9. (a) Show that the Cauchy product of the two divergent series
\[ \sum_{n=1}^{\infty} a_n = 2 + \sum_{n=1}^{\infty} 2^n \]
\[ \sum_{n=1}^{\infty} b_n = -1 + \sum_{n=1}^{\infty} 1^n \] is convergent.

(b) Show that the infinite product:
\[ \left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)\left(1 - \frac{1}{4^2}\right) \ldots \ldots \ldots \text{is convergent.} \]
(e) Discuss the convergence of the infinite product
\[ \prod_{n=1}^{\infty} \left(1 + \frac{1}{n^\alpha}\right), \quad 0 < \alpha < 1. \]

UNIT-I

2. (a) If \( x \) and \( y \) are two positive real numbers, prove that there exists a natural number \( n \) such that \( nx > y \).
(b) Prove that interior of a set is an open set.

3. (a) State and prove Bolzano-Weierstrass theorem for sets.
(b) Define a Compact set. Show that a finite set is a Compact set.

UNIT-II

4. (a) Prove that
\[ \lim_{n \to \infty} \left[ \frac{1}{n^2} + \frac{1}{(n+1)^2} + \cdots + \frac{1}{(2n)^2} \right] = 0. \]
(b) Discuss the convergence of the sequence \( \langle a_n \rangle \) defined by
\[ a_n = \left(1 + \frac{1}{n}\right)^n. \]

5. (a) If \( \sum_{n=1}^{\infty} a_n \) is a convergent series of positive terms such that \( a_n \neq \pm 1 \), then show that the following series are also convergent:
(i) \( \sum_{n=1}^{\infty} \frac{a_n}{1+a_n} \)
(ii) \( \sum_{n=1}^{\infty} \frac{a_n}{1-a_n} \)
(b) Test the convergence of the series \( \sum_{n=1}^{\infty} \frac{1}{n} \cdot \frac{\sin \frac{1}{n}}{n} \).

UNIT-III

6. (a) State and prove D'Alembert's Ratio test.
(b) Test the convergence of the series
\[ \sum_{n=1}^{\infty} \frac{1.3.5\ldots(2n-1) \cdot x^n}{2.4.6\ldots(2n)} \frac{1}{2^n} \]

7. (a) State and prove Caney's Integral test.
(b) Test the convergence of the series \( \sum_{n=1}^{\infty} \frac{1}{n^p}, p > 0 \).

UNIT-IV

8. (a) Test for convergence and absolute convergence of the series \( \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt{n+1}} \).

1612/K/646/4,700 2
1612/K/646/4,700 3 P. T. O.
SPECIAL FUNCTIONS AND INTEGRAL TRANSFORMS

Paper–BM–242

Time Allowed : 3 Hours] [Max. Marks : \(\text{B.A.} = 26\, \text{B.Sc.} = 40\)

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) Show that \(x = 1\) is a regular singular point of:

\[(x^2 - 1) \frac{d^2 y}{dx^2} + x \frac{dy}{dx} - y = 0.\]

(b) Write orthogonality relation of Bessel’s function.

(c) Find Laplace transform of \(\sin 2t \cos 3t\).

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

UNIT-1

2. (a) Solve \(\frac{d^2 y}{dx^2} + x \frac{dy}{dx} + y = 0\) in series.
(b) Show that:

\[ J_4(x) = \left( \frac{48}{x^3} - \frac{8}{x} \right) J_1(x) + \left( 1 - \frac{24}{x^2} \right) J_0(x). \]

3. (a) Find the series solution of the following differential equation about 0:

\[ (x-x^2) \frac{d^2y}{dx^2} + (1-5x) \frac{dy}{dx} - 4y = 0. \]

(b) Show that under the transformation \( y = \frac{4}{\sqrt{x}} \), the Bessel's equation becomes

\[ \frac{d^2y}{dx^2} + \left[ 1 - \frac{4x^2}{x^2} \right] u = 0. \]

Hence find the solution of this equation.

UNIT-II

4. (a) Prove that \( P_n(x) = \frac{1}{n!2^n} \frac{d^n}{dx^n} (x^2-1)^n \).

(b) Solve \((1-x^2)P'_n(x) = (n+1) P_0(x) P_{n+1}(x)\).

5. (a) Show that \( H_n(x) = 4n(n-1)H_{n-2}(x) \).

(b) Prove that \( \int_{-\infty}^{\infty} x^2e^{-x^2} [H_n(x)]^2 \, dx = \sqrt{\pi} 2^n n! \left( 1 + \frac{1}{2} \right) \).

UNIT-III

6. (a) Find Laplace transform of \( \sin t \cos^3 t e^{-2t} \).

(b) Evaluate \( \int_0^\infty t e^{-t} \sin^4 t \, dt \).

7. (a) Find inverse Laplace transform of \( \frac{\tan^{-1}\frac{x}{2}}{s^2} \).

(b) Apply convolution theorem to evaluate

\[ L^{-1} \left( \frac{s}{(s^2 + 4)^2} \right) \]

UNIT-IV

8. (a) Find the Fourier cosine transform of \( e^{-x^2} \).

(b) Using Parseval's identity, prove that:

\[ \int_0^\infty \frac{dx}{x^2 + 1} = \frac{\pi}{4}. \]

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

(a) \( u(0, t) = 0 \).

(b) \( u(\pi, t) = 0 \).

(c) \( u(x, 0) = 2x \); when \( 0 < x < \pi \), \( t > 0 \).
PROGRAMMING IN C & NUMERICAL METHODS

Paper–BM–243

Time allowed : 3 Hours] [Max. Marks : (B.Sc.: 30
| B.A.: 20

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) Write an algorithm to find sum of three numbers.
   (ii) What is order of Convergence of Bisection and Newton Rapson method?
   (iii) Write syntax of switch statement.
   (iv) What is the purpose of Scanf function?
   (v) Write the syntax of FOR loop.
   (vi) Differentiate between Jacobi’s method and Gauss Seidal’s method.

UNIT–I

2. (i) Draw a flow chart to find the area of a circle.
   (ii) What is an escape sequence? What is its purpose?
3. (i) What is the purpose of the scanf() and printf() functions. How it is used in C programe?
   (ii) What is the difference between postfix and prefix increment and decrement operators? Explain.

   UNIT-II

4. (i) Write a program to find sum of first 10 natural numbers.
   (ii) Explain the syntax of switch statement by an example.

5. (i) What do you mean by formal and actual arguments?
   (ii) Differentiate between macros and functions.

   UNIT-III

6. (i) What are pointers? Why are they needed? Explain with an example.
   (ii) Describe the various ways in which files can be characterized in C?

7. (i) Find a real root of the equation $x^3 - x - 4 = 0$ using bisection method correct to three places of decimal.
   (ii) Find cube root of 24, correct to three decimal places by Newton–Raphson method.

   UNIT-IV

8. (i) Solve the following equations by Gauss Elimination Method.
   \[2x + 3y - z = 5\]
   \[4x + 4y - 3z = 3\]
   \[2x - 3y + 2z = 2.\]

9. Solve the following equations by using triangularization (LU decomposition) method.
   \[10x + y + z = 6\]
   \[x + 10y + z = 6\]
   \[x + y + 10z = 6.\]

   Solve the following equations by using triangularization (LU decomposition) method.
   \[2x + y + z = 2\]
   \[x + 3y + 2z = 2\]
   \[3x + y + 2z = 2.\]
WAVE & OPTICS-II

Paper—VIII

Time allowed : 3 Hours

[Maximum Marks : 40]

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

Compulsory Question

1. Attempt all questions: 

   4×2 = 8

   (a) What is the thickness of a quarter wave plate?
   (b) What are Dirichlet's conditions for a Fourier series?
   (c) Under what conditions do the unit planes coincide with nodal planes of an optical system?
   (d) Calculate the critical angle between two materials with refractive indices \( \mu_1 = 1.45 \) and \( \mu_2 = 1.40 \).

UNIT-I

2. (a) Explain the phenomenon of double refraction. 2
   (b) How can elliptically and circularly polarized lights be produced and detected? 6

3. (a) Discuss the use of polarimeter to determine the specific rotation of sugar solution. 5

1620/K/424/3100

P.T.O.
(b) What are optically active substances? Discuss the factors on which optical rotation of plane of polarization depend.

UNIT-II

4. (a) Define Fourier sine series.
(b) Analyse the output of a full wave rectifier using Fourier theorem.

5. (a) State Fourier integral theorem.
(b) Evaluate Fourier co-efficients $a_n$ and $b_n$ of Fourier theorem.

UNIT-III

6. (a) State Fourier sine transforms.
(b) Find Fourier transform of function $f(x)$
\[
f(x) = \begin{cases} 
1 & \text{for } |x| < a \\
0 & \text{for } |x| > a 
\end{cases}
\]

7. Drive lens formula for a thick lens developing system matrix.

UNIT-IV

8. (a) Explain how an achromatic lens can be made by placing two thin lenses in contact.
(b) Explain in brief lens aberrations Coma and Astigmatism.

9. (a) What are Single Mode Fiber (SMF) and Multi-Mode Fiber (MMF). Explain with diagram.
(b) Give medical applications of optical fiber.
INORGANIC CHEMISTRY

Paper-BOT-401

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. Answer the following questions : 8×1=8

(a) Which is more basic, La(OH)₃ or Lu(OH)₃?

(b) Why do Eu and Yb exhibit +2 oxidation state?

(c) Write the IUPAC name of element with atomic no. 110.

(d) Which element of the actinide series has highest melting and boiling-point?

(e) What is the precipitating reagent for group V radicals?

(f) Write the Chemical formula of Nessler’s reagent.

(g) Why NH₄Cl is added in 3rd group qualitative analysis?

(h) What is Coprecipitation?
UNIT-I

2. (a) Out of La(NO₃)₃ and Lu(NO₃)₃, which is more thermally stable? 2
(b) What is the cause of lanthanide contraction? 2
(c) Explain the magnetic properties of lanthanides. 2

3. (a) Why do Zr and Hf have similar properties? 2
(b) Explain the isolation of lanthanides from monazite sand. 2
(c) Why do lanthanides prefer to form ionic compounds? 2

4. (a) Actinides forms oxo-cations but lanthanides do not. Explain. 2
(b) Discuss the separation chemistry of Np, Pu and Am from U. 3
(c) What is nuclear fission? 1

5. (a) Write the various differences between lanthanides and actinides. 2
(b) Why it is difficult to interpret the paramagnetic behaviour of actinides? 2
(c) Actinides have greater tendency to form complexes than lanthanides. Explain. 2

UNIT-II

6. (a) Write a note on the following:
   (i) Ring test for nitrate. 4
   (ii) Match stick test for sulphate.

7. (a) How will you detect nitrite and nitrate in presence of each other? 2
   (b) How will you remove PO₄³⁻ ions proceeding for third group? 2
   (c) What is solubility product. How it helps in qualitative analysis. 2

8. (a) Explain the chemistry of analysis of basic radicals of group V. 3
   (b) H₂S is passed in presence of NH₄OH in group IV analysis whereas H₂S is passed in presence of dil. HCl in group II analysis. Why? 2
   (c) What is Magnesia mixture? 1

9. (a) What is the role of Digestion in precipitation? 2
   (b) What is Simultaneous precipitation. 2
   (c) Explain the ammonium molybdate test for phosphate. 2
GSM/M-23

PHYSICAL CHEMISTRY (Theory)

Paper—XII, CH-205

Time allowed : 3 Hours] [Maximum Marks : 32

Note : Attempt five questions in all, selecting two questions from each unit. Question No. 1 is compulsory. All questions carry equal marks. Use of Log-table and Non-programmable calculator is allowed.

Compulsory Question

1. Attempt all questions :
   (i) What is residual entropy? 1
   (ii) What should be the temperature of the sink for the efficiency of Carnot engine to be unity? 1
   (iii) Define Second law of thermodynamics in two different ways. 2
   (iv) What are concentration cells? Give one example. 2
   (v) What is meant by electrode potential? 1
   (vi) What is the principle of a glass electrode? 1

UNIT-I

2. (i) Derive an expression for the efficiency of a reversible heat engine working between the temperatures T₁ and T₂ (T₂ > T₁).

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P.T.O.
(ii) Calculate the entropy change involved in isothermal and reversible expansion of 5 moles of an ideal gas from a volume of 10 litres to a volume of 100 litres at 300 K.

3. (i) Justify that $\sum \frac{q}{T} = 0$ for Carnot cycle.

(ii) State ‘Third Law of Thermodynamics’. How does this law help in the determination of absolute entropies of chemical compounds at any desired temperature?

4. (i) Derive thermodynamically the relationships:

$$\Delta G_R = nRT \ln \frac{P_2}{P_1} = nRT \ln \frac{V_1}{V_2}$$

where the symbols have their usual meanings.

(ii) Derive the required expression to show that mixing of ideal gases is always accompanied by increase in entropy.

5. (i) Show that $(dG)_{P,T} \leq 0$ is a criterion for spontaneity and equilibrium of a process.

(ii) Calculate the amount of heat supplied to Carnot’s cycle working between 368 K and 288 K if the maximum work obtained is 895 joules.

(iii) What is ‘Nernst Heat Theorem’? What result follows from it regarding entropy change and heat capacity change?

6. (i) Taking an example of electrolyte concentration cell without transference, derive expression for its E.M.F.

(ii) Represent schematically the cell made up of the following half cell reactions:

Mg $\rightarrow$ Mg$^{2+}$ (0.01 M) + 2 e$^-$, $E^o = +2.34$ volts

Sn$^{2+}$ (0.1 M) + 2 e$^-$ $\rightarrow$ Sn, $E^o = -0.136$ volts.

Calculate the EMF of the above cell at 25°C.

7. (i) What is ‘Liquid Junction Potential’? Derive an expression for the liquid junction potential.

(ii) Describe the potentiometric method to determine the solubility and solubility product of sparingly soluble salt.

8. (i) How do Galvanic cells differ from Electrolytic cells?

(ii) Describe the construction and working of hydrogen gas electrode.

(iii) How is an oxidation-reduction electrode set up? Give an example.

9. (i) What are reversible and irreversible cells? Explain each of them with a suitable example.

(ii) Derive Nernst equation for measuring E.M.F. of a cell.
BIOLOGY & DIVERSITY OF
SEED PLANTS-II

Paper-I

Time allowed : 3 Hours] [Maximum Marks : 40

Note: Attempt five questions in all, selecting two questions from each unit. Question No. 1 is compulsory. All questions carry equal marks. Supplement your answers with diagrams wherever necessary.

Compulsory Question

1. Explain briefly:

(i) Systematics
(ii) Monotypic genera
(iii) Chemotaxonomy
(iv) Scapigerous inflorescence
(v) Genera Plantarum
(vi) Floral Diagram
(vii) Obdiplostamenous
(viii) Parietal Placentation.

UNIT-I

2. Write short notes on the following:

(i) Taximetrics in relation to taxonomy.
(ii) Karyotype study in relation to taxonomy.
3. Write short notes on the following:  
   (i) Type Concept  
   (ii) Taxonomic Ranks.

4. What are taxonomic keys? Give an account of different types of taxonomic keys.

5. Write short notes on the following:  
   (i) Adelphous Stamens  
   (ii) Spadix  
   (iii) Cyathium  
   (iv) Panicle.

UNIT-II


7. Distinguish the following:  
   (i) Gynoecium in Ranunculaceae and Solanaceae.  
   (ii) Androecium in Malvaceae and Brassicaceae.  
   (iii) Inflorescence in Asteraceae and Apiaceae.  
   (iv) Perianth in Poaceae and Liliaceae.

8. Give an account of distinguishing features of family Rutaceae along with its economic importance. Draw the floral diagram and write the floral formula of any member of this family.

9. Write short notes on the following:  
   (i) Economic Importance of family Fabaceae.  
   (ii) Androecium and Gynoecium of Asclepiadaceae.
PLANT EMBRYOLOGY

Paper—II

Time allowed : 3 Hours] [Maximum Marks : 40

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

Compulsory Question

1. Attempt all questions briefly:
   
   (i) What do you mean by complete flower?
   (ii) Name the innermost layer of anther wall.
   (iii) Define self-incompatibility.
   (iv) What is dichogamy?
   (v) What is exostome?
   (vi) Write function of antipodal cells.
   (vii) Write one example of pepo fruit.
   (viii) What is pericarp?

UNIT—I

2. With suitable illustration describe how flower a modified shoot.

1627/K/18/900

P.T.O.
3. Explain the dehiscence and germination of pollen grain before pollination.

4. Write notes on the following:
   (a) Structure of anther
   (b) Self incompatibility.

5. Write notes on the following:
   (a) Hydrophily
   (b) Difference between self and cross pollination.

UNIT-II

6. Define ovule and draw well labeled diagrams of various types of ovules found in angiosperms.

7. Explain with suitable illustrations what do you mean by double fertilization?

8. Write notes on the following:
   (a) Types of endosperms.
   (b) Structure of Dicot seed.

9. What is a fruit. Define it and write note on the fleshy fruits with suitable examples.

1627/K/18/900
LIFE AND DIVERSITY OF CHORDATES—II

Paper—I

Time Allowed : 3 Hours] [Maximum Marks : 40

Note : Attempt five questions in all, selecting two questions from each Unit. Question No. 1 is compulsory. Illustrate your answer with suitable diagram(s) wherever necessary.

Compulsory Question

1. Give brief account of the following in about 20 words each :  

   \[10 \times 1 = 10\]

   (a) Bidder’s canal.  
   (b) Amplexusory pad.  
   (c) Fangs.  
   (d) Pterosaurs.  
   (e) Uropygial gland.  
   (f) Wish bone.  
   (g) Diastema.  
   (h) Pigeon’s milk.  
   (i) Scrotum.  
   (j) Adaptive radiations

UNIT—I

2. Enlist different modes of respiration in Frog. Explain mechanism of pulmonary respiration in Frog. \[7\frac{1}{2}\]

1628/K/542/1,000

P. T. O.
3. Give a brief note on the following:
   (a) Parental care in amphibians. 
   (b) Buccopharyngeal cavity of Frog.
4. (a) Distinguish between poisonous and non-poisonous snakes.
   (b) Describe evolutionary tree of reptiles.
5. Give an account of digestive system of Hemidactylus.

UNIT-II

6. What are flight adaptations? Describe morphological and physiological adaptations of flight in birds.
7. (a) Structure and functions of air sacs in Pigeon.
   (b) Migration of birds.
8. (a) Unique features of class Mammalia.
   (b) Dentition in mammals.
9. Give a detailed account of female reproductive system in rat.
MAMMALIAN PHYSIOLOGY–II

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.

Compulsory Question

1. Answer the following in about 20 words each :
   (i) Closed Circulatory System
   (ii) Myogenic Heart
   (iii) Cardiac Cycle
   (iv) Carbamino-haemoglobin
   (v) Endometrium
   (vi) Spermogenesis
   (vii) Resting Potential
   (viii) Glands of Emergency
   (ix) Gestation Period
   (x) Medullated Nerve Fibre.

   UNIT–I

2. Write notes on the following :
   (a) Haemopoiesis
   (b) Origin and conduction of Heart Beat.

1629/K/428/1000
3. (a) What is Chloride Shift? Write it's significance during respiration. 3
(b) Describe Oxygen Dissociation Curve of Haemoglobin. 3¼
4. (a) Differentiate between Ammonotelism, Ureotelism and Uricotelism. 3
(b) Write a note on Role of rennin-angiotensin system and ADH in osmoregulation. 3¼
5. Give details of process of Urine Formation in a Nephron. 6¼

UNIT-II
6. (a) Describe the Saltatory conduction of a nerve impulse. 2
(b) Explain the Synaptic transmission of a nerve impulse. 4¼
7. (a) Describe second messenger hypothesis of hormone action. 3
(b) Draw a well labelled diagram of a human sperm. 3¼
8. Describe the functions and disorders of various hormones of pituitary gland. 6¼
9. Write notes on the following:
   (a) Oxytocin 2
   (b) Addison's disease 2¼
   (c) Testosterone. 2
GSM/M-23

OSCILLATORS AND MULTIVIBRATORS

Paper-I

Time Allowed : 3 Hours] [Maximum Marks : 40

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

Compulsory Question

1. Answer the following questions : 4×2=8

   (a) What should be the input and output impedances for an Ideal Transconductance Amplifier?

   (b) What is the difference between class B and Class AB amplifiers?

   (c) What is Piezoelectric effect? Give examples of two Piezoelectric crystals.

   (d) What are Breakdown devices? Give examples.

UNIT-I

2. (a) What should be the value of $R_i$ and $R_o$ with respect to $R_S$ and $R_L$ for a current amplifier? Justify it with the help of equivalent circuit diagram. 4

1632/K/677/200

P. T. O.
(b) Drive an expression for the effect of Negative feedback on input impedance \((R_i)\) of voltage series feedback topology.

3. (a) What should be the value of \(R_l\) and \(R_o\) with respect to \(R_s\) and \(R_L\) for a transresistance amplifier? Justify it with the help of equivalent circuit diagram.

(b) Drive an expression for the effect of Negative feedback on input impedance \((R_i)\) of voltage Shunt feedback topology.

UNIT-II

4. Differentiate among Class A, B, AB and C amplifiers with the help of input and output waveforms, load line and operating point? Also compare their efficiencies.

5. (a) Explain the working of a single ended power amplifier in class A operation with the help of its circuit diagram.

(b) What are the advantages of using RF Choke in place of collector resistor in a Power amplifier?

UNIT-III

6. What is Colpit Oscillator? Explain its working and derive an expression for its frequency with the help of Circuit diagram.

7. What is Wien Bridge Oscillator? Explain its working and derive an expression for its frequency with the help of circuit diagram.

UNIT-IV

8. What is a Multivibrator? Explain the working Astable Multivibrator using transistor with the help of its circuit diagram. Write its atleast two applications.

9. What is 555 IC Timer? Explain its working with the help of its Internal circuit diagram. Discuss, how 555 IC Timer is used as Monostable Multivibrator.
GSM/M-23
APPLIED AND COMMUNITY NUTRITION
Course 211

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 पौंच 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) Body Mass Index (BMI)
   (b) Fumigation
   (c) Pasteurization
   (d) Anthropometrics.

निम्नलिखित पर संक्षिप्त दिया गया लिखिए :
   (अ) बॉडी मास इंडेक्स (बीएमआई)
   (ब) फ्यूमिजेशन
   (स) पास्टराइजेशन
   (ट) एंथ्युपोमेट्रिक्स

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P.T.O.
2. Discuss in detail the assessment of nutritional status of a community.

3. Why Protein Energy Malnutrition (PEM) is a major nutritional concern among poor Indian children? Elaborate its types, symptoms and preventive measures for eradication.

4. Discuss in detail the etiology, symptoms and prevention of vitamin A deficiency disorders.

5. Discuss the following:
   (a) Types of anemia
   (b) Symptoms and prevention of anemia

6. Define Food Spoilage. What are the causative factors of food spoilage? Describe the undesirable changes in food as a result of spoilage.

7. Explain the principles to be followed for safe storage of food at commercial level.

8. Discuss the following:
   (a) Canning
   (b) Radiation
   (c) Refrigeration

9. Discuss the bacteriostatic and bacteriocidal methods of food preservation.
GSM/M-23 1823
APPAREL DESIGNING AND SELECTION
Course-212

Time: Three Hours] [Maximum Marks: 40

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

Compulsory Question (अनिवार्य प्रश्न)

1. Elaborate the following terms: 4×2=8
   (a) Texture
   (b) Teenage group
   (c) Mending
   (d) Rhythm.

   निम्नलिखित शब्दों को विस्तृत कोजिए:
   (अ) बनावट
   (ब) फिशोर समूह
   (स) मरम्मत
   (ब) जाल

   (5-27/8) L-1823(TR) P.T.O.
Unit I (इक्काई I)

2. Differentiate between tailor made and homemade garments.

3. What is the importance and meaning of clothing in today’s world?

4. What factors should be kept in mind while selecting clothing for old age people?

5. What do you mean by renovation of apparel? What is the importance of storage in care of our clothing?

Unit II (इक्काई II)

6. Explain the term design in terms of fashion by using different principles.

7. How texture analysis is important while selecting attire for a particular occasion and season?

8. What is the importance of color, its dimension and harmony while selecting an attire according to the figure and complexion?

9. What is line and shape analysis? Discuss their appropriate use while designing and selecting an apparel.
GSM/M-23 1824
CHILDHOOD AND ADOLESCENT
DEVELOPMENT
Course—213

Time: Three Hours] [Maximum Marks: 40

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

Compulsory Question (अनिवार्य प्रश्न)

1. Explain any four briefly:
   (i) Reflexes
   (ii) Body built
   (iii) Leg skills
   (iv) Fear
   (v) Types of speech disorders.

   किन्हीं चार पर संक्षिप्त व्याख्या लिखिए:
   (i) अनुक्रियाएं
   (ii) शरीर रचना या प्रकार
   (iii) पैरों के कौशल
   (iv) भय
   (v) भाषा-व्याख्या के प्रकार
Unit I (इकाई I)

2. Describe physical development during childhood.

3. Describe the major milestones in motor development through infancy and preschool years.

4. Write an essay on some childhood emotions.

5. Give a brief introduction to Piaget's theory and stages of cognitive development.

6. What is Language? Discuss prespeech forms of communication.

7. What is the meaning of play? What are the different types of play?

8. Discuss common behaviour problems seen in children.

9. What is meant by socialization? Describe the role of family in socialization.

Unit II (इकाई II)

L-1824
GSM/M-23 1825
FAMILY RESOURCE MANAGEMENT
Course-214

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Question)

1. Define the following terms : 4x2=8
   (a) Time Plan
   (b) Planning
   (c) Budget
   (d) Marketing.

Unit I

2. Discuss the concept of time demand during various stages of family life-cycle. 8

3. Write down various steps in making daily or weekly time plan. 8

4. Elaborate different types of fatigue along with remedies. 8

(3-60/2) L-1825 P.T.O.
5. What is Work Simplification? Discuss its techniques.

Unit II

6. How do you justify money as a resource? What is investment?

7. Write down the types of expenditure along with factors affecting it.

8. Discuss different types of income.

9. What is good buymanship? Write various factors affecting consumer decision in the market.
5. Explain the principle and working of spin dryer in washing machine.

6. Explain the principle, construction and working of Pressure Cooker.

7. Explain the principle, construction and working of Dry cell and explain its uses.

8. Define the following:
   (a) Wavelength and Frequency
   (b) Echo and Reverberation of sound waves.

9. Explain the principle, construction and working of C.F.L. Also, explain its advantages.

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

GSM/M-23
INTRODUCTORY PHYSICS
COURSE-216

Time : Three Hours] [Maximum Marks : 40

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

Compulsory Question (अनिवार्य प्रश्न)

1. (i) The SI unit of Surface Tension is :
   (a) Newton/meter
   (b) Newton/meter square
   (c) Joule/meter
   (d) None of these

Praakthan ka SI mukta hain :
   (a) न्यूटन/मीटर
   (b) न्यूटन/मीटर वर्ग
   (c) जूल/मीटर
   (d) इनमें से कोई नहीं
(ii) Working principle of Hydraulic lift is based on the:
(a) Archimedes principle  
(b) Pascal’s law  
(c) Ohm’s law  
(d) None of these  

Unit I (इकाई I)

2. Define the following properties of solids:
(a) Density  
(b) Specific gravity  
(c) Elasticity  
(d) Hardness  

3. State Archimedes principle and explain its applications.

4. Explain CGS, MKS and the British system of units and their interrelationship.
ADVANCE DIGITAL ELECTRONICS

Paper-II (Theory)

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) What is the function of the comparator in the ADC.

   (ii) A 10-bit DAC has a step size of 10 mV. Determine the full-scale output voltage and the percentage resolution.

   (iii) Enlist the steps to expand the word size of the memory.

   (iv) Enlist the applications of PLAs.

UNIT-I

2. (i) Explain the working of weighted resistor type DAC.

   (ii) If the maximum output voltage of a 7-bit D/A Converter is 25.4 V, what is the smallest change in the output as binary count increases?

3. (i) Explain the operation of switched current source type DAC.
(ii) Define the following terms:
   (a) Linearity  (b) Settling Time
   (c) Resolution  (d) Temperature Sensitivity.

UNIT-II

4. (i) Explain the working of Tracking Type ADC.
   (ii) Discuss various specifications of analog to digital converters.

5. (i) With the appropriate circuit diagram, describe the working of Dual Slope Analog to Digital Converter.
   (ii) Explain the process of Sampling and Quantization for the analog to digital converter.

UNIT-III

6. (i) What is ROM? Enlist the differences between ROM, PROM, EPROM and EEPROM.
   (ii) Explain the operation of Dynamic MOS RAM Cell with the appropriate circuit diagram.

7. (i) How word Capacity may be increased to expand the memory size. Discuss taking suitable example.
   (ii) Write a short note on Content Addressable Memory (CAM).

UNIT-IV

8. (i) Differentiate between PAL (programmable Array Logic) and PLA (Programmable Logic Array).
   (ii) Design a four bit up-down counter using suitable PLA.

9. Implement a BCD to Gray Code converter using PAL.
OBJECT ORIENTED PROGRAMMING
WITH C++

Paper—I

Time allowed: 3 Hours] 
[Max. Marks : { B.A. : 25
{ B.Sc. : 40

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

Compulsory Question

1. Attempt all questions: 5×1 = 5
   (i) Define Objects in C++.
   (ii) Define various access Specifiers.
   (iii) Difference between Function and Array.
   (iv) What is data abstraction.
   (v) Define Inline function.

UNIT—I

2. (a) Difference between Class and Object. What is the relation between the two. 2½
   (b) What is data member and member functions. Give example. 2½

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P.T.O.
3. (a) Difference between nested class and local class. 
   Explain. 2½
   (b) Write a program using class to find the largest of three 
   given numbers. 2½

UNIT–II

4. (a) Explain various types of constructors by using 
   example. 2½
   (b) Write a program to illustrate the concept of 
   destructor. 2½

5. (a) Explain characteristics of destructor. Can a destructor 
   accept arguments. 2½
   (b) What is copy constructor? Explain its significance by 
   giving example. 2½

UNIT–III

6. (a) What is pointer. Explain how do you declare an array 
   of pointers. 2½
   (b) Write a program to find the smallest of three given 
   numbers by using pointer. 2½

7. (a) Explain various methods of passing arguments to 
   functions. 2½
   (b) Explain dynamic memory allocation operators. 2½

UNIT–IV

8. (a) Define between operator overloading and function 
   overloading. 2½

9. (a) Discuss various ways of implementing the operator 
   overloading. 2½
   (b) Discuss various rules of operator overloading. 2½
Roll No. ..............................................

GSM/M-23

OPERATING SYSTEM

Paper—II

Time allowed : 3 Hours] [Max. Marks : \{ B.A. = 25 \\
B.Sc. = 40 \}

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

Compulsory Question

1. Attempt all questions:
   (a) Differentiate between Single user and Multi user Operating system. 2
   (b) What is a process? 1
   (c) What do you mean by Interprocess communication? 2

UNIT—I

2. What is operating system? Explain the historical evolution of operating system? 5

3. How operating system act as resource manager and also explain the structure of operating system? 5

1635/K/20/1700          P.T.O.
UNIT-H

4. (a) Differentiate between preemptive and non-preemptive scheduling.
(b) Explain the concept of semaphores. Write an example?
(c) What is its advantages?
(d) Various methods for handling deadlocks?

UNIT-III

5. Explain various page replacement algorithms with example?
6. Explain various disk scheduling algorithms with example?

UNIT-IV

7. Explain various file protection schemes.
8. Explain various ways of file protection.
9. What is file protection?
HINDI (Compulsory)

Time allowed : 3 Hours] [Maximum Marks : 40

Note : सभी प्रश्न अनिवार्य हैं। दिशा निर्देशानुसार प्रश्नों के उत्तर दीए।

1. निम्नलिखित अवतरणों में से किन्हीं दो की समस्या चयित कीजिएः 2×6=12

(i) भाषी ने जो लक्षण बताए थे, उन्हें सुनकर मैं बचाव के तौर पर इंजेक्शन का सामना और ठंडी साथ लेता आया था और मेरा खायल ठीक निकला। भाषी को मेरे सुथ भेज दे, मैं इसे नुस्खा हिर्ख देता हूँ, यह बाजार से दवाई बनवा लेगा, मेरी जगह तो दूर है। पहले-पहल मिनट के बाद हलक में दवा को दे-चरे बूढ़े टपकाते रहना और एक घंटे में पुनः सुधित करना। यदि एक घंटे तक यह ठीक रहा, तो मैं, एक इंजेक्शन और कर जाऊँगा। इंजेक्शन को दिव्या दिन्यरिया का दूसरा इलाज नहीं।

(ii) बजाया तो था हुआ। बाप सेंर है तो लड़का सवा सेर। बी.एस.टी. के बाद लखनऊ में ही जो पढ़ा है मेडिकल कॉलेज में। कहता है कि शादी का सवाल दूर है, लाओम का फूसरा। क्या कहें, मुझसेै। मलबाब अपना है, चर्चा इन लड़कों और इनके बापों को ऐसी कोरी-कोरी सुनाक कि ये भी भी ...

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P.T.O.
(iii) गार्दी का महीना था-शुरू-शुरू के दिन। मौसम फूल अब तक हीसे रहे थे। लगता था, बसा नही के हाथ में इनक्रमण खिचा है। रात के नौ बजे रहे थे। पाक़ टब तब तक सुना हो चुका था। अकेला में ही उस बाहरी परिधि की भीतर वाली एक बेंच पर गुमगुम बैठा था।

(iv) तब मैंने अज्ञात होकर कहा था, ‘नहीं भाँध! मैं नहीं छोड़ सकूँ! तब भी नहीं।’ सुनकर वे गुस्सा हो, कहने लगींं, ‘अच्छा! अब छोड़ो इन बातों को। अभी तो शादी हो और अभी से बैठीं वे पूंछँ। आओ अनदर बैठो।’ पर मालाजी! मुझे न जाने क्या हो रहा था। मेरा अन्तर्मन को पड़ाने लगा था; उसे देखती थी तो उसी गोदों-सी छा जाती थी। मैं थी भी और नहीं भी थी। मोह-प्रसन आमी होता भी है और नहीं भी होता, पर हुआ यही, मैं नहीं न ठहर सकी। वह पुकारती ही रह गई।

2. लक्षणोत्पादण लाल का साहित्यिक परिचय दीजिए।

अथवा
मोहन सकेश का साहित्यिक परिचय दीजिए।

3. निम्नलिखित विवरणों में से किसी एक विषय पर निबंध लिखिए: 8
   (i) महिलाधिकार
   (ii) गार्दी दर्शन
   (iii) प्रौद्योगिकी विज्ञान और पर्यावरण प्रौद्योगिकी
   (iv) विश्व विद्यालय सैनिक और उनके अधिकार
   (v) कम्युनिटी तथा इंटरनेट।

4. डी.एच.जी. कॉलेज, चीका, प्राचीन की ओर से कुरसूत्र विश्वविद्यालय के उपकुलपति को कॉलेज के दीक्षात समारोह में मुख्य अधिकार देने के रूप में आने के लिए एक अर्थ संस्कारी पत्र लिखिए।

अथवा
आपने राजकमल प्रकाशन, दिल्ली को पुस्तक भेजने का आदेश दिया परतु पुस्तकें भारत नहीं हुई। आप वार द्वारा सूचित करें और शीघ्र भेजने का निर्देश करें।

9

5. निम्नलिखित औद्योगिक राज्यों में से किन्हीं दो के समय की अर्थ लिखिए:

(i) Inertia
(ii) Insulation
(iii) Intestine
(iv) Membrane
(v) Magnetism
(vi) Microscope
(vii) Multiplier
(viii) Photo-catalyst
(ix) Phenomenon
(x) Pollution
(xi) Projectile
(xii) Radiation
(xiii) Reflective
(xiv) Index
(xv) Remainder
(xvi) Qualification Velocity.

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HINDI (Compulsory)

Time allowed : 3 Hours

[Maximum Marks : 40]

Note : सभी प्रश्न अनिवार्य हैं। दिशा निदेशानुसार प्रश्नों के उत्तर दीजिए।

1. निम्नलिखित अवतरणों में से किन्हीं दो की सहसंग व्याख्या
कीजिए : 2×6=12

(i) भाषी ने जो लक्षण बताए थे, उन्हें सुनकर मैं बचाव के तौर
पर इंजेक्शन का सामान और ट्यूब साथ लेता आया था और
मेरा खवाल ठीक निकला। भाषी को मेरे सुझाव देने थे, मैं
इसे नुस्खा लिख पेटा हूँ, यह बाजार से दूराई बनवा लेना,
मेरी जगह तो दूर है। पन्ह-पन्ह भीमके को बाद हलक में
दवा की दो-चार बूंदें टपकाल सहायता और एक घटे में मुझे
सूचित करता। यदि एक घटे तक यह ठीक रहा, तो मैं,
एक इंजेक्शन और कर जाऊँगा। इंजेक्शन के लिए डिप्टीरिया का
सूचित हलज नहीं।

(ii) बताया तो था दुखी। बाप सेर है तो लड़का सवा सेर।
बी.एस.शी. को बाद लखनऊ में दी तो पत्रता है मेडिकल
कॉलेज में। कहता है कि, शादी का सवाल दूसरा है, तालीम
का सूचित। क्या कहें, मजबूती है। मतलब अपना है, बसा
इन लड़कों और इनके बापों को ऐसी कोरी-कोरी सुनाए जिसे
भी भी .........

1650/K/434/2,700

P.T.O.
(iii) मार्ग का महीना ता-सुंदर-सुंदर को दिन। नौसभी पूल अब तक हेंस रहे थे। लगता था, बसन जंगु के हाथ में इद्रिशसुप खिला है। रात के नीचे झांक रहे थे। पाकर तब तक सूटा हो चुका था। यह उस वाहीनी परिक्षा को भीतर वाली एक बेंच पर गुम्मुक बैठा था।

(iv) तब मैं ने ज्या होकर कहा था, ‘नहीं भाभी! मैं नहीं छोड़ सकूँगा! तब भी नहीं।’ सुनकर वे मुसकराई, कहने लगीं, ‘अच्छा! अब छोड़ो इन बातों को। अभी हो आई हो और अभी ते बैठने ये चुड़बड़े। आयो अबर चलों।’ पर माताजी। युगे न जाने क्या हो रहा था। मैं अपना कपड़ा लगा था; में उस队伍 देखती थी तो जैसे मोहिनी-सी छा चाहती थी। में थी भी और नहीं भी थी। मह-प्रसन्न आयो होता भी है और नहीं होता, पर हुआ यहीं, में वहां न उठे सकी। वह पुकारती ही रह गई।

2. लक्ष्मीनारायण लाल का साहित्यिक परिचय दीजिए। 6

अर्थात
मोहन राकेश का साहित्यिक परिचय दीजिए।

3. निम्नलिखित विषयों में से किसी एक विषय पर निबंध लिखिए: 8
(i) पहलाविधि
(ii) गांधी दर्शन
(iii) प्रौद्योगिकी और पर्यवेक्षण प्रौद्योगिकी
(iv) विज्ञान विकास वैज्ञानिक और उनके अविष्कार
(v) विज्ञान तथा इंटरनेट।

4. डॉ.एयों. कॉलेज, चीफ, प्रधान द्वारा ओर से कुशलता विचारविद्यालय के उपकल्पनित को कॉलेज के दीर्घत रकमें में पृथ्वी अतिव से रूप में आने के लिए एक अर्थ नकाशा पत्र लिखिए।

अर्थात
आपने राजकमल प्रकाशन, दिल्ली को पुस्तक भेजने का आदेश दिया परंतु पुस्तक प्राप्त नहीं हुई। आप तर ही सुनिचत करें और शीघ्र भेजने का निर्देशन करें।

5. निम्नलिखित अंग्रेजी शब्दों में से किन्हीं दस को हिंदी तकनीकी अर्थ लिखिए:
(i) Inertia
(ii) Insulation
(iii) Intestine
(iv) Membrane
(v) Magnetism
(vi) Microscope
(vii) Multiplier
(viii) Photo-catalyst
(ix) Phenomenon
(x) Pollution
(xi) Projectile
(xii) Radiation
(xiii) Reflective
(xiv) Index
(xv) Remainder
(xvi) Qualitation Velocity.
निम्नलिखित प्रश्नों के उत्तर दीजिए :

1. दण्ड: शासित प्रजा: सर्वा: पाठ मूल रूप से किस ग्रन्थ से लिया गया है? इसके रचयिता का नाम लिखिए।

(i) 'दण्ड: शासित प्रजा: सर्वा:' पाठ किस मूल ग्रन्थ से संकलित है?
(ii) इसके लेखक कौन हैं?
(iii) 'अच्छा सन्धि' का अन्य नाम चलाकर एक उदाहरण दीजिए।
(iv) 'फटामि' पर में कौन सा लक्ष स्थापन कर बचन है?

2. निम्नलिखित स्लोकों में से किन्हीं दो स्लोकों का सरलाधि लिखिए:

(ii) प्रजाहति यथा कामासनांन्याय मनोगतां
आत्मनेवतामना हुष्ट: रित्वप्रस्तवतोऽच्छयः।
(iii) केनामुनियां शुभदं मित्रमिलकायतम्।
आप्यां च परिज्ञानं सोक-सत्तापं भेजाम्॥

(iv) दुर्बनस्य च सर्पस्य वर्ण सचो न दुर्बन।।
सर्वं दससि काले हुं दुर्बनस्य पदे पदो।॥

3. निम्नलिखित गद्यां में से किन्हें दो का सत्ताप में किये गए हैं: 2×4=8

(i) अस्तित वाराणस्यं कर्पोषपदको वाण रजकः। स राजी गाढगिन्द्राणां
प्रसुपतः। दसस्तं दशैद्रयाणि हहूं चौरे: प्रविष्टः। तथ्या
प्राकृपगणे गर्भेण तद्निश्चिततः।

(ii) चटका प्राह - अस्तित्वं परं दुर्वाकायं मध्यमम सत्ताम्यः
कृतः। तदहिं मम लवं, सुदर्शनपदस्य गाढगिन्द्राणं कोशि
वधोपायितं सत्ताम्य, रस्तानुपातं मे सत्ताविभाजितं। कन्यकूटः आह-मघायत। सत्तापमिहितं भवत्या।

(iii) अस्तितुज्ज्वलितस्य प्राचार्यं भक्तिः। तत्र हेतु काली निर्मयं
कदाचित् ग्रीष्मसमये परिश्रमं: कवितासप्रकाशं तस्मले
द्वृष्ट्वा वर्ण नितिनादिः। तत्र श्रणानि परमुखाद्
वृहद-कालमासः ॥

(iv) अस्तित कवितासत्ववैकवैकवे वासनसुंदरम्। तत्या कदाचित्
हे मनसमये प्रियकृताः दिनश्रमाः च-प्रेममाः कले वरं
दुधार-वचन-भूर-प्रर्व-धन-धारा-पिपा-सममितं न
cविष्णुकृतासिमागमत॥

4. निम्नलिखित धातुओं में से किन्हें दो धातुओं के स्थाननिर्देश लक्षणों
में रूप लिखिते हैं: 2×4=8

(i) बुध - लक्ष्य लक्षक ।
(ii) कस्य - लक्ष्य लक्षक ।
(iii) युध - लक्ष्य लक्षक ।
(iv) भुव - लक्ष्य लक्षक ।

5. निम्नलिखित पद्य में से किन्हें चार का स्निध अथवा समिध-विकृतियों
किये गए हैं: 4×2=8

(i) दिन + अंक: ।
(ii) विद्या + अर्थ: ।
(iii) प्र + प्रति: ।
(iv) हेत + अत्र: ।
(v) शिष्य + शिष्य: ।
(vi) प्रतिशक्षा: ।
(vii) साधू + पत्नी: ।
(viii) कोशि: ।
BSIT/M-23 26509
DIGITAL ELECTRONICS-III
BSIT-401

Time : Three Hours] [Maximum Marks : 40

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

Compulsory Question

1. (a) What is a ripple counter? How does it work? 2
(b) Mention the various modes in which the data can be entered or taken out from a register. 2
(c) Distinguish between static and dynamic RAM. 2
(d) What will be the resolution of 16-bit D/A converter? 2

Unit I

2. (a) Design Mod-5 counter. 6
(b) Draw the waveforms of 4-bit ripple binary counter. 2

3. Describe the working of a decade counter with the help of logic diagram. 8
Unit II

4. (a) Explain the operation of parallel in serial out shift register. 4
(b) Draw and explain 4-bit Ring Counter using timing diagram. 4

5. (a) Draw and explain 4-bit universal shift register. 4
(b) Design a sequence generator to generate a sequence 101011. 4

Unit III

6. (a) How can we expand word capacity? Obtain a 2048 × 8 memory using 256 × 8. 6
(b) Compare bipolar and MOS RAM. 2

7. (a) Draw a diode matrix ROM that converts Excess-3 code to cyclic code. 4
(b) Draw and explain static bipolar RAM cell. 4

Unit IV

8. (a) Draw and explain weighted resistive network. Mention its drawbacks. 6
(b) For a five-bit binary ladder D/A converter the input levels are 0 = 0 volt and 1 = +10 volts, find the output voltage corresponding to an input of 10110. 2

9. (a) Define the terms:
(i) Resolution
(ii) Monotonicity.
(b) Describe the successive approximation method for A/D conversion. 4
BSIT/M-23  
OSCILLATORS AND MULTIVIBRATORS  
BSIT-402

Time: Three Hours  
(Maximum Marks: 40)

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

(Compulsory Question)

1. (a) Define input bias current and output offset voltage.  
2

(b) What are the advantages of negative feedback?  
2

(c) Why do you use three RC sections in Phase shift oscillator?  
2

(d) An astable multivibrator has component values  
$R_{B1} = R_{B2} = R = 10 \, \text{k}\Omega$,  
$C_1 = C_2 = C = 120 \, \text{pF}$ and  
$R_{L1} = R_{L2} = R_L = 1 \, \text{k}\Omega$. Find frequency of oscillation and minimum value of transistor $\beta$.  
2

Unit I

2. (a) Discuss the working of op-amp as a differentiating circuit.  
4

(b) Discuss 1st order (First order) high pass active filter using op-amp.  
4

(5-14/H) L-26510  
P.T.O.
3. (a) Design a first order high pass filter at cut-off frequency of 400 Hz and a pass band gain of 1.3
(b) Draw the circuit of Schmitt trigger. Explain its operation.

Unit II
4. (a) Mention the names of the four feedback topologies. Find the expression of transfer gain in voltage series feedback topology.
(b) Explain how non-linear distortion decreases with negative feedback.
5. (a) Discuss the effect of negative current shunt feedback on output resistance.
(b) When negative voltage feedback is applied to an amplifier of gain 100, the overall gain falls to 50:
   (i) Calculate the fraction of the output voltage feedback.
   (ii) If this fraction is maintained, calculate the value of the amplifier gain required if the overall gain is to be 75.

Unit III
6. Draw the circuit of Colpitts Oscillator and explain its operation. Find the expression of frequency of oscillations.

7. Draw the circuit of Wien Bridge Oscillator and explain its working and calculate the frequency of oscillations.

Unit IV
8. (a) Draw and discuss the block diagram of 555 timer.
(b) Draw and explain the circuit of Astable Multivibrator by using 555 timer.
9. Draw and discuss transistorized Monostable Multivibrator. Derive the expression for time delay.
BSIT/M-23
TELECOMMUNICATION AND NETWORKING-II
BSIT-403

Time: Three Hours] [Maximum Marks: 40

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

(Compulsory Question)

1. (a) A Repeater is a regenerator not an amplifier. Justify this statement. 2

(b) Differentiate between Guided and Unguided media. 2

(c) What is the range of Radio wave and Microwave transmission ? 2

(d) How to check whether a phone is 4G or not ? 2

Unit I

2. (a) What do you mean by Hub ? How is it related to a Repeater ? Explain, how it extend the length of LAN ? 6

(b) Explain Transparent Bridges in brief. 2

(3-51/5) L-26511

P.T.O.
3. (a) Explain, how the number of twists per unit length determine the quality of cable?  
(b) Discuss the Principle of Satellite Communication.

Unit II

4. (a) Discuss the concept of Cellular Networks.
(b) Explain the frequency-reuse principle with the help of frequency reuse pattern.

5. (a) Explain GSM architecture in detail.
(b) Elaborate IS-95 Reverse Transmission with the help of diagram.

Unit III

6. (a) Describe any three advantages of Optical Fibre as a transmission medium when compared to Copper Cables.
(b) Explain why Cladding is not necessary for light to propagate along the Fibre?

7. (a) Discuss Fibre Optic System principle through ray optics concept.
(b) Determine the angle of refraction when a light ray passes from glass to air with an angle of incidence is 30° (Refractive index of Glass is 1.5 and air a 1.0).

Unit IV

8. (a) Explain with the help of diagram Fibre Optic Receiver System
(b) Explain Step-indexed and Multi-indexed Fibres.

9. (a) Explain with the help of diagram how Fibre Optic Transmission is achieved.
(b) Why is the wavelength region (1.1 to 1.6) micro meter preferred for Fibre Optic Communication.
BSIT/M-23
MICROPROCESSOR ARCHITECTURE AND
PROGRAMMING-II
BSIT-404

Time: Three Hours]  [Maximum Marks: 40

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

(Compulsory Question)

1. (a) Why 8255 is required for interfacing with 8085
microprocessor?  2

(b) Determine the control word in I/O mode to configure
port A and port C\textsubscript{U} as input port and port B and
port C\textsubscript{L} as output port.  2

(c) Write control word to initialize the 8254 for counter
2 in mode 0 that counts in binary form.  2

(d) What is the use of DMA controller in
microprocessor?  2
Unit I

2. Discuss the interfacing of 8 bit 1408 DAC in bipolar range. Write a program to generate continuous waveform.

3. Discuss the interfacing ckt of 8255A in model. Address line A7 is connected with CS. Port A is designed as the input port for a keyboard with I/O, and port B is designed as the output port for a printer with status check I/O. Write a program to interface it.

Unit II

4. (a) Discuss the pin configuration of 8254 in detail.

(b) Design a square wave generator using 8253.

5. (a) Discuss instructions to generate a pulse every 100 µs from counter 0.

(b) Discuss read back command and its format in 8254.

Unit III

6. (a) Discuss the internal block diagram of 8086 in detail.

(b) Calculate the effective address for the instruction MOV AX, 50H + [BX], where DS is equal to 1005H and [BX] = 5555H.

7. (a) Discuss different addressing modes of 8086.

(b) Explain the following instructions in 8086:

   (i) IMUL

   (ii) IDIV

   (iii) IDAS

   (iv) SBB.

Unit IV

8. (a) Discuss the difference between WHILE-DO and REPEAT-UNTIL using flow chart and using instructions.

(b) Discuss the coding template for 8086 instructions which MOV data between registers or between a register and memory location.

9. (a) Discuss IF-THEN-ELSE structure and CASE structure using program and flow chart.

(b) Discuss different type of JUMPS in 8086. Explain each type of JUMPS instructions with example.
BSIT/M-23  26514
COMPUTER PROGRAMMING WITH C-II
BSIT-406

Time: Three Hours] [Maximum Marks: 40

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

1. (a) Explain various string handling functions in C. 2
   (b) Write in detail about return statement in C. 2
   (c) Comment on the use of typedef in C. 2
   (d) Explain fgets and fprintf functions in C. 2

Unit I

2. (a) Explain the following using suitable example: 4
   (i) #define
   (ii) #include
   (iii) #if
   (iv) #undef.
   (b) Write a program in C using four string manipulation functions. 4

(3-17/1) L-26514

P.T.O.
3. Explain various file inclusion directives in C using suitable example.

Unit II

4. (a) Differentiate between call by value and call by reference with a suitable examples. 6
   (b) How to pass arrays to functions? 2

5. (a) What is recursion? Write a program to find factorial of a given number using recursion. 4
   (b) Define a function and explain, how to create and call a function. 4

Unit III

6. What is a pointer? Explain various operations that can be performed and that cannot be performed on pointers. 8

7. Explain the following in detail:
   (a) Malloc function
   (c) Calloc function
   (b) Realloc function
   (d) Free function.

Unit IV

8. (a) Explain different modes to open a file. 5
   (b) Explain process of reading and writing into a binary file. 3
(b) Find the image of \( x^2 + y^2 - 4y + 2 \) under the mapping \( w = \frac{z-i}{iz-1} \).

9. (a) Find the bilinear transformation which maps the points \( z = 0, -1, i \) onto \( w = i, 0, \infty \). Also, find the image of unit circle \( |z| = 1 \).

(b) Find the Mobius transformation which map the half plane \( I(z) \geq 0 \) into circle \( |w| \leq 1 \).
3. (a) Evaluate the integral:
\[ \iiint \frac{1}{\sqrt{1-x^2-y^2-z^2}} \, dx \, dy \, dz, \]
the integral being extended to the positive octant of the sphere \( x^2 + y^2 + z^2 = 1 \).

(b) Evaluate the following integral by changing the order of integration:
\[ \int_0^\infty \int_x^\infty e^{-y} \, dy \, dx. \]

4. (a) Find the Fourier series expansion for the function
\[ f(x) = |x|, \quad -\pi \leq x \leq \pi. \]
Also, deduce that:
\[ \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots = \frac{\pi^2}{8}. \]

(b) Find the Fourier series expansion of the function
\[ f'(x), \text{ where } f(x) = \begin{cases} \cos x & -\pi < x < 0 \\ -\cos x & 0 < x < \pi \end{cases}. \]

5. (a) Find the half-range cosine series for
\[ f(x) = x(\pi - x) \text{ in the interval } (0, \pi). \]
Hence, deduce that:
\[ \frac{\pi^2}{6} = \frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \ldots. \]

(b) Find the Fourier series for the function
\[ f(x) = x^2 - 2; \quad -2 \leq x \leq 2. \]

6. (a) Show that the function:
\[ f(z) = \begin{cases} \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2} & \text{when } z \neq 0 \\ 0 & \text{when } z = 0 \end{cases} \]
is continuous and that CR equations are satisfied at the origin, yet \( f'(0) \) does not exist.

(b) Prove that an analytic function with constant modulus is constant.

7. (a) Prove that \( f(z) = \overline{z} \) is nowhere differentiable but continuous everywhere in the complex plane.

(b) Show that \( u = y^3 - 3x^2y \) is a harmonic function. Find its harmonic conjugate and the corresponding analytic function.

8. (a) Show that the transformation \( w = \frac{1}{z} \) maps a circle in \( z\)-plane to a circle in \( w\)-plane or to a straight line if the circle in the \( z\)-plane passes through the origin.
GSQ/M-23
LINEAR ALGEBRA
Paper : BM-362

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 a map $T : \mathbb{R}^3 \to \mathbb{R}^2$ defined by
$T(x, y, z) = (|x|, y - z)$ is not a linear transformation.
(b) Give an example to show that union of two
subspaces need not be a subspace.
(c) Show that the function $T : \mathbb{R}^3 \to \mathbb{R}^3$ defined by
$T(x, y, z) = x^2 + y^2 + z^2$ is not a linear transformation.
(d) Find the matrix representing the transformation
$T : \mathbb{R}^2 \to \mathbb{R}^3$ defined by $T(x, y) = (x + y, 2x - y, 7y)$
relative to the standard basis of $\mathbb{R}^2$ and $\mathbb{R}^3$.
(e) Define Normed Linear Space.

Unit I

2. (a) A non-empty subset $W$ of a vector space $V(F)$ is a
subspace of $V$ iff $au + bv \in W$ for $a, b \in F$ and
$u, v \in W$.
(b) Prove that \( S = \{(1, 0, 0), (1, 1, 0), (1, 1, 1), (0, 1, 0)\} \) spans the vector space \( \mathbb{R}^3(\mathbb{R}) \) but is not a basis set.

3. (a) If a vector \( v \) is a linear combination of the set of \( n \) vectors \( \{v_1, v_2, \ldots, v_n\} \), then the set of vectors \( \{v_1, v_2, \ldots, v_n, v\} \) form a linearly dependent set.

(b) If a finite dimensional vector space \( V(F) \) is a direct sum of its two subspaces \( W_1 \) and \( W_2 \), then \( \dim V = \dim W_1 + \dim W_2 \).

Unit II

4. (a) If \( T : U(F) \to V(F) \) is a linear transformation, then \( \dim (R(T)) + \dim (N(T)) = \dim U \).

(b) Let \( T : U(F) \to V(F) \) be a linear transformation. If \( v_1, v_2, \ldots, v_n \) are linearly independent vectors of \( U \) and \( T \) is one-one, then \( T(v_1), T(v_2), \ldots, T(v_n) \) are also linearly independent.

5. (a) State and prove Fundamental theorem of vector space homomorphism.

(b) If \( W \) is any subset of a vector space \( V(F) \), then \( A(W) = A(L(W)) \).

Unit III

6. (a) Find the matrix representing the transformation \( T : \mathbb{R}^3 \to \mathbb{R}^4 \) defined by:

\[ T(x, y, z) = (x + y + z, 2x + z, 2y - z, 6y) \]

relative to the standard basis of \( \mathbb{R}^3 \) and \( \mathbb{R}^4 \).

(b) Let \( T_1 : U \to V \) and \( T_2 : V \to W \) be two linear transformations. Then \( \rho(T_1 T_2) \leq \rho(T_2) \).

7. (a) Find the co-ordinates of vector \( (1, 1, 2), (2, 2, 1), (1, 2, 2) \) relative to basis \( (1, 1, 1) \).

(b) Prove that similar matrices have same characteristic polynomial.

Unit IV

8. (a) State and prove CAUCHY SCHWARZ INEQUALITY.

(b) If \( x \) and \( y \) are vectors in an inner product space \( V(F) \), then show that \( x = y \) iff \( \langle x, z \rangle = \langle y, z \rangle \) for all \( z \in V \).

9. (a) Every finite dimensional vector space is an inner product space.

(b) A linear operator \( T \) on a unitary space \( V \) is Hermitian iff \( \langle T(v), v \rangle \) is real for every \( v \).
(c) Define Hooke's law and modulus of elasticity. 2
(d) Find the amplitude of a S.H.M. of period 12 sec. which travels 15 cm from rest in 2 seconds.

Roll No. ......................  Total Pages : 04
GSQ/M-23 .......................... 1744
DYNAMICS ..........................
BM-363 ..........................

Time : Three Hours]  [Maximum Marks : 40

Note : Attempt Five questions in all, selecting one question from each Unit. Q. No. 9 is compulsory.

Unit I

1. A particle moves along a circle \( r = 2a \sin \theta \) in such a way that its acceleration towards the origin is always zero. Show that the transverse acceleration varies as the fifth power of sec \( \theta \). 8

2. (a) The path of two trains P and Q are due north and east and they have the same and speed of 20 m.p.h. At noon Q is due north of P and 10 miles away. Find the time when they are nearest and also the least distance between them. 4

(b) When a point describing S.H.M. is distant 13 inches from the center, its speed is 30 ft/sec. and when distant 5 inches from center, its speed is 50 ft/sec. Find the amplitude and the period. 4
Unit II

3. Prove that the shortest time from rest to rest in which an a steady load P tons can lift a weight of W tons and through and vertical distance lift is \( \sqrt{\frac{2hP}{g(P-W)}} \) seconds.

4. (a) If a string of an Atwood machine can bear a strain of only \( \frac{1}{8} \) of the sum of two weights, show that the least possible acceleration is \( \frac{\sqrt{3}}{2} g \).
(b) State and prove principle of conservation of energy.

Unit III

5. A particle is projected with velocity \( u \) from the lowest point and move along the inside of a smooth vertical circle. Discuss the motion.

6. (a) A ball thrown from a height 6 ft. at an angle of 30° to the horizon with a speed of 60 ft/sec. is caught by another man at a height 2 ft. from the ground. How far apart were the two men?

Unit IV

7. (a) Prove that central orbit is always a plane curve.
(b) If \( v_1 \) and \( v_2 \) are maximum and minimum velocities of a plant for an elliptic path then prove that \( (1-e)v_1 = (1+e)v_2 \).

8. A particle moves in a hyperbola under a central force which is always directed towards its focus. Find, law of force, velocity of any point of its path and the periodic time.

Unit V

(Compulsory Question)

9. (a) Prove that acceleration of a point moving in a curve with uniform speed is \( \rho \left( \frac{dv}{dt} \right)^2 \).

(b) Find the pressure of a body resting on a horizontal plane moving vertically downwards with acc. \( f \).
9. (a) What is Molecular assembler concept? How do you understand advanced capabilities of nanotechnology?  
(b) Explain the applications of nanotechnology in the field of electronics.

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

GSQ/M-23  
1749

SOLID STATE AND NANO PHYSICS  
PH-601 Paper–XI

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. Use of scientific (non-programmable) calculator is allowed.

1. (a) Compare and contrast crystalline and amorphous solids with reference to their technological applications.
(b) What is K-Space? What is its physical significance?
(c) Differentiate between ground state of Fermi gas and BCS ground state.
(d) Give one example each of 0-D, 1-D, 2-D and 3-D nanomaterials.  
4×2=8

Unit I

2. (a) What are liquid crystals? Give applications, advantages and disadvantages of liquid crystal.  
(b) Calculate \(c/a\) ratio of hexagonal close-packed structure.  
4

(5-01/0) L-1749  
P.T.O.
3. (a) What is atomic packing fraction in crystals? Calculate atomic packing fraction of diamond crystal. 3
(b) Draw and explain the crystal structure of NaCl. 3
(c) Draw (121) and (201) planes in a simple cubic crystal. 2

Unit II

4. (a) What is a Reciprocal lattice? How do you visualize Reciprocal lattice of a given crystal? Why is it needed? 4
(b) What are the steps to construct Reciprocal lattice? Illustrate with a suitable example. 4

5. (a) What is X-ray diffraction? Explain Powder method of X-ray diffraction. Show that the resolving power for crystal planes is best demonstrated by powder photograph. 4
(b) Can visible light be diffracted by crystals and X-rays be diffracted by optical grating? Give reason of your answers. 2
(c) A certain crystal reflects monochromatic X-rays strongly when Bragg’s glancing angle (1st order) is 15°. What are the glancing angles for 2nd and 3rd orders of spectrum? 2

Unit III

6. (a) What do you mean by critical magnetic field in superconductors? Explain. 3
(b) Explain Meissner effect and hence show that perfect diamagnetism is an essential property of superconductors. 3
(c) What are the applications of superconductivity in medical sector? 2

7. (a) Compare and contrast Type-I and Type-II superconductors. 3
(b) What are the observations that led to BCS theory? Explain. 3
(c) The critical temperature for mercury with isotopic mass 199.5 is 4.185K. Calculate its critical temperature when its isotopic mass changes to 204.4. 2

Unit IV

8. (a) What is the vision and objective of nanotechnology? 4
(b) What are the potential applications of nanotechnology in medicines? 4
1. (i) The wavelength of the first member of the Balmer series in hydrogen spectrum is $6563 \times 10^{-10}$ m. Calculate the wavelength of the first line of Lyman series in the same spectrum.  

(ii) What are penetrating and non-penetrating orbits?  

(iii) Write down the quantum number for the states $^4F_5$, $^2D_{3/2}$, $^3P_2$, $^1P_1$.  

(iv) What is Paschen-Back effect?
Unit I

2. (a) Discuss the Sommerfeld's extension to Bohr's model and derive an expression for size of an elliptical orbit of electron.

(b) How de-Broglie concept of matter-wave support the Bohr's quantization law?

3. (a) What are quantum numbers associated with the vector atom model?

(b) Explain the concept of spatial quantization in a vector atom model.

Unit II

4. Derive an expression for spin-orbit interaction energy and double term separation for non-penetrating orbits for a single valence electron.

5. (a) Explain the various spectral series observed in the spectra of Alkali metals.

(b) Explain the concept of quantum defect.

Unit III

6. Derive an expression for interaction energy in L-S coupling.

7. (a) Show that the number of terms for pp-configuration is the same for L-S coupling as that for j-j coupling.

(b) Explain j-j coupling and selection rules for two valence electrons.

Unit IV

8. (a) What is Anomalous Zeeman effect? Explain its quantum theory and discuss the splitting of D1 and D2 lines of sodium metal.

(b) What is Stark effect?

9. (a) What is Raman effect? Explain the effect on the basis of quantum theory.

(b) Discuss the rotational energy levels of molecules.
GSQ/MR-23
INORGANIC CHEMISTRY (TH)

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. (i) Which is stronger acid, HCN or HOCN?
   (ii) Write down the conjugate acid of $H_2PO_4^-$.
   (iii) Name the energy rich molecule in biological system.
   (iv) Name the disease caused by excess of copper.
   (v) Give one example of three electron donor ligand.
   (vi) Give the IUPAC names of $Fe(C_3H_5)_2$ and $Co_4(CO)_{12}$.
   (vii) What is the oxidation state of nitrogen in Phosphazene?
   (viii) Write the IUPAC name of $[Si(CH_3)(C_6H_5)O]$. 1×8

Section A

2. (a) Discuss the Lewis concept of acids and bases. 3
   (b) How will you explain the strength of acids BF$_3$, BCl$_3$ and BBr$_3$ on the basis of their electronegativities and back bonding? 3

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P.T.O.
3. (a) What are the characteristics of hard and soft acids and bases?
   (b) What is HSAB principle? How will you explain the occurrence of ores and minerals using HSAB principle?

4. (a) Give any two methods of preparation of organolithium compounds.
   (b) Explain the structure of methyl lithium.
   (c) What are the various types of bonding involved in organometallic compounds?

5. (a) Calculate the effective atomic number of chromium in Cr(CO)₃(C₆H₅)₂.
   (b) Discuss the factors responsible for metal-carbon bond cleavage in organometallic compounds.
   (c) Give some important use of organotin compounds.

Section B

6. (a) What are the essential elements? Discuss the biological role of Zn, Cu, and Mn.
   (b) What is Na⁺-K⁺ pump? Explain its working.

7. (a) What are basic functions of haemoglobin and myoglobin in the body? Discuss the structure of haemoglobin.

8. (a) What are the silicone? How are cross-linked silicones prepared?
   (b) How are cyclic silicones prepared? Write four uses of silicones.

9. (a) What are Polyphosphazene? How are polyphosphazenes prepared?
   (b) What are homomorphic and heteromorphic p-system? Explain.
8. (a) Derive thermodynamically the relation:
\[ \Delta T_b = K_b \times m, \]
where \( m \) is molality of the solution.

(b) What are colligative properties? How can you say that ‘Relative lowering of vapour pressure’ is a colligative property?

(c) What is the difference between Molarity and Molality of a solution?

9. (a) Define ideal and non-ideal solutions. Give two examples of each of them.

(b) Calculate the osmotic pressure of 0.01 M solution of cane sugar at 27°C.

(c) Explain, why equimolar solutions of \( \text{Na}_3\text{PO}_4 \) and KCl do not have the same osmotic pressure?

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

(Compulsory Question)

1. (a) What is meant by ‘Partition Function’ as used in statistical mechanics?

(b) Write the basic relation which links thermodynamics with statistical mechanics.

(c) What are photo-inhibitors? Give one example.

(d) Define Grotthus-Draper Law.

(e) Define the term ‘Degrees of Freedom’ as used in Phase Rule.

(f) What is eutectic mixture?

(g) What is cryoscopic constant?

(h) Define Raoult’s law for solutions containing non-volatile solute.
Section A

2. (a) Discuss the following:
   (i) Thermodynamic Probability
   (ii) Born-Oppenheimer Approximation.

(b) What are the assumptions made for deriving Maxwell Boltzmann's distribution law?

(c) Write expression for vibrational partition function. What do the different symbols signify?

3. (a) How do photochemical reactions differ from thermochemical reactions?

(b) What is photosensitization? Explain with two suitable examples.

(c) Calculate the value of an Einstein of energy in electron volts for radiation of frequency $3 \times 10^{13}$ s$^{-1}$.

4. (a) Differentiate between the following:
   (i) Fluorescence and Phosphorescence
   (ii) Internal Conversion and Intersystem Crossing.

(b) The photodecomposition of HI vapour was carried out with $\lambda = 2070$ Å radiation. Absorption of each calorie gave $1.44 \times 10^{-5}$ g of Hydrogen. What is the quantum yield?

5. (a) Show that the complete partition function for a system is given by the product of translational, rotational, vibrational and electronic partition functions.

(b) Define Second Law of Photochemistry. Derive the relationship between an Einstein of energy (in kcal) and the wavelength of the radiation (in Å).

Section B

6. (a) What do you understand by phase diagram? How are bivariant, univariant and non-variant systems represented in a phase diagram?

(b) What is a condensed system? Write the reduced phase rule equation.

(c) How many number of Phases and Components are present in the following systems?
   (i) $\text{CaCO}_3(s) \rightleftharpoons \text{CaO}(s) + \text{CO}_2(g)$
   (ii) Rhombic Sulphur in equilibrium with Monoclinic Sulphur.

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

(b) Draw a well labelled phase diagram of Pb-Ag system.
ECONOMIC BOTANY
Paper II

Time : Three Hours] [Maximum Marks : 40

Note : Attempt Five questions in all, selecting two questions from each Unit. Question No. 1 is compulsory (short answer type). All questions carry equal marks (8 marks each).

1. Answer the following : 1×8=8

(a) What do you mean by Karyopsis ?

(b) The male inflorescence in Maize is called.........
   (fill the gap)

(c) Name any two fruit vegetables.

(d) Give examples of two Bast Fibres.

(e) What is “Flush” ? In which crop you will best observe it ?

(f) Name the active and useful alkaloids obtained from Rauvolfia serpentina.

(g) From which part of the plant you will obtain Coffee.

(h) What are Energy Plantations ?
Unit II

2. (a) Write a note on Botanical Characters and uses of Wheat. 4
(b) Discuss various types of rice cultivated in India based upon the season of cultivation and also different Rice cultivation practices followed in India. 4

3. Give a detailed account of Origin, Cultivation, Harvesting and Uses of any two vegetables you have studied. 8

4. (a) Write the Botanical account and Harvesting Procedure in Cotton. 4
(b) Write a note on Retting, taking example of Jute. Also write the uses of Jute Fibers. 4

5. Discuss details of any two oil yielding crops you have studied. 8

Unit II

6. Discuss the following:
   (i) Botanical Characters of Ginger. Which part of the plant is most useful? 4
   (ii) Uses of Ferula and Turmeric. 4

7. Write notes on the following:
   (i) Processing of Cane Juice to prepare Cane Sugar. 4
   (ii) Various categories of Tea, outlining the procedure to make them. 4

8. Write notes on the following:
   (i) Medicinal Significance of Opium 4
   (ii) Morphological characters and significance of Neem. 4

9. Give an account of:
   (i) Rubber Tree. 4
   (ii) Timber Sources. 4
(b) What is Pointer? What kind of information is represented by pointer variable?

सूचक क्या है? सूचक चर द्वारा किस प्रकार की सूचना का प्रतिनिधित्व किया जाता है?

(c) What is the difference between passing by the value and passing by reference? Give suitable example.

मूल्य से गुजराने और संदर्भ से गुजराने के बीच क्या अंतर है? उपयुक्त उदाहरण दीजिए।

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GSQ/M-23 1763

INTRODUCTION TO C AND ITS PROGRAMMING

Time: Three Hours [Maximum Marks: 40]

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

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

1. (a) What are the advantages of high level languages over machine language?

मोटी भाषा की तुलना में उच्च स्तरीय भाषाओं के क्या लाभ हैं?

(b) Give any two differences between a while statement and a Do-while statement in C.

C में while स्टेटेंट और एक Do-while स्टेटेंट के बीच कोई दो अंतर दीजिए।

(c) Explain, why functions are important in writing a program.

समझाइए कि प्रोग्राम लिखने में फंक्शन क्यों महत्त्वपूर्ण हैं।
(d) Name and describe four basic data types in C. \(4 \times 2 = 8\)

C में चार बिनियमी डाटा प्रकारों का नाम लिखिए और वर्णन कीजिए।

Unit I (आकांक्षा I)

2. (a) Explain the different ways and rules in which floating points can be written. \(4\)

विभिन्न तरीकों और नियमों की व्याख्या कीजिए जिसमें फ्लोटिंग पॉइंट लिखते जा सकते हैं।

(b) What is the use of conditional operator to form the conditional expression? How is a conditional expression evaluated? \(4\)

सर्वत्र अभिव्यक्ति बनाने के लिए सर्वत्र ऑपरेटर का उपयोग क्या है? एक सर्वत्र अभिव्यक्ति का निरूपण किया जाता है?

3. (a) Describe two logical operators in C. What is purpose of each? With what types of operands can they be used? \(4\)

C में दो तार्किक ऑपरेटरों का चर्चण कीजिए। प्रत्येक का उद्देश्य क्या है? किस प्रकार के ऑपरेटर के साथ उनका उपयोग किया जा सकता है?

(b) Define Array Variable. Differentiate between Ordinary Variable and Array Variable. \(4\)

ऐसे बैरिएन्स को परिभाषित कीजिए। साधारण चर और ऐसे चर के बीच अंतर कीजिए।

 Unit II (आकांक्षा II)

4. (a) Explain if, if-else, nested if-else and cascaded if-else with examples and syntax. \(4\)

उदाहरणों और स्ट्रिक्स सहित if, if-else, nested if-else और cascaded if-else का स्पष्ट व्याख्यात है।

(b) Explain the meaning of Cast operator with the help of suitable example. \(4\)

उपयुक्त उदाहरण की सहायता से कॉस्ट ऑपरेटर का अर्थ समझाइए।

5. (a) Show how break and continue statements are used in a C-program, with example. \(4\)

दिखाइए कि C-प्रोग्राम में ब्रेक और कांटिन्यू स्टेंटेंट का उपयोग अपूर्व किया जाता है, उदाहरण के साथ।

(b) Write a program to find the HCF of the two numbers using do while loop. \(4\)

do while loop का उपयोग करके दो संख्याओं का HCF ज्ञात करने के लिए एक प्रोग्राम लिखिए।

 Unit III (आकांक्षा III)

6. (a) Write a function which, given a number from 1 to 12 and a character array, stores the name of the month in the array. For example, given 8, it stores August in the array. Store the empty string if the number given is not valid. \(5\)

(3-33/3) L-1763(TR) 3 P.T.O.
8. (a) While passing an argument to a function, what is the difference between passing by the value and passing by reference?

(b) Explain the meaning of the following Declaration:

(i) `float a = -0.167;`

(ii) `char c1, c2, c3;`

(iii) `char *pcl, *pc2, *pc3 = &c1;`

9. (a) Explain different types of strings used in C. How are strings initialized?

C में प्रयुक्त होने वाले विभिन्न प्रकार के स्ट्रिंग को समझाइए। स्ट्रिंग कैसे इनिशियलाइज किया जाता है?
GSQM-23
COMPUTER SCIENCE
Paper: I
Relational Database Management System

Time: Three Hours] [Maximum Marks: [B.Sc. 40
[B.A. 25

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

1. Explain in brief: 4×2=8
   (a) Differentiate relational algebra and relational calculus.
   (b) What is the need of normalization?
   (c) Differentiate between DROP and DELETE commands in SQL.
   (d) How you can display a message in PL/SQL?

Unit I

2. Differentiate between Hierarchical, Network and Relational data model. 8

3. What is Union Compatibility? Discuss the division operation with example? Also discuss its properties. 8

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4. How does tuple relational calculus different from domain relational calculus?  

5. What is Normalization? Discuss various normal forms.

Unit III

6. What is the purpose of ALTER statement in SQL? Explain giving a suitable example.

7. What is Foreign Key? Explain foreign key constraint specified in SQL.

Unit IV

8. What is conditional control? What are the various types of conditional control statements in PL/SQL?

9. Discuss the structure of PL/SQL. What is the purpose of % TYPE and % ROW TYPE attributes?
1. Write short notes on the following:
   (a) Wide Area Network
   (b) Repeaters and Hubs
   (c) Selective Repeat protocol
   (d) Choke packets.

Unit I

2. What do you mean by network topology? Explain Ring, Mesh and Star topologies using suitable examples.

3. Discuss the TCP/IP reference model in detail.
Unit II

4. Explain the following w.r.t. Computer Networks: Signals, capacity, multiplexing.

5. (a) What do you mean by wireless data transmission?
(b) Write a short note on communication satellites.

Unit III

6. What is an error in network transmission? How the error can be detected and corrected using hamming distance method? Discuss.

7. Write short notes on the following:
(a) Collision free protocols.
(b) Token Ring.

Unit IV

8. Why routing is an important part of network? Explain the link state routing and hierarchical routing with suitable examples.

9. (a) What do you mean by load shedding? Why is it needed?
(b) Discuss the WWW services along with their applications.
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   (b) Repeaters and Hubs
   (c) Selective Repeat protocol
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GSQM-23
COMPUTER APPLICATIONS
Paper: I
Multimedia Tools

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 are text usages in multimedia?
(b) Differentiate between Raster and Vector graphics.
(c) What is basic difference between 2D and 3D animation techniques?
(d) Distinguish between Analog and Digital Video.

4×2=8

Unit I

2. Explain various applications of multimedia.
3. Explain various stages of Multimedia production.

Unit II

4. What is RTF and HTML Text? Also differentiate between them.

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P.T.O.
5. Explain the tools available in Photoshop for editing the image.

Unit III

6. Explain the various digital audio formats.

7. Describe the terms Morphing, Rotoscopying and Antialiasing.

Unit IV

8. Describe Interlaced and Non-interlaced scanning methods.

9. Explain AVI and MPEG video file formats.
GSQ/M-23
ADVANCED PROGRAMMING USING C++
Paper : II

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.

1. Answer the following questions in brief : 4×2=8
   (a) How can you create abstract class in C++? Explain with an example.
   (b) Explain roles of constructors and destructors in inheritance.
   (c) What are rules for protected derivation?
   (d) Distinguish between seekg() and seekp() file pointers.

Unit I

2. (a) What is dynamic polymorphism? Explain function overriding with an example. 4
   (b) What is virtual function? Justify the need for virtual functions in C++. 4
3. What are virtual destructors? How do they differ from normal destructors? Give an example of virtual destructor?

Unit II

4. How can you convert basic data type to user-defined data type? Write a program to convert centimeter to object of Meter.

5. What is Inheritance? Distinguish between private and public inheritance. Write a program to demonstrate private inheritance.

Unit III

6. What is multilevel inheritance? Write a program of your choice to demonstrate multilevel inheritance.

7. What is template function? Write a template function to find largest of three numbers and demonstrate its use.

Unit IV

8. What are exceptions? Explain the constructs of exception handling model of C++. What happens when a raised exception is not caught by catch-block?
0. Write short notes on the following :  
(a) Meaning of Guidance  
(b) Midlife Crisis  
(c) Methods of counselling children  
(d) Widowhood.

Note: Attempt Five questions in all, selecting two questions from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.
2. Discuss the criteria for mate selection. What kind of adjustments are to be made during parenthood?  

3. Describe social and vocational adjustments during middle adulthood.  

4. Write short notes on the following:  
   (a) Menopause  
   (b) Grandparenthood.  

5. Discuss widowhood, death, dying and bereavement in brief.  

Unit II (उकाई II)  

6. Discuss the principles of counselling. Differentiate between individual and group guidance.  

7. Describe different techniques of counselling.  

8. Explain concept, need and objectives of guidance and counselling.  

9. What are the characteristics and skills required to be an effective counsellor?
GSQ/M-23
INTERIOR DECORATION
Course-314

Time: Three Hours] [Maximum Marks: 40

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

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

Compulsory Question (अनिवार्य प्रश्न)

1. Define the following in 2-3 lines each : 2×4=8

(a) Art
(b) Design
(c) Floor Covering
(d) Decorative Lighting.

निम्नलिखित प्रत्येक को 2-3 पंक्तियों में परिभाषित कीजिए:

(अ) कला
(ब) डिजाइन
(स) फार्श कवरिंग
(द) सजावटी प्रकाश व्यवस्था
Unit I (इकाई I)

2. What is interior decoration? Explain its objectives.
अंतर्द्वार सजा-सजना क्या है? इसके हेतु कैसे की जाए?

3. What are color schemes? Explain various types of color schemes.
रंगों की योजनाएं क्या हैं? विभिन्न प्रकार के रंगों की योजनाएं कीजिए।

4. What is flower arrangement? Explain the principles of flower arrangement.
पुष्प व्यवस्था क्या हैं? पुष्प व्यवस्था के सिद्धांत की जानकारी कीजिए।

5. Why there is need of table setting. Explain formal table setting.
टेबल सेटिंग की आवश्यकता क्यों होती है? फॉर्मल टेबल सेटिंग को समझाएं।

Unit II (इकाई II)

6. Discuss lighting requirements for various activities in the house.
घर में विभिन्न गतिविधियों के लिए प्रकाश की आवश्यकताओं पर प्रश्न कीजिए।

7. How will you arrange furniture for different activities in the house?
आप घर में विभिन्न गतिविधियों के लिए फर्नीचर की व्यवस्था कैसे करेंगे?

8. What points will you keep in mind while selecting furniture for middle income group?
मध्यम आय वर्ग के लिए फर्नीचर का चयन करते समय आप किन बातों का ध्यान रखेंगे?

9. Explain different types of soft furnishings required for home.
घर के लिए आवश्यक विभिन्न प्रकार के मुलायम सजावट का व्यवस्था कीजिए।
BSIT/M-23  
PROGRAMMING IN C++-II  
BSIT-602

Time : Three Hours]  
[Maximum Marks : 40

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

1. Write short notes on the following :  
(a) Operators which cannot be overloaded  
(b) Access specifiers for deriving class  
(c) Abstract Class  
(d) Catch block.

Unit I

2. (a) Explain with example how member function of one class can be used as friend function of another class.

(b) Design a Distance class with feet and inches as data members. Write a program to add two objects of distance class using friend function.  

4×2=8

P.T.O.
3. Explain with example the procedure of overloading unary and binary operators.

Unit II

4. What is the advantage of Inheritance? Explain different forms of inheritance with examples.

5. Design an application for Publication Company. For this, create the following classes and members:

<table>
<thead>
<tr>
<th>Class</th>
<th>Data Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publication (Base class)</td>
<td>Title, Price</td>
</tr>
<tr>
<td>Book (Derived class)</td>
<td>Pages,</td>
</tr>
<tr>
<td>Tape (Derived class)</td>
<td>Playing duration</td>
</tr>
</tbody>
</table>

Inherit Book and Tape classes from Publication class. Write the member functions to get the data from user and display data to the user in each of the class.

Unit III

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

(a) Virtual Function
(b) Abstract Class.

7. What are templates? Why are they needed? Explain the different types of templates.

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

(a) File opening modes
(b) Text and Binary Files.

9. What is the purpose of try, catch and throw in exception handling?
BSIT/M-23
INTERNET CONCEPTS AND
APPLICATION-II
BSIT-604

Time : Three Hours] [Maximum Marks : 40

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

1. Write short notes on the following : 4x2=8
   (i) Online Conferencing
   (ii) Types of cookies
   (iii) EFT
   (iv) HTTP.

Unit I

2. (a) What do you mean by computer security ? Briefly describe various types of computer security.
    (b) What do you mean by cryptography ? Briefly describe any three objectives of cryptography. 4x2=8

3. (a) What do you mean by breaches of security ? Briefly describe any three common security breaches.

(2-10/5) L-26518 P.T.O.
(b) What do you mean by computer virus? How can we prevent our computer from virus? \[4 \times 2 = 8\]

Unit II

4. What do you mean by multimedia? State various components of multimedia. Briefly discuss applications of multimedia. \[8\]

5. What do you mean by online chatting? Briefly describe its pros and cons. \[8\]

Unit III


7. What do you mean by EDI? Briefly discuss advantages and limitations. \[8\]

Unit IV

8. (a) Distinguish between Intranet and Extranet.
(b) What do you mean by e-Mail? Briefly discuss its advantages. \[4 \times 2 = 8\]

9. Write short notes on the following:
   (a) Web publishing
   (b) Video conferencing. \[4 \times 2 = 8\]

L-26518 2 150
BSIT/M-23 26519
EMBEDDED SYSTEMS AND 8051
MICROCONTROLLER–II
BSIT-605

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Question)

1. (a) What are the characteristics of Embedded System ? 2

(b) Distinguish between microprocessor and microcontroller. 2

(c) Write the interrupt priority ranking of 8051 microcontroller. 2

(d) Why 8051 family is chosen for microcontroller ? 2

Unit I

2. (a) In what ways do RISC and CISC processors differ? 4
(b) Discuss the memory devices for embedded system.

3. Discuss the structural units of processor.

Unit II

4. With neat sketch, explain the architecture of an 8051 microcontroller.

5. (a) Explain how external memory is accessed by 8051 microcontroller?

(b) Differentiate between Harvard and Princeton Architecture.

Unit III

6. (a) Discuss the different addressing modes of 8051 microcontroller.

(b) Write a program to swap the contents of register R6 and R7 in register bank 0 by using register address mode.

7. (a) Discuss serial data transmission mode 1 and mode 2.

(b) Draw and explain bit pattern of IE and IP special function registers.

Unit IV

8. Explain the final microcontroller design in detail.

9. (a) Discuss the steps for design testing.

(b) Discuss in brief the microcontroller specification.