a) Write a short note on silicone elastomers. 3

(b) What is Island model of bonding in cyclic  $(\text{N}(\text{PCl}_2)_3)_3$  ? 3

9. (a) What is Crosslinking ? Explain important consequences of crosslinking in macro molecules. 3

(b) Discuss the role of Haemoglobin and Myoglobin in transporting  $\text{O}_2$ . 3

- (ii) The solution of benzoic acid in benzene shows less osmotic pressure than expected.
- (iii) The relative lowering of vapour pressure is a colligative property.
- (b) Out of one molar and one molal aqueous solutions, which one is more concentrated and why ? **1½**

Roll No. ....

Total Pages : 04

**GSO/M-22 1752**

**CHEMISTRY**

**Paper XIX (CH-305)**

**Physical Chemistry (Theory)**

Time : Three Hours]

[Maximum Marks : 32

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. **1** is compulsory. Use of Log-table and Non-programming calculator is allowed.

**(Compulsory Question)**

1. (a) Give *two* examples of photosensitized reactions. **2**
- (b) What is meant by thermodynamic probability ? Illustrate with example. **2**
- (c) What is 'Eutectic Mixture' ? Calculate the degrees of freedom of Pb-Ag system at eutectic point. **2**
- (d) Define ideal and non-ideal solutions ? Give *one* example of each of them. **2**

**Unit I**

2. (a) State and explain Stark-Einstein law of photochemical equivalence. **3**

**L-1752**

**4**

**3,150**

(3-03/6) L-1752

**P.T.O.**

## Unit II

(b) The photo-decomposition of  $\text{H}_2$  vapours was carried

out with radiation of wavelength 2070 Å. Absorption of each calorie gave  $1.44 \times 10^{-6}$  g of  $\text{H}_2$ . Calculate the quantum yield. 3

3. (a) Differentiate between fluorescence and phosphorescence. Draw the Jablonski diagram depicting these processes. 4

(b) What do you mean by quantum yield of a photochemical reaction? Why the quantum yield of photosynthesis of HCl decreases if the vessel contains small traces of oxygen? 2

4. (a) What are photochemical reactions? Give the main points of difference between photochemical reaction and thermochemical reaction. 3

(b) Write the important features of Maxwell-Boltzmann statistics. 3

5. (a) What do you understand by Partition Function? Show that the total partition function for a system may be expressed as a product of translational, rotational, vibrational and electronic partition functions. 4

(b) Discuss Born-Oppenheimer Approximation. 2

6. (a) Define 'Gibbs Phase Rule'. How can you derive it thermodynamically? 3

(b) Draw a labelled phase diagram for water system. 3

7. (a) Define the terms : 4½

(i) Phase

(ii) Component

(iii) Degrees of freedom.

(b) Discuss the application of Phase Rule in Partition's process for the desilverisation of lead. 1½

8. (a) Define molal depression constant. Derive the relationship between depression in freezing point and molality of the dissolved solute. 4

(b) Calculate the osmotic pressure of 0.01 M solution of cane sugar at 27°C ( $R = 0.0821$  litre-atm-degree/mol). 2

9. (a) Give reasons for the following : 4½

(i) The equimolar solutions of NaCl and cane sugar do not have the same boiling point.

8. (a) Write equations for the preparation of  $\alpha$ -amino acids in (i) Gabriel Phthalimide synthesis (ii) Direct amination of  $\alpha$ -halo acids.
- (b) What are neutral, acidic and basic amino acids ?
- (c) What is a Zwitter ion ? Give evidences in favour of Zwitter ion structure in amino acids.
9. (a) Prepare a dipeptide Gly-Ala by classical peptide synthesis.
- (b) Explain the term isoelectric point of amino acids.
- (c) Compare the Fibrous and Globular proteins.
- 2×3=6**

Roll No. ....

Total Pages : 04

**GSO/M-22 1753**

**CHEMISTRY**

**Paper III (XX-CH-306)**

**Organic Chemistry**

Time : Three Hours]

[Maximum Marks : 32

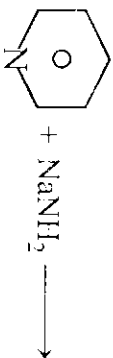
**Note :** Attempt *Five* questions in all, selecting *two* questions from each Section. Q. No. **1** is compulsory.

**Compulsory Question**

1. (a) Synthesis thiophene from 1,4-diketone.
- (b) Arrange in increasing order of basicity Piperidine, Pyrrole, Pyridine.
- (c) Draw the structure of enolate ions obtained from acetyl acetone.
- (d) Out of the acetone and diethyl malonate which has more acidic strength and why.
- (e) What are  $\alpha$ -aminoacids ? Give example.
- (f) Define essential aminoacid with example.
- (g) Give one example each of :
- (i) Polyester
- (ii) Phenol formaldehyde resin.
- (h) Define the terms Polymerisation and Polymer.

### Section A

2. (a) Write about molecular orbital structure of Pyroole.  
 (b) Sketch the following reaction and give mechanism : 2×3=6



- (c) What happens when :  
 (i) Quinoline reacts with  $\text{KMnO}_4$   
 (ii) Isoquinoline reacts with  $\text{Sn/HCl}$  ?  
 3. (a) Explain low reactivity of Pyridine towards electrophilic substitution reactions.  
 (b) Compare the aromatic character of furan, thiophene, pyrrole.  
 (c) Write a note on skraup synthesis of quinoline. 2×3=6

4. (a) Give mechanism of Claisen condensation.  
 (b) Prepare from malonic ester (i) 1, 3-Dicarboxylic acid (ii) 2-Methyl butanoic acid.  
 (c) Which alkyl halides is used in preparation of  $\text{CH}_2=\text{CH}-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3$  from ethylacetoacetate. 2+3+1=6

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2

5. (a) Comment upon ketonic hydrolysis in the synthetic importance of Ethylacetoacetate.

- (b) Prepare from ethylacetoacetate (i) n-valeric acid (ii) succinic acid.

- (c) Synthesize cyclobutane carboxylic acid from malonic ester. 2×3=6

### Section B

6. (a) Write the general mechanism for free radical vinyl polymerisation.

- (b) Prepare and write the uses of (i) Teflon (ii) Styron.

- (c) Explain Ziegler-Natta Polymerisation. 2×3=6

7. (a) Comment upon stereochemistry of Polymerisation.

- (b) Prepare and write the uses of :

- (i) Urea formaldehyde resin

- (ii) Perlon.

- (c) Of the following which one would show maximum reactivity towards anionic and which one would show maximum reactivity towards cationic polymerisation : 2×3=6



(2-02/15) L-1753

3

P.T.O.

Roll No. ....

Total Pages : 03

**GSO/M-22**

**1756**

**BIOCHEMISTRY AND PLANT  
BIOTECHNOLOGY**

**Paper I**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each part (A & B). No. **1** is compulsory. All questions carry equal marks. Supplement your answer with diagrams wherever necessary.

A. Answer (of 10)

(1×8=8

- What are phytohormones ? Give an example.
- What is hormone precursors level ?
- Name the substance used for artificial ripening of fruits.
- What is the function of gynoecium cycle ?
- What is the pigment present in root nodules of leguminous plants. What is its functions ?
- What is an auxin-inducing bacteria ?
- Explain the process.
- Define the term totipotency.

Page 1 of 3

Page 1 of 3

## Unit I

2. Write short notes on the following : 3+2+3=8
  - (a) Differentiate between competitive inhibition and allosteric inhibition of enzyme action.
  - (b) Lock and key mechanism of enzyme action.
  - (c) Coenzymes and their characteristics.
3. Write short notes on the following : 3+2+3=8
  - (a) Mechanism of action and properties of gibberellins.
  - (b) Phases of growth.
4. Write short notes on the following : 2+3+3=8
  - (a) *Abnema* structure test.
  - (b) Photomorphogenesis.
  - (c) Physiological effects of cytokinin.
5. Discuss, how storage and mobilizer of fatty acids occur in various parts of a plant ?

## Unit II

6. Write short notes on the following : 3+2+3=8
  - (a) Biological nitrogen fixation.
  - (b) Ammonium assimilation.

L-1756

2

2. What are cloning vectors in recombinant DNA technology ? What characteristics should they bear to be used as vectors ? Discuss the role of plasmids and phages as cloning vectors 3+2+3=8
3. Write short notes on the following : 3+2+3=8
  - (a) *Agrobacterium* mediated gene transfer.
  - (b) Significance of Transgenesis in plants.
4. Explain about tissue culture of plants or an appropriate example of plant tissue culture technique.

L-1756

2

Roll No. ....

Total Pages : 03

**GSO/M-22 1757**

**BOTANY**

**Paper : II**

**Economic Botany**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

**(Compulsory Question)**

**1.** Define the following :

**1×8=8**

- (a) Bulb
- (b) Tuber
- (c) Bast fiber
- (d) Spices and condiments
- (e) Energy plantation
- (f) Bath
- (g) Bio-fuels
- (h) Coir

**Unit I**

2. Briefly describe the origin, distribution, cultivation and uses of Maize.

**8**

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P.T.O.

3. Write short notes on the following :

- (a) Coconut
- (b) Pea.

4

## Unit II

4. Give a concise account of cultivation and uses of the

following :

- (a) Groundnut
- (b) Mustard.

4

5. Discuss the characteristic features of surface fibers and bast fibers. Describe the cultivation and uses of jute. 8

## Unit III

6. What are Beverages ? Differentiate between alcoholic and non-alcoholic beverages. Describe the processing and uses of tea. 8

7. Give the botanical names, family, plant part used, cultivation and uses of the following :

- (a) Cloves
- (b) Rubber.

4

## Unit IV

8. Give a concise account of botanical features, processing and uses of sugarcane. 8

9. Write short notes on any two of the following :

- (a) *Rauwolfia*
- (b) *Cinchona*
- (c) *Camubis*.

4

4

4

Roll No. ....

Total Pages : 03

**GSQ/M-22 1758**

**ZOOLOGY**

Paper : I

**Aquaculture and Pest Management-I**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from Section A and Section B. Q. No. **1** is compulsory.

1. Explain the following in about **20** words each : **1.5×10=15**

- (a) FAO
- (b) Capture fisheries
- (c) Fishing gears
- (d) Tuticorin boat
- (e) Gill net
- (f) Systematic position of Gurdaspur Borer
- (g) Grub
- (h) Ratooning of sugarcane crop
- (i) Common name of *Sesamia inferens*
- (j) Polyphagous.

**Section A**

- (a) Enumerate ecological factors affecting productivity of reservoir fisheries **4**
- (b) Describe lake fisheries. **2.25**

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P.T.O.

3. (a) What are fishing crafts ? 1.5  
 (b) What is a dugout canoe and how is it different from a outrigger canoe ? 2.5  
 (c) Write a note on two indigenous fishing crafts used in India. 2.25
4. Write notes on the following :  
 (a) Pearl culture 3  
 (b) World fish demand and utilization. 3.25
5. (a) Describe induced breeding in fishes by hypophysation. 3.25  
 (b) What are the advantages of induced breeding ? 3

#### Section B

6. Explain the systematic position, habits, nature of damage, life-cycle and prevention and control of sugarcane leaf-hopper. 6.25
7. (a) What is integrated pest management ? 1  
 (b) Describe components and advantages of integrated pest management. 5.25
8. Give the systematic position of the following pests :  
 (a) Wheat stem borer 1.75  
 (b) Red cotton bug 1.5  
 (c) Sugarcane white fly 1.5  
 (d) Pumpkin fruit fly. 1.5

9. Write notes on the damage causing stage and control measures of the following pests :  
 (a) Gundhi bug 2.25  
 (b) Sugarcane top borer 2  
 (c) Red pumpkin beetle. 2

Roll No. ....

Total Pages : 02

**GSQ/M-22**

**1759**

**ZOOLOGY**

**Paper : II**

**Aquaculture and Pest Management-II**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all. Q. No. 1 is compulsory.

Answer to each part should not exceed **20** words. Out of remaining eight, attempt *four* questions, selecting *two* questions from each Section.

1. Explain the following in about **20** words each : **1.5×10=15**

- (a) Fry
- (b) Euryphagic
- (c) Benchi jal
- (d) Monosex culture
- (e) Weed fish
- (f) Transgenic fish
- (g) Caterpillar
- (h) Fungigants
- (i) Larvling
- (j) Insecticides classification based on mode of entry.

**Section I**

2. What are the limitations of natural fish seed ? Describe induced breeding in detail **6.25**

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P.T.O.

3. Write notes on the following :
  - (a) Cage culture 3
  - (b) Feeding habits of fishes. 3.5

## Section II

4. Write notes on the following :
  - (a) Cryopreservation 3
  - (b) Transgenic fish. 3.25
5. Write notes on the following :
  - (a) Poly culture 3
  - (b) Running water culture. 3.25

## Section III

6. Explain the systematic position, habits, nature of damage, life-cycle and control of Wheat weevil. 6.25
7. Discuss the nature of damage caused and habits of the following pests :
  - (a) Pulse beetle 3
  - (b) Grain and Flour moth. 3.25

## Section IV

8. Discuss in detail about biological control. 6.25
9. Write notes on the following :
  - (a) Rodent pest 3
  - (b) Legal control. 3.25

Roll No. ....

Total Pages : 03

**GSO/M-22**

**1762**

**ELECTRONICS**

Paper : I (Theory)

Micro Processor Architecture and  
Programming-II

Time : Three Hours]

[Maximum Marks : 40

**Note :** There are nine questions in the paper. Attempt *Five* questions in all. Q. No. 1 is compulsory. Attempt remaining *four* questions by selecting *one* question from each Unit. All questions carry equal marks.

1. (a) How will you enable RST 5.5 and disable RST 6.5, RST 7.5 ? 2
- (b) What is the mode and input-output configuration for ports A, B and C of an 8255 PPI after its control word register is loaded with 98H ? 2
- (c) Name the applications of the 8253. 2
- (d) What is DMA ? Using block diagram explain, how the data is transferred by a DMA controller. 2

## Unit I

2. (a) Explain maskable and non-maskable interrupts. 2  
(b) Explain Hardware and Software interrupts in brief. 3  
(c) Discuss EI and DI instructions. 3
3. (a) Draw and discuss the interrupt control circuit for 8085. 5  
(b) Discuss the bit pattern for RIM instruction. 3

## Unit II

4. Draw the schematic block diagram of 8255 and explain the function of each block. 8
5. (a) Explain the control word format of 8255. 3  
(b) Mention various modes of operations of 8255 and explain its working in BSR mode only. 5

## Unit III

6. Draw the block diagram of Programmable Interval Timer 8253 and explain it in brief. 8
7. (a) Write the features of Programmable Interval Timer 8253. 4  
(b) What is the difference between hardware-triggered strobe and software-triggered strobe ? 4

## Unit IV

8. Explain microprocessor based washing machine controller. Also write the program to control it. 8
9. Discuss microprocessor based temperature controller. Also write the program to control the temperature of an oil bath. 8

Roll No. ....

Total Pages : 05

**GSO/M-22**

**1763**

**ELECTRONICS**

**Paper : II**

**Introduction to C and its Programming**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. (a) What is an escape sequence ? What is its purpose ?  
2
- (b) Differentiate between getch() and putchar with suitable example. 2
- (c) What is the purpose of return statement ? 2
- (d) In what ways does an array differ from an ordinary variable ? 2

**Unit I**

2. (a) What is an operator ? Describe several different types of operator that are included within the C language. 4

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P.T.O.

- (b) A program in C contains the following declarations : 4

```
int i, j ;
long ix ;
short s ;
float x ;
double dx ;
char c ;
```

Determine the data type of each of the following expression :

- (i)  $dx + x$
- (ii)  $ix + c$
- (iii)  $((int) dx) + ix$
- (iv)  $s + j$

3. (a) Name and describe the four basic data types in C. 4

- (b) Describe the use of the conditional operator to form conditional expression. How is a conditional expression evaluated ? 4

## Unit II

4. (a) What is the purpose of for statement ? How does it differ from the while statement and do while statement ? 4

- (b) Describe the output that will be generated by the following C program : 4

```
# include <stdio.h>
Main()
```

```
{
```

```
int i = 0, x = 0;
```

```
while (i<20) {
```

```
if (i%5 == 0) {
```

```
x += i;
```

```
printf ("%d", x);
```

```
}
```

```
+ + i;
```

```
}
```

```
Printf("\nx = %d, x);
```

```
}
```

5. (a) What is the purpose of if else statement ? 4
- (b) What is the purpose of break statement and continue statement ? Explain by taking suitable examples. 4

## Unit III

6. (a) What are formal and actual arguments ? What is the relation between the two ? 4

- (b) Explain the meaning of each of the following prototypes : 4

```
(i) int f(int a);
```

```
(ii) double f(double a, int b);
```

7. (a) Describe the manner in which an actual argument

passes information to a function. What name is associated with this process ? What are advantages and disadvantages to passing arguments in this manner ? 4

- (b) Describe the output generated by the following

program : 4

```
# include <stdio.h>
```

```
int funct (int count);
```

```
main()
```

```
{
```

```
    int a, count;
```

```
    for (count = 1; count <= 5; + count)
```

```
    {
```

```
        a = funct(count);
```

```
        printf("%d", a);
```

```
    }
```

```
}
```

```
int funct(int x)
```

```
{ int y;
```

```
    y = x * x;
```

```
    return (y);
```

```
}
```

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4

## Unit IV

8. (a) What is the relationship between an array name and

a pointer ? How is an array name interpreted when

it appears as an argument to a function ? 4

- (b) Explain the meaning of the following declarations : 4

```
float a[4] = {0.167};
```

```
float *pa = &a;
```

```
char c1, c2, c3;
```

```
char *pc1, *pc2, *pc3 = &c1;
```

9. (a) When passing an argument to a function ? What is

the difference between passing by value and passing by reference ? 4

- (b) Under what conditions can two pointer variables be

compared ? Under what conditions are such comparisons useful ? 4

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5

Roll No. ....

Total Pages : 02

**GSO/M-22**

**1764**

**COMPUTER SCIENCE**

Paper : 1

**Relational Database Management System**

Time : [Three Hours]

[Maximum Marks : 40]

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

**1.** Explain in brief :

**2×4=8**

- (a) What is Union Compatibility ?
- (b) Define view. Write SQL query to create a view.
- (c) Differentiate between 3NF and BCNF.
- (d) Differentiate between SQL and PL/SQL.

#### **Unit I**

- 2. What are Codd's twelve rules that a database must obey if it is to be considered truly relations ? 8
- 3. Differentiate between Relational algebra and Relational calculus. Explain by giving examples of each. 8

#### **Unit II**

- 4. What is functional dependency ? Explain primary and transitive functional dependency with example. 8

5. What are the anomalies that lead to the bad design of the database ? Also explain BCNF by using an appropriate example 8

### Unit III

6. Explain the following constraints with reference to SQL :
  - (a) Primary Key Constraint 4
  - (b) Check Constraint. 4
7. Explain the following using SQL queries :
  - (a) Sorting the data 4
  - (b) Filtering the data. 4

### Unit IV

8. Discuss the advantage of PL/SQL along with its execution environment. 8
9. Explain the working of For loop statement in PL/SQL, giving an appropriate example. 8

Roll No. ....

Total Pages : 02

**GSO/M-22**

**1765**

## COMPUTER SCIENCE

### Computer Networks

Paper : II

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. Write short notes on the following :

- (a) Local Area Network
- (b) Data Transfer Rate
- (c) Go Back N protocol
- (d) Domain Name Server.

### **Unit I**

- 2. What do you mean by Computer Networks ? Explain its applications using suitable examples.
- 3. What is a reference model ? Why is it needed ? Explain OSI reference model with its layers.

### **Unit II**

- 4. Explain the following w.r.t. Computer Network :  
Bandwidth, Modem, Baud rate, Capacity.

5. (a) What do you mean by guided data transmission ? Discuss.  
(b) Write a short note on modems and modulation techniques.

### **Unit III**

6. Differentiate between the following :
  - (a) Pure ALOHA and slotted ALOHA
  - (b) Switched Ethernet and Fast Ethernet.
7. What do you mean by Bluetooth Technology ? Explain in detail.

### **Unit IV**

8. What is a routing algorithm ? Explain flooding with suitable examples.
9. (a) What is the need of network security ? Explain.  
(b) Discuss the concept of firewalls with suitable examples.

Roll No. ....

Total Pages : 03

**GSO/M-22**

**1815**

**DIETETICS-II**

Course 311

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से एक प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

**Compulsory Question ( अनिवार्य प्रश्न )**

I. Write short notes on the following :

2×4=8

- (a) Chemotherapy
- (b) Renal Calculi
- (c) Acute and Chronic Renal Failure
- (d) Atherosclerosis.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

- (अ) कीमोथेरेपी
- (ब) गुर्दे की पथरी
- (स) तीव्र और ज्वरित गुर्दे की विफलता
- (द) एथेरोस्क्लेरोसिस ।

## Unit I (इकाई I)

2. Define Glycemic Index (GI). Enlist the foods with high and low glycemic index. Explain its significance with special reference to diabetic patients. 8  
गलाइसेमिक इंडेक्स (जी.आई.) को परिभाषित कीजिए । उच्च और निम्न गलाइसेमिक इंडेक्स वाले खाद्य पदार्थों को सूचीबद्ध कीजिए । मधुमेह रोगियों के विशेष संदर्भ में इसके महत्व की व्याख्या कीजिए ।
3. Explain the causes, symptoms and dietary modifications for the patients suffering from Insulin Dependent Diabetes Mellitus (IDDM). 8  
इंसुलिन पर निर्भर मधुमेह मेलिटस (आई.डी.डी.एम.) से पीड़ित रोगियों के लिए कारण, लक्षण और आहार संशोधनों की व्याख्या कीजिए ।

## Unit II (इकाई II)

4. Discuss the classification and etiology of hypertension along with principles of diet management in patients suffering from hypertension. 8  
उच्च रक्तचाप से पीड़ित रोगियों में आहार प्रबंधन के सिद्धांतों के साथ-साथ रक्तचाप के वर्गीकरण और कारकों पर चर्चा कीजिए ।
5. Elaborate the types, symptoms, causes and nutritional management of Coronary Heart Disease (CHD). 8  
कोरोनरी हृदय रोग (सी.एच.डी.) के प्रकार, लक्षण, कारण और पोषण प्रबंधन का विस्तार से वर्णन कीजिए ।

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2

## Unit III (इकाई III)

6. Elaborate the complications and recommended dietary modifications in patients suffering from cancer. 8  
कैंसर से पीड़ित मरीजों में जटिलताओं और अनुशंसित आहार संशोधनों पर विस्तार से बताइए ।
7. Discuss the diet for a patient suffering from glomerulonephritis. 8  
ग्लोमेरुलोनेफ्राइटिस से पीड़ित रोगी के लिए आहार की चर्चा कीजिए ।

## Unit IV (इकाई IV)

8. Describe dietary guidelines to be followed in the dietary management of a patient with Chronic Renal Failure (CRF). 8  
जीर्ण गुर्दे की विफलता (सी.आर.एफ.) वाले रोगी के आहार प्रबंधन में पालन किए जाने वाले आहार संबंधी दिशा-निर्देशों का वर्णन कीजिए ।
9. What are Kidney Stones ? Discuss their type, foods allowed and restricted during Kidney stones. 8  
किडनी स्टोन क्या हैं ? गुर्दे की पथरी के प्रकार एवं उनके दौरान अनुमत और प्रतिबंधित खाद्य पदार्थों पर चर्चा कीजिए ।

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Roll No. ....

Total Pages : 03

**GSO/M-22 1816**

**TRADITIONAL TEXTILES EMBROIDERIES  
AND CONSUMERISM**

Course No. 312

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

**Compulsory Question ( अनिवार्य प्रश्न )**

1. Write short notes on the following : 4×2=8

- (a) Kalamkari of Andhra Pradesh
- (b) Patolas of Gujarat
- (c) Kasuti of Karnataka
- (d) Role of Labelling.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

- (अ) आंध्र प्रदेश की कलमकारी
- (ब) गुजरात के पटोला

- (स) कर्नाटक की कसूती  
(द) लेबल की भूमिका ।

### Unit I (इकाई I)

2. Write a detailed note on brocades of Benaras with its various types. 8  
बनारस के ब्रोकेड और उसके सभी प्रकारों पर विस्तृत टिप्पणी लिखिए ।
3. Give an explanatory details of technique, history, patterns and qualities of Bandhani. 8  
बांधनी की तकनीक, इतिहास, नमूने और विशेषताओं पर विस्तार से टिप्पणी लिखिए ।
4. Write in detail about the mulmul of Dhaka and Chikankari of Lucknow. 8  
लखनऊ की चिकनकारी और ढाका की मलमल के बारे में लिखिए ।
5. Give the origin, patterns, colours, articles and other details about Kantha embroidery. 8  
कांथा की कढ़ई के उद्गम, नमूने, रंग, सामग्री, वस्तुएँ तथा अन्य संभव जानकारी पर विस्तार से लिखिए ।

### Unit II (इकाई II)

6. What are the factors that affect the clothing selection and case in intelligent choice ? 8  
वस्त्रों के चयन एवं विवेकपूर्ण निर्णय को प्रभावित करने वाले तत्वों का विस्तारपूर्वक विवरण दीजिए ।

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7. In present context, explain the factors that affect the selection of fabric for bed linens, table linens and towels. 8

आधुनिक संदर्भ में बिछौने, मेज के कवर और तौलियों के वस्त्रों के चयन को प्रभावित करने वाले तत्व कौन-कौनसे हैं ? लिखिए ।

8. What are the various finishes in practice these days, with suitable examples. 8

आज के युग में वस्त्रों पर प्रयोग होने वाली फिनिश को ग्रन्थसंग्रह उदाहरणों की सहायता से वर्णित कीजिए ।

9. Explain briefly about the following : 2 × 4 = 8

(a) Carpets and Rugs

(b) Draperies.

निम्नलिखित के विषय में संक्षेप में लिखिए :

(अ) दरियाँ और रस

(ब) ड्रेपरीज ।

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Roll No. ....

Total Pages : 03

**GSO/M-22 1817**

**ADULTHOOD GUIDANCE AND  
COUNSELLING**

**Course 313**

**Time : Three Hours]**

**[Maximum Marks : 40**

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

**Compulsory Question ( अनिवार्य प्रश्न )**

**1. Write short notes on the following : 2×4=8**

- (a) Developmental Tasks
  - (b) Parenthood
  - (c) Counselling Parents
  - (d) Effect of death of a member on family.
- निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :
- (अ) विकासात्मक कार्य
  - (ब) माता-पिता बनना
  - (स) माता-पिता को परामर्श देना
  - (द) सदस्य की मृत्यु का परिवार पर प्रभाव ।

## Unit I (इकाई I)

2. Discuss the vocational development and adjustment to vocations during young adulthood. 8  
युवावस्था में व्यावसायिक विकास तथा व्यवसायों के साथ समायोजन की चर्चा कीजिए ।
3. Write notes on the following : 8
  - (i) Marital adjustment during young adulthood
  - (ii) Menopause in women.
 निम्नलिखित पर टिप्पणियाँ लिखिए :
  - (i) युवावस्था में वैवाहिक समायोजन
  - (ii) महिलाओं में रजोवृत्ति ।
4. Describe the retirement and grandparenthood during late adulthood. 8  
अंतिम युवावस्था में सेवानिवृत्ति और दादा-दादी बनने की व्याख्या कीजिए ।
5. Discuss the physical changes and health problems in old age. 8  
वृद्धावस्था में शारीरिक बदलाव और स्वास्थ्य समस्याओं पर चर्चा कीजिए ।

## Unit II (इकाई II)

6. Discuss the need and principles of guidance. 8  
निर्देशन की आवश्यकता और सिद्धान्तों की चर्चा कीजिए ।

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7. What is individual and group guidance ? Explain the objectives of individual and group guidance. 8  
वैयक्तिक एवं समूह निर्देशन क्या है ? इनके लक्ष्यों का वर्णन कीजिए ।
8. Discuss the methods and techniques of counselling children. 8  
बच्चों को परामर्श देने की विधियों और तकनीकों की चर्चा कीजिए ।
9. What kind of skills and characteristics an effective counsellor should possess ? 8  
अच्छे परामर्शदाता होने के लिए किन कौशलों की और क्या विशेषताएँ होनी चाहिए ?

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Total Pages : 03

**GSO/M-22 1818**

## INTERIOR DECORATION

Paper : 314

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

प्रत्येक इकाई से दो प्रश्न चुनते हुए, कुल पाँच प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

### Compulsory Question ( अनिवार्य प्रश्न )

1. Define the following terms :

4×2=8

- (a) Achromatic colour scheme
- (b) Texture
- (c) Furnishings
- (d) Emphasis.

निम्नलिखित पदों को परिभाषित कीजिए :

- (अ) एक्रोमैटिक कलर स्कीम
- (ब) टेक्सचर/बनावट
- (स) फर्निशिंग
- (द) जोर ।

## Unit I (इकाई I)

2. Write in detail about different types of flower arrangement.

What principles to be followed for making flower arrangements ? 8

विभिन्न प्रकार के फूलों की व्यवस्था के बारे में विस्तार से लिखिए । फूलों की व्यवस्था करने के लिए किन सिद्धान्तों का पालन किया जाना चाहिए ?

3. Explain the importance of elements of art and their application in the interior decoration of a house. 8

एक घर की आंतरिक सजावट में कला के तत्वों और उनके अनुप्रयोग के महत्त्व की व्याख्या कीजिए ।

4. What is table setting ? Differentiate between formal and informal table setting. 8

टेबल सेटिंग क्या है ? औपचारिक और अनौपचारिक टेबल सेटिंग के बीच अंतर कीजिए ।

5. What is the importance of colour in interior decoration ?

Write in detail about the various colour schemes and dimensions of colour. 4,4

आंतरिक सजावट में रंग का क्या महत्त्व है ? विभिन्न रंग योजनाओं और रंग के आयामों के बारे में विस्तार से लिखिए ।

## Unit II (इकाई II)

6. Write in detail about arrangement and care of different types of furniture. What principles to be followed while selecting comfortable furniture for work and rest ? 8

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विभिन्न प्रकार के फर्नीचर की व्यवस्था और देखभाल के बारे में विस्तार से लिखिए । काम और आराम के लिए उपयुक्त फर्नीचर का चयन करते समय किन सिद्धान्तों का पालन किया जाना चाहिए ?

7. Define furnishing. Explain different types of furnishing and their application in the interior decoration of a house. 8

फर्निशिंग का अर्थ क्या है ? फर्निशिंग के विभिन्न प्रकारों और उनके आंतरिक सजावट में उनके उपयोग के बारे में विस्तार से लिखिए ।

8. What is the importance of lighting in interior decoration ?

Elaborate about lighting requirements for different rooms and areas.

आंतरिक सजावट में प्रकाश का क्या महत्त्व है ? विभिन्न गतिविधियों और क्षेत्रों के लिए प्रकाश की आवश्यकताओं के बारे में विस्तार से बताइए ।

9. (a) Write about the cost estimation of different furniture groups while selecting furniture.

Write about the cost estimation of different furniture groups while selecting furniture.

विभिन्न फर्नीचर समूहों के चयन के दौरान लागत आकलन के बारे में विस्तार से लिखिए ।

विभिन्न फर्नीचर समूहों के चयन के दौरान लागत आकलन के बारे में विस्तार से लिखिए ।

विभिन्न फर्नीचर समूहों के चयन के दौरान लागत आकलन के बारे में विस्तार से लिखिए ।

विभिन्न फर्नीचर समूहों के चयन के दौरान लागत आकलन के बारे में विस्तार से लिखिए ।

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Roll No. ....

Total Pages : 02

**BSIT/M-22      26109**

**INTERNET CONCEPTS AND**

**APPLICATIONS-II**

**BSIT-604**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. Write short notes on the following :      4×2=8
- (a) Cookies
  - (b) Video Conferencing
  - (c) EDI
  - (d) Intranet.

**Unit I**

2. What is Cryptography ? Explain its various types.      8
3. Explain various types of viruses along with its preventions.      8

**Unit II**

4. Write short notes on the following :      4×2=8
- (a) Web Based Chat Services
  - (b) IRC.

5. What is Multimedia Authoring Tools ? 8

### Unit III

6. Differentiate the following : 4×2=8

(a) Pure and Partial e-Commerce

(b) e-Commerce and m-Commerce.

7. Define Electronic Fund Transfer. Explain its advantages and types. 8

### Unit IV

8. Explain hardware and software requirements of Intranet. 8

9. Explain various Electronic Meeting Systems in detail. 8

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Total Pages : 02

**BSIT/M-22      26106**

## **COMPUTER SYSTEM ARCHITECTURE**

**BSIT-601**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all. Q. No. 1 is compulsory.

Attempt *four* more questions, selecting *one* question from each Unit. All questions carry equal marks.

1. (a) What are auxiliary memories ? Also write its type.  
(b) Draw a crossbar switch network and describe its working.  
(c) What is an input-output interface ?  
(d) Elaborate the role of computer in exploiting parallelism. 4×2=8

### **Unit I**

2. Distinguish between scalar RISC and super scalar RISC in terms of Instruction issue, pipeline architecture and performance. 8
3. Explain factors speedup, efficiency and throughput of a K-stage pipeline. 8

## Unit II

- 2. With a suitable diagram, explain set-associative mapped cache memory with two blocks per set. 8
- 3. Write short notes on the following :
  - (a) Virtual Memory 4
  - (b) Interleaved Memory. 4

## Unit III

- 1. Draw a Hypercube Network Structure. Explain its configuration for physical Interconnection in a computer system. 8
- 2. Explain the following :
  - (a) Vector Processing 4
  - (b) Multistage switching. 4

## Unit IV

- 1. Why does DMA have priority over the CPU when both request memory transfer ? 8
- 2. Differentiate, how isolated I/O is different from memory mapped I/O. 8

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Total Pages : 02

**BSIT/M-22**

**26107**

**PROGRAMMING IN C++-II**

**BSIT-602**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) What is Protected Class ?  
(b) Name *two* stream classes used in File-operations.  
(c) Write formatted input and output statements in files.  
(d) Differentiate Normal member function and Friend Function.

**Unit I**

2. (a) Define Friend Function. Write its major properties and use.  
(b) Write a Program showing use of Friend Function.
3. Explain concept of Operator Overloading. Write a program in C++ using classes and showing concept of Operator Overloading.

## **Unit II**

4. Explain concept of inheritance, types of inheritance and write a program to explain multiple inheritance.
5. (a) Explain scope of class using the concept of Public, Private and Protected base class.  
(b) Explain concept of inheriting operator functions.

## **Unit III**

6. Discuss Virtual Function. Write a program showing Virtual Function and Virtual Base class.
7. Discuss properties of template class and also define Instantiation and Specialization.

## **Unit IV**

8. Make a Program using Files to use “File-1” for Output and “File-2” for input with the following data :  
File-2 : Name, Rollno, BOD, Address, Marks in Sub1, Sub2 and Sub3  
File 1 : All above and also Total marks.
9. Explain Exception handling. Write a program to show Catch, Try and Throw handlers.

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Total Pages : 03

**BSIT/M-22                      26108**

**WEB-SITE DESIGN IMPLEMENTING BASIC  
DESIGN TOOLS-II**

**BSIT-603**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**((Compulsory Question))**

1. Write short notes on the following : 4×2=8
  - (a) <Frame> Element
  - (b) Get Method in Form
  - (c) CSS Rules
  - (d) Uses of XML.

**Unit I**

2. Explain the procedure to create links between frames using an appropriate examples. Also explain the use of TARGET attribute. 8
3. Explain with examples the method to create the following Form Controls : 2×4=8
  - (a) Text Input Controls

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- (b) Checkbox
- (c) Submit and Reset Button
- (d) Hidden Controls.

### Unit II

4. (a) Discuss the <MARQUEE> element along with the various attributes associated with it. 4
- (b) Explain the various attributes of <EMBED> element. 4

5. Write short notes on the following in Frontpage : 2×4=8

- (a) Title Bar
- (b) Menu Bar
- (c) Scroll Bar
- (d) Status Bar.

### Unit III

6. (a) What is External Style Sheet ? How is it different from Internal Style Sheet ? 4
- (b) Write short notes on the following :
  - (i) Import Style Sheet 2
  - (ii) CSS Comments. 2
7. Explain the CSS properties for FONT and TEXT. 8

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### Unit IV

8. What is XML ? Differentiate XML and HTML. Also explain advantages of XML. 8
9. Explain schema of XML in detail using appropriate examples. 8

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**BSIT/M-22                      26109**

**INTERNET CONCEPTS AND  
APPLICATIONS-II**

**BSIT-604**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

**(Compulsory Question)**

1. Write short notes on the following : **4×2=8**

- (a) Cookies
- (b) Video Conferencing
- (c) EDI
- (d) Intranet.

**Unit I**

- 2. What is Cryptography ? Explain its various types. **8**
- 3. Explain various types of viruses along with its preventions. **8**

**Unit II**

- 4. Write short notes on the following : **4×2=8**
  - (a) Web Based Chat Services
  - (b) IRC.

5. What is Multimedia Authoring Tools ? 8

### Unit III

6. Differentiate the following : 4×2=8

(a) Pure and Partial e-Commerce

(b) e-Commerce and m-Commerce.

7. Define Electronic Fund Transfer. Explain its advantages and types. 8

### Unit IV

8. Explain hardware and software requirements of Intranet. 8

9. Explain various Electronic Meeting Systems in detail. 8

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Total Pages : 03

**BSIT/M-22                      26110**

**EMBEDDED SYSTEMS AND 8051**

**MICROCONTROLLER**

**Paper : II BSIT-605**

Time : Three Hours]

[Maximum Marks : 40

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

**(Compulsory Question)**

1. (a) Why is microcontroller used in embedded system ?  
2
- (b) Why 8051 microcontroller uses 11.0592 MHz crystal ?  
2
- (c) What will be the result after executing these instructions ?  
2  
    MOV A, # + 96  
    MOV R<sub>1</sub>, # + 70  
    ADD A, R1
- (d) What are the specifications of 8051 microcontroller ?  
2

**Unit I**

2. Explain different hardware units used in embedded system in detail.  
8

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P.T.O.

3. (a) What is CISC and RISC architecture ? Which architecture is preferred in 8051 microcontroller and why ? 4
- (b) Discuss different types of single purpose processor used in embedded system. 4

### Unit II

4. (a) Explain Program Status Word (PSW) of 8051 microcontroller. 4
- (b) What is the role of timers in 8051 ? Explain TMOD and TCON special function register. 4
5. (a) Discuss internal RAM structure of 8051. 4
- (b) Explain, how external memory is access by 8051. 4

### Unit III

6. (a) What is serial communication ? Discuss SCON and PCON registers in 8051. 4
- (b) How many interrupts are provided in 8051 ? Explain with their priorities. 4
7. (a) Explain different types of addressing modes used in 8051 microcontroller to access data with examples. 4
- (b) What is the use of CALL instruction ? Explain (i) LCALL (ii) ACALL with example. 4

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### Unit IV

8. (a) Why testing of a design is required ? Discuss the different steps involved in the testing of microcontroller design. 4
- (b) What is the role of look-up tables in microcontroller ? 4
9. (a) Explain different steps involved in the designing of a microcontroller. 4
- (b) Discuss different types of data transmission in microcontroller and which one is preferred. 4

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