4

SECTION–IV

8. (a) Using Cardon's method, show that the roots of the equation $x^3 - 6x - 4 = 0$ are $-2, 1 \pm \sqrt{3}$. 4

(b) Solve by the method of resolution into quadratic factors $x^4 - 2x^3 - 5x^2 + 10x - 3 = 0$. 4

9. (a) Apply Descarte's rule of sign to discuss the nature of roots of the equation $3x^4 + 12x^2 + 5x - 4 = 0$. 4

(b) Solve the equation using ferrari's method

$x^4 + 4x^3 + 12x^2 - 8x + 95 = 0$. 4

BSc I, III, V

Roll No. ..... Total Pages : 4

GSE/D-22 **772**

ALGEBRA

Paper–BM-111

Time : Three Hours] [Maximum Marks : 40

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

Compulsory Question

1. (a) Show that the diagonal elements of a Hermitian matrix are all real. 1½

(b) Find the value of a in order that the roots of the equation $2x^3 + 6x^2 + 5x + a = 0$ are in AP. 2

(c) If A and B are skew symmetric matrices of same order, then prove that BAB and ABA are skew symmetric. 1½

(d) If $A = \frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1+i \\ 1-i & -1 \end{bmatrix}$ is unitary, then find A^{-1}. 1½

(e) Show that every identity matrix of order $n \geq 2$ is derogatory. 1½

SECTION–I

2. (a) Show that every square matrix A can be expressed in one and only one way as P + iQ where P and Q are Hermitian matrices. 4

(b) Reduce the matrix A to find non-singular matrices P and Q such that $\begin{bmatrix} 1 & 2 & -1 & 2 \\ 1 & 5 & -2 & 3 \\ 1 & 2 & 1 & 2 \end{bmatrix}$ is in normal form, hence find the rank of A. 4

3. (a) If $|A| \neq 0$ and A, B are both n-square matrices then prove that $A^{-1}B$ and BA^{-1} have same characteristic roots. 4

(b) Prove that $A = \begin{bmatrix} 2 & 6 & 1 \\ 0 & 1 & -6 \\ 3 & 4 & 2 \end{bmatrix}$ satisfies its characteristic equation. Also find its inverse, if exists. 4

SECTION–II

4. (a) For what values of a and b, the system of equations

$x + y + 5z = 0$ have (i) no solution

$x + 2y + 3za = b$ (ii) unique solution

$x + 3y + az = 0$ (iii) infinitely many solutions. 4

(b) If A is a real skew symmetric matrix such that $A^2 + I = 0$, show that A is orthogonal and is of oven order. 4

5. (a) Reduce the quadratic form $x_1^2 - 2x_2^2 + 3x_3^2 - 4x_2x_3 + 6x_3x_1$ to canonical form and find the rank, index and signature of the form. Also find the equations of linear transformations. 4

(b) Determine the definiteness of the quadratic form $-x_1^2 - 2x_2^2 - 2x_3^2 + 2x_1x_2 + 2x_2x_3$ using Sylvester's criterion. 4

SECTION–III

6. (a) Solve the equation $4x^4 - 4x^3 - 25x^2 + x + b = 0$ given that the difference between two roots is unity. 4

(b) Solve the equation $15x^4 - 8x^3 - 14x^2 + 8x - 1 = 0$ given that the roots are in H.P. 4

7. (a) If α, β, γ are the roots of the equation $2x^3 + x^2 + x + 1 = 0$ then find an equation where roots are

$\frac{1}{\beta^2} + \frac{1}{\gamma^2} - \frac{1}{\alpha^2}$, $\frac{1}{\gamma^2} + \frac{1}{\alpha^2} - \frac{1}{\beta^2}$, and $\frac{1}{\alpha^2} + \frac{1}{\beta^2} - \frac{1}{\gamma^2}$. 4

(b) Solve the equation

$x^4 - 9x^2 + 4x + 12 = 0$, given that it has a multiple root.

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Total Pages : 3

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GSE/D-22

SOLID GEOMETRY

Paper–BM-113

Time : Three Hours]

[Maximum Marks : 40

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

Compulsory Question

1. (a) Find the nature of the conic

$$13x^2 - 18xy + 37y^2 + 2x + 14y - 2 = 0.$$ 2

(b) Find the equation to the sphere on the join of (–1, 3, 2) and (5, 7, –6) as the diameter. 2

(c) Find the enveloping cone of the sphere

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

with its vertex at (1, 1, 1). 2

(d) Find the equation of the plane which cuts the paraboloid $x^2 - 2y^2 = z$ in a conic with its centre at the point $\left(2, \frac{3}{2}, 4\right)$. 2

SECTION–I

2. Find the centre, length and equations of the axes, eccentricity, foci of the conic $9x^2 - 6xy + 17y^2 + 30x - 74y + 17 = 0$ and trace the curve. 8

3. (a) Prove that the conics $x^2 + 3y^2 - 1 = 0$ and $2x^2 + 12xy + 39y^2 - 2x - 12y = 0$ have double contact with each other. Find the co-ordinates of the points of intersection of the tangents at the two points of contact. 4

(b) Prove that the conics $x^2 - y^2 - 4x + 2y + 2 = 0$ and $x^2 + 3y^2 - 4x - 6y + 4 = 0$ are confocal. 4

SECTION–II

4. (a) Find the equation of the sphere having the circle $x^2 + y^2 + z^2 + 7y - 2z + 2 = 0$, $2x + 3y + 4z - 8 = 0$ as a great circle. 4

(b) Find the equation of the right circular cone whose vertex is at the origin, axis the line $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$, and which has a vertical angle of 60°. 4

5. (a) Find the limiting points of the co-axial system of spheres

$x^2 + y^2 + z^2 + 3x - 3y + 6 = 0$,

$x^2 + y^2 + z^2 - 6y - 6z + 6 = 0$. 4

(b) Find the equation of the right circular cylinder, whose guiding circle is $x^2 + y^2 + z^2 = 9$, $x - y + z = 3$. 4

SECTION–III

6. (a) Find the equations of the two tangent planes which contain the lines given by $7x + 10y = 30$, $5y - 3z = 0$ and touch the ellipsoid $7x^2 + 5y^2 + 3z^2 = 60$. 4

(b) Prove that six normals can be drawn from a given point to the ellipsoid. 4

7. (a) Find the equation of the enveloping cylinder of the conicoid $2x^2 + y^2 + 3z^2 = 1$ where generators are parallel to the line $\frac{x}{1} = \frac{y}{2} = \frac{z}{2}$. 4

(b) Find the centre of the conic given by the equations $2x - 2y - 5z + 5 = 0$, $3x^2 + 2y^2 - 15z^2 = 4$. 4

SECTION–IV

8. (a) Find the lengths of semi-axis of the sections of the paraboloid $2x^2 + y^2 - z = 0$ by the plane $x + 2y + z = 4$. 4

(b) Show that the two confocal paraboloids cut everywhere at right angles. 4

9. Prove that the surface whose equation is $16x^2 + 4y^2 + 4z^2 + 4yz - 8zx + 8xy + 4x + 4y - 16z - 24 = 0$ is an elliptic paraboloid. Find the co-ordinates of its vertex and the equation to its axis. 8

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GSE/D-22 **777**

CLSSICAL MECHANICS AND THEORY OF RELATIVITY

Paper : I

Time : Three Hours] [Maximum Marks : 40

Note : (i) Attempt any *five* questions.
(ii) Question No. 1 is compulsory.
(iii) Select *one* question from each unit.
(iv) All questions carry equal marks.
(v) Non-programmable calculator is allowed.

Compulsory Question

1. (a) Write an expression for generalized velocity. (2)

(b) Show that angular is conserved under central force. (2)

(c) Draw the conclusion from negative result of Michelson-Morley's experiment. (2)

(d) Justify the mass-energy relation in nuclear fusion and fission. (2)

UNIT-I

2. (a) State and prove the conservation theorem for linear momentum and angular momentum for system of particles. (4)

(b) Show that kinetic emery can be expressed as a sum of kinetic energy of center of mass and total kinetic energy of motion about the center of mass. (4)

3. (a) State and prove the energy conservation theorem for a system of particles. (4)

(b) Derive expressions for generalized displacement, acceleration and force. (4)

UNIT-II

4. (a) State D'Alembert principle. (2)

(b) Deduce Lagrange's equation of motion from D'Alembert principle. (6)

5. (a) Assume the Atwood's machine to be conservation system with holonomic, scleronomous and its pulley frictionless then find out the acceleration of two masses attached to either end of the rope that pass over the pulley. (4)

(b) Find the time period for simple pendulum with the help of Lagrange's equation of motion. (4)

UNIT-III

6. (a) What do you mean by Galilean invariance? (2)

(b) Derive equations for Lorentz Transformation. (6)

7. (a) What are Coriolis and Centrifugal forces? When do they come into picture? (6)

(b) Calculate the fictitious force and the total force acting on a body of mass 5 kg relative to a frame moving with a downward acceleration of 2 ms^{-2}. (2)

UNIT-IV

8. (a) Discuss the concept of Fitzgerald length contraction. Derive an expression for length contraction. (4)

(b) From the Einstein theory of relativity, find out the relation for addition of velocities. (4)

9. (a) What are mass less particle? (3)

(b) Find the expression for the energy and momentum for a particle measured in a moving frame using equations of Lorentz Transformation. (5)

---

9. (a) Define quality factor and calculate its value for a parallel resonant circuit. 3

(b) In parallel resonant circuit show that resonant frequency

$$f_r = \frac{1}{2\pi}\sqrt{\frac{1}{LC} - \frac{R^2}{L^2}}.$$ 5

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GSE/D-22 **778**

ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

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.

SECTION–A
(Compulsory Question)

1. Attempt all the parts :

(a) Show that Div. of a curl is always zero. 1

(b) An electromagnetic wave has electric field component along *y*-direction and magnetic field component along *x*-direction. Name direction of wave propagation. 1

(c) A series LCR circuit has quality factor = 100. If each R, L, C is made double from its original value, find new quality factor of circuit. 2

(d) Sketch arrangement of magnetic moments in paramagnetic and ferromagnetic substances. 2

(e) Name the magnetisation which is manifestation of Lenz's law. 1

(f) Write down S.I. unit of $\vec{\nabla} \times \vec{H}$. 1

SECTION–B

UNIT–I

2. (a) Verify Stoke's theorem for the function $\vec{F} = \left(x^2\hat{i} + xy^2\hat{j}\right)$ integrated around the square in the plane $z = 0$ and bounded by the lines $x = 0$, $y = 0$, $x = a$, $y = a$. 5

(b) Derive Poisson's and Laplace's equation. 3

3. (a) For a scalar function $\phi = \ln\left(|\vec{r}|\right)$, find $\vec{\nabla}\phi$. 3

(b) State and prove Gauss's Divergence theorem. 2

(c) In an electric field, the potential is represented by $\phi = (3x^2 - y + z)$ volt. Find volume charge density in C m^{-3}. 3

UNIT–II

4. (a) Describe the Langevin's theory of Diamagnetism. 5

(b) Find an expression for the magnetic moment of an electron due to orbital motion and hence define Bohr Magneton. 3

5. (a) Establish the following relation :

$$\mu_r = 1 + \chi_m \qquad 2$$

(b) What is hystersis loss ? Show that energy loss per unit volume per cycle of magnetisation is equal to area of B–H Curve. 5

(c) Comment on temperature variation of susceptibility of paramagnetic material. 1

UNIT–III

6. (a) Establish Poyning Theorem for the conservation of energy for the electromagnetic field. Explain the meaning of each term in the resulting equation. 6

(b) Differentiate scalar and vector potential. 2

7. (a) Prove $\left(\vec{\nabla} \times \vec{H}\right) = \left(\vec{J} + \frac{\partial \vec{D}}{\partial t}\right)$. 3

(b) Determine the boundary condition satisfied by the magnetic field vector $\vec{B}$ at the interface of two media. 3

(c) An electromagnetic wave in vacuum has electric field $\vec{E}$ along x-axis and magnetic field $\vec{B}$ along y-axis then find direction of polarization of an e.m. wave and that of wave propagation. 2

UNIT–IV

8. (a) Derive an expression for impedence of a series LCR circuit, using j-operator and discuss resonance condition. 5

(b) A capacitor of 0.001 μF is connected in parallel with a 2 millihenry coil of resistance 0.5Ω. Calculate the frequency at which current from an AC source to this circuit is minimum. Also calculate selectivity of the circuit. 3

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GSE/D-22 **779**

INORGANIC CHEMISTRY

Paper–I

Time : Three Hours] [Maximum Marks : 32

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

Compulsory Question

1. (a) Write down the electronic configuration of Palladium (Atomic number = 46) and Cu^{2+} ion (Atomic number of Copper = 29). (2)

(b) Explain the Pauling scale of electronegativity. (2)

(c) Discuss the shape of H_2O molecule according to VSEPR theory. (2)

(d) Differentiate between Polarizing Power and Polarizability. (2)

SECTION-A

2. (a) Write *n, l, m, s* values of 4^{th} electron in :

(i) Carbon.

(ii) Oxygen. (3)

(b) What are the significance of ψ and ψ^2. (2)

(c) What is shielding effect? (1)

3. (a) What is significance of de-Broglie relationship? (2)

(b) What do you understand by Hund's rule of maximum multiplicity? Discuss with suitable example. (2)

(c) Calculate the uncertainty in the velocity of an electron if the uncertainty in position is 1.0 Å. ($h = 6.6 \times 10^{-34}$ J s, mass of electron = 9.1×10^{-31} kg. (2)

4. (a) Which out of O^{2-} and Mg^{2+} is smaller in size and why? (2)

(b) Differentiate between Electronegativity and Electron Affinity. (4)

5. (a) Why electron affinity of Fluorine is less than chlorine? (2)

(b) Discuss the Mullikan's scale of electronegativity. (2)

(c) Why second ionization energy is greater than first ionization energy? (2)

SECTION-B

6. (a) Describe Valence bond theory. (2)

(b) BeF_2 is linear but SF_2 is angular although both are triatomic. Explain. (2)

(c) What will be geometry of NH_3 molecule according to VSEPR theory? (2)

7. (a) What do you understand by bond pair and lone pair of electrons? Give *one* example of each type. (2)

(b) Explain the geometry and hybridization involves in following molecules :

(i) CH_4.

(ii) SF_6. (4)

8. (a) Explain the structure of Sodium Chloride also draw the diagram. (3)

(b) What are the Schottky and Frankel Defects? (3)

9. (a) Explain the structure of Cesium Chloride. Illustrate the unit cell structure. (3)

(b) What do you understand by radius ratio rule? Write down its limitations. (3)

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GSE/D-22 **780**

PHYSICAL CHEMISTRY

Paper–II

Time : Three Hours] [Maximum Marks : 32

Note : Students are required to attempt *five* questions, selecting at least *two* questions from each section. Question No. 1 is compulsory.

Compulsory Question

1. (a) Write units of Vander Walls constant. 2

(b) What is the basic principle of Linde's process for liquefaction of gases? 2

(c) Why drop of water is spherical in shape? 2

(d) Write the name of seven crystal systems? 2

SECTION–A

2. (a) Write assumptions of Kinetic molecular theory of gases. 3

(b) Calculate the Boyle's temperature for oxygen molecule assuming that it is a Vander Waals gas. Given a = 1.36 dm^6 atm mol^{-1} and R = 0.0821 dm^3 atm K^{-1} mol^{-1}. 3

3. (a) Calculate the ratio of Root mean square of velocity, Average velocity and Most Probable velocity. 3

(b) Calculate the volume of 10 moles of methane at 100 atm pressure and 0°C. At this temperature and pressure, Z = 0.783. 3

4. (a) Define Collision number, collision diameter & collision frequency. 3

(b) At 0°C and 1 atmospheric pressure, the molecular diameter of a gas is 4 Å. Calculate the mean free path of its molecules. 3

5. (a) Explain Andrew's experiment for critical phenomenon of Carbon dioxide. 3

(b) The critical constants of Carbon tetrachloride are T_c = 556.2 K, P_c = 45.0 atm, V_c = 275.5 cm^3. Calculate Vander Waals constant *a* and *b*. 3

SECTION–B

6. (a) Explain any *three* types of intermolecular forces of attraction among liquid molecule. 3

(b) Explain the structure of liquids on the basis of X-ray diffraction studies. 3

7. (a) Explain drop number method to determine surface tension of liquid. 3

(b) The value of $[\alpha]_D^{20}$ for lactose is 55.4°. What is the concentration in gram per litre of a solution of lactose which gives a rotation of 7.24° in a 10 cm cell at 20°C with sodium D-light? 3

8. (a) Explain any *three* symmetry elements in crystalline solids. 3

(b) A crystal plane has intercepts on the three axis of the crystal as l/3a , 3/4b & l/2c. Calculate the Miller indices of the face. 3

9. (a) Explain Bragg's equation for determination, interplanar distance in crystal. 3

(b) Explain Smectic liquid crystals with suitable example. 3

9. (a) Write the postulates of Baeyers Strain theory. What are its limitations? (2)

(b) Give *two* methods of preparations of Cycloalkanes. (2)

(c) What is Blanc's rule? (2)

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GSE/D-22 **781**

ORGANIC CHEMISTRY

Paper-III

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) What is Localized chemical bond? (1)
   (b) Define Homolytic bond fission. (1)
   (c) Give one example of Addition reaction. (1)
   (d) Define Plane of Symmetry. (1)
   (e) Two examples of Nucleophiles. (1)
   (f) What are Free radicals? (1)
   (g) Define Angle Strain. (1)
   (h) Two examples of Metamerism. (1)

SECTION-I

2. (a) Define Inductive effect. Give its types with examples. (2)

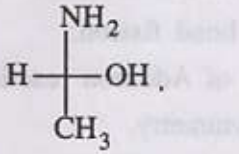
   (b) Write short note on van der Waals forces of attraction. (2)

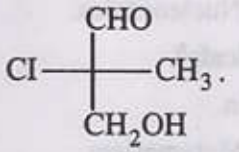
   (c) What is Resonance? Give two applications of resonance. (2)

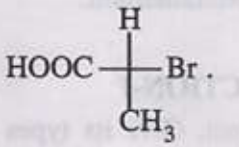
3. (a) Define Electromeric effect. Give example. (2)
(b) What is Isomerism? Give two examples of Functional isomerism. (2)
(c) What are Enantiomers? Write their properties. (2)

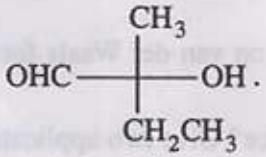
4. (a) What are Threo and Erythro diastereomers? Give examples. (2)
(b) Write notes on :
(i) Racemic mixture. (1)
(ii) Molecular chirality. (1)
(iii) Configurational isomerism. (1)
(iv) Inversion of configuration. (1)

5. (a) Assign R and S configuration to the following : (2)

(i) 

(ii) 

(iii) 

(iv) 

(b) What is Geometrical Isomerism? Give two examples. (2)
(c) Draw the various conformations of cyclohexane and give their order of stability. (2)

SECTION-II

6. (a) What are Electrophiles? Give *two* examples. (2)
(b) Give structure, hybridization, types and order of stability of (i) Carbocation. (ii) Carbene. (2+2=4)

7. (a) Write *two* other isomers of n-Pentane and write their IUPAC names. (2)
(b) Write notes on :
(i) Wurtz reaction and its limitations. (2)
(ii) Corey-House reaction and its advantage. (2)

8. (a) Write mechanism of free radical chlorination of Methane. (2)
(b) Calculate the percentage of isomers formed during bromination of n-butane.
[The reactivity order for 1° : 2° : 3° hydrogen abstraction, is 1 : 82 : 1600]. (2)
(c) Give *one* example each of Primary, Secondary, Tertiary and Quaternary carbons. (2)

(b) Fill in the blanks with suitable prepositions :

(i) I do not believe ..... ghosts.

(ii) A gale got up ..... the night, and did much damage.

(iii) It is rude to point ..... people.

(c) Correct the following sentences :

(i) I am junior to he.

(ii) These pages were written in inks.

(iii) This cloth is inferior with that.

(iv) A snake cut him. 10

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Total Pages : 6

GSE/M-22 **782**

ENGLISH

Time : Three Hours] [Maximum Marks : 40

Note : Attempt all questions.

1. Read the passage given below and answer the questions that follow :

Let me not to the marriage of true minds

admit impediments. Love is not love

which alters when its alteration finds,

Or bends with the remover to remove.

Questions :

(a) Name the poem and the poet.

(b) What is the poet not prepared to admit ?

(c) What happens to true love when there is a chance to change ?

(d) Does true love yield before anybody ?

(e) Use in sentences of your own :

(i) Alter.

(ii) Impediment. 5

OR

Thus Nature spake – The work was done—

How soon my Lucy's race was run !

She died, and left to me

This heath, this calm, and quiet scene;

The memory of what has been,

And never more will be.

Questions :

(a) From which poem have these lines been taken ?

(b) What does the poem mean by "The work was done" ?

(c) What is the meaning of "How soon my Lucy's race was run" ?

(d) What did Lucy leave to the poet ?

(e) What does the poet think about Lucy ?

2. Explain with reference to the context :

From rest and sleep, which but thy pictures be,

Much pleasure then from thee much more must flow,

And soonest our best men with thee do go

Rest of their bones and soul's delivery.

OR

My mother bore me in the southern wild

And I am black, but oh ! my soul is white;

White as an angel is the English child;

But I am black, as if bereaved of light. 3

3. Answer the following questions in about 30 words each :

(a) How does Milton regret the loss of his 'light' ?

OR

Why should death be not proud of its power ?

(b) What makes England a 'fainting country' for Shelley ?

OR

What do you understand by 'City of Palm Trees' ?

(c) What did nature decide for Lucy ?

OR

Explain : 'The Princes are the dregs of their dull race'.

(d) Why does the poet want to be a child in 'The Retreat' ?

OR

Who was Flecknoe ? 6

4. How does the poet justify the ways of God to man in the sonnet 'On His Blindness' ?

OR

Bring out the pathetic condition of England as portrayed in the poem 'England in 1819'. 6

5. Translate the following passage into English :

इस समय राष्ट्रीय एकता और संगठन की हमें बहुत आवश्यकता है। इसी पर हमारी सफलता, प्रगति और समृद्धि निर्भर है। भारत एक विशाल देश है जिसकी जनसंख्या 121 करोड़ के लगभग है। इसमें भिन्न-भिन्न भाषाएँ बोलने वाले लोग रहते है जो भिन्न-भिन्न वस्त्र पहनते हैं। इनके धर्म भी अलग-अलग हैं। इनके रीति-रिवाज़ भी भिन्न हैं। परन्तु यह सभी भारतीय हैं। दु:ख की बात यह है कि ये लोग प्राय: भाषा और धर्म के आधार पर लड़ते हैं। अपने स्वार्थ को देश प्रेम से ऊँचा रखते है। यह आपस के झगड़े देश को कमज़ोर करते हैं।

OR

(For Non-Hindi/Foreign candidates only).

Read the following passage and answer the questions given at the end :

Nation become great by self-confidence, not by relying on others. You can be friends with others, but you have to rely on yourselves. There can be co-operation with others, but you have to do your own thinking and work with your own hands. Any country which forgets this and is frightened begins to decline, faces ruin and lowers itself what greater indignity for India that fear should grip up and we lose confidence in ourselves ? Whatever work is there, it is we who have to do it, although we have friends in the world

and we have to maintain that friendship and take their help. The big countries in the world have helped us and we are grateful for that, not only for the help but for their sympathy. We have to march ahead towards our goal on the path we have chosen for ourselves, and we shall attain that goal. We have to remember this principle and ensure the progress of the country. Relying on ourselves and with the help of friends, we have to solve our problems and so change our country that it would be able to stand on its legs.

Questions :

(a) How can nations become great ?

(b) What happens to a country which loses self-confidence?

(c) How can we ensure the progress of our country ?

(d) Use in meaningful sentences : Decline; Indignity. 4

6. Write a paragraph on any one of the following in about 250 words :

(a) Our College Library.

(b) Beauties of Nature.

(c) Memories of childhood.

(d) Noise Pollution.

(e) Corruption. 6

7. (a) Use the following phrasal verbs in your own sentences :

(i) Break off.

(ii) Think over.

(iii) Give in.

Roll No. ..... Total Pages : 2

GSE/D-22 **785**

DIVERSITY OF MICROBES

Paper–I

Time : Three Hours] [Maximum Marks : 40

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

Compulsory Question

1. (a) What is difference between the cell wall of gram positive and gram negative bacteria?

(b) What is bacterial endospore?

(c) What is Hormogonia in Cyanobacteria?

(d) What is Phialophore?

(e) Define Phytoplanktons.

(f) What is mycelia?

(g) What is Cleistothecium?

(h) Causal organism of Red Rot of Sugarcane? (1×8=8)

UNIT–I

2. Describe structure of typical Bacterial cell. (8)

3. Describe various types of life cycles found in algae. (8)

4. Explain the life cycle of *Polysiphonia* with suitable diagrams. (8)

5. Describe in brief the classification and economic importance of algae. (8)

UNIT–II

6. Explain general feature of viruses and structure of TMV. (8)

7. Describe sexual Reproduction in fungi. (8)

8. Write short notes on the following :
   (a) Heterothalism.
   (b) Cleistothecium.
   (c) Symptoms of late blight of Potato.
   (d) Fairy Rings in *Agaricus*. (8)

9. Explain the structure of lichens and their mode of reproduction. (8)

Roll No. ..... Total Pages : 2

GSE/D-22 **786**

CELL BIOLOGY

Paper–II

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *two* questions from each unit. Draw neat and well labelled diagrams where they are necessary.

Compulsory Question

1. (a) What are allosomes ?

(b) Who coined the term nucleolus ?

(c) What are Nullisomics ?

(d) What do you mean by middle lamella ?

(e) Write short note on Nuclear envelope.

(f) Define Plasmodesmata.

(g) Name *two* enzymes present in ER.

(h) Define stroma in chloroplast. (1×8=8)

UNIT–I

2. Write short note on the following :

(a) Structure and function of Nuclear pore.

(b) Fluid mosaic model of plasma membrane with suitable examples. (4,4)

3. Why Mitochondrion is called "Power House of the Cell". Give its structure and function in detail. 8

4. (a) Describe various kinds of lysosomes.

   (b) Define the terms RER and SER. Give the functions of each. (4,4)

5. Explain the detailed structure of chloroplast with suitable diagrams. 8

UNIT–II

6. What is cell cycle ? Describe the process of mitosis in plant cell with suitable labelled diagrams. 8

7. (a) Explain the role of telomere in cell.

   (b) What are inversions ? Discuss the behaviour of chromosomes having inversions during meiosis. (4,4)

8. Distinguish between :

   (a) Mitosis and Meiosis.

   (b) Primary and Secondary constriction.

   (c) Telomeres and Centromeres. (3,3,2)

9. Write notes on :

   (a) Sex determination.

   (b) Variation in chromosome number in plants. (4,4)

Roll No. .....

Total Pages : 3

GSE/D-22

787

LIFE AND DIVERSITY FROM PROTOZOA TO PORIFERA AND CELL BIOLOGY-I

Paper–I

Time : Three Hours]

[Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory. Attempt *two* questions from Section A and *two* questions from Section B.

Compulsory Question

1. (a) What is nuclear dimorphism.

(b) Name the infective stage of *Plasmodium*.

(c) What is a reservoir host ?

(d) Write the scientific names of two harmful sponges.

(e) What are thesocytes ?

(f) What are tonofibrils ?

(g) Name the *two* types of intercellular junctions.

(h) What are microsomes ?

(i) What is the role of Mg^{2+} ions in ribosome assembly ?

(j) Explain the term MAP. (10×1=10)

SECTION–A

2. (a) Explain the life cycle of *Plasmodium vivax* diagrammatically only. 4

   (b) Give a brief account of life cycle of *Trypanosoma gambiense*. 3½

3. (a) Differentiate between the various species of Plasmodium that causes malaria in man. 4

   (b) Give a brief account of life history of Leishmania in man. 3½

4. (a) Write short notes on :

   (i) Amphiblastula.

   (ii) Fertilization in *Scypha*. (2×2=4)

   (b) Draw well labelled diagram of vertical section of *Scypha* showing its canal system. 3½

5. Give an account of various kind of spicules found in sponges. 7½

SECTION–B

6. (a) Distinguish between :

   (i) Extrinsic and intrinsic proteins.

   (ii) Osmosis and diffusion. (2×2=4)

   (b) Discuss the various functions of ER in cell. 3½

7. (a) Enumerate the chemical composition of plasma membrane. 4

   (b) "Golgi complex acts as the traffic police of the cell". Justify. 3½

8. (a) Give an account of ultra-structure of ribosomes. 4

   (b) Write a note on the biogenesis of mitochondria. 3½

9. (a) Explain the functions of microtubules. 4

   (b) Describe the ultrastructure of centriole. 3½

Roll No. 22003287 Total Pages : 3

GSE/D-22 **788**

LIFE AND DIVERSITY FROM COELENTERATA TO HELMINTHES AND CELL BIOLOGY–II

Paper–II

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all. Q. No. 1 is compulsory. Select at least *two* questions from each Section A and B. Draw well labelled diagrams wherever necessary.

Compulsory Question

1. Short answer type questions (in about 20-30 words)

(i) What are cnidoblasts? Give their functions.

(ii) Mehlis glands.

(iii) Coral reefs.

(iv) Name the disease caused and symptoms of disease caused by Oxyuris.

(v) Delayed Polyembryony.

(vi) Nucleosome.

(vii) Define crossing over. What is its significance?

(viii) Chemotherapy.

(ix) Cell Mediated Immune System.

(x) Satellite DNA.

SECTION–A

2. What is Metagenesis? Describe the life cycle of obelia. 7½

3. Describe the Reproductive System of *Fasciola hepatica*. 7½

4. (a) Draw a well labelled diagram of V.S. Polyp of obelia. 2½
   (b) Discuss pathogenicity of *Fasciola hepatica*. 2½
   (c) Draw graphic life cycle of Schistosoma. 2½

5. (a) Write a note on Cercaria Larva. 3½
   (b) Describe the life history, made of infection and pathogenicity of Ancylostoma. 4

SECTION–B

6. (a) Explain ultrastructure and functions of nucleolus. 5½
   (b) What is Master and Slave hypothesis? 2

7. Compare Prophase stage of Mitosis and Meiosis. 7½

8. (a) Differentiate between Benign Tumour and Malignant Tumour. 3½

   (b) Discuss the causes, symptoms and therapy of any *two* of the following :
      (i) Lung Cancer.
      (ii) Breast Cancer.
      (iii) Leukemia. 4

9. (a) What do you mean by inflammatory response? 1½
   (b) Draw a flowchart of activation of classical pathway of Complement System. 3
   (c) Differentiate between Active and Passive Immunity. 3

Roll No. ..... Total Pages : 3

GSE/D-22 **791**

ELECTRONICS DEVICES AND CIRCUITS–I

Paper–I

Time : Three 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 (8) marks.

Compulsory Question

1. (a) What is doping in semiconductors? Why is it done?

(b) What do you understand by ripple factor? What is its significance?

(c) Base is always kept very thin and lightly doped. Why?

(d) Why h-parameters are known as hybrid parameters? Justify. (2×4=8)

UNIT-I

2. What do understand by voltage regulation? Explain the working of Zener Diode as voltage regulator. 8

3. (a) What are drift and diffusion currents? Write equations for these currents. 4

(b) Explain the working of shunt negative clipper with the help of circuit diagram and waveforms. 4

UNIT-II

4. What is a Rectifier circuit and explain the working of centre-tapped full wave rectifier with the help of circuit diagram and waveforms. Drive an expression for average and RMS value of the output voltage. 8

5. (a) What is a voltage multiplier circuit? Explain the working of voltage doubler. 4

(b) Compare centre-tapped and bridge full wave rectifier circuits. 4

UNIT-III

6. Explain the input and output characteristics of transistor in Common Emitter (CE) Configuration. Also show the cut-off, active and saturation regions in the output characteristics. 8

7. (a) What is Early Effect and write its consequences. 4

(b) Drive an expression to show relation between α and β. 4

UNIT-IV

8. (a) Draw the small signal equivalent circuit of transistor in CE configuration using h-parameters. 4

(b) Compare the three configurations of transistor. 4

9. (a) Using h-parameter model of the transistor, derive the expression for :

(i) Input impedance.

(ii) Output impedance. 6

(b) Common Collector (CC) configuration of transistor is known as Emitter Follower. Why? 2

Roll No. ..... Total Pages : 5

GSE/D-22 **792**

NETWORK ANALYSIS

Paper–II

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *one* question from each unit. Question 1 is compulsory.

Compulsory Question

1. (a) Explain the terms with reference to networks :

(i) Linear.

(ii) Bilateral.

(iii) Passive.

(iv) Lumped.

(b) What is a 2-port network? Give examples.

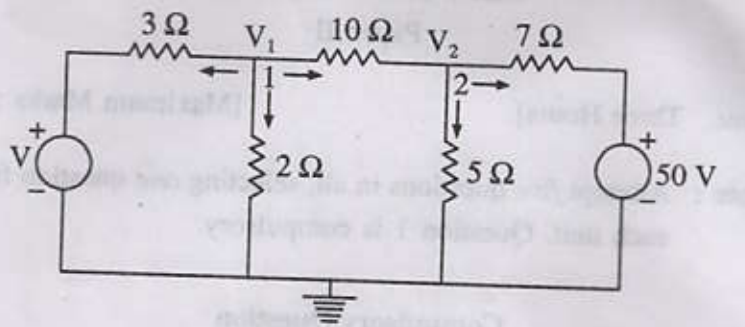
(c) Write the conditions of reciprocity and symmetry for Z-Parameters.

(d) Define Y-parameters. Why they are called short circuit admittance parameters. (2×4=8)

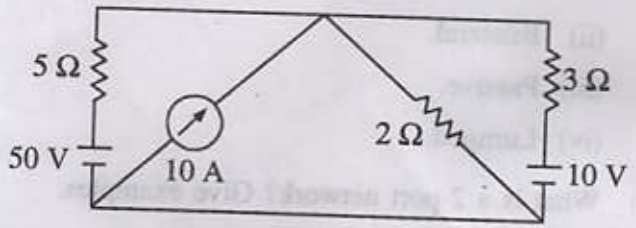
UNIT–I

2. (a) Enlist the steps to solve any network using Node Analysis. 3

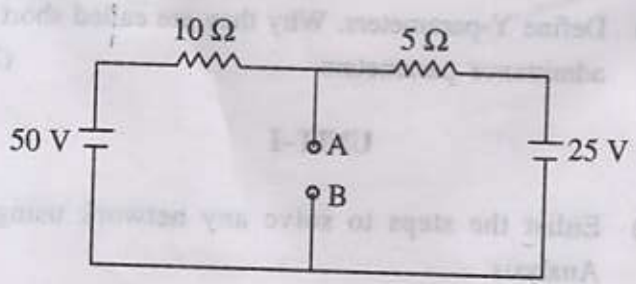
(b) Find the voltage "V" in the following circuit which makes the current in 10 Ω resistor zero using Nodal analysis : 5



3. (a) Find the power delivered by the 50 V source in the following network : 4



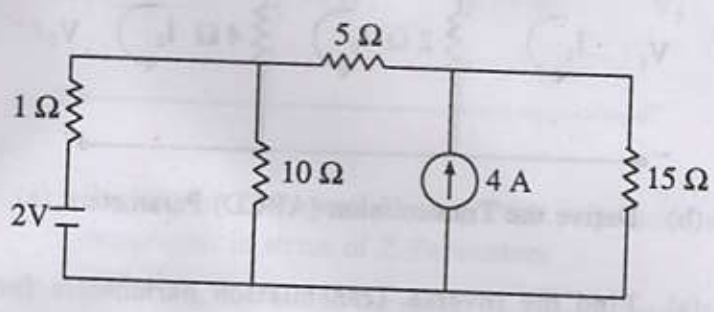
(b) Determine the Thevnin equivalent across AB for the following network : 4



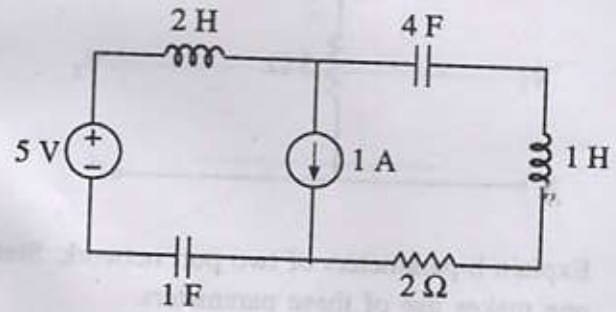
UNIT–II

4. (a) Define Norton's Theorem. Enlist the steps to solve the network using Norton's Theorem. 3

(b) Find the current through 10 Ω resistor using Norton's Theorem in the network below : 5



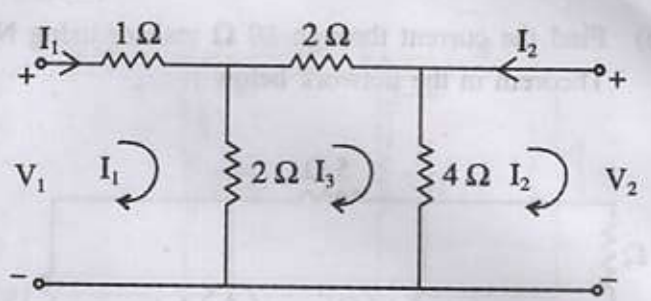
5. (a) Draw the dual network for the given network : 3



(b) State and Explain Milliman Theorem and its Dual. 5

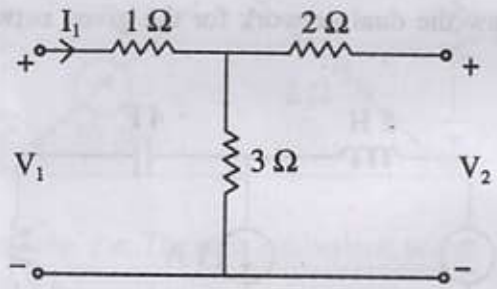
UNIT–III

6. (a) Find the Y-Parameters for the network shown in figure below : 5



(b) Derive the Transmission (ABCD) Parameters. 3

7. (a) Find the inverse Transmission parameters for the following network : 4

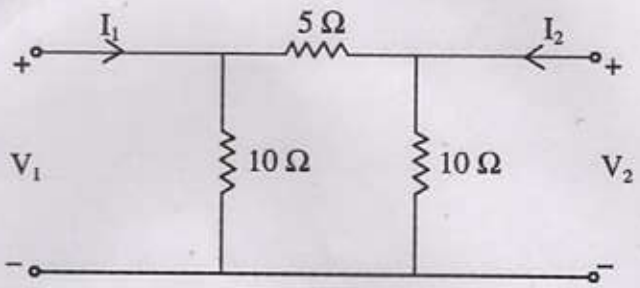


(b) Explain h-parameters of two port network. State where one makes use of these parameters. 4

UNIT–IV

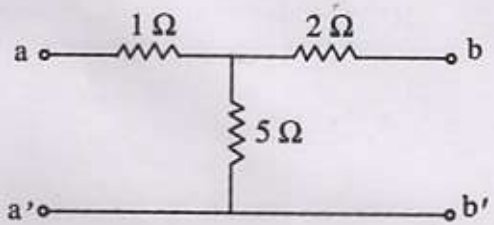
8. (a) Derive Y-Parameters in terms of ABCD parameters. 3

(b) Obtain Lattice equivalent of the symmetrical T-network : 5



9. (a) Explain the concept of Driving Point impedance at the output port in terms of Z-Parameters. 4

(b) Determine the Image parameters of the T-network : 4



Roll No. .....

Total Pages : 2

GSE/D-22 **794**

COMPUTER AND PROGRAMMING FUNDAMENTALS

Paper – I

Time : Three Hours] [Maximum Marks : 40

Note : Students should attempt *five* questions in all. Question No. 1 is compulsory. Attempt *four* more questions, selecting *one* question from each unit. All questions carry equal marks.

Compulsory Question

1. Write notes on :

(i) Hardware. (2)

(ii) CPU. (2)

(iii) HLL. (2)

(iv) DVD. (2)

UNIT–I

2. (a) Differentiate between RAM and ROM. (4)

(b) What is Cache memory? Explain its different levels. (4)

3. Explain ROM with its usage. Elaborate its different types. (8)

UNIT–II

4. Write notes on :

(i) Ports in computers. (4)

(ii) Various types of software. (4)

5. (a) What is computer virus? Explain at least three types of viruses. (3)

(b) Explain Time sharing operating system. (5)

UNIT–III

6. (a) Write note on Flow Charts. (5)

(b) Differentiate between Debugging and Testing. (3)

7. What do you understand by system documentation? Explain characteristics of good documentation with its different forms. (8)

UNIT–IV

8. Explain role of translator software in computer languages. Give different types of translators and highlight contrast between them. (8)

9. Explain bubble sort technique. Write algorithm and discuss its complexity. (8)

Roll No. ..... Total Pages : 3

GSE/D-22 **795**

PC SOFTWARE

Paper–II

Time : Three 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) How can you customize the start menu and taskbar? (2)

(b) How will you apply a page border in MS-Word? (2)

(c) What is the purpose of Formula Bar in MS Excel? How is it used? (2)

(d) What are the steps to move text in MS-PowerPoint? (2)

UNIT–I

2. (a) What are various features of MS-Windows? Also discuss why Windows is the most used operating system. (4)

(b) How can you change settings, password and pictures of user account? (4)

3. (a) Discuss the following system tools of Windows : Disk cleanup, Disk defragmenter; system restore. (6)

(b) What is windows explorer? Discuss its basic features. (2)

UNIT–II

4. (a) What is the use of Mail Merge? Discuss the concept by explaining the steps involved in mail merge. (4)

(b) What is the need of bookmarks in MS-Word? How will you apply and use bookmarks in the document? (4)

5. (a) What is the difference between page break and section break? How are these applied in MS-Word? (4)

(b) How do you create index and table of contents in MS-Word? Discuss. (4)

UNIT–III

6. (a) Explain various types of Charts in MS-Excel and discuss how charts can be created in MS-Excel. (4)

(b) What is the difference between freezing and hiding in MS-Excel? How these can be done? (4)

7. (a) Explain the mathematical functions supported by MS-Excel. (4)

(b) Discuss Pivot Table and Pivot charts in MS-Excel. (4)

UNIT–IV

8. (a) How can a PowerPoint presentation be created and enhanced? (4)

(b) Differentiate between slide sorter, slide view and slide show view of a presentation? (4)

9. (a) What are the steps to add animation and sounds in a PowerPoint presentation? (4)

(b) How can chart be added in a slide in MS-PowerPoint? (4)

Roll No. .....

Total Pages : 02

GSE/D-22 **1109**

HYGIENE AND PROMOTIVE HEALTH

Course No. 102

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.
प्रत्येक इकाई से कम से कम **एक** प्रश्न चुनते हुए, कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या 1 अनिवार्य है ।

Compulsory Question (अनिवार्य प्रश्न)

1. Answer briefly in 2-3 lines : 2×4
   (i) Infection (ii) Tetanus
   (iii) Immunity (iv) BCG.
   2-3 पंक्तियों में संक्षेप में उत्तर दीजिए :
   (i) संक्रमण (ii) टिटनेस
   (iii) प्रतिरक्षण (iv) बी.सी.जी. ।

Unit I (इकाई I)

2. Explain causes, symptoms, mode of spread and treatment of hepatitis. 8
   हेपेटाइटिस के कारण, लक्षण, फैलने के तरीके और इलाज के बारे में बताइए ।

3. Write down in detail about AIDS. 8
एड्स के बारे में विस्तार से लिखिए ।

4. Discuss causes, symptoms and prevention of polio. 8
पोलियो के कारण, लक्षण और रोकथाम पर चर्चा कीजिए ।

5. Write down causes and treatment of Dengue. 8
डेंगू के कारण और उपचार लिखिए ।

Unit II (इकाई II)

6. What is Personal Hygiene ? Why is physical health important ? 8
व्यक्तिगत स्वच्छता क्या है ? शारीरिक स्वास्थ्य क्यों महत्वपूर्ण है ?

7. Discuss vaccination schedule of children. 8
बच्चों के टीकाकरण कार्यक्रम पर चर्चा कीजिए ।

8. Why is mental health important for maintaining physical health ? 8
शारीरिक स्वास्थ्य बनाए रखने के लिए मानसिक स्वास्थ्य क्यों महत्वपूर्ण है ?

9. Discuss National Health Programme on Tuberculosis. 8
तपेदिक पर राष्ट्रीय स्वास्थ्य कार्यक्रम की चर्चा कीजिए ।

Roll No. .....

Total Pages : 03

GSE/D-22

1110

INTRODUCTION TO TEXTILES

Course No. 103

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 in few words :

(i) Fiber (ii) Spinning

(iii) Weaving (iv) Yarn count

(v) Knitting (vi) Banding

(vii) Felting (viii) Loom.

कुछ शब्दों में लिखिए :

(i) फाइबर (ii) कताई

(iii) बुनाई (iv) सूत की गिनती

(v) निटिंग (vi) बैंडिंग

(vii) फेल्टिंग (viii) करघा ।

Unit I (इकाई I)

2. Define the term Fibre. Give the classification of fibre and their characteristics in detail.

फाइबर शब्द को परिभाषित कीजिए । रेशों का वर्गीकरण एवं उनकी विशेषताओं को विस्तार से लिखिए ।

3. Explain the manufacturing process of cotton and describe its physical properties.

कपास की निर्माण प्रक्रिया को समझाइए तथा इसके भौतिक गुणों का वर्णन कीजिए ।

4. Explain manufacturing process of nylon using diagram.

नाइलॉन की निर्माण प्रक्रिया को चित्र की सहायता से समझाइए ।

5. Differentiate between the following :

(a) Monofilament and Multifilament fiber.

(b) Vegetable fiber and Annual fiber.

(c) Staple and Filament.

निम्नलिखित के बीच अंतर कीजिए :

(अ) मोनोफिलामेंट और मल्टीफिलामेंट फाइबर

(ब) वनस्पति फाइबर और वार्षिक फाइबर

(स) स्टेपल और फिलामेंट ।

Unit II (इकाई II)

6. Define yarn and explain its types in detail. Give examples and draw diagram if required.

सूत को परिभाषित कीजिए तथा इसके प्रकारों को विस्तार से समझाइए । उदाहरण दीजिए एवं यदि आवश्यक हो तो चित्र भी बनाइए ।

7. What do you mean by weaving ? Explain different parts of loom and its working and draw diagram.

बुनाई से आप क्या समझते हैं ? करघे के विभिन्न भागों और उसकी कार्यप्रणाली को समझाइए तथा रेखाचित्र बनाइए ।

8. Differentiate between knitting and weaving.

बुनाई और बिनाई में अंतर स्पष्ट कीजिए ।

9. Write short notes on the following :

(a) Braiding.

(b) Net ling.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) ब्रेडिंग

(ब) नेट लिंग ।

7. Write down the names of various cooking methods using different cooking medium. Explain in detail cooking by dry heat giving advantages and disadvantages of each method. 8

भोजन पकाने की विभिन्न विधियों के नाम लिखिए तथा सूखे ताप द्वारा पकाने वाली विधियों के लाभ व हानियाँ बताते हुए विस्तार से लिखिए ।

8. Write short notes on the following : 2×4=8

(a) Importance of enhancing nutritive value of food

(b) Solar cooking.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) भोजन का पोषक मान बढ़ाने की महत्ता

(ब) सोलर कुकिंग ।

9. What are various household methods of improving the nutritional quality of food ? 8

भोजन का पोषक मान बढ़ाने के लिए घरेलू विधियों के बारे में विस्तार से लिखिए ।

Roll No. 22.01.1001..... Total Pages : 04

GSE/D-22 1111

FOOD SCIENCE

Course : 104

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. Fill in the blanks : 1×4=4

(a) The yellow colour in fruits and vegetables is due to presence of.....pigment.

(b) .....spice is considered as king of spices.

(c) Tikki, Chilla and Omlette are cooked by.....frying method.

(d) .....vitamin is increased almost 10 times in food stuffs during germination.

Define the following : 1×4=4

(a) Avidin

(b) Supplementation
(c) Nutrition
(d) Icing sugar.

रिक्त स्थान भरिए :

(अ) फल एवं सब्जियों में पीला रंग----------पिंगमेट के कारण होता है ।

(ब) ----------मसाले को मसालों का राजा कहा जाता है ।

(स) टिक्की, पूड़ा, आमलेट----------तलने द्वारा बनाए जाते हैं ।

(द) अंकुरण विधि द्वारा खाद्य पदार्थों में----------विटामिन की मात्रा लगभग 10 गुना बढ़ जाती है ।

निम्नलिखित को परिभाषित कीजिए :

(अ) ऐविडिन

(ब) सप्लीमेन्टेशन

(स) पोषण

(द) आइसिंग शुगर ।

Unit I (इकाई I)

2. Why are cereals essential for our body ? Discuss the nutritional value of cereals. 8

हमारे जीवन/शरीर के लिए अनाज क्यों जरूरी है ? अनाज के पोषक मान पर प्रकाश डालिए ।

3. Write short notes on any *two* of the following : 2×4=8

(a) Nutritional and medicinal value of clove and turmeric

(b) Nutritional value of fish

(c) Nutritional contribution of pulses in diet.

निम्नलिखित में से किन्हीं **दो** पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) लौंग एवं हल्दी का पोषक मान एवं औषधीय मूल्य

(ब) मछली का पोषक मान

(स) दालों का पोषण संबंधी योगदान ।

4. Write short notes on the following : 2×4=8

(a) Nutritional value of vegetables

(b) Nutritional value of egg.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) सब्जियों का पोषक मान

(ब) अण्डे का पोषक मान ।

5. Explain in detail about fermented and non-fermented milk products. 8

खमीरीकरण तथा खमीरीकरण के बिना दूध से बनाए जाने वाले खाद्य पदार्थों के बारे में विस्तार से लिखिए ।

Unit II (इकाई II)

6. Write short notes on any *two* of the following : 2×4=8

(a) Principles of cooking

(b) Effect of cooking on different nutrients

(c) Microwave cooking.

निम्नलिखित में से किन्हीं **दो** पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) खाना पकाने के सिद्धांत

(ब) खाना पकाने का विभिन्न पोषक तत्वों पर प्रभाव

(स) माइक्रोवेव कुकिंग ।

संरचना लिखिए :

(i) But-2-en-1-ol

(ii) Pentanal.

(b) Give the chemical composition and uses of Paints and Varnishes. 4

पेंट्स एवं वॉर्निश के घटक और उपयोग बताइये ।

(c) Give an example of condensation polymer. 1

संघनन बहुलक का एक उदाहरण दीजिए ।

9. (a) Write notes on the following : 2×3=6

(i) Hair Dye

(ii) Nail Polish.

निम्नलिखित पर टिप्पणियाँ लिखिए :

(i) Hair Dye

(ii) Nail Polish.

(b) How the four valencies of the carbon atom are oriented in space ? Discuss. 2

कार्बन परमाणु की चार (valencies) के arrangement का वर्णन कीजिए ।

Roll No. ..... Total Pages : 06

GSE/D-22 1112

INTRODUCTORY CHEMISTRY

Course No. 105

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) Distinguish between element and compound. 2

तत्त्व व यौगिक में भेद लिखिए ।

(b) What is Avogadro's number ? 2

एवोगेड्रो नम्बर क्या है ?

(c) Define an ionic bond. 2

आयोनिक बन्ध (bond) को परिभाषित कीजिए ।

(d) Write the structure of 2-Butene. 1

2-ब्यूटीन की संरचना लिखिए ।

(e) What is electronegativity ? 1

विद्युतऋणात्मकता क्या है ?

Unit I (इकाई I)

2. (a) Calculate the no. of electrons, protons and neutrons present in the element with notation : 3

$^{23}_{11}Na$

दिये गये तत्त्व के 'सांकेतिक' में इलेक्ट्रान, प्रोटॉन व न्यूट्रान की संख्या ज्ञात कीजिए :

$^{23}_{11}Na$

(b) Write the electronic configuration of Oxygen (At. No. 8) and Chlorine (At. No. 17). 2

ऑक्सीजन (At. No. 8) एवं क्लोरीन (At. No. 17) का इलेक्ट्रोनिक विन्यास लिखिए ।

(c) What is a covalent bond ? Explain by taking a suitable example. 3

सहसंयोजक बंध क्या है ? एक उपयुक्त उदाहरण द्वारा वर्णन कीजिए ।

3. (a) Classify the following as acids and bases giving reasons : 4

HCl, $\ddot{N}H_3$, $NaOH$, BF_3.

निम्नलिखित को 'क्षार' व 'अम्ल' में विभाजित कीजिए, उपयुक्त कारण भी बताइये :

HCl, $\ddot{N}H_3$, $NaOH$, BF_3.

(b) Calculate the number of moles present in 22 grams of carbon dioxide (CO_2). (Atomic wt. of C is 2 and O is 16). 3

22 ग्राम कार्बन डाइक्साइड में कितने 'मोल' होते हैं ? ज्ञात कीजिए । आण्विक भार C = 2 तथा O = 16 है ।

(c) What do groups and periods represent in the Periodic Table ? 1

आवर्त सारणी में ग्रुप (groups) एवं पीरियड (periods) क्या होते हैं ?

4. (a) What is pH ? Give its application. 3

pH क्या है ? इसकी अनुप्रयोज्यता दीजिए ।

(b) Define the term Orbit. 2

Orbit (कक्षा) शब्द को परिभाषित कीजिए ।

(c) Identify the nature of the bond in the following compounds :

(i) HCl (ii) NaCl

(iii) H_2O 3

निम्नलिखित यौगिकों में बॉण्ड की प्रकृति पहचानिए :

(i) HCl (ii) NaCl

(iii) H_2O

5. (a) Fill in the blanks :

(i) For the formation of H-bond, hydrogen atom must be attached to.....

(ii) The given solution will be.....if its pH = 11.

(iii) Sucrose ($C_{12}H_{22}O_{11}$) is an example of a..... 3

रिक्त स्थानों को भरिए :

(i) H-बन्ध बनाने के लिए हाइड्रोजन का परमाणु अवश्य.....से जुड़ा होना चाहिए ।

(ii) दिया गया घोलक.....होगा अगर उसकी pH = 11 है ।

(iii) सुक्रोज ($C_{12}H_{22}O_{11}$).....का उदाहरण है ।

(b) Define Electron Affinity. 2

इलेक्ट्रोन बन्धुता की परिभाषा दीजिए ।

(c) Calculate the mass of one mole of sulphuric acid (H_2SO_4). 3

(At. Wt., Sulphur = 32, Oxygen = 16, Hydrogen = 1).

एक 'मोल' सल्फ्यूरिक अम्ल का भार ज्ञात कीजिए :

(अणु भार, सल्फर = 32, ऑक्सीजन = 16, हाइड्रोजन = 1).

Unit II (इकाई II)

6. (a) Explain any two characteristic properties of Carbon. 4

कार्बन की किन्हीं **दो** विशेषताओं का वर्णन कीजिए ।

(b) Write the name, structure and uses of the polymer PVC. 3

PVC 'पोलिमर' का नाम, संरचना व उपयोग बताइये ।

(c) Write IUPAC names of the following. Do any *one*.

(i) $CH_3-CH_2-C\equiv CH$

(ii) $H_3C-\overset{\overset{O}{\|}}{C}-CH_3$ 1

निम्नलिखित में से किसी **एक** का IUPAC नाम बताइये :

(i) $CH_3-CH_2-C\equiv CH$

(ii) $H_3C-\overset{\overset{O}{\|}}{C}-CH_3$

7. (a) What is the general formula of Alakanes ? 1

एलकेन्स का 'सामान्य सूत्र' लिखिए ।

(b) What are detergents ? Discuss advantages and disadvantages of detergents ? 4

सर्फ (detergents) क्या हैं ? इनके लाभ व हानियों का वर्णन कीजिए ।

(c) Mark primary (1°), secondary (2°) and tertiary (3°) carbon atoms in the following structure : 3

$$H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{H}{|}}{C}}-CH_2-CH_2-CH_3$$

निम्नलिखित उदाहरण में 1°, 2° एवं 3° कार्बन परमाणु को अंकित कीजिए :

$$H_3C-\overset{\overset{CH_3}{|}}{\underset{\underset{H}{|}}{C}}-CH_2-CH_2-CH_3$$

8. (a) Write down the structures of :

(i) But-2-en-1-ol

(ii) Pentanal. 2×1.5=3

Roll No. 220111004

Total Pages : 03

GSE/D-22 **1113**

INTRODUCTION TO HUMAN DEVELOPMENT

Course 106

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 the following : **2×4=8**

(a) Infancy is a crucial stage.

(b) Psychoanalytical theory

(c) Role of childhood experience on development of a child

(d) Characteristics of adolescence.

निम्नलिखित का वर्णन कीजिए :

(अ) शैशवावस्था एक महत्त्वपूर्ण अवस्था है ।

(ब) साइकोएनालिटिकल सिद्धान्त

(स) बालक के विकास में बाल्यावस्था के अनुभवों का योगदान

(द) किशोरावस्था की विशेषताएँ ।

Unit I (इकाई I)

2. Define Human Development. Explain the various milestones of development. 8

मानवीय विकास को परिभाषित कीजिए । विकास की महत्त्वपूर्ण उपलब्धियों (मील के पत्थर) का वर्णन कीजिए ।

3. Discuss the scope of Human development. 8

मानवीय विकास के क्षेत्र की चर्चा कीजिए ।

4. Explain the stages of psychosocial development. 8

मनोसामाजिक विकास की विभिन्न अवस्थाओं का वर्णन कीजिए ।

5. What is the importance of early concepts in the field of child development ? 8

बाल विकास के क्षेत्र में प्रारंभिक अवधारणाओं के महत्त्व को स्पष्ट कीजिए ।

Unit II (इकाई II)

6. Briefly explain the different methods of child study. 8

बाल अध्ययन की विभिन्न विधियों का संक्षिप्त वर्णन कीजिए ।

7. Discuss the factors affecting growth and development of a child. 8

बालक की वृद्धि और विकास को प्रभावित करने वाले कारकों का उल्लेख कीजिए ।

8. Write an essay on importance of child study. 8

बाल अध्ययन के महत्त्व पर एक प्रस्ताव लिखिए ।

9. Highlight various areas of development of a child. 8

बालक के विकास के विभिन्न क्षेत्रों पर प्रकाश डालिए ।

Roll No. ..... Total Pages : 2

BSIT/D-22 **26112**

COMMUNICATION SKILLS–I

(English)

Paper – BSIT-101

Time : Three Hours] [Maximum Marks : 40

Note : Attempt all questions. Question No. 1 is compulsory.

Compulsory Question

1. Write short notes on any *four* of the following :

(a) Memorandum.

(b) Endorsement.

(c) Voice Tone.

(d) Difference between conference and meeting.

(e) Notification. (2×4=8)

2. What are the essentials of effective communication? And what are its barriers and how can you overcome them? (3+3+2=8)

OR

What do you understand by Group Discussion? Explain its purpose and process. How should behave during Group Discussion? (2+3+3=8)

3. What do you understand by body language? Describe its effects on communication skills. (4+4=8)

OR

What are circulars? Draft a circular appealing the employees of ABC Company to observe punctuality. (2+6=8)

4. What is the format of an official letter? Explain it with an example. (8)

OR

Write a letter to the customer service manager of ABC Electronics Pvt. Ltd. complaining about a defect in the music system purchased from the store. (8)

5. Compose your resume for the post of computer programmer in XYZ Company. (8)

OR

What do you understand by an employee manual? What should be included in it? What are its benefits? (3+3+2=8)

Roll No. ..... Total Pages : 3

BSIT/D-22 **26114**

FUNDAMENTAL OF EM WAVES

Paper : BSIT-103

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) Explain the situations that div F = 0 but curl F ≠ 0. 2

(b) Define skin depth. 2

(c) Write the voltage and current phase relationship across L and C in series and parallel resonant circuits. 2

(d) Write down the losses in transmission line. 2

UNIT–I

2. (a) State and prove Gauss's divergence theorem. 5

(b) Explain that the electric field is equal to negative gradient of electric potential. 3

3. (a) Distinguish between the scalar and vector potentials as applied in magnetism. Derive expression for vector potential $\vec{A}$ and current density $\vec{J}$, i.e., $\Delta^2\vec{A} = -\mu_0\vec{J}$. 5

(b) Explain the concept of displacement current. Why is displacement current called so? 3

UNIT–II

4. (a) Derive Maxwell's equations for propagation of electromagnetic waves in the non-conducting medium. 4

(b) Derive Maxwell's electromagnetic equations in the differential and integral form. 4

5. Define Poynting Vector. Derive Poynting's theorem for the conservation of energy in an electromagnetic field and discuss the physical meaning of each term in the resulting equation. 8

UNIT–III

6. Derive expression for the relation between the e.m.f. and current in a circuit consisting of (i) resistance only, (ii) inductance only and (iii) capacitance only. 8

7. (a) Derive an expression for impedance of a series LCR circuit. Discuss the condition of resonance and find the resonance frequency. 5

(b) A resistance of 20 ohm is joined in series with an inductance of 0.5 henry. What capacitance must be put in series with the combination to obtain maximum current. What will be the potential drop across each element of the circuit, if it is connected to 200 V 50 Hz mains. 3

UNIT–IV

8. (a) Explain the basic principle of a transmission line. Discuss various types of transmission lines. 6

(b) Calculate the characteristic impedance of a transmission impedance of a transmission line having inductance $= 5 \times 10^{-7}$ henry/meter and capacitance C = 30 pico-Farad/meter. 2

9. (a) Explain the input impedance of open circuit and short circuit lines. Discuss how $\frac{\lambda}{2}$ and $\frac{\lambda}{4}$ lines act as circuit element. 5

(b) Describe the electrical and physical properties of a transmission line. 3

Roll No. 22.0014.007 Total Pages : 3

BSIT/D-22 **26115**

ELECTRONIC DEVICES AND CIRCUITS

Paper–BSIT-104

Time : Three 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) Give the name of capacitance which is more effective in reverse biased p-n junction. (1)

(b) Why IIIrd group impurity is known as acceptor type impurity? (1)

(c) Define the following with reference to rectifier :

(i) PIV.

(ii) Rectification Efficiency. (2)

(d) Which configuration of transistor is mostly used and why? (2)

(e) Define the following :

(i) Transconductance, g_m.

(ii) Amplification factor, μ for an FET. (2)

UNIT-I

2. (a) What is a semiconductor? Give the essential characteristics of the semiconductor. (4)
   (b) Explain the Avalanche and Zener breakdown in a diode. (4)

3. (a) Draw the circuit diagram of Zener diode as voltage regulator. Explain its working. (4)
   (b) What are N-type and P-type semiconductors? Discuss the effect of temperature on the extrinsic semiconductor. (4)

UNIT-II

4. (a) Explain the working of full-wave rectifier. What are the disadvantages of fullwave rectifier? (6)
   (b) Define percentage regulation. (2)

5. (a) Discuss the positive and negative unbiased shunt clipper with the help of suitable circuit diagrams. (4)
   (b) A 15 volt a.c. from the secondary of a transformer is applied to the input of a half wave rectifier circuit having 10 KΩ load resistance. If the diode is ideal, find :
   (i) Peak value of the a.c. signal.
   (ii) D.C. output voltage.
   (iii) Peak value of the current through the load resistance.
   (iv) Average value of the current through the load resistance. (4)

UNIT-III

6. (a) What is a Transistor? Explain the working of a transistor. (4)
   (b) Discuss various current components in a transistor under the normal biasing. (4)

7. (a) Discuss input and output characteristics of PNP transistor in CB configuration. (6)
   (b) If for a transistor $\alpha = .95$ and $I_E = 1$ mA, find the values of I_C and I_b. (2)

UNIT-IV

8. (a) What are the advantages of the FET over BJT? (2)
   (b) Draw and explain the drain and transfer characteristics of P-channel enhancement MOSFET. Also draw its circuit symbol. (6)

9. (a) Draw the drain characteristics of an N-channel JFET. Explain the shapes of these curves qualitatively. (4)
   (b) Draw and explain common drain low frequency model. (4)

Roll No. ..... Total Pages : 2

BSIT/D-22 **26116**

ELECTRONICS COMMUNICATION-I

Paper –BSIT-105

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. (i) What is meant by the term channel in Communication? Why is high frequency carrier needed in communication system?

(ii) Enlist the advantages and disadvantages of digital communication system.

(iii) Write a short note on granular noise.

(iv) Define Bit rate and Channel capacity. (4×2=8)

UNIT–I

2. (a) What do you mean by demodulation? Describe the diode detector circuit and explain its operation. (4)

(b) State and explain Fourier Theorem. (4)

3. (a) A sinusoidal carrier voltage of frequency 1 MHz and amplitude 100 V is modulated by a sinusoidal voltage of frequency 5 kHz producing 50% modulation. Calculate the frequency and amplitude of USB and LSB. (5)

(b) What do you mean by synchronization in PAM systems? (3)

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UNIT–II

4. (a) State and explain Sampling Theorem for low pass signals. (5)

   (b) Enlist the drawbacks of Pulse Amplitude Modulated Signal. (3)

5. (a) Explain the Process of Quantization through one Example. (5)

   (b) Explain the different types of quantization errors in digital communication. (3)

UNIT–III

6. (a) Explain the DPCM system with neat diagram. (6)

   (b) Why is Companding required? (2)

7. Write the differences between PCM, DPCM and DM. (8)

UNIT–IV

8. Draw the basic block diagram of electronic communication system. State the function of transmitter. (8)

9. (a) An analog signal carries 16 bit in each signal element. If 10000 signal elements are sent per second, find the band rate and bit rate. (3)

   (b) What is Echo Canceller device? Discuss its use in digital communication. (5)

Roll No. ..... Total Pages : 2

BSIT/D-22 **26117**

COMPUTER FUNDAMENTALS–I

Paper–BSIT–106

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all. Question No. 1 is compulsory and attempt one question from each unit. All questions carry equal marks.

Compulsory Question

1. (a) Explain any *one* input and *one* output device. (2)

(b) What is cache memory? (2)

(c) What is firmware? (2)

(d) Explain difference between Save and Save as. (2)

UNIT–I

2. What is computer? What are the various applications and characteristics of computer? (8)

3. Explain the block Diagram of computer. (8)

UNIT–II

4. Explain various types of optical disks in details and its advantages. (8)

5. (a) Write a note on Winchester Disk. (4)

(b) Write a note on Magnetic bubble memory. (4)

UNIT–III

6. What is the relationship between Hardware and Software? Explain in details. (8)

7. What is software? Explain various types of software. (8)

UNIT –IV

8. What is Multimedia? Explain various components of Multimedia. (8)

9. What is MS-Word? Write the steps to create blank document in MS-Word. Explain all menus available in MS-Word. (8)

UNIT-IV

8. (a) Find the normal form of the curve :

$\vec{r} = e^t \cos t\,\hat{i} + e^t \sin t\,\hat{j} + e^t\,\hat{k}$.

(b) Find the curvature and torsion of the helix :

$x = a \cos t$, $y = a \sin t$, $z = a\,t \tan \alpha$.

9. (a) If the radius of spherical curvature is constant, prove that the curve lies on a sphere or has a constant curvature.

(b) Find the involute of a circular helix.

Roll No. 2100 33004 Total Pages : 4

GSM/D-22 **902**

ADVANCE CALCULUS

Paper—BM-231

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 Questions

1. (i) Using $\varepsilon - \delta$ definition, prove that $|x|$ is continuous function.

(ii) Evaluate : $\lim_{x \to \infty} x \tan \frac{1}{x}$.

(iii) State Euler's theorem on Homogeneous functions.

(iv) Find unit tangent vector to the curve :

$\vec{r} = t\,\hat{i} + t^3\,\hat{j}$.

(v) Write down the equation of osculating plane.

UNIT-I

2. (a) Prove that every function defined and continuous on a closed interval attains its bounds in that interval.

(b) Verify Rolle's Theorem for the function $f(x) = (x - a)^m (x - b)^n$, in the interval $[a, b]$, where m and n are positive integers.

3. (a) Using Langrange's mean value theorem, prove that :

$$\frac{x^2}{2} < x - \log(1 + x) < \frac{x^2}{2(1 + x)} \quad \text{on } (-1, 0).$$

(b) Prove that :

$$\lim_{x \to \infty} \frac{(1 + x)^{1/x} - e + \frac{ex}{2} - \frac{11}{24} ex^2}{x^3} = -\frac{7e}{16}.$$

UNIT-II

4. (a) Show that the function f defined by :

$$f(x, y) = \begin{cases} \dfrac{x^3 - y^3}{x^2 + y^2} & , (x, y) \neq (0, 0) \\ 0 & , (x, y) = (0, 0) \end{cases}$$

is continuous at (0, 0).

(b) If $u = f(r)$, where $r = \sqrt{x^2 + y^2}$; prove that :

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = f''(r) + \frac{1}{r} f'(r).$$

5. (a) If $u = \sin^{-1} \dfrac{x + y}{\sqrt{x} + \sqrt{y}}$; prove that :

$$x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = -\frac{\sin u \cos^2 u}{4 \cos^3 u}.$$

(b) Expand $x^4 + x^2y^2 - y^4$ about the point (1, 1) upto the terms of the second degree.

UNIT-III

6. (a) If $f : R^2 \to R$ be a function such that both fx and fy are differentiable at a point (a, b) of the domain, then :

$$f_{xy}(a, b) = f_{yx}(a, b).$$

(b) For the function :

$$f(x, y) = \begin{cases} \dfrac{x^2 y}{x^4 + y^2} & , (x, y) \neq (0, 0) \\ 0 & , (x, y) = (0, 0) \end{cases}$$

Show that the partial derivatives fx, fy exist everywhere in the region $-1 \leq x \leq 1, -1 \leq y \leq 1$, although $f(x, y)$ is discontinuous at the origin.

7. (a) Examine for maximum and minimum values of the function :

$$f(x, y) = xy(a - x - y).$$

(b) Show that the rectangular solid of maximum volume that can be inscribed in a given sphere is a cube.

(b) Obtain the solutions of two dimensional wave equation by using the method of separation of variables. Give all possible solutions. 4

9. (a) Show that the solution of the Cauchy problem for the equation : 4

$$\frac{\partial^2 z}{\partial x^2} - \frac{1}{c^2}\frac{\partial^2 z}{\partial t^2} = 0, c > 0 \text{ satisfying } z(x,0) = f(x) \text{ and } \left[\frac{\partial z}{\partial t}\right]_{t=0} = 0, \text{ is } z(x,t) = \frac{1}{2}\{f(x-ct) + f(x+ct)\}.$$

(b) Solve $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0; 0 < x < \pi, y > 0;$ subject to the boundary conditions $u(0,y) = u(\pi,y) = 0, u(x,0) = 1$ and $u(x,y) \to 0$ as $y \to \infty$. 4

Roll No. 2100330006. Total Pages : 4

GSM/D-22 **903**

PARTIAL DIFFERENTIAL EQUATIONS

Paper–BM–233

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. Answer the following questions :

(a) Find the differential equation of all spheres whose center lie on z–axis. 2

(b) Examine whether the system of partial differential equations $\frac{\partial z}{\partial x} = 1 + e^{x/y}, \frac{\partial z}{\partial y} = e^{x/y}\left(1 - \frac{x}{y}\right)$, are compatible or not. 1

(c) Find the complete integral of $p^2 + p = q^2$. 2

(d) Solve the partial differential equation :

$$2\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial x \partial y} - 3\frac{\partial^2 z}{\partial y^2} = 0.$$ 2

(e) Classify the partial differential equation :

$xyr - (x^2 - y^2)s - xyt + py - qx = 2(x^2 - y^2)$, where r, s, t have standard notations. 1

Unit–I

2. (a) Solve the partial differential equation $z = yf(x) + xy(y)$ by elimination of arbitrary functions. 4

   (b) Solve the partial differential equation : 4

   $(y^2 + yz + z^2)p + (z^2 + zx + x^2)q = x^2 + xy + y^2$.

3. (a) Find the complete integral of : 4

   $p_3x_3(p_1 + p_2) + x_1 + x_2 = 0$ using Jacobi's method.

   (b) Find the complete integral of $2z + p^2 + qy + 2y^2 = 0$ using Charpit's method. 4

Unit–II

4. (a) Solve the differential equation : 4

   $(D^2 - 3DD' + 2D'^2)z = e^{2x-y} + e^{x+y} + \cos(x + 2y)$.

   (b) Solve : 4

   $(x^2D^2 - xyDD' - 2y^2D'^2 + xD - 2yD')z = \log\frac{y}{x} - \frac{1}{2}$.

5. (a) Solve $(D^2 + DD' - 6D'^2)z = x^2\cos(x + y)$. 4

   (b) Solve the differential equation :

   $$x^2\frac{\partial^2 z}{\partial x^2} - y^2\frac{\partial^2 z}{\partial y^2} + x\frac{\partial z}{\partial x} - y\frac{\partial z}{\partial y} = 0.$$ 4

Unit–III

6. (a) Classify and reduce the equation : 4

   $y(x + y)(r - s) - xp - yq - z = 0$ to canonical form. Also find its general solution.

   (b) Solve the differential equation $pt - qs = q^3$ using Monge's method. 4

7. (a) Classify and reduce the equation : 4

   $$\frac{\partial^2 z}{\partial x^2} + 2\frac{\partial^2 z}{\partial x\partial y} + 5\frac{\partial^2 z}{\partial y^2} + \frac{\partial z}{\partial x} - 2\frac{\partial z}{\partial y} - 3z = 0$$ to canonical form.

   (b) Prove that the Green's function for the equation $$\frac{\partial^2 z}{\partial x\partial y} + \frac{2}{x + y}\left(\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y}\right) = 0$$ subject to the conditions $z = 0$, $\frac{\partial z}{\partial x} = 3x^2$ on $y = x$ is given by : 4

   $$w(x, y, \xi, \eta) = \frac{(x + y)\{2xy + (\xi - \eta)(x - y) + 2\xi\eta\}}{(\xi - \eta)^3}.$$

Unit–IV

8. (a) Determine the characteristics of the partial differential equation $\frac{\partial^2 z}{\partial x^2} - x^2y\frac{\partial^2 x}{\partial y^2} = 0$. 4

(b) An endless chain of weight W rests in the form of a circular band round a smooth vertical cone which has its vertex upwards. Find the tension in the chain due to its weight, assuming the vertical angle of the cone to be 2α. 8

7. (a) Show that the quantities $(LX+MY+NZ)$ and $(X^2+Y^2+Z^2)$ are invariants for any given system of forces, whatever origin and axes may be chosen.

(b) A force P acts along the axis of x and another force 3P along a generator of the cylinder $x^2+y^2=a^2$. Show that the central axis lies on the Cylinder $9(3x-z)^2+100y^2=81a^2$. 8

Unit–IV

8. (a) The axes of two given wrenches intersect at right angles. Their intensities are X and Y and their pitches are P_x and P_y. If their pitches are given, find the locus of the central axis.

(b) Forces act along the edges of a regular tetrahedron, P along BC and DA, Q along CA and DB, and R along AB and CD. Show that the pitch of the equivalent wrench is $\frac{1}{2\sqrt{2}}$ of the edge of tetrahedron. 8

9. (a) Show that among that null lines of any system of forces, four are generator of any hyperboloid, two belonging to one system of generators and two to the other.

(b) A heavy body, the section of which is a Cycloid, rests on a rough horizontal plane and has its C.G at the centre of curvature of the curve at the point of contact. Show that the equilibrium is unstable. 8

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GSM/D-22 **904**

STATICS

Paper–BM–233

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. Answer the following questions :

(a) Find the resultant of two unlike parallel forces 40N an 5N acting at A an B where AB = 40 cm. 2

(b) A body of weight 80 g is at rest on a rough horizontal plane while force of 20 kg is acting on it in a direction making an angle of 60° with the horizontal. Find the force of friction that is called into play. 2

(c) State principle of Virtual work. 1

(d) Write the condition when the system of forces in three dimension reduces to a single force. 2

(e) Define the Unstable equilibrium. 1

Unit–I

2. (a) The resultant of two forces P and Q is R. If the force P is increased, then the new resultant bisects the angle between R and P. Find the increase in P.

(b) Forces of 6, 8, 12 kg wt. act along BC, CA, AB the sides of a triangle of lengths 3, 4, 5 cm. respectively. Show that their resultant is a force of 2 kg wt. acting parallel to AB. 8

3. (a) Three like parallel forces P, Q, R act at the corners of the triangle ABC. Prove that their resultant passes through the incentre of the triangle if, $\frac{P}{a}=\frac{Q}{b}=\frac{R}{c}$.

(b) A B C D E F is a regular hexagon. Forces P, 2P, 3P, 2P, 5P, 6P act along AB, BC, DC, ED, EF, AF respectively. Show that six forces are equivalent to a couple and find its moment. 8

Unit–II

4. (a) Two uniform rods, AB, BC rigidly jointed at B so that angle ABC is a right angle, hang freely in equilibrium from a fixed point A. The length of the rods are a and b and their weights are 'aw' and 'bw'. Prove that if AB makes an angle θ with the vertical, then :

$$\tan\theta=\frac{b^2}{a^2+2ab}.$$

(b) Two equal uniform rods AB and AC are freely joined at A. The ends B and C connected by a fine string.

The rods are suspended from B by a string. If in the position of equilibrium the angle between the rods is 2α, then show that the tension in the string is $\frac{3W\sin\alpha}{\sqrt{1+3\sin^2\alpha}}$, where 2W is the weight of either rod. 8

5. (a) A particle is at rest on the inner surface of a sphere of radius 'r' if the coefficient of friction be μ, show that the greatest distance of the particle from the vertical diameter is $\frac{\mu r}{\sqrt{1+\mu^2}}$.

(b) A piece of wire is bent in the shape of an isosceles tringle whose sides are a, a and b.

Show that the distance of the C.G. from the base of the triangle is $\frac{a}{2}\sqrt{\frac{2a-b}{2a+b}}$. 8

Unit–III

6. (a) A string of length a, forms the shorter diagonal of a rhombus formed of four uniform rods, each of length b and weight W, which are hinged together. If one of the rod is supported in a horizontal position, prove that the tension of the string is $\frac{2W(2b^2+a^2)}{b\sqrt{4b^2-a^2}}$.

Roll No. .....

Total Pages : 3

GSM/D-22

910

WAVE AND OPTICS–I

Option–PH–302

Paper–VI

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 :

   (a) What are the Radii of zones of a Zoneplate? 1

   (b) What is the condition for absent spectra is a diffraction grating? 1

   (c) Why Newton's rings are circular? 1

   (d) State the conditions of Maxima and Minima in interference pattern. 1

   (e) Differentiate Fraunhofer and Fresnel diffractions. 2

   (f) Sodium light of Wavelength 5890 Å falls on a double slit of separation 2.0 mm. The distance between the slits and screen is 0.04 m. Find the position of tenth bright fringe. 2

Unit–I

2. (a) Explain the formation of interference fringes by means of Fresnel biprism and Calculate the Wavelength of light used. 5

   (b) Discuss the terms phase difference, Wavefrant and Coherent sources. 3

3. (a) Calculate the thickness of Mica sheet using Fresnel biprism. 5

   (b) Calculate the distance between Coherent sources formed by a biprism whose inclined faces make angle of 2° with its lose, the slit source being 0-10 m away from the biprism ($\mu = 1.50$). 3

Unit–II

4. (a) Describe the theory of Colour of this films and Calculate the wavelength of given light. 5

   (b) In a Newton's ring experiment the diameter of the 5th and 25th rings are 0.3 cm and 0.8 cm respectively. Find the wavelength of light, given R= 100 cm. 3

5. (a) Discuss Michelson interferometer and explain the measurement of length of metre rod? 5

   (b) A Plano-convax lens of radius 3 m is placed on an optically flat glass plate and is illuminated by monochomatic light. The Diameter of the 8th bright ring us the reflected system is 0.72×10^{-2} m. Calculate the Wavelength of light used. 3

Unit–III

6. (a) Describe how a Zone plate is constructed. Find its focal length and Compare its performance with convex lens. 5

   (b) What is the highest order spectrum which may be seen with monochromatic light of Wavelength 5000 Å by means of a diffraction grating with 5000 lines/cm? 3

7. (a) What are Fresnel half period zones? Using this concept prove that light travels is a straight line. 5

   (b) Discuss the Fresnel diffraction at a circular aperture. 3

Unit–IV

8. (a) Give the Construction and theory of a plane transmission grating and explain the formation of spectra by it. 5

   (b) Explain highlight's limit of resolution. 3

9. (a) Explain the phenomenon of Fraunhofer diffraction through a single slit. 4

   (b) Derive expressions for dispersive power and resolving power of a plane transmission grating. 4

(b) At 15°C an aqueous solution of oxalic acid containing 5.0g of oxalic acid per 100cc of water is in equilibrium with an ethereal solution containing 0.50g per 100cc. The solubility of oxalic acid in water at 15°C is 10g per 100cc. Calculate the solubility in ether. 3

9. (a) Derive the required expression to show that multistep extraction is more economical than single step extraction. 3

(b) With the help of distribution law, how do you determine the equilibrium constant of potassium tri- iodide complex? 3

Roll No. ..... Total Pages : 4

GSM/D-22 **912**

PHYSICAL CHEMISTRY

Paper–IX-CH-202

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 Questions

1. Attempt all questions : 1×8=8

(a) Which of the following properties are extensive T, P, H, S, V, E?

(b) What is chemical equilibrium?

(c) What is difference between homogenous and heterogenous system?

(d) Which salt is used as instant cold packs?

(e) What is Zesoth law of thermodynamics?

(f) Can we find the distribution coefficient of iodine between water and ethyl alcohol ? Why or why not?

(g) What is the physical significance of enthalpy?

(h) What are partial molar quantities?

UNIT-I

2. (a) State and explain first law of thermodynamics. 2

   (b) Calculate the maximum work done when the pressure on 10 gram of hydrogen is reduced from 20 to 1 atm. at a constant temperature of 273 K. The gas behaves ideally. 2

   (c) Distinguish between reversible and irreversible process by taking suitable examples. 2

3. (a) Define two types of heat capacity and derive the relationship between them. 3

   (b) State and derive Kirchoff's equation. 3

4. (a) What is Joule-Thomson effect ? Explain the difference in case of an ideal gas and a real gas. 3

   (b) The band dissociation energy of gaseous H_2, Cl_2, and HCl are 430 KJ mol^{-1}, 242 KJmol^{-1} and 427 KJmol^{-1} respectively. Calculate the enthalpy of formation for HCl gas. 3

5. (a) If pressure, volume and temperature of one mole of a gas are related as :

   $(P+\frac{a}{V^2})V=RT$, show that :

   (i) P is a state function.

   (ii) dP is exact differential. 3

   (b) Show that for an adiabatic expansion of an ideal gas : 3

   $TP^{\frac{1-r}{r}}$ = constant.

UNIT-II

6. (a) Derive Clausious-Clapeyson equation for liquid vapour equilibrium. Also show how the equation can be expressed in the integrated form. 3

   (b) The standard free energy change ΔG° of a reaction at 298 K is 28.5 KJ. Calculate the value of the equilibrium constant Kp. 3

7. (a) The normal boiling point of water is 100°C. Its vapour pressure at 80°C is 0.4672 atm. Calculate enthalpy of vaporisation per mole of water. 3

   (b) State and explain the Nernst Distribution Law. How the Law is modify when solute undergoes :

   (i) Association

   (ii) Dissociation. 3

8. (a) Derive the relationship between Kp and Kc. Under what conditions they are independent of temperature. 3

(b) Convert following :

(i) Acetic acid into Ethane. 1

(ii) Acetic acid into methyl amine. 1

(c) Out of the following examples choose which are UV active and give reason for that :

(i) Ethanol (ii) Benzene

(iii) Water (iv) Toluene. 2

9. (a) Give the mechanism of nucleophilic acid catalysed acyl substitution in acid derivatives. 2

(b) Complete the following :

(i) Acetamide + Nitrous acid $\longrightarrow$? 1

(ii) Acetic acid + $P_2O_5 \longrightarrow$? 1

(c) Write the following :

(i) Claisen condensation. 1

(ii) Hofmann Bromamide Reaction. 1

Roll No. ..... Total Pages : 4

GSM/D-22 **913**

ORGANIC CHEMISTRY

Paper–X-CH-203

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. (a) Arrange 1°, 2° and 3° alcohols in increasing order of their acidity and give reason. 2

(b) Define following : 2

(i) Molar absorptivity

(ii) Bathochromic shift.

(c) What happens when :

(i) Ethylene glycol is distilled with conc H_2SO_4. 1

(ii) Chlorobenzene is heated with NaOH. 1

(d) What happens when :

(i) Acetic acid is heated with Soda lime. 1

(ii) Acetyl chloride is heated with Pd and $BaSO_4$. 1

UNIT-I

2. (a) n-Butyl alcohol forms but-1-ene and but-2-ene on acidic dehydration. Which is major product? Support your answer with mechanism. 2

(b) Explain ring opening of epoxides with mechanism under basic conditions? 2

(c) Explain with mechanism Fries rearrangement? 2

3. What happens when :

(a) (i) Ethanol reacts with conc H_2SO_4 at 413°K.

(ii) Ethene is treated with perbenzoic acid.

(iii) Phenol reacts with dil. HNO_3.

(iv) Phenol reacts with bromine in CS_2. 4

(b) Why phenols one acidic in nature? Explain. 2

4. Explain following with mechanism :

(a) Pinacol-Pinacolone Rearrangement. 2

(b) Preparation of ethanol using $LiAlH_4$. 2

(c) Reimer-Tiemann Reaction. 2

5. (a) How will you prepare the following :

(i) Ethyl bromide using HBr.

(ii) Phenol using Benzene diazonium chloride.

(iii) Isobutene using red hot copper.

(iv) Glycol using Baeyer's reagent. 4

(b) What is Lucas reagent ? How it can differentiate among primary, secondary and tertiary alcohols. ½, ½

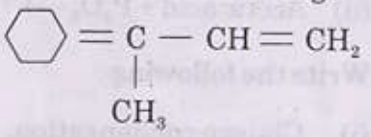
UNIT-II

6. (a) Discuss the relative stabilities of acid derivatives in detail. 2

(b) λmax. for aniline in neutral medium is observed at 230 nm, but it shifts to 203 nm in acidic medium. Why? Explain. 2

(c) Give the mechanism hydrolysis of ester in basic medium. 2

7. (a) Calculate λmax. for the following : 2



(b) Discuss the effect of conjugation on λmax. in UV spectroscopy. Explain with example. 2

(c) Define : 2

(i) Molar absorptivity.

(ii) Bathachromic shift.

8. (a) Which one is more acidic and explain why ? 2

(i) Formic acid (ii) Acetic acid.

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Roll No. ..... Total Pages : 2

GSM/D-22 **916**

BIOLOGY AND DIVERSITY OF SEED PLANTS

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.

Compulsory Question

1. Write short notes on the following : 8×1=8

   (a) What is Polyembryony?

   (b) Describe the Apospory and Apogamy.

   (c) What is Geological time table?

   (d) What are bulbils?

   (e) What is Coralloid roots?

   (f) Does Ephedra show poly embrony? How ?

   (g) Differentiate between Manoxylic and Pycnoxylic wood.

   (h) Name the Smallest and Tallest Angiosperm.

Unit–I

2. Describe the characteristic features of Gymnosperm in detail. 8

3. Describe the Heterospory with its importance. 8

4. Describe the different types of fossils. 8

5. Describe the structure of Williamsonia and Lyginopteris. 8

Unit–II

6. Give diagrammatic life cycle of Pinus. 8

7. Briefly describe the following :

   (a) Reproductive structure of Ephedre. 4

   (b) Primitive angiosperems. 4

8. Briefly describe the :

   (a) Differentiate between Cycas and Pinus ovule. 4

   (b) T.S. of Rachis in Cycas. 4

9. Write important features of following primitive Angiospermic group :

   (a) Amentiferae. 4

   (b) Renales. 4

Roll No. 21003070 Total Pages : 2

GSM/D-22 **917**

PLANT ANATOMY

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. Define the following : 1×8 = 8

   (a) Epiphytes

   (b) Secondary Meristem

   (c) Bast fibres

   (d) Redial vascular bundle

   (e) Cork

   (f) Root cap

   (g) Quiescent centre

   (h) Rhizosphere.

UNIT-I

2. Write notes on :
   (a) Xylem 5
   (b) Collenchyma 3
3. Describe secondary growth in a typical dicot stem. 8
4. Describe anomalous secondary growth in Boerhavia stem. 8
5. Write notes on : 8
   (a) Meristematic Tissue
   (b) Sclerenchyma.

UNIT-II

6. Draw a labelled diagram of anatomy of monocot leaf. Differentiate between monocot and dicot leaf. 8
7. Describe the Epidermal tissue system with its appendages in detail. 8
8. Describe the structural modifications in a storage root. 8
9. Write notes on :
   (a) Compound leaves 5
   (b) Stomatal apparatus. 3

Roll No. ..... Total Pages : 3

GSM/D-22 **922**

OP-AMP AND LINEAR INTEGRATED CIRCUITS–I

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.

Compulsory Question

1. (i) What do you understand by Open Loop and Closed Loop Operation of the Op-amp ?

   (ii) What is buried layer in an IC ? Why is it used ?

   (iii) Discuss the concept of Virtual ground in operational amplifier.

   (iv) What are the limitations of Regulator using Zener diode ? 4×2=8

UNIT–I

2. (a) Draw the block diagram of an op-amp and write the function of each block. 4

   (b) Describe the operation of op-amp as difference amplifier. Also derive the expression for output voltage. 4

3. (a) Draw and explain the circuit of emitter coupled differential amplifier. Also derive the expression for the differential gain. 6

(b) Explain the Ideal Voltage transfer curve of the Op-amp. 2

UNIT–II

4. (a) With a neat diagram explain the operation of op-amp as integrator. Also derive the expression for the output of the practical Integrator. 4

(b) Define the following :

(i) Input offset voltage (ii) Input Bias current

(iii) Slew rate (iv) PSRR. 4

5. Enlist the advantages of Active filter. Explain the operation of first order low pass butter worth filter and derives the expression for filter gain and draw a neat sketch of frequency response. 8

UNIT–III

6. Write short notes on the following :

(i) Metallization

(ii) Photolithography. 4×2=8

7. (a) What is an Integrated circuit ? Explain how transistor is fabricated in a Monolithic Integrated circuit. 6

(b) Differentiate between SSI, MSI, LSI and VLSI. 2

UNIT–IV

8. (a) What are various types of IC regulators ? Describe the Fundamental block diagram of three terminal IC voltage regulators. 5

(b) Write a short note on Boosted power supply. 3

9. (a) Describe the operation of series regulator using transistor with necessary circuit diagram. 4

(b) Write a short note on Short circuit protection. 4

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GSM/D-22 **924**

DATA STRUCTURE

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. Answer the following questions : 8

   (a) Differentiate between linear and non-linear Data structure.

   (b) Differentiate between array and linked list.

   (c) Explain different applications of stack.

   (d) Explain directed and undirected graphs.

Unit–I

2. Define the Data structure. Explain linear and non linear Data structure. 8

3. Define the String. Explain various operations on the string. 8

Unit–II

4. Write an algorithm to insert and delete an element in one dimensional array. 8

5. Write an algorithm to insert and delete a node in a single linked list. 8

Unit–III

6. (a) Define the Stack. Explain push and pop operation in stack. 4

   (b) Convert infix expression to postfix expression (A+B)*C/D+E^F/G. 4

7. Define the Queue. Write an algorithm to insert and delete and element in queue. 8

Unit–IV

8. What is a Binary tree. Explain traversal operation in binary tree with suitable examples. 8

9. Write short notes on the following :

   (a) Weighted Graph. 4

   (b) Adjacency Matrix. 4

UNIT-IV

8. (i) Design and draw the circuit of a shift register to generate the following sequence 1101011. 4

   (ii) How a shift register can be used to introduce time-delay? 4

9. (i) Explain how a shift register can be used for an odd parity generation cum checker. 4

   (ii) Design and discuss Bidirectional Shift Register based on a control signal, so that it becomes Right Shift Register for control signal = 1 and Left Shift Register for control signal = 0. 4

Roll No. ..... Total Pages : 4

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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. Attempt all questions :

   (i) A 4-bit Serial in Parallel out shift register contains 1011. The data 1010 is to be entered. What should be the outputs after 3 clock pulses? 2

   (ii) How a decoder can be used as a Demultiplexer? 2

   (iii) List the characteristics that must have a device that is to be used as a binary memory cell. 2

   (iv) Why no race-around problem occurs in counters, etc., while designed by using flip-flops? 2

UNIT-I

2. (i) What do you understand by Code Converter. Design a code converter logic circuit to convert BCD code to Cyclic Code. Use 4:1 multiplexer(s) for its realization. 5

(ii) Implement the Boolean Function: F (A, B, C) = Σ (0, 2, 4, 6. 7) using 8:1 multiplexer. 3

3. (i) Show how a multiplexer can be used as : 5

(a) a parallel to serial converter

(b) a sequence data selector.

(ii) Design an Even Parity Generator Cum Error Detector circuit for Ex-3 code. 3

UNIT-II

4. (i) Explain the working of an edge trigger T-Flip Flop. How a T Flip-Flop can be used as divided by two device? 4

(ii) The following serial data is applied to JK Flip-Flop : J = 1100, K1010. What will be the resulting serial data that will appear on the Q output, assuming that initially Q = 0. 4

5. (i) The Q and $\overline{Q}$ outputs of a clocked RS Flip-Flop are connected to R and S frequency is applied inputs, respectively. What specific function does this flip-flop perform? If 2 KHz frequency

is applied to its clock input, what is the frequency at the Q - out of the flip-flop? 4

(ii) How Flip-Flop does not change its states in between the clock pulses? Explain. 4

UNIT-III

6. (i) Design Mod-6 counter using T Flip-Flops to count in the sequence ..... 1, 2, 3, 5, 6, 7..... and repeats. 4

(ii) Assuming that Mod-8 counter, design combinational logic circuit to generate the following control signals having periodicity of 8 clock pulses :-

S_1 = 10101010, S_2 = 11001100. 4

7. (i) Design Mod-10 counter using JK Flip-Flops to count in the sequence 1, 3, 5, 0, 4, 6, 10, 11, 12 4

(ii) Design a logic circuit for synchronous Skip Counter using T Flip-Flop :- 4

A	B	C
0	0	0
0	1	1
1	0	0
1	1	0
1	1	1

Roll No. .....

Total Pages : 2

GSM/D-22

925

SOFTWARE ENGINEERING

Paper–II

Time Allowed : 3 Hours]

[Maximum Marks : 25

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. Answer the following questions : 5×1=5

   (a) What do you mean by Programming paradigm?

   (b) What are various Software development process models?

   (c) What is the purpose of E-R diagram?

   (d) What is SCM ?

   (e) Define the Software Metric.

Unit–I

2. Explain different phases of Software development life Cycle Model. 5

3. What is Software Crisis? Discuss various reasons for Software Crisis? 5

Unit–II

4. What is Feasibility study? Explain different type of Feasibility? 5

5. What are the various information gathering tools? Explain any one tool? 5

Unit–III

6. Write short notes on the following : 5

   (a) Data flow diagram.

   (b) Data Dictionary.

7. What do you mean by Risk Management? Explain various objectives of Risk Management. 5

Unit–IV

8. Define the Software maintenance and different types of maintenance. 5

9. Why testing is needed? Explain Unit and Integration Testing. 5

Roll No. .....

Total Pages : 3

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942

HINDI COMPULSORY

Time Allowed : 3 Hours]

[Maximum Marks : 40

नोट: सभी प्रश्न अनिवार्य है।

1. निम्नलिखित पद्यांशों में से किन्हीं **दो** की सप्रसंग व्याख्या कीजिए: 6×2=12

(क) नयन उन्हे हैं निष्ठुर कहते,
पर इनसे जो आँसू बहते,
सदय हृदय वे कैसे सहते,
गये तरस ही खाते।
सखि, वे मुझसे कहकर जाते।।

(ख) यह सुख कैसा शासन का?
शासन रे मानव मन का
गिरि-भार बना-सा तिनका,
यह घटाक्षेप दो दिन का–
फिर रवि शशि किरणों का प्रसंग।

(ग) कौन उसको धीरज दे सके
दु:ख का भार कौन ले सकें?
यह दु:ख वह जिसका नहीं कुछ छोर हैं
दैव, अत्याचार कैसा घोर और कठोर हैं

(घ) रामकृष्ण और रमण

रोग की यातना दोनों ने सही थी।

मगर अपने अन्तिम दिनों में

महर्षि ने एक बात कही थी।

जीवन भोज है,

शरीर केले का पत्ता हैं।

2. सूर्यकान्त त्रिपाठी 'निराला' का साहित्यिक परिचय दीजिए।

अथवा

मैथिलीशरण गुप्त का साहित्यिक परिचय दीजिए। 6

3. निम्नलिखित विषयों में से किसी **एक** पर निबन्ध लिखिए: 8

(i) नैतिक शिक्षा। (ii) मानवाधिकार।

(iii) दूरदर्शन। (iv) विज्ञान और औद्योगिकरण।

(v) वैश्वीकरण और विज्ञान।

4. भारत सरकार, गृह मंत्रालय के उपसचिव की ओर से मुख्य सचिव, हरियाणा सरकार को किसान आंदोलन के कारण सामान्य जनता को हुई असुविधा व मंत्रणा के बारे में एक पत्र लिखिए।

अथवा

जिला उपायुक्त, कुरुक्षेत्र की ओर से मुख्य चिकित्सा अधिकारी कुरुक्षेत्र को एक पत्र लिखिए, जिसमें डेंगू बीमारी से बचने के लिए उपाय एवं निर्देश दिए गए हों। 9

5. निम्नलिखित वैज्ञानिक शब्दावली में से किन्हीं पाँच का अर्थ लिखिए: 5

(i) Alloy (ii) Analysis

(iii) Capillary (iv) Cluster

(v) Compound (vi) Comet

(vii) Diffusion (viii) Extraction

(ix) Fission (x) Hybrid.

Roll No. ..... Total Pages : 3

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PUNJABI COMPULSORY

Time Allowed : 3 Hours] [Maximum Marks : 40

ਨੋਟ: ਸਾਰੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣੇ ਲਾਜ਼ਮੀਂ ਹਨ।

1. ਹੇਠ ਲਿਖੇ ਕਾਵਿ ਬੰਦਾਂ ਵਿੱਚੋਂ ਕਿਸੇ ਦੋ ਦੀ ਪ੍ਰਸੰਗ ਸਾਹਿਤ ਵਿਆਖਿਆ ਕਰੋ: 5,5

(ੳ) ਛੁਕ ਮੁਸੱਲਾ ਭੰਨ ਸਿਟ ਲੋਟਾ।
ਨਾਂ ਫੜ ਤਸਬੀ ਕਾਸਾ ਸੋਟਾ,
ਆਲਿਮ ਕਹਿੰਦਾ ਦੇ ਦੇ ਹੋਕਾ,
ਤਰਕ ਹਲਾਲੋਂ ਖਾ ਮੁਰਦਾਰ,
ਇਸ਼ਕ ਦੀ ਨਵੀਓਂ ਨਵੀਂ ਬਹਾਰ।

(ਅ) ਹੀਰ ਆਖਦੀ ਬਖਸ਼ ਗੁਨਾਹ ਮੇਰਾ,
ਸੇਜੇ ਸੁੱਤੜਾ ਆਣ ਜਗਾਇਆ ਏ।
ਘੋਲ ਘੱਤੀਆਂ ਮੈਂ ਉਸ ਰਾਹ ਉੱਤੋਂ,
ਜਿਸ ਰਾਹ ਤੂੰ ਚੱਲ ਕੇ ਆਇਆ ਏਂ।
ਬਾਪ ਦਾਦਿਓਂ ਜਾਤ ਦਾ ਕੌਣ ਹੈ ਤੂੰ,
ਕਿਸ ਮਾਂ ਸੁਪੱਤੜੀ ਜਾਇਆ ਏਂ।

ਔਂਸੀ ਪਾਉਂਦੀ ਕਾਂ ਉਡਾਉਂਦੀ ਨੂੰ,
ਮੈਨੂੰ ਮੁਕਬਲਾ ਰੱਬ ਮਿਲਾਇਆ ਏਂ।

(ਏ) ਓੜਕ ਖੋਫ਼ ਉਤਾਰ ਨਜ਼ੂਮੀਂ, ਬਾਤ ਕਹੀ ਮਨ ਭਾਣੀ।
ਆਸ਼ਕ ਹੋਗੁ ਕਮਾਲ ਸੱਸੀ ਜਦੁ, ਹੋਗੁ ਜੁਆਨ ਸਿਆਣੀ।
ਮਸਤ ਬਿਹੋਸ਼ ਥਲਾਂ ਵਿਚ ਮਰਸੀ, ਇਸ਼ਕ ਫ਼ਿਰਾਕ ਰੰਝਾਣੀ।
ਹਾਸ਼ਮ ਦਾਗ ਲਗਾਉਸੁ ਕੁਲ ਨੂੰ, ਹੋਗੁ ਜਹਾਨ ਕਹਾਣੀ।

(ਸ) ਦਿੱਲੀ ਹੈਂਸਿਆਰੀਏ! ਰੱਤ ਧੜੀ ਲਵਾਈ।
ਤੂੰ ਮਾਸ ਖਾਏਂ ਰਾਜ ਪੁੱਤਰਾਂ, ਜਿਉਂ ਬੱਕਰ ਕਸਾਈ।
ਤੂੰ ਲੱਖ ਲਹਾਈਆਂ ਖੂਹਣੀਆਂ, ਮਿਹਰ ਮੂਲ ਨਾ ਆਈ।
ਤੈਨੂੰ ਨਿਵੀਆਂ ਜ਼ਿਮੀਆਂ ਸਾਰੀਆਂ, ਜੱਗ ਫਿਰੀ ਦੁਹਾਈ।
ਇਕ ਮਾਰੇਂ ਇਕ ਸਿਰ ਧਰੇਂ, ਨਿੱਤ ਹੁਸਨ ਸਵਾਈ।
ਦਿੱਲੀ ਤੋਂ ਸ਼ਹਿਜ਼ਾਦਿਆਂ, ਖਹਿ ਹੁੰਦੀ ਆਈ।

2. 'ਦਾਰਾਂ' ਜਾਂ 'ਜ਼ੀਨਤ-ਆਪਾ' ਕਹਾਣੀ ਦਾ ਵਿਸ਼ਾ ਸਪਸ਼ਟ ਕਰੋ। 10

3. ਕਿਸੇ ਵੀ ਅਖਬਾਰ ਦੇ ਸੰਪਾਦਕ ਨੂੰ ਆਪਣਾ ਮਕਾਨ ਵੇਚਨ ਲਈ ਇਸ਼ਤਿਹਾਰ ਦੇਣ ਲਈ ਪੱਤਰ ਲਿਖੋ।

ਜਾਂ

ਆਪਣਾ ਫਲੈਟ ਕਿਰਾਏ 'ਤੇ ਦੇਣ ਲਈ ਅਖਬਾਰ ਵਿੱਚ ਇਸ਼ਤਿਹਾਰ ਦੇਣ ਲਈ ਸੰਪਾਦਕ ਨੂੰ ਪੱਤਰ ਲਿਖੋ। 5

4. ਹੇਠਾਂ ਦਿੱਤੇ ਵਿਸ਼ਿਆਂ ਵਿੱਚੋਂ ਕਿਸੇ **ਇੱਕ** ਵਿਸ਼ੇ ਉੱਪਰ ਪੈਰ੍ਹਾ ਰਚਨਾਂ ਕਰੋ: 5

(ੳ) ਧਰਮ ਅਤੇ ਸਿਆਸਤ

(ਅ) ਸਮਾਰਟ ਫ਼ੋਨ ਦੇ ਲਾਭ ਹਾਨੀਆਂ

(ਏ) ਔਰਤ ਦਾ ਸਨਮਾਨ

(ਸ) ਇੰਟਰਨੈੱਟ ਅਤੇ ਰੋਜ਼ਾਨਾ ਜੀਵਨ।

5. ਹੇਠ ਲਿਖੇ 10 ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖੋ: 5

ਰੋਟੀ, ਨੈਹਰ, ਹਨੈਰਾ, ਸ਼ਫੈਦ, ਸੱਚਾਇ, ਦਰਤੀ, ਘਮਲਾ, ਰੂੱਖ, ਵੀਸਵਾਸ, ਸਪੂੰਧਰ।

6. ਹੇਠ ਲਿਖੇ 10 ਸ਼ਬਦਾਂ ਦਾ ਪੰਜਾਬੀ ਵਿੱਚ ਅਨੁਵਾਦ ਕਰੋ: 5

Address, Bold, Connection, Disk, File, Input, Key, Matter, Memory, Option.

Roll No. .....

Total Pages : 2

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SANSKRIT COMPULSORY

Time Allowed : 3 Hours]

[Maximum Marks : 40

नोटः सभी प्रश्न अनिवार्य हैं।

1. निम्नलिखित प्रश्नों के उत्तर दीजिए: 4×2=8

   (क) 'धर्मज्ञः रामः' पाठ मूलरूप से किस ग्रन्थ से लिया गया है?

   (ख) वेदान्त-स्तोत्र-संग्रह के लेखक कौन हैं?

   (ग) 'रामम्' पद में कौन सी विभक्ति प्रयुक्त हुई है?

   (घ) 'गणेशः' पद में कौन सी सन्धि हुई है?
   (सन्धि का नाम बताइए)

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

   (क) भयानां भयं भीषणं भीषणानां
   गतिः प्राणिनां पावनं पावनानाम्।
   महोच्चैः पदानां नियत् त्वमेकं
   परेषां परं रक्षणं रक्षाणानाम्।।

   (ख) यथा वै भरतो मान्यस्तथा भूयोऽपि राघवः।
   कौसल्यातोऽतिरिक्तं च मम शुश्रूषते बहु।।

(ग) वचो मिथ्या-प्रणीतात्मा पथ्यमुक्तं विचक्षणैः।

राक्षसानामभावाय त्वं वा न प्रतिपद्यसे।।

(घ) वीर विक्रान्त विख्यात प्रवीण नयकोविद।

महार्हशयनोपेत किं शेषे निहतो भूवि।।

3. निम्नलिखित गद्यांशों में से किन्हीं **दो** गद्यांशों का सरलार्थ कीजिए: 2×4=8

(क) श्रद्धया देयम्। अश्रद्धयाऽदेयम्। श्रेया देयम्। ह्रिया देयम्। भिया देयम्। संविदा देयम्।

(ख) नाविगतक्लमो नानाप्लुतवदनो न नग्न उपस्पृशेत न स्नानशाट्या स्पृशेदुत्तमाङम् न केशाग्राण्यभिहन्यात् न उपस्पृश्य त एव वाससी विभृयात्।

(ग) ततो दिनेषु गच्छत्सु तत्तीरावस्थिताः क्षुद्रशशकाः गजपादाऽऽहतिभिश्चूर्णिताः। अनन्तरं शिलिमुखो नाम शशकः चिन्तयामास– 'अनेन गजयूथेन पिपासाऽऽकुलितेन प्रत्यहम् अत्त आगन्तत्यम्, ततो विनष्टमस्मत्कुलम्'।

4. देव **अथवा** मुनि का शब्दरूप सभी विभक्तियों एवं वचनों में लिखिए। 2×4=8

5. निम्नलिखित में से किन्हीं **चार** का सन्धि अथवा सन्धिविच्छेद कीजिए: 4×2=8

(क) सूर्योदयः (ख) महर्षिः

(ग) एकैकः (घ) इत्यादिः

(ङ) द्वौ+अपि (च) लंका+ईश्वरः

(छ) भो+अति (ज) सु+आगतम्।

Roll No. .....

Total Pages : 03

GSM/D-22

1115

INTRODUCTION TO CLOTHING CONSTRUCTION

HS-202

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) Novelty Yarns

(b) Scissors

(c) Tension Regulator

(d) Vegetable Fibres.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) नवीन यार्न

(ब) कैंची

(स) तनाव नियामक

(द) वनस्पति फाइबर ।

Unit I (इकाई I)

2. Draw a well labelled diagram of a sewing machine. Explain the functioning of various parts of sewing machine. 8
एक सिलाई मशीन का नामांकित चित्र बनाइए । सिलाई मशीन के विभिन्न भागों की कार्यप्रणाली समझाइए ।

3. Discuss in detail the various defects of sewing machine and their identification as well as rectification. 8
सिलाई मशीन के विभिन्न दोषों और उनकी पहचान के साथ-साथ सुधार पर विस्तार से चर्चा कीजिए ।

4. Discuss the following : 2×4=8
(a) Yarn
(b) Fibre.
निम्नलिखित पर चर्चा कीजिए :
(अ) यार्न
(ब) फाइबर ।

5. Enlist types of equipments required for clothing construction. Explain cutting and sewing equipments in detail. 8
कपड़ों के निर्माण के लिए आवश्यक उपकरणों की सूची बनाइए । काटने और सिलाई के उपकरणों को विस्तार से समझाइए ।

Unit II (इकाई II)

6. Define Clothing. Why is it important for us ? 8
वस्त्र को परिभाषित कीजिए । यह हमारे लिए क्यों महत्त्वपूर्ण हैं ?

7. What is Drafting ? Explain drafting tools. Give its advantages and disadvantages. 8
ड्राफ्टिंग क्या है ? ड्राफ्टिंग टूल्स को समझाइए । इसके लाभ तथा हानियाँ दीजिए ।

8. Write notes on the following : 2×4=8
(a) Pattern Layouts
(b) Cutting and Marking.
निम्नलिखित पर टिप्पणियाँ लिखिए :
(अ) पैटर्न लेआउट
(ब) काटना और अंकन ।

9. Discuss the general principles underlying clothing construction. 8
कपड़ों के निर्माण में अंतर्निहित सामान्य सिद्धांतों पर चर्चा कीजिए ।

Roll No. ..... Total Pages : 03

GSM/D-22 1116

FAMILY DYNAMICS

Course 203

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting at least *two* questions from each Unit and 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. Write short notes on the following :

(a) Divorce

(b) Urbanisation

(c) Nuclear Family

(d) Population Education. **2×4=8**

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) तलाक

(ब) शहरीकरण

(स) एकांकी परिवार

(द) जनसंख्या शिक्षा ।

Unit I (इकाई I)

2. What is Marriage ? Write down the criteria for mate selection. 8
विवाह क्या है ? साथी के चयन के लिए मापदंड के विषय में लिखिए ।

3. What are the changes Indian families are undergoing ? 8
भारतीय परिवारों में क्या परिवर्तन आ रहा है ?

4. Describe child rights in detail. 8
बच्चों के अधिकारों की विस्तृत व्याख्या कीजिए ।

5. Write short notes on the following :
(a) New Economic Policy
(b) Caring of Aged. 4×2=8
निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :
(अ) नई आर्थिक नीति
(ब) वृद्धों की देखभाल ।

Unit II (इकाई II)

6. Explain the importance of studying family planning. Discuss temporary methods of family planning. 8
परिवार नियोजन के अध्ययन की क्या महत्वता है ? परिवार नियोजन के अस्थाई तरीकों का वर्णन कीजिए ।

7. Throw light on Indian Population Policy. 8
भारतीय जनसंख्या नीति पर प्रकाश डालिए ।

8. Explain Reproductive Rights of Women. 8
महिलाओं के प्रजनन सम्बन्धी अधिकारों का उल्लेख कीजिए ।

9. What is impact of Urbanisation and Industrialization on family. 8
परिवार पर शहरीकरण और औद्योगीकरण का क्या प्रभाव पड़ा है ?

Roll No. ..... Total Pages : 03

GSM/D-22 **1118**

COMMUNITY DEVELOPMENT AND EXTENSION EDUCATION-I

Course 205

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit as well as compulsory question. All questions carry equal marks.

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

Compulsory Question (अनिवार्य प्रश्न)

1. Define the following :

(a) Family

(b) Society

(c) SNP

(d) Poverty alleviation. **4×2=8**

निम्नलिखित को परिभाषित कीजिए :

(अ) परिवार

(ब) सोसायटी

(स) SNP

(द) गरीबी उन्मूलन ।

Unit I (इकाई I)

2. Explain the key components of Social Structure. 8
सामाजिक संरचना के प्रमुख घटकों की व्याख्या कीजिए ।

3. Explain the characteristics and types of a family. 8
परिवार की विशेषताओं और प्रकारों के बारे में बताइए ।

4. (a) Explain the key elements of a communication process.
संचार प्रक्रिया के प्रमुख तत्त्वों की व्याख्या कीजिए ।
(b) Explain the factors influencing effective communication. 4+4=8
प्रभावी संचार को प्रभावित करने वाले कारक की व्याख्या कीजिए ।

5. Elaborate family as a social unit. 8
एक सामाजिक इकाई के रूप में परिवार को विस्तृत कीजिए ।

Unit II (इकाई II)

6. Write short notes on the following : 4×2=8
(a) PMRY
(b) NREGA.
निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :
(अ) PMRY
(ब) NREGA

7. Name the social and economic groups which are more vulnerable to poverty in India. Explain the economic and cultural factors responsible for poverty in India. 8
उन सामाजिक और आर्थिक समूहों का नाम बताइए जो भारत में गरीबी की चपेट में हैं । भारत में गरीबी के लिए जिम्मेदार आर्थिक और सांस्कृतिक कारकों की व्याख्या कीजिए ।

8. Explain the aims, objectives and beneficiaries of the following programmes meant for women and children :
(a) TRYSEM
(b) DWACRA. 4×2=8
महिलाओं और बच्चों के लिए निम्नलिखित कार्यक्रमों के उद्देश्य और लाभार्थी स्पष्ट कीजिए :
(अ) TRYSEM
(ब) DWACRA.

9. What are the different methods for measuring poverty ? 8
गरीबी को मापने के लिए विभिन्न तरीके क्या हैं ?

Roll No. .....

Total Pages : 3

BSIT/D-22

26119

TRANSISTOR AND LINEAR INTEGRATED CIRCUITS

Paper : BSIT-302

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 and usages of an emitter follower? [2]
   (b) What is buried layer in an IC? Why is it used? [2]
   (c) Why are npn devices preferred over pnp in ICs? [2]
   (d) What are the characteristics of an ideal operational amplifier? [2]

UNIT–I

2. (a) Define h-parameters of a transistor. Draw h-parameter model of a transistor. [4]
   (b) Discuss the comparative study of the transistors in three configurations. [4]

3. Derive the expression for current gain, voltage gain, input impedance and output admittance of a transistor amplifier. Discuss, how source and load impedance affects these amplifier parameters? [8]

UNIT–II

4. (a) What is the necessity of epitaxial growth in the formation of integrated circuits? Discuss how the epitaxial layer grown? [4]

   (b) Discuss various methods for isolation between components in the fabrication of integrated circuits? [4]

5. (a) Discuss the photolithography techniques in detail. [6]

   (b) What are the advantages of integrated circuits over conventional circuits? [2]

UNIT–III

6. (a) Discuss the formation of N-P-N transistor in monolithic IC. [4]

   (b) How many different ways are there to connect the transistor as diode in monolithic IC? [4]

7. (a) Discuss various steps to fabricate capacitor in integrated circuits. [4]

   (b) Describe the formation of Junction field effects transistor. [4]

UNIT–IV

8. Draw the circuit diagram of an emitter coupled differential amplifier. Find the expression of common mode gain and differential mode gain of this amplifier. [8]

9. (a) Discuss the working of operational amplifier as a summing amplifier. [4]

   (b) Derive the expression for the gain of an operational amplifier in inverting configuration. [4]

Roll No. 21cv.133.01.. Total Pages : 3

BSIT/D-22 **26118**

CIRCUIT ANALYSIS & DIGITAL ELECTRONICS-II

Paper–BSIT-301

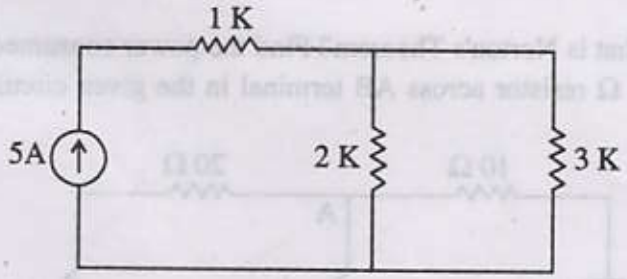
Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all, selecting *one* question from each unit. Question No. 1 is compulsory. All questions carry equal 8 marks.

Compulsory Question

1. (a) Compare an ideal and practical voltage source.

(b) Find the current in 3 kΩ resistor.



(c) What is half subtractor? Give its truth table.

(d) What is sequential circuit? Give two examples.

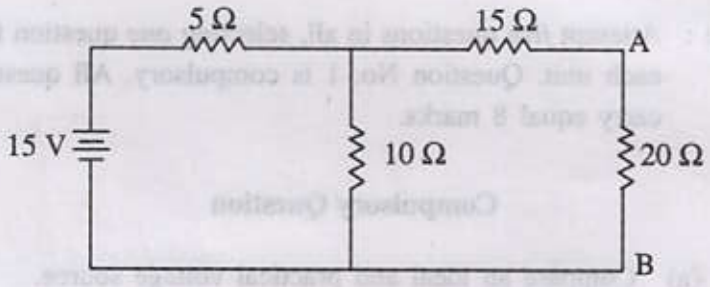
(2×4=8)

UNIT–I

2. (a) Discuss Node Analysis method for network analysis with a suitable example. 4

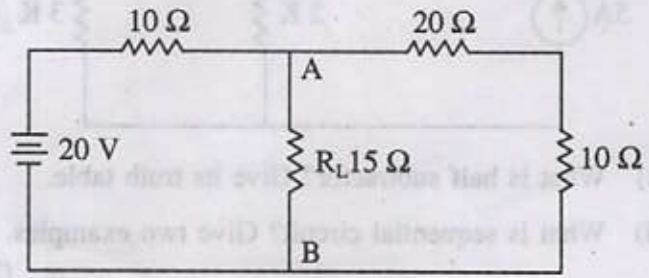
(b) What is Star-Delta transformation? Derive expression for equations to convert a star representation into equivalent delta representation. 4

3. What is Thevnin's Theorem? Using Thevnin theorem, find the power consumed across 20 Ω resistor connected across terminals AB in the given circuit. 8



UNIT–II

4. What is Norton's Theorem? Find the power consumed across 15 Ω resistor across AB terminal in the given circuit. 8



5. What is maximum power transfer theorem? Derive the condition for maximum power transfer by taking a suitable circuit example. 8

UNIT–III

6. (a) What is a combinational circuit? Explain the 4:1 Multiplexer circuit with the help of the truth table and its boolean function. 6

(b) Implement the following function using multiplexer.

$F(A, B, C, D) = \Sigma(1, 3, 4, 9, 14)$ 2

7. (a) What is a code converter and design a gray code to excess-3 code converter circuit. 4

(b) Implement the following function using multiplexer. 4

$F1(A, B, C, D) = \Sigma (2, 4, 6, 7)$

$F2(A, B, C, D) = \Sigma (1, 2, 5, 6)$

UNIT–IV

8. (a) What is a one bit memory cell? What are its salient features? 3

(b) Explain JK flip-flop with the help of its truth table and circuit diagram. What is its limitation and how is it resolved ? 5

9. (a) Convert a JK flip-flop into a D-FF using sequential circuit analysis method. 6

(b) Why preset and clear inputs are known as asynchronous inputs ? 2

Roll No. .....

Total Pages : 3

BSIT/D-22

26119

TRANSISTOR AND LINEAR INTEGRATED CIRCUITS

Paper : BSIT-302

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 and usages of an emitter follower? [2]

(b) What is buried layer in an IC? Why is it used? [2]

(c) Why are npn devices preferred over pnp in ICs? [2]

(d) What are the characteristics of an ideal operational amplifier? [2]

UNIT–I

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3. Derive the expression for current gain, voltage gain, input impedance and output admittance of a transistor amplifier. Discuss, how source and load impedance affects these amplifier parameters? [8]

UNIT–II

4. (a) What is the necessity of epitaxial growth in the formation of integrated circuits? Discuss how the epitaxial layer grown? [4]
   (b) Discuss various methods for isolation between components in the fabrication of integrated circuits? [4]

5. (a) Discuss the photolithography techniques in detail. [6]
   (b) What are the advantages of integrated circuits over conventional circuits? [2]

UNIT–III

6. (a) Discuss the formation of N-P-N transistor in monolithic IC. [4]
   (b) How many different ways are there to connect the transistor as diode in monolithic IC? [4]

7. (a) Discuss various steps to fabricate capacitor in integrated circuits. [4]
   (b) Describe the formation of Junction field effects transistor. [4]

UNIT–IV

8. Draw the circuit diagram of an emitter coupled differential amplifier. Find the expression of common mode gain and differential mode gain of this amplifier. [8]

9. (a) Discuss the working of operational amplifier as a summing amplifier. [4]
   (b) Derive the expression for the gain of an operational amplifier in inverting configuration. [4]

Roll No. ..... Total Pages : 2

BSIT/D-22 **26120**

TELECOMMUNICATION-I

Paper–BSIT-303

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.

1. (a) What are applications of Wave-Division Multiplexing? (2)

(b) Briefly explain Time Division switch. (2)

(c) Write the demerits of LAN topology. (2)

(d) Briefly explain ATM layers. (2)

UNIT–I

2. (a) What do you mean by data communication and discuss its components. (6)

(b) Write the applications of frequency division multiplexing. (2)

3. (a) Differentiate between WDM and TDM. (4)

(b) Explain the structure of Telephone system. (4)

UNIT–II

4. Explain Switching in Communication and describe the various switching techniques. (8)

5. (a) Briefly explain ISDN system architecture. (4)

(b) Explain ISDN Interface in detail. (4)

UNIT–III

6. (a) Define LAN Topology and discuss its various types. (5)

(b) Briefly explain Client/Server network model. (3)

7. Describe the various layers in OSI model with its functionality. (8)

UNIT–IV

8. Discuss the ATM architecture and also write the advantages of ATM technology. (8)

9. Describe the architecture of Frame relay. (8)

Roll No. ..... Total Pages : 2

BSIT/D-22 **26122**

OPERATING SYSTEM-I

Paper–BSIT–305

Time : Three Hours] [Maximum Marks : 40

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

Compulsory Question

1. (a) Distinguish Types of operating systems.
(b) What is process of Booting in Operating system?
(c) Define term Shortest job first Scheduling.
(d) What is concept of Switching? (8)

UNIT-I

2. Define Operating system and discuss time sharing and real time. (8)

3. (a) How do you describe OS as Resource Manager.
(b) What is System Call. Give example. (8)

UNIT-II

4. (a) Explain term Process and define various Process states.

(b) Discuss Process control block and scheduling of process. (8)

5. Explain Queue Scheduling and its types. (8)

UNIT-III

6. (a) What is Critical section and how it is described?
   (b) Discuss Reader writer problem. (8)

7. (a) What is Inter Process Communication.
   (b) Synchronization is important, explain. (8)

UNIT-IV

8. Deadlock concept is so important, explain and its prerequisites. (8)

9. Write note on :
   Deadlock avoidance its Detection and Recovery. (8)

Roll No. ..... Total Pages : 2

BSIT/D-22 **26123**

COMPUTER PROGRAMMING WITH C – I

Paper–BSIT-306

Time : Three Hours] [Maximum Marks : 40

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

Compulsory Question

1. (a) Why C is called Middle Level Language?

(b) Differentiate Switch and Else If statement in C.

(c) What is difference between Break and Continue statements?

(d) Write example of getch() and getchar(). (8)

UNIT-I

2. C is enriched in terms of data types, explain. (8)

3. Discuss formatted and unformatted input and output statements in C with syntaxes. (8)

UNIT-II

4. Explain operators used in C with their precedence. (8)

5. Discuss IF statement and its types. Write a program using Nested IF to find Smallest among three numbers. (8)

UNIT-III

6. Discuss various Loops available in C – 1, write rules to do Nesting of Loops. (8)

7. (a) Write a program using Loop to find Sum of any 10 numbers.
   (b) Write a Program using Nesting loop to find Factorial from 2 to 7. (8)

UNIT-IV

8. (a) Explain ways to Read/Write 2-D array in C.
   (b) Write a program to find sum all elements of A[10] Real numbers. (8)

9. (a) Write a program using 2-D Array to Add two Matrices.
   (b) Write a Program to perform Bubble Sort. (8)

(b) Find the largest eigen values and the corresponding eigen vector of the matrices $\begin{bmatrix} -1 & 1 & 2 \\ 0 & 1 & -1 \\ 4 & -2 & -9 \end{bmatrix}$. 3½

Section IV

8. (a) Using Gauss's Quadrature formula for $n = 2$ evaluate the integral $\int_{-1}^{1} \frac{dx}{1+x^2}$. 3

(b) If $\frac{dy}{dx} = x + \sqrt{y}$, use Euler's modified method, to approximate y when $x = 3$ in steps of 0.2 given that $y = 4$ at $x = 2$. 3½

9. (a) Use Taylor's series method to find y for $x = 0.1$ correct to four places of decimal, if y satisfies $\frac{dy}{dx} = x - y^2$ with $y_0 = 1$ and $x_0 = 0$. 3

(b) Use Runge-Kutta method to approximate y, whe $x = 0.3$; $h = 0.1$, given that $y(0.2) = 1.2428$ a $\frac{dy}{dx} = x + y$. 3½

Roll No. ..... Total Pages : 04

GSQ/D-22 **1039**

NUMERICAL ANALYSIS

BM-353

MATHEMATICS

(For B.Sc. Candidates)

Time : Three Hours] [Maximum Marks : 30

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

Compulsory Question

1. (a) If a, b are constants, then $\Delta(af + bg) = a\Delta f + b\Delta g$.

(b) Prove that :

$$\nabla = \Delta E^{-1}$$

(c) For the Poisson distribution, find P(2), given $m = 0.7$.

(d) Write formula for $\frac{dy}{dx}$ using Newton's Forward formula. 4

Section I

2. (a) From the following table, find the number of students who obtained marks less than 45 : 3

Marks	No. of Students
30-40	31
40-50	42
50-60	51
60-70	35
70-80	31

(b) Given $\sum_{11}^{20} f(x) = 44060$, $\sum_{14}^{20} f(x) = 38220$, $\sum_{17}^{20} f(x) = 27178$ and $f(20) = 8450$. Find the value of $f(11)$. **3½**

3. (a) Using Newton's divided difference formula, find the function u_x in powers of $x - 1$, given that $u_0 = 8$, $u_1 = 11$, $u_4 = 68$, $u_5 = 123$. **3**

(b) Given that $\log_{10}2 = 0.3010$, $\log_{10}3 = 0.4771$ and $\log_{10}7 = 0.8451$, find the value of $\log_{10}33$. **3½**

Section II

4. (a) Find the value of $f(32)$ given that $f(25) = 0.2707$, $f(30) = 0.3027$, $f(35) = 0.3386$, $f(40) = 0.3794$. **3**

(b) Apply Bessel's formula to find the value of $y_{2.73}$ given that $y_{2.5} = 0.4938$, $y_{2.6} = 0.4953$, $y_{2.7} = 0.4965$, $y_{2.8} = 0.4974$, $y_{2.9} = 0.4981$, $y_{3.0} = 0.4987$. **3½**

5. (a) A box contains 12 items of which 3 are defective. A sample of 3 items is selected from the box. Let X denotes the number of defective items in the sample. Find the mean of X. **3**

(b) The probability that a patient recovers from a rare blood disease is 0.4. If 10 people have caught this disease, what is the probability that : **3½**

(i) excactly 3 people recover ?

(ii) at least 7 people recover ?

(iii) 3 to 5 people recover ?

Section III

6. (a) Using divided difference, find the value of $f'(8)$ given that $f(6) = 1.556$, $f(7) = 1.690$, $f(9) = 1.908$, $f(12) = 2.158$. **3**

(b) Using Jacobi's method, find all the eigen values and eigen vectors of the matrix $\begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix}$. **3½**

7. (a) Find the first derivative of $f(x)$ at $x = 1.5$ if $f(1.5) = 3.375$, $f(2.0) = 7.000$, $f(2.5) = 13.625$, $f(3.0) = 24.000$, $f(3.5) = 38.875$, $f(4.0) = 59.000$. **3**

Unit III

6. (a) Find the spacing between two adjacent Longitudinal Modes in a plane laser resonator having separation between two mirrors d = 10 cm. 2

   (b) What are Einstein's coefficients ? Derive relation between them. 6

7. (a) A laser beam of wavelength 1.5 micron is used in a Michelson interferometer to obtain interference fringes. The fringes remained visible for a path length of 5.0 m. Find the lower limit on Coherence Time and Coherence Width respectively. 2

   (b) What are Homogeneous and Inhomogeneous broadening ? Discuss in detail Doppler broadening. 6

Unit IV

8. Discuss with suitable diagrams the principle, construction and working of Helium-Neon laser. Draw its energy level diagram also. 8

9. (a) How even a 2 mW Helium-Neon laser is much-much brighter than a 100 W ordinary bulb ? 2

   (b) Discuss with suitable diagrams the principle, construction and working of a RUBY LASER. 6

Roll No. 2010324480..... Total Pages : 04

GSQ/D-22 1044

QUANTUM AND LASER PHYSICS

Paper IX

(Physics)

Time : Three Hours] [Maximum Marks : 40

Note : Q. No. **1** will be compulsory. *Four* more questions are to be attempted, selecting *one* question out of two questions from each Unit.

(Compulsory Question)

1. (i) Prove that function $\psi(x) = R \cos x$ is not physically acceptable (admissible) to represent a material particle. 2

   (ii) Calculate probability of transmission of an electron of 1.0 eV energy through a potential barrier of 4.0 eV and 0.1 nm width. 2

   (iii) Name the active element used in RUBY LASER and also tell colour of monochromatic light emitted in Rubby laser. 2

   (iv) What is the dimension of $\frac{\hbar}{i}\frac{\partial \psi}{\partial x}$, where ψ is a wave function in two dimensions ? 1

(v) In simple co-ordinate space $p_{op} = i\hbar \frac{\partial}{\partial x}$ represents the momentum operator. What does $i\hbar \frac{\partial}{\partial p}$ stand for ? Explain. 1

Unit I

2. (a) Calculate the ground state energy of a particle of mass m, moving inside one dimensional potential $V(x) = \frac{1}{2} m w^2 x^2$ by using Heisenberg's Uncertainty Principle (H.U.P.). 4

(b) Define position probability density (ρ) and probability current density ($\bar{J}$). Establish equation of continuity and show that :

$$\bar{J} = \frac{\hbar}{2im}(\psi^* \nabla\psi - \psi \nabla\psi^*)$$ 4

3. (a) The wave function of a particle is given as $\psi(x) = \frac{1}{\sqrt{a}} e^{-\frac{|x|}{a}}$, find the probability of locating particle in the range $-a \leq x \leq a$. 3

(b) Construct Time Dependent Schrödinger equation and derive Time Independent Schrödinger equation from it. 5

Unit II

4. A stream of particles of mass m and energy E is directed from left to a one-dimensional potential barrier defined as :

$$V(x) = \begin{cases} 0 & ; \quad x < 0 \\ V_0 & ; \quad 0 < x < a \\ 0 & ; \quad x > a \end{cases}$$

Given that $E < V_0$. Set up the time-independent Schrödinger equation and obtain expression for transmission probability from region I to III. 8

5. (a) An electron in one-dimensional box is subjected to a potential energy function that is infinite everywhere along x-axis except for a line segment of length l, where the potential energy is zero. For this electron, the longest wavelength transition occurs at 400 nm. Find the length of box in Å ? 3

(b) Ground state wave function of a linear simple harmonic oscillator is $\psi = A \exp\left(-\frac{\alpha^2 x^2}{2}\right)$. Calculate average value of x^2 and x. 5

Roll No. ..... Total Pages : 03

GSQ/D-22 1045

PHYSICS

Paper : X

Nuclear Physics

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 electric quadrupole moment ? How does it give information about nuclear shape ? **2**

(b) Differentiate between β^+-decay and electron capture. **2**

(c) Give the principle of linear accelerator. **2**

(d) What is the role of a moderator in a nuclear reactor ? **2**

Unit I

2. (a) Why proton-electron theory could not explain structure of a nucleus ? How proton-neutron theory solved those difficulties ? **5**

(b) Write a short note on nuclear spin. **3**

3. (a) Give principle, construction and working of Bain Bridge mass spectrograph. What is its advantage ? 5

(b) Find the density of $_6C^{12}$ nucleus. 3

Unit II

4. Discuss in detail, the theory of α-disintegration with the help of quantum mechanical testing. 8

5. (a) What is β-decay ? Discuss the neutrino hypothesis for β-decay. 5

(b) In absorption-experiment of 1.14 MeV γ-rays from Zn^{65}, it is found that 1.96 cm of lead sheet reduce the intensity of beam to 25%. Find the absorption co-efficient, half value thickness. 3

Unit III

6. Describe a Tendem accelerator. How is it superior over van de Graaff accelerator ? 8

7. (a) Explain in detail the GM-counter, its various regions, efficiency of counting and its dead time. What are its advantages and disadvantages ? 6

(b) A GM-counter wire collects 10 electrons per discharge. When the counting rate is 500 counts per minute, what will be the average current in the circuit ? 2

Unit IV

8. Define Q-value of a nuclear reaction. Derive an expression of it in terms of the kinetic energies of the incident and resulted particles and nuclei (as two body system) assuming that the initial nucleus to be at rest. 8

9. What is a nuclear fusion reactor ? Give its principle, laws on criterion and is relevant details. Discuss self-sustained nuclear fusion reaction. 8

Roll No. ..... Total Pages : 03

GSQ/D-22 **1046**

INORGANIC CHEMISTRY

Paper XV (CH-301)

(Chemistry) (Theory)

Time : Three Hours] [Maximum Marks : 32

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

Compulsory Question

1. (a) What are the limitations of Valence Bond Theory ? **2**

(b) Cu^{2+} ions are colored and paramagnetic whereas Zn^{2+} ions are colorless and diamagnetic. Why ? **2**

(c) What is magnetic permeability ? **2**

(d) Derive term symbol for p^2 configuration. **2**

Section A

2. (a) Discuss crystal field splitting of *d*-orbitals in case of an octahedral complex with the help of a labelled diagram. **3**

(b) Calculate CFSE for the following systems : **3**

(i) d^4 high spin octahedral

(ii) d^6 low spin octahedral

(iii) d^7 high spain octahedral.

3. (a) How does the nature of ligand affect the CFSE ? 2

(b) Determine the number of unpaired electrons and CFSE for the following : 2

(i) $[Fe(H_2O)_6]^{3+}$

(ii) $[Cr(NH_3)_6]^{3+}$

(c) Why tetrahedral complexes are always high spin ? 2

4. (a) What is Thermodynamics Stability of complexes ? Discuss the factors which affect thermodynamic stability of the complex. 3

(b) What do you mean by trans effect ? Explain it with suitable examples. 3

5. (a) Discuss the mechanism of nucleophilic substitution reaciton in square planar complexes. 3

(b) What is chelate effect ? How does it affect the stability of complexes ? Give suitable examples. 3

Section B

6. (a) What is magnetic susceptibility ? How is it related to magnetic moment ? 3

(b) What is origin of paramagnetism and dimagnetism in transition metal complex ? 2

(c) Calculate the Bohr magneton the expected magnetic moment for the following ions (Spin magnetic moment) : 1

(i) Ni^{2+}

(ii) Mn^{2+}

7. (a) Discuss briefly the Gouy's method for measuring magnetic susceptibility. 2

(b) Calculate magnetic moment for the complex $K_4[Mn(CNS)_6]$ spin only value. 2

(c) What is temperature independent paramagnetism ? 2

8. (a) Calculate the no. of Microstates for p^3. 2

(b) Draw a combined orgel diagram for d^1 and d^9 complexes in octahedral and tetrahedral complexes. 3

(c) Explain why $[Ti(H_2O)_6]^+$ is violet. 1

9. (a) Define term symbol. Derive the term symbol for $3p^2$ configuration. 3

(b) Write a short note on "Spectrochemical Series". 2

(c) $CuSO_4.5H_2O$ is blue which becomes colorless on heating. Explain why. 1

8. (a) What is Raman Effect ? Discuss the quantum theory of Raman Effect.

(b) What is Rule of Mutual Exclusion for vibrational transitions ?

(c) What is the advantage of Raman spectroscopy over Infra-Red spectroscopy ? **3,2,1**

9. (a) The rotational Raman spectrum of H_2 gas gives 1st line at 346 cm^{-1} relative to the source of excitation. Calculate the bond distance of H_2.

(b) Discuss the isotopic effect on rotational transitions.

(c) What types of molecules does Raman Spectra exhibit ? **3,2,1**

Roll No. ..... Total Pages : 04

GSO/D-22 **1047**

PHYSICAL CHEMISTRY

Paper XVI, CH-302

(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. Non-programmable calculator is allowed.

1. (a) What is the difference between intensity and frequency of light ?

(b) What is zero point energy ?

(c) What is optical activity ?

(d) What do you mean by polarizability of a molecule ?

(e) What is molecular spectroscopy ?

(f) What are electromagnetic radiations ?

(g) What do ~~you~~ mean by selection rules in spectroscopy ?

(h) Out of the following, which molecules exhibit pure vibrational spectra : H_2, H_2O, CO_2, O_2 ? **8×1=8**

Unit I

2. (a) What are black body radiations ? Derive an expression for Planck's radiation law.

   (b) Discuss the failure of Classical Mechanics.

   (c) What is eigen value and eigen function ? **3,2,1**

3. (a) Derive an expression for eigen function and energy for a particle in one-dimensional box.

   (b) The work function for sodium metal is 1.82 eV. What is the threshold frequency of sodium ($1\ eV = 1.6 \times 10^{-19}\ J$) ?

   (c) Evaluate the commutator $[x, d/dx]$. **3,2,1**

4. (a) What is optical and specific rotation ? How is the chemical constitution of a substance related to the optical rotation ?

   (b) A molecule of type AB has dipole moment 2D and A-B bond length is known to be 1.8 Å. Calculate the percentage ionic character of A-B bond.

   (c) What do you mean by paramagnetism ? **3,2,1**

5. (a) Discuss the applications of magnetic susceptibility.

   (b) Discuss the temperature method for the measurement of dipole moment.

   (c) What is the significance of Clausius-Mossotti equation ? **3,2,1**

Unit II

6. (a) Discuss in detail the rotational spectra of a diatomic molecule.

   (b) The frequency separation in rotational spectra of HI is 12.8 cm^{-1}. Calculate the moment of inertia and bond length in HI molecule. Mol. Wt. of I = 127 g/mol.

   (c) What is Born-Oppenheimer approximation ? **3,2,1**

7. (a) What do you understand by degree of freedom ? Explain the different types of degrees of freedom possessed by the linear and non-linear molecules.

   (b) Discuss the qualitative relationship between force constant and bond energy.

   (c) What do you understand by fundamental and overtone transitions ? **3,2,1**

9. (a) Draw the Haworth formula structure of the following : 3

(i) Amylose

(ii) Sucrose.

(b) How the ethyl magnesium bromide is used for the synthesis of the following compounds : 3

(i) Propionaldehyde

(ii) *tert*-Butyl alcohol.

Roll No. ..... Total Pages : 04

GSQ/D-22 **1048**

CHEMISTRY

Paper : XVII CH-303

Organic Chemistry (Theory)

Time : Three Hours] [Maximum Marks : 32

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory. Attempt *four* more questions, selecting *two* questions from each Section.

1. (a) Explain with example shielding and deshielding protons. 2

(b) How many signals will 1, 2-dichloropropane will give ? Explain. 2

(c) What the products when : (i) Phenyl lithium reacts with ethyl bromide (ii) Dimethyl zinc reacts with. *tert*-Butyl chloride. 2

(d) Why do we take TMS as reference compound in PMR studies ? 2

Section A

2. (a) Discuss the NMR spectra of ordinary ethanol and ultrapure ethanol. Explain the difference between them. 3

(b) Explain the principle and applications of NMR spectroscopy. 3

3. (a) What do you mean by enantiotopic protons ? Explain giving example. Are these protons magnetically equivalent ? 3

(b) PMR spectrum of an organic compound recorded on 80 MHz instrument shows a single signal at 98 Hz. Compare the position of the signal using 120 MHz spectrometer. What would be the position of the signal in δ units in each instrument ? 3

4. (a) Compare and explain the PMR spectra of methyl propionate and ethyl acetate. 2

(b) Explain any *two* factors influencing chemical shift in NMR spectroscopy. 2

(c) What kind of NMR spectra do you expect from : 2

(i) Toluene

(ii) *p*-Dichlorobenzene ?

5. (a) How would you distinguish acetone and methyl acetate on the basis of NMR spectroscopy ? 2

(b) A compound having molecular formula $C_{10}H_{14}$ shows the following set of NMR data : 2

(i) Singlet τ 2.7, 5H

(ii) Doublet τ 7.5, 2H

(iii) Multiplet τ 8.0, 1H

(iv) Doublet τ 8.9, 6H.

Write the structure of the compounds.

(c) There are three isomeric dimethyl cyclopriopanes. How many signals do you get in each compound ? Explain. 2

Section B

6. (a) Give *four* major differences betweeen starch and cellulose. 3

(b) Describe Ruff's degradation for the conversion of an aldohexose into aldopentose. 3

7. (a) What is the procedure, precautions, proposed mechanism for the formation of Grignard reagent ? 3

(b) Discuss how the ring size of glucose was determined. 3

8. (a) How will you prepare the following compounds using appropriate organometallic compounds ? 3

(i) Ethyl methyl ketone .

(ii) *iso*-butylic acid.

(b) How will you convert fructose into glucose and mannose ? 3

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GSQ/D-22 **1051**

PLANT PHYSIOLOGY

First Paper

Botany

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. Supplement your answer with diagrams wherever necessary.

1. Answer briefly the following :
   (a) Define imbibition.
   (b) Define DPD.
   (c) Name two anti-transpirants.
   (d) Give two deficiency symptoms of copper in plants.
   (e) What colour of visible spectrum is least effective in the process of photosynthesis ?
   (f) What are the end products of glycolysis ?
   (g) Define phytochromes.
   (h) What are climacteric fruits ? 1×8=8

Unit I

2. Write short notes on the following : 4×2=8
   (a) Imbibition

(b) Plasmolysis

(c) Importance of water to plant life

(d) Difference between active absorption and passive water absorption.

3. Write short notes on the following : 4×2=8

(a) Guttation

(b) Cohesive theory of ascent of sap

(c) Transpiration is a necessary evil

(d) Root Pressure.

Unit II

4. Explain the physiological role of iron and calcium in plants and show how their deficiency affects the plant. 8

5. Write short notes on the following : 2×4=8

(a) Mass flow hypothesis

(b) K^+ ion pump hypothesis for the mechanism of stomatal movement.

Unit III

6. Write short notes on the following : 5+3=8

(a) Light reaction in photosynthesis

(b) Blackman's Law of Limiting Factors.

7. Write short notes on the following : 5+3=8

(a) Crassulacean Acid Metabolism

(b) Schematic diagram of mechanism of photorespiration.

Unit IV

8. Describe electron transport system in respiration and show the sites of ATP synthesis in an electron transport chain in mitochondria. 8

9. Write short notes on the following : 4+4=8

(a) Vernalization

(b) Physiology of senescence.

Roll No. ..... Total Pages : 02

GSQ/D-22 **1052**

ECOLOGY

Paper II

Botany

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.

(Compulsory Question)

1. Briefly write about : **1×8=8**

(a) Pedogenesis

(b) Halophytes

(c) Relative humidity

(d) Parasitism

(e) Allogenic succession

(f) Food-webs

(g) Eutrophication

(h) Nitrogen fixation.

Unit I

2. What are climatic factors ? Write about the role of light as a climatic factor. 8

3. Write short notes on the following : 4+4

(a) Positive interaction in species

(b) Soil profiles.

4. Define a population. What are its characteristics ? Write about any *three* of them. 8

5. Write about the following : 4+4

(a) Adaptations in xerophytes

(b) Topographic factors.

Unit II

6. What are different characteristics used in a community analysis ? Write about its quantitative analytical characteristics. 8

7. Write notes on the following : 4+4

(a) Structure of an ecosystem

(b) Carbon cycle.

8. What is Green-house-effect ? Write about its causes, impacts and control measures. 8

9. Write short notes on the following : 4+4

(a) Forest types of India

(b) Xerosere.

Roll No. ..... Total Pages : 02

GSQ/D-22 1053

ZOOLOGY

Paper : I

Environmental Biology

Time : Three Hours] [Maximum Marks : 40

Note : Q. No. 1 is compulsory. Out of remaining eight questions, attempt *four* questions, selecting *two* questions each from Section A and Section B.

1. Write short notes on the following : **1.5×10=15**

(a) Autoecology
(b) Pedogenesis
(c) Primary productivity
(d) Benthonic zone
(e) Denitrification
(f) Rhythm period
(g) Endangered species
(h) Latitudinal migration
(i) Holoparasites
(j) SPM.

Section A

2. Discuss the effects of temperature as a climatic factor on living organism. **6½**

3. Explain energy flow in an ecosystem. 6

4. Differentiate between the following :
   (a) Ecological niche 3
   (b) Ecological equivalents. 3½

5. Explain the Nitrogen cycle. Why is it called a perfect cycle ? 6

Section B

6. (i) What are test tube babies ? Explain its procedure and significance. 4
   (ii) Birth Rate or Natality Rate. 2½

7. (i) What are various causes of extinction of Biodiversity ? 4
   (ii) Name various IUCN red list threat categories. 2

8. Write short notes on the following :
   (a) Biosphere reserves 3
   (b) Extinction of species. 3

9. Describe the various sources of water pollution. 6½

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GSQ/D-22 1054

EVOLUTION AND DEVELOPMENT BIOLOGY

Paper II

Time : Three Hours] [Maximum Marks : 40

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

1. Define the following : **8×1=8**

(a) Divergent Evolution (b) Coacervates

(c) Somatopleur (d) Darwin's Finches

(e) Mesolecithal Eggs (f) Function of Acrosome

(g) Cledoic Egg (h) Holoblastic Cleavage

Section A

2. (a) Give a brief account of Miller's experiment and its importance in understanding of origin of life on earth.

(b) Explain Homologous organs in support of evolution giving at least three examples. **4+4**

3. Write notes on the following :
   (a) Symbiotic theory of origin of eukaryotes
   (b) Oxygen evolution. 4+4

4. Explain the Synthetic or Modern theory of evolution (Neo-Darwinism). 8

5. Explain the following :
   (a) Haeckel's Biogenetic Law
   (b) Homology in chromosome of Man and Ape. 4+4

Section B

6. Write all you know about :
   (a) Vitellogenesis
   (b) Types of Blastulae on the basis of amount and distribution of yolk. 4+4

7. Describe in detail :
   (a) Acrosomal Reaction
   (b) How hormones control the process of spermatogenesis ? 4+4

8. (a) Draw a well labelled diagram of fate map of blastula of chick.
   (b) Explain the Gastrulation in chick. 3+5

9. What is Neural Induction ? How is it controlled ? Explain with example. 8

Roll No. ..... Total Pages : 03

GSQ/D-22 1057

MICROPROCESSOR ARCHITECTURE AND PROGRAMMING-I

First Paper

(Electronics)

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) Write the control word in SAP-1 to transfer contents from memory to accumulator. 2
   (b) Discuss the instruction JM SAP-2 2
   (c) How the instructions STC and CMC are used to reset the carry flag in SAP-3 ? 2
   (d) If A = 20 H and ANI 55H is executed, write the contents of accumulator and the Zero flag. 2

Unit I

2. Discuss the Architecture of SAP-I. 8

3. (a) Explain the fetch and execution cycle of ADD instruction in SAP-1 and draw the timing diagram. 5

(b) Define a three state switch and explain its working. 3

Unit II

4. (a) Discuss various addressing modes of SAP-2. 4

   (b) Explain the Zero and Sign flags of SAP-2 with example. 4

5. (a) Explain the instructions CMP and XRI of SAP-2. 4

   (b) Write an assembly language program for SAP-2 using "Arithmetic Immediate Instructions" to add decimal 650 and 850 and save the answer in memory. 4

Unit III

6. (a) If the clock frequency of SAP-2 is 1 MHz, calculate the time required for executing the following delay subroutine :

Given That

	Instruction	No. of T-States required
MVI C, 64H		
AGAIN-DCR C	MVI	07
JNZ-AGAIN	DCR	04
NOP	JNZ	10/7
RET	NOP	04
	RET	10

4

(b) How is CALL and RET executed in SAP-3 ? 4

7. (a) Explain how Indirect Read and Write takes place in SAP-3. 4

   (b) Suppose 256 bytes of data are stored in memory between 3000H and 30FFH. Show a program that will copy these bytes at addresses 4000H to 40FFH. 4

Unit IV

8. (a) Explain the signals HOLD and HLDA of microprocessor 8085. 4

   (b) Discuss how the instruction JMP is fetched and executed in microprocessor 8085. 4

9. (a) Explain the instruction DAA in microprocessor 8085. 3

   (b) Explain how fetch-execute overlap takes place in microprocessor 8085. 3

   (c) Suppose the Stack Pointer is at 2100H and the bytes at 2100H and 2101H are 56H and 78H respectively. If HL = 1234H and the instruction XTHL is executed, write the contents of HL register pair and the two top memories of the stack. 2

Roll No. ..... Total Pages : 03

GSQ/D-22 **1059**

ELECTRONIC COMMUNICATION

Paper II

(Electronics) (Theory)

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) Explain the terms frequency deviation and modulation index in F.M.

(b) Discuss B.W. in respect of A.M. and F.M.

(c) Why is scanning necessary in T.V. transmission ?

(d) Why (G-Y) signal is not choosen for transmission ?

2×4=8

Unit I

2. (a) Prove that after amplitude modulation the carrier power increases from P_c to $P_c\left(1+\frac{m_a^2}{2}\right)$, where m_a is the modulation index. **4**

(b) The r.m.s value of carrier voltage is 125 volts. Calculate r.m.s. value when it has been amplitude modulated by a sinusoidal audio voltage to a depth of 50%. 4

3. (a) What is amplitude modulation ? Derive an expression for amplitude modulated wave. 5

(b) Explain how depth of modulation affects the power of side bands in amplitude modulation. 3

Unit II

4. (a) Derive the relation between frequency deviation and modulation index of frequency modulated wave. 3

(b) Describe the basic principle of detection. Draw the circuit of square law diode detector and explain how detection takes place. 5

5. (a) Show that in frequency modulation (FM) produced side bands theoretically expands upto infinity. 4

(b) Discuss the comparison between A.M. and F.M. 4

Unit III

6. (a) What is Flecker ? How can it be reduced in a T.V. system ? 3

(b) Drive the expression for highest modulating frequency in a T.V. system. 5

7. (a) Discuss components of a composite video signal in brief. 4

(b) Explain how the illusion of continuity is created in television system/pictures. Why the frame reception rate has been chosen 25 instead of 24 as in motion pictures ? 4

Unit IV

8. Draw and discuss block diagram of Monochrome T.V. transmitter. 8

9. (a) Explain Luminance, Hue and Saturation related to colour T.V. 3

(b) Explain, how luminance and colour difference signals are generated in a T.V. system with the help of a suitable circuit diagram. 5

Roll No. .....

Total Pages : 02

GSQ/D-22

1061

COMPUTER SCIENCE

Paper : I

Fundamentals of Database System

(For B.Sc. Candidates)

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.

(Compulsory Question)

1. (a) What is System Catalog ?

   (b) Differentiate between the logical and physical data independence.

   (c) What is difference between database schema and database state ?

   (d) Why duplicate tuples are not allowed in the Relation ? 4×2=8

Unit I

2. Discuss the main characteristics of database approach and how does it differ from traditional file system. 8

3. Explain the components of DBMS Environment. 8

Unit II

4. Discuss the responsibilities of DBA and database designer. 8

5. Explain the languages provided by DBMS. 8

Unit III

6. Differentiate between the following : 4×2=8
   (a) Composite and Simple Attribute
   (b) Single values and Multivalued Attribute
   (c) Stored and Derived Attribute.

7. (a) Discuss the naming conventions used for ER Schema diagrams. 4
   (b) Draw the ER diagram for Library database. 4

Unit IV

8. Discuss the classification of DBMS on the basis of database distribution. 8

9. Explain primary, secondary, candidate, alternate and composite keys giving examples. 8

Roll No. ..... Total Pages : 02

GSQ/D-22 1062

COMPUTER SCIENCE

Second Paper

Web Designing

(For B.Sc. Candidates)

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.

Unit I

1. (i) What is use of colspan and rowspan in <table> tag ? 2
   (ii) Explain the
, <Center> and <P> tag. 2
   (iii) What is purpose of web browser ? 2
   (iv) Explain the purpose of alink and vlink in <body> tag ? 2

Unit II

2. Explain the various services of internet in brief and explain the web casting techniques in detail. 8

3. What is web server ? Explain the various ways to connect internet at home. 8

Unit III

4. Explain the various points for website planning. 8

5. (a) Define ISP and what are its features ? 4

   (b) What are basic components of website ? 4

Unit IV

6. Explain the basic structure of HTML document. 8

7. Explain the internal and external linking with example. 8

Unit V

8. Explain adding of image with attributes. 8

9. Explain the following :

   (a) Radio button 4

   (b) Working with menus. 4

Roll No. .....

Total Pages : 03

GSQ/D-22

1063

DESKTOP PUBLISHING

Paper I

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. (i) Explain features of DTP. 1

(ii) How to apply color to text in Page maker. 1

(iii) What are applications areas of DTP ? 2

(iv) Write steps to link graphics in book publishing 2

(v) Explain how to edit text in a table. 2

Unit I

2. Explain components of Pagemaker window in detail. 8

3. (a) What are the various DTP packages available in market Now-a-days ? Make a comparison between them. 4

(b) What are Hardware & Software requirements for DTP ? 4

Unit II

4. (a) Explain five types of publication in market today. 4

   (b) Discuss the factors you will put in to consideration before designing the publication. 4

5. How to perform the following on a given paragraph of text ?

   Text wrap, Bring to Front, Send to Back, Reversing the Text. 8

Unit III

6. (a) Explain various types of publication in market today. 4

   (b) Explain various factors to be considered while designing a Publication. 4

7. Explain the following with suitable example : 8

   (i) Text Wrap & Reversing of Text

   (ii) Change Character & Paragraph Attributes

   (iii) Creating Index

   (iv) Use of Story editor.

Unit IV

8. Elaborate how to create frames and Edit them with various frame options. 8

9. Write notes on the following : 8

   (i) Work with master pages

   (ii) Replace & removing colors

   (iii) Design a grid

   (iv) Creating a Table.

Roll No. ..... Total Pages : 03

GSQ/D-22 **1064**

COMPUTER APPLICATION PROGRAMMING USING C++

Paper II

Time : Three Hours] [Maximum Marks : 40

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

1. (a) Describe class and object. 2

   (b) Distinguish between data abstraction and encapsulation. 2

   (c) What is the use of copy constructor ? 2

   (d) How is memory allocated to objects of a class ? 1

   (e) What is operator function ? Write syntax of operator function. 1

Unit I

2. (a) What is Object Oriented Programming (OOP) ? Compare OOP with procedure oriented programming (POP). 4

(b) What is Polymorphism ? Explain various types of polymorphism with example. 4

3. (a) What are static data members ? What is the use of static data members ? Explain. 4

(b) Write a program in C++ to display sum of two complex numbers, using passing of objects as function arguments. 4

Unit II

4. (a) What is the difference between default constructor and constructor with default arguments ? Illustrate with suitable example. 4

(b) What do you mean by constructor overloading ? Write a program in C++ to demonstrate the concept of constructor overloading. 4

5. (a) Discuss the main features of destructor. 4

(b) What is purpose of setf() and getline() functions ? Explain with example. 4

Unit III

6. (a) What are the uses of friend function ? Discuss its characteristics with a suitable example. 4

(b) Explain various string handling functions used in C++. 4

7. Write short notes on the following : 8

(a) New operator

(b) This pointer

(c) Manipulators

(d) Friend class.

Unit IV

8. (a) What is Operator Overloading ? Explain various rules for operator overloading. 4

(b) Write a program in C++ to illustrate overloading of '+' binary operator using friend function. 4

9. Write short notes on the following : 8

(a) Operator precedence and associatively

(b) Function overloading

(c) Inline functions

(d) Unary operators.

Roll No. .....

Total Pages : 03

GSQ/D-22

1119

DIETETICS-I

Course No. 301

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) B.M.I.

(b) Bland Diet

(c) Types of Constipation

(d) Liver Cirrhosis.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) बी.एम.आई.

(ब) सौम्य आहार

(स) कब्ज के प्रकार

(द) यकृत अधितंतुरुजा ।

Unit I (इकाई I)

2. How will you adapt a normal diet to light, soft, full fluid, clear fluid and bland diet ? 8

आप एक सामान्य आहार को हल्का, नरम, पूर्ण द्रव, स्पष्ट तरल और नरम आहार में कैसे ढालेंगे ?

3. Explain the causes, symptoms and dietary modifications for the patients suffering from Malaria fever. 8

मलेरिया बुखार से पीड़ित रोगियों के लिए कारण, लक्षण और आहार संशोधनों की व्याख्या कीजिए ।

4. Discuss the classification and etiology of diarrhoea. Give dietary modification for a patient of diarrhoea. 8

दस्त से पीड़ित रोगियों में आहार प्रबंधन के सिद्धांतों के साथ-साथ दस्त के वर्गीकरण और कारकों पर चर्चा कीजिए ।

5. Elaborate the various dietary modifications in Pre- and Post-operative diet. 8

सर्जरी के पहले और सर्जरी के बाद के आहार के प्रकार, लक्षण, कारण और पोषण प्रबंधन का विस्तार से वर्णन कीजिए ।

Unit II (इकाई II)

6. Elaborate on complications and recommended dietary modifications in patients suffering from infective hepatitis. 8

संक्रामक हेपेटाइटिस से पीड़ित मरीजों में जटिलताओं और अनुशंसित आहार संशोधनों पर विस्तार से बताइए ।

7. What type of diet will you prescribe in cases of weight imbalance ? 8

वजन असंतुलन से पीड़ित रोगी के लिए आहार की चर्चा कीजिए ।

8. Describe dietary guidelines to be followed in the dietary management of a patient with hepatic coma. 8

यकृत कोमा वाले रोगी के आहार प्रबंधन में पालन किए जाने वाले आहार संबंधी दिशानिर्देशों का वर्णन कीजिए ।

9. What is Arthritis ? Describe its symptoms, dietary considerations and nutritional requirements. 8

गठिया क्या है ? गठिया के लक्षण एवं उनके दौरान अनुमत और प्रतिबंधित खाद्य पदार्थों पर चर्चा कीजिए ।

Roll No. .....

Total Pages : 03

GSQ/D-22

1120

ADVANCE APPAREL AND TEXTILE DESIGNING

Course No. 302

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. (a) Define the following : 4

(i) Fashion cycle

(ii) Fashion forecast

(iii) Fashion designer

(iv) High fashion.

निम्नलिखित को परिभाषित कीजिए :

(i) फैशन चक्र

(ii) फैशन पूर्वानुमान

(iii) फैशन डिजाइनर

(iv) हाई फैशन ।

(b) Differentiate between : 4

(i) Discharge and Resist Printing

(ii) Hand and Machine Printing.

निम्नलिखित में अंतर लिखिए :

(i) डिस्चार्ज व अवरोध छपाई

(ii) हस्त व मशीन छपाई ।

Unit I (इकाई I)

2. Explain the factors retaining fashion. 8

फैशन की गति को धीमा करने वाले कारक समझाइए ।

3. What are different body proportions and how dress is chosen considering those ? 8

शारीरिक गठन के अनुपात कितने प्रकार के होते हैं व उनके अनुसार परिधान कैसे चुना जाता है ?

4. What are possible defects in garment fitting ? Explain. 8

परिधान की फिटिंग में आमतौर पर कौनसे दोष हो सकते हैं ? व्याख्या कीजिए ।

5. What are different sources of fashion information for consumers ? 8

उपभोक्ताओं के लिए फैशन की जानकारी के कौनसे स्रोत हैं ?

Unit II (इकाई II)

6. Write an essay on methods of textile designing. 8

कपड़ा आकल्पन की विधियों पर निबंध लिखिए ।

7. Differentiate the following : 4+4

(a) Block Printing and Roller Printing

(b) Stencil Printing and Screen Printing.

निम्नलिखित में अन्तर कीजिए :

(अ) ब्लॉक छपाई व रोलर छपाई

(ब) स्टेन्सिल छपाई व स्क्रीन छपाई ।

8. Name three types of screen printing. What is the difference among three ? 8

स्क्रीन प्रिंटिंग के कौनसे तीन प्रकार हैं ? तीनों में क्या अंतर है ?

9. Write down the method of home dyeing of cotton fabric step by step. 8

घर पर सूती कपड़ा रंगने की विधि के चरण-दर-चरण लिखिए ।

Roll No. .....

Total Pages : 03

GSQ/D-22

1122

HOUSING

HS-304

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) Light and Ventilation

(b) Cooperative Housing Societies

(c) LIC

(d) NIN.

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :

(अ) प्रकाश और वेंटिलेशन

(ब) सहकारी आवास समितियाँ

(स) एल.आई.सी.

(द) एन.आई.एन. ।

Unit I (इकाई I)

2. Discuss in detail the advantages and disadvantages of owning a house. 8

घर के मालिक होने के लाभ और हानि पर विस्तार से चर्चा कीजिए।

3. Explain, how various agencies help in the provision of house loans ? 8

समझाइए कि विभिन्न एजेंसियाँ गृह ऋण प्रदान करने में किस प्रकार सहायता करती हैं ?

4. Describe various characteristics of stones and tiles used for wall and floor covering. 8

दीवारों और फर्श को ढँकने के लिए इस्तेमाल किए जाने वाले पत्थरों और टाइलों की विभिन्न विशेषताओं का वर्णन कीजिए ।

5. Highlight the role of finance corporations for funding house construction. 8

गृह निर्माण के वित्तपोषण के लिए वित्त निगमों की भूमिका पर प्रकाश डालिए ।

Unit II (इकाई II)

6. Highlight the significance of symbols used for reading house plans. 8

गृह योजनाओं को पढ़ने के लिए प्रयुक्त प्रतीकों के महत्त्व पर प्रकाश डालिए ।

7. Plan the space for furniture setting of a bed room for a low income group family. 8

निम्न आय वर्ग के परिवार के लिए शयन कक्ष की फर्नीचर व्यवस्था के लिए स्थान की योजना बनाइए ।

8. Write notes on the following : 4×2=8

(a) Objectives and Beneficiaries of UNICEF

(b) ICMR.

निम्नलिखित पर चर्चा कीजिए :

(अ) यूनिसेफ के उद्देश्य और लाभार्थी

(ब) आई.सी.एम.आर. ।

9. Discuss the planning of passages and staircases for effective space utilization in house. 8

घर में जगह के प्रभावी उपयोग के लिए रास्तों और सीढ़ियों की योजना पर चर्चा कीजिए ।

Roll No. ..... Total Pages : 2

BSIT/D-22 **26125**

PROGRAMMING IN C++ (I)

Paper : BSIT-502

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions in all, select atleast *one* question from each Unit.

UNIT–I

1. (a) Define major properties of C++ with reference to OOPS.
   (b) Define keywords *struct*, *enumerated* and *union*. Give their syntaxes and example.

2. Explain various operators used in C++. Give example in each case.

3. (a) Explain difference between *do* and *while* loop.
   (b) Write a program using for loop to Make Multiplication table of any number.

   OR

   Write a program in C++ using for loop to find Prime number from 3 to 90.

UNIT–II

4. (a) Explain use of 2-D array with operations like Read, Write and Process.

(b) Write a program in C++ using Factorial as a Function to find NCR = $\frac{n!}{r! \times (n-r)!}$.

5. Write a note on :
   (a) String Manipulators in C++.
   (b) C++ streams.

UNIT–III

6. (a) Define Recursion and its example.
   (b) Define an Inline Function in C++. Write its syntax. Give example.

7. Explain concept of function overloading with example.

UNIT–IV

8. (a) What is Local and Nested Class?
   (b) Use of 'this' pointer.

9. (a) Explain static class members using a program.
   (b) Write a note on Types of Constructors.

(b) HEIGHT

(c) CELLPADDING

(d) VALIGN (2×4=8)

सारणी की निम्नलिखित विशेषताओं की व्याख्या कीजिए :

(क) NOWRAP

(ख) HEIGHT

(ग) CELLPADDING

(घ) VALIGN

9. Write HTML code to generate the following table: 8

Electricity Bill			
Meter no	Units Consumed	Rate per Unit	Bill Amount
MOO1	50	15	750
MOO2	75	20	1500
MOO3	70	20	1400

निम्नलिखित सारणी को बनाने के लिए HTML कोड लिखिए:

बिजली बिल			
मीटर संख्या	उपयुक्त इकाइयां	प्रति इकाई दर	बिल राशि
MOO1	50	15	750
MOO2	75	20	1500
MOO3	70	20	1400

Roll No. ..... Total Pages : 4

BSIT/D-22 **26126**

WEB-SITE DESIGN IMPLEMENTING

BASIC DESIGN TOOLS-I

Paper: BSIT-503

Time : Three 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.

नोट: प्रत्येक इकाई से एक प्रश्न चुनते हुए कुल पांच प्रश्न कीजिए प्रश्न सं. एक अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

Compulsory Question (अनिवार्य प्रश्न)

1. Write short notes on following:

(a) <INS> tag

(b) <PRE> tag

(c)
 tag

(d) <STRIKE> tag (2×4=8)

निम्नलिखित पर संक्षिप्त टिप्पणी लिखिए :

(क) <INS> टैग।

(ख) <PRE> टैग।

(ग)
 टैग।

(घ) <STRIKE> टैग।

UNIT–I (इकाई-I)

2. (a) Explain categories of Body element. 4

(b) Discuss Nesting Rules. 4

(क) बाडी ऐलिमेन्ट की श्रेणियों की व्याख्या कीजिए।

(ख) नेस्टिंग नियमों की चर्चा कीजिए।

3. Describe the basic structure of HTML Document by giving suitable example. 8

HTML दस्तावेज की मूल संरचना का वर्णन उपयुक्त उदाहरण देते हुए कीजिए।

UNIT–II (इकाई–II)

4. Write short notes on the following:

(a) phrase element

(b) <FONT> and <BASEFONT> tags. (2×4=8)

निम्नलिखित पर संक्षिप्त टिप्पणी लिखिए :

(क) वाक्यांश ऐलिमेन्ट।

(ख) <FONT> और <BASEFONT> टैग।

5. Write HTML code to create a web page to pay tribute to Mahatma Gandhi. Add his Name and image at the top of the page then add his details. Explain all tags and their attributes used in it. 8

महात्मा गांधी को श्रद्धांजलि देने के लिए एक वेब पेज बनाने के लिए HTML कोड लिखें। पेज के शीर्ष पर उसका नाम और छवि लगाएं तब उसका विवरण दें। इसमें प्रयुक्त होने वाले सभी टैग और उनकी विशेषताओं की व्याख्या करें।

UNIT–III (इकाई–III)

6. Briefly describe :

(a) Image as a link. 4

(b) Anchor tag. 4

संक्षेप में वर्णन कीजिए :

(क) लिंक के रूप में छवि।

(ख) ऐंकर टैग।

7. What do you mean by External Linking. Discuss various attributes with suitable example. 8

बाहरी संयोजन से आपका क्या अभिप्राय है? विभिन्न गुणों की विवेचना उपयुक्त उदाहरण के साथ कीजिए।

UNIT–IV (इकाई–IV)

8. Explain following attributes of the table :

(a) NOWRAP

Roll No. ..... Total Pages : 2

BSIT/D-22 **26127**

INTERNET CONCEPTS AND APPLICATIONS–I

Paper : BSIT-504

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *five* questions by selecting *one* question from each unit. Question number 1 is compulsory for all. All questions carry equal marks.

Compulsory Question

1. Define the following terms :

(a) Protocol. 2

(b) E-mail. 1

(c) TELNET. 1

(d) SMTP. 1

(e) ADSL. 1

(f) Web Directory. 1

(g) Cable Modem. 1

UNIT-I

2. Explain all the e-mail used for e-mail in detail with their architecture. 8

3. Explain Internet Architecture and Organisation in detail. 8

UNIT-II

4. Differentiate between 4
   (a) FTP *Vs.* TFTP. 4
   (b) TCP/IP *Vs.* OSI.

5. What do you mean by Remote Login? How it works? What are the advantages of remote login? 8

UNIT-III

6. Define Search Engine and explain the tools used in search engine in detail by giving suitable examples. 8

7. What is WWW? How the documents are located over WWW? Give example. 8

UNIT-IV

8. Explain Satellite Internet Connection in detail. Why satellite internet connection is less popular than broadband and cable modem. 8

9. (a) Differentiate between dial up *Vs.* DSL internet connection.
   (b) What are the applications of ISDN? 8

Roll No. .....

Total Pages : 5

BSIT/D-22

26128

MICROPROCESSOR ARCHITECTURE AND PROGRAMMING-III

Paper: BSIT-505

Time : Three 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.

नोट: प्रत्येक इकाई से एक प्रश्न चुनते हुए कुल पांच प्रश्न कीजिए। प्रश्न सं. एक अनिवार्य है। सभी प्रश्नों के अंक समान हैं।

Compulsory Question (अनिवार्य प्रश्न)

1. (a) What is the difference between maskable and non-maskable interrupts? 2

(b) Why memory mapped method of interfacing I/O devices is not preferred? 2

(c) What is the function of SOC and EOC in ADC interfacing? 2

(d) What do you mean by swapping in of the program? 2

(क) मास्केबल और नॉन-मास्केबल हस्तक्षेप के बीच क्या अंतर है?

(ख) इंटरफेसिंग I/O उपकरणों की मेमोरी मानचित्रित विधि को प्राथमिकता क्यों नहीं दी जाती है?

(ग) एडीसी इंटरफेसिंग मे एसओसी और ईओसी का क्या कार्य है?

(घ) कार्यक्रम में अदला-बदली से आपका क्या अभिप्राय है?

UNIT–I (इकाई–I)

2. (a) Explain the structure of interrupt vector table of 8086 microprocessor. 4

(b) Define Macro. Explain the process of passing parameters to macro. 4

(क) 8086 माइक्रोप्रोसेसर की हस्तक्षेप वेक्टर सारणी की संरचना की व्याख्या करें।

(ख) मैक्रो को परिभाषित करें। मैक्रो के लिए पैरामीटर पास करने की प्रक्रिया की व्याख्या कीजिए।

3. (a) Define stack. What is the role of stack segment register and stack pointer register? How can you calculate physical address of the top of stack in 8086 μp. 5

(b) Write an ALP to generate 100 ms delay using a microprocessor system that runs at 10 MHz. 3

(क) स्टैक को परिभाषित कीजिए। स्टैक सेगमेंट रजिस्टर और स्टैक पॉइंटर रजिस्टर की क्या भूमिका है? आप 8086 μp में स्टैक के शीर्ष के भौतिक पते की गणना कैसे कर सकते हैं।

(ख) 10 MHz पर चलने वाले माइक्रोप्रोसेसर सिस्टम का उपयोग करके 100 MS डिले उत्पन्न करने के लिए एक एएलपी लिखें।

UNIT–II

(इकाई–II)

4. (a) Discuss in detail, the procedure of interfacing dynamic RAM with 8086. 4

(b) Using 74LS373 output ports and 7-segment displays, design a seconds counter that counts from 0 to 9. Draw the suitable hardware schematic and write an ALP for this problem. Assume that a delay of 1 sec is available as a subroutine. Select the port address suitably. 4

(क) डायनेमिक रैम को 8086 के साथ इंटरफेस करने की प्रक्रिया पर विस्तार से चर्चा कीजिए।

(ख) 74LS373 आउटपुट पोर्ट और 7-सेगमेंट डिस्प्ले का उपयोग करके, एक सैकेंड काउंटर डिजाइन करें जो 0 से 9 तक गिना जाता है। उपयुक्त हार्डवेयर योजनाबद्ध बनाएं और इस समस्या के लिए एएलपी लिखें। मान लें कि 1 सैकेंड की डिले सबरूटीन के रूप में उपलब्ध है। उपयुक्त रूप से पोर्ट एड्रेस चुनें।

5. (a) Interface two 4K X 8 EPROMS and two 4K X 8 RAM chips with 8086. Select suitable map. 4

(b) Compare the interfacing of I/O mapped and Memory-mapped. 4

(क) 8086 के साथ दो 4K X 8 EPROMS और दो 4K X 8 RAM चिप्स का इंटरफेस करें। उपयुक्त मानचित्र का चयन करें।

(ख) मानचित्रित और मेमोरी-मानचित्रित के इंटरफेसिंग की तुलना करें।

UNIT–III

(इकाई–III)

6. Discuss the architecture of numeric processor 8087 in detail. 4

संख्यात्मक प्रोसेसर 8087 के आर्किटेक्चर की विस्तार से विवेचना करें।

7. (a) Discuss the interfacing of 8-bit DAC 0800 with 8086 using 8255 with suitable diagram. 4

(b) Draw and discuss shared bus architecture that uses a common memory. 4

(क) 8-बिट डीएसी 0800 के साथ 8086 के इंटरफेसिंग की विवेचना 8255 का उपयोग करके उपयुक्त आरेख के साथ करें।

(ख) एक साझा स्मृति का उपयोग करने वाले साझा बस आर्किटेक्चर को अंकित और विवेचना करें।

UNIT–IV

(इकाई–IV)

8. (a) What are the comparisons between 8086, 80286 and 80386? 4

(b) Write down the disadvantages of RISC processor. 4

(क) 8086, 80286 और 80386 के बीच तुलना क्या हैं?

(ख) आरआईएससी (RISC) प्रोसेसर की हानियाँ लिखिए।

9. (a) Explain the basic features of RISC processor. 4

(b) Discuss salient features of Pentium. 4

(क) आरआईएससी (RISC) प्रोसेसर की मूलभूत विशेषताओं की व्याख्या कीजिए।

(ख) पेंटियम की मुख्य विशेषताओं की विवेचना करें।