7. (a) Prove that every contraction mapping on a complete metric space has a unique fixed point. 4

(b) Prove that in any metric space (X, d), every derived set is a closed set. 4

Section IV

8. (a) Let f be a function of (X, d) into (Y, d^*). Then f is continuous if and only if f^{-1} (G) is open in X whenever G is open in Y. 4

(b) Prove that a compact subset of a metric space is closed and bounded. 4

9. (a) Prove that a continuous image of a connected space is connected. 4

(b) Prove that a metric space (X, d) is compact if and only if it has Bolzano Weierstrass Property. 4

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

GSQ/D-16 1156

REAL ANALYSIS

BM-351

Time : Three Hours] [Maximum Marks : 40

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

(Compulsory Question)

1. (a) Compute $\int_0^6 [x]dx$, where $[x]$ stands for greatest integer not greater than x. 2

(b) Let X = R^2 and metric d is defined on R^2 as :

$$d(z_1, z_2) = |x_1 - x_2| + |y_1 - y_2|;$$

$$z_1 = (x_1, y_1),\ z_2 = (x_2, y_2) \in R^2$$

Describe the open sphere S ((0, 0), 1) for (X, d). 2

(c) Give an example of an incomplete metric space. 2

(d) Discuss the convergence of the integral : 2

$$\int_0^1 \frac{dx}{x^{\frac{1}{4}}(1+x^3)}.$$

Section I

2. (a) If P′ is a refinement of P containing 'p' points more than P and $|f(x)| \leq k$ for all $x \in [a, b]$, then prove that :

$U(f, P) \geq U(f, P') \geq U(f, P) - 2pk\delta$, where $\|P\| \leq \delta$. **4**

(b) Using definition, evaluate the integral : **4**

$$\int_1^4 \frac{dx}{\sqrt{x}}.$$

3. (a) Let $F(x) = \int_a^x f(t)dt$, where f is continuous function on $[a, b]$. Prove that F is differentiable on $[a, b]$ and $F' = f$. **4**

(b) Prove that if f and g are two integrable functions on $[a, b]$, then fg is integrable on $[a, b]$. **4**

Section II

4. (a) Examine the convergence of the integral : **4**

$$\int_a^{3a} \frac{dx}{(x-2a)^2}.$$

(b) Discuss the convergence of : **4**

$$\int_0^{\pi/2} x^m \operatorname{cosec}^n x dx.$$

5. (a) Test the convergence of the integral : **4**

$$\int_0^{\infty} \frac{x \log x}{(1+x^2)^2} dx$$

(b) Prove that : **4**

$$\int_0^{\pi/2} \frac{\log(1+\alpha \sin^2 x)}{\sin^2 x} dx = \pi\left[\sqrt{1+\alpha} - 1\right], \alpha > -1.$$

Section III

6. (a) Prove that any metric space (X, d), bounded or not, can be converted into a bounded metric space (X, d^*), where : **4**

$$d^*(x, y) = \frac{d(x, y)}{1 + d(x, y)} \forall x, y \in X$$

(b) Prove that in a metric space, the intersection of a finite number of open sets is open. Is the intersection of infinite number of open sets open ? Justify your answer. **2½+1½**

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

GSQ/D-16 **1157**

MATHEMATICS

BM-352

Groups and Rings

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) Prove that a group G is abelian if every element of G except the identity element is of order 2. **2**

(b) Prove that inner automorphism corresponding to every element of an abelian group is trivial. **1½**

(c) Let R be a ring with unity element 1 and $f : R \to R'$ be an onto homomorphism. Show that $f(1)$ is unity element of R'. **1½**

(d) Show that the ideal $S = \{6r ; r \in Z\}$ is not a prime ideal of the ring Z of integers. **1½**

(e) Show with the help of an example that an irreducible polynomial need not be an irreducible element. **1½**

Section I

2. (a) Prove that the orders of the elements a and $x^{-1}ax$ are the same, where a, x are the two elements of a group. 4

   (b) If an abelian group of order 6 contains an element of order 3, show that it must be a cyclic group. 4

3. (a) Show that the order of each subgroup of a finite group is a divisor of the order of the group. 4

   (b) If H is the only subgroup of finite order in the group G, then prove that H is the normal subgroup of G. 4

Section II

4. (a) If H and K are subgroups of a group G and H is normal in G, then $HK/H \cong K/(H \cap K)$ 4

   (b) Prove that the set Inn(G) of all inner automorphisms of a group G is a normal subgroup of the group Aut(G) of its automorphisms. 4

5. (a) Show that centre of a non-abelian group of order 343 always have 7 elements in its centre. 4

   (b) Find the centre of permutation group S_3. 4

Section III

6. (a) Prove that characteristic of an integral domain is either zero or a prime number. 4

   (b) Define simple ring and show that a division ring is a simple ring. 4

7. (a) Let R be a commutative ring and S is an ideal of R. Then show that R/S is an integral domain iff S is a prime ideal. 4

   (b) Let f be a ring isomorphism of R onto R'. Show that if R' is an integral domain, then so is R. 4

Section IV

8. (a) Prove that if an ideal S of an Euclidean ring R is maximal then S is generated by some prime element of R. 4

   (b) Show that units of $Z[i]$ are $+1, \pm i$. 4

9. (a) In a unique factorization domain, every pair of non-zero elements have a g.c.d. and l.c.m. 4

   (b) Show that $f(x) = x^3 + y^3 + xy$ is irreducible over C, the field of complex numbers. 4

7. Using Jacobi's method, find all the eigen values and the eigen vectors of the matrix : 6½

$$A = \begin{bmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{bmatrix}$$

Section IV

8. (a) Evaluate :

$\int_0^4 e^x dx$, by Simpon's rule using the data

$e = 2.72$, $e^2 = 7.39$, $e^3 = 20.09$, $e^4 = 54.60$ and compare it with the actual value. 3½

(b) Evaluate :

$\int_0^6 \frac{1}{1+x^2} dx$ by Trapezodial rule. 3

9. (a) Solve the differential equation :

$$\frac{dy}{dx} = -xy^2, \; y = 2 \text{ at } x = 0,$$

by modified Euler's method and obtain y at $x = 0.2$ in two steps of 0.1 each. 3½

(b) Use Picard's method to find the third approximation of the following differential equation : 3

$$\frac{dy}{dx} = y - 1, \; y(0) = 2$$

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

GSQ/D-16 1158

NUMERICAL ANALYSIS

BM-353

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. (i) Define Binomial distribution.

(ii) Prove that :

$$\nabla \equiv \Delta E^{-1}$$

(iii) State Gauss's forward interpolation formulae.

(iv) State Simpson's one-third quadrature formula. 4

Section I

2. (a) Find the lowest degree polynomial which satisfies the following values : 3

x	:	0	1	2	3	4	5
$f(x)$	:	0	3	8	15	24	35

(b) State and prove Newton-Gregory Forward interpolation formula. 3½

3. (a) The values of the function $f(x)$ for values of x are given as :

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

Find the value of $f(6)$ and also the values of x for which $f(x)$ is maximum or minimum. 3

(b) By means of Newton's divided difference formula, find the value of $f(8)$ from the following table : 3½

x	$f(x)$
4	48
5	100
7	294
10	900
11	1210
13	2028

Section II

4. (a) Find the probability distribution of the number of red balls drawn from a bag containing 3 white and 4 red balls. Three balls are drawn one by one with replacement. 3

(b) State and prove the Gauss Forward interpolation formula. 3½

5. (a) If x is a Poisson distribution variate such that :

$$p(x = 2) = \frac{2}{3} p(x = 1),$$

find $p(x = 0)$ and $p(x = 3)$.

(b) If x be the normal variate with mean 50 and standard deviation 8; find the probability that : 3½

$$x \geq 60$$

Section III

6. (a) Find the first derivative of the function $y = f(x)$ tabulated below at the point $x = 1.1$: 3

x	$f(x)$
1	0.00
1.2	0.1280
1.4	0.5440
1.6	1.2960
1.8	2.4320
2.00	4.00

(b) Using Power method, find the largest eigen value and the corresponding eigen vector of the matrix : 3½

$$A = \begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

9. (a) Discuss the mechanism pumping in a He-Ne laser using a suitable energy level diagram. Describe the design aspects of a typical He-Ne laser. **5**

(b) Discuss the applications of lasers in communication and industry. **3**

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GSQ/D-16 **1161**

PHYSICS

Paper : IX

Quantum Mechanics and Laser Physics

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory. Select *one* question from each Unit. All questions carry equal marks. Non-programmable calculator is allowed.

(Compulsory Question)

1. Attempt any *four* of the following :

(a) What do you understand about eigen functions and eigen values ? **2**

(b) What is quantum mechanical tunneling ? Explain. **2**

(c) Why is 'population inversion' necessary for laser action ? **2**

(d) Why is cooling arrangement required for Ruby Laser ? **2**

(e) What is line broadening ? Elaborate. **2**

Unit I

2. (a) What is difference between Photoelectric effect and Compton effect ? **2**

   (b) Derive an expression for Kinetic energy of recoiling electron in terms of scattering angle of photons. **4**

   (c) An X-ray photon of wavelength 1.4 Å suffers Compton scattering. If the wavelength of scattered photon is 2.0 Å, find the kinetic energy of the recoiling electron. **2**

3. (a) Discuss the experimental verification of uncertainty principle using X-ray microscope. **5**

   (b) Apply uncertainty principle to explain non-existence of electron in nucleus. **3**

Unit II

4. (a) What is meaning of 'boundary' in quantum mechanics ? **2**

   (b) Apply Schrödinger wave equation to obtain energy eigen value and wave function for a particle in 1-*d* potential box defined as **6**

   $V(x) = \infty, \quad x < 0$ and $x > 0$

   $= 0, \quad 0 < x < a$

5. (a) What do you mean by step potential ? Solve Schrödinger wave equation for a particle in a step potential for $E > V_0$. **6**

   (b) Calculate energy states for a ball of mass 10 g moving in a box of length 10 cm. **2**

Unit III

6. (a) Discuss the main components of a leser using a block diagram. **3**

   (b) What is meaning of coherence ? Show that a laser beam has high value of temporal and spatial coherence. **5**

7. (a) What are different types of broadenings ? Explain. **6**

   (b) Determine the type of emission that predominates for $\lambda = 30$ cm at a temperature of 27°C. Given Boltzmann constant $k_B = 1.38 \times 10^{-23}$ J/K, Planck's constant $h = 6.625 \times 10^{-34}$ Js. **2**

Unit IV

8. (a) What are advantages of semiconductor lasers ? **2**

   (b) Derive an expression for threshold junction current density in a semiconductor laser. **6**

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GSQ/D-16 1162

NUCLEAR PHYSICS

Paper : X

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. Non-programmable calculator is allowed.

1. (a) What is electric quadruple moment ? How does it give information about the shope of nucleus ? **2**

(b) What do you mean by internal conversion ? **2**

(c) What did dead time and recovery time ? **2**

(d) Explain the concept of chain reaction. **2**

Unit I

2. (a) Discuss the electric and magnetic properties of a nucleus. **6**

(b) Comment on the following properties of $_{82}Pb^{208}$ Nucleus : **2**

(i) Charge

(ii) Spin.

3. Discuss the principle, construction and working of a Bain Bridge type of mass spectrometer. Explain determination of mass of the nucleus using it. **8**

Unit II

4. (a) What is α-decay ? Discuss energetic of α-decay to explain the energy carried by α particle and daughter nucleus. **6**

   (b) Find Q-value and kinetic energies of the products in the reaction $_{94}Pu^{236} = {}_{92}U^{232} + {}_{2}He^{4} + Q$. **2**

5. Discuss in brief the three processes of interaction of γ-photon with matter by which radiation loses energy while passing through matter. **8**

Unit III

6. (a) What is Betatron ? Derive betatron condition. Briefly describe its principles, construction and working. **6**

   (b) What is the role of oscillating magnetic field in the betatron ? **2**

7. (a) Describe the principle and working of a Geiger-Mullar (GM) counter. Mention its use. **6**

   (b) If a photo-multiplier tube has 10 dynodes and secondary emission factor of these dynodes ≈4, then find out the total multiplication factor. **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 resultant particles, masses of various particles and nuclei (as two body system) assuming that the initial nucleus to be at rest. **8**

9. (a) Discuss general aspects of a design of a nuclear reactor. **5**

   (b) Calculate the excitation energy of the $_{92}U^{236}$ nucleus when a thermal neutron (E_n ≈0.25 eV) is absorbing by a $_{92}U^{235}$ nucleus. Mass of neutron = 1.0087 u, mass of $_{92}U^{235}$ = 235.0435u and mass of $_{92}U^{236}$ = 236.04574 u. **3**

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GSQ/D-16 1163

INORGANIC CHEMISTRY

Paper XV (CH-301)

Time : Three Hours] [Maximum Marks : 32

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

1. (a) What is crystal field splitting ? Why tetrahedral complexes are always high spin ? 2½

(b) Calculate μs for Ni^{2+}, Cr^{3+} and Cu^{2+} ions. 1½

(c) What do you mean by Labile complexes and inert complexes ? 2

(d) What are rules which help us to identify the ground term of a particular electronic configuration. 2

Section A

2. (a) Calculate CFSE in case of d^5 and d^8 tetrahedral complexes. 2

(b) Discuss the factors affecting magnitude of crystal field splitting. 3

(c) NH_3 acts as a ligand but NH_4^+ does not. 1

3. (a) Define trans effect and trans-directing effect. Explain with a suitable example. 3

(b) Explain the following substitutions reactions observed in not determining steps : 3

(i) Associative

(ii) Interchange associative.

4. (a) Explain the bonding and magnetic properties of $[Co(NH_3)_6]^{3+}$ and $[CoF_6]^{3-}$ complexes in terms of crystal field theory. 3

(b) How does nature of ligand and chelation affect the stability of a complex ? 3

5. (a) Discuss the various theories put forward to explain the trans effect. 3

(b) Differentiate between thermodynamic and kinetic stability. 3

Section B

6. (a) Explain paramagnetism and antiferromagnetism. 3

(b) Define magnetic susceptibility. How does it vary with magnetic field ? 3

7. (a) Explain Gouy's method for measuring magnetic susceptibility. 2½

(b) Discuss the phenomenon of orbital contribution to magnetic moment. 3½

8. (a) Describe the vibronic coupling with an example. 3

(b) Find term symbols for the following configuration :

(i) $s'p'$

(ii) $s'd'$ 3

9. (a) Draw orgel diagrams for d^9-configuration in tetrahedral and octahedral fields. 3

(b) What are microstates ? Calculate number of microstates for d^1 and p^3 configuration. 3

9. (a) Give a brief discussion of structural information from IR spectra of molecules. 2

(b) Discuss the intensity of rotational spectra with reference to the degeneracy factor and Boltzman exponential factor. 2

(c) Discuss the experimental set up of Raman spectroscopy. 2

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GSO/D-16 1164

PHYSICAL CHEMISTRY

Paper XVI (CH-302) (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. (i) What is classical mechanics ?
   (ii) What are the conditions for a wave function ψ to be acceptable ?
   (iii) Define an operator.
   (iv) What is the unit of dipole moment ?
   (v) Define mangetic induction.
   (vi) Define force constant.
   (vii) Explain Wave No. separation.
   (viii) Define Additive property. 1×8

Section A

2. (a) Give the difference between classical mechanics and quantum mechanics. 1

(b) What is the basic equation on which quantum mechanics is based ? Derive the equation in the usual form. 3

(c) Write a note on Compton effect. 2

3. (a) Discuss the postulates of quantum mechanics. 3

(b) Explain the terms Eigen value and Eigen function. 1½

(c) Molar heat capacity of solids deviate from '3R' in magnitude. Justify. 1½

4. (a) Define dipole moment. Discuss its use in elucidating the structure of molecules. 2

(b) The dipole moment of HI is 0.38 D and the bond distance is 1.60Å. Calculate the percentage ionic character of the molecule. 2

(c) Discuss the applications of magnetic susceptibility. 2

5. (a) Derive Clausius Mosotti equation. Give its significance. 3

(b) A solution of optically active substance prepared by dissolving 1.38 gm of it in 100 ml of water rotated the plane of polarised light by 7.05° in a polarimeter having 25 cm long cell. The D line of sodium vapour was used as a light source. Calculate the specific rotation. 2

(c) What are the factors on which optical rotation depends ? 1

Section B

6. (a) What are the selection rules for rotational vibrational Raman spectra of diatomic molecules ? Applying these rules explain what type of Raman spectra is obtained for diatomic molecules. 2½+½=3

(b) Calculate the force constant k for a diatomic molecule of mass 2.5×10^{-26} kg. Given that the fundamental vibrational frequency is 2358 cm^{-1}. 3

7. Write notes on the following :

(i) Signal to noise ratio

(ii) Resolving power

(iii) Selection rules. 2×3

8. (a) Why a diatomic molecule should be considered as an an harmonic oscillator ? Write Morse equation for energy of vibrational levels on anharmonic oscillator. Also draw its PE curve. 3

(b) What do you know about Born Oppenheimer approximation ? 1

(c) Explain Raman effect. 2

(b) Give one method of preparation of each of the following :

(i) Grignard's reagent

(ii) Organozine compound

(iii) Organolithium compound. **3,3**

7. (a) How will you prepare the following from C_2H_5MgBr ?

(i) Ethane Sulphinic Acid

(ii) Ethane

(iii) Butanone-2

(iv) 2-Methyl-2-butanol.

(b) How $n-C_4H_9Li$ react with :

(n – Butyl Lithium)

(i) Pyridine

(ii) Methyl bromide. **4,2**

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GSQ/D-16 1165

ORGANIC CHEMISTRY THEORY

Option XVIII

CH-303

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) Indicate 'True' *or* 'False' for the following statements :

(i) Galactose and mannose are epimers. **1**

(ii) Methyl-α-D-Glucoside is an acetal. **1**

(iii) C-1 is an anomeric carbon in Fructose. **1**

(b) Which type of radiations are used in PMR spectroscopy ? **1**

(c) What is induced magnetic field ? **1**

(d) On what factors value of 'J' depends ? **1**

(e) Why Organozine compounds are less reactive than G.R. ? **1**

(f) Prepare Primary alcohol from G.R. with the same no. of carbon atoms as in alkyl gp. of G.R. **1**

Section A

2. (a) How does absorption signal originate in PMR spectroscopy ?

(b) A compound with molecular formula C_3H_6O can have the following possible structures :

(i) $CH_3–CO–CH_3$

(ii) $CH_3–CH_2–CHO$

(iii) $CH_2=CH–CH_2–OH$.

Show how can you decide their structures on the basis of PMR spectroscopy ? **3,3**

3. (a) Explain shielding and deshielding of Protons.

(b) Define chemical shift and on what factors it depends ? **3,3**

4. (a) Give number of signals, their relative positions and multiplicities in the PMR of the following compounds :

(i) CH_2-CH_2 (Cl, Cl)

(ii) $CH_3 - CH_2 - Br$

(iii) $CH_2 = CH - Cl$.

(b) Why are acetylenic protons more shielded than vinylic protons ? Explain. **4½,1½**

5. (a) On the basis of given PMR data assign structure to the compound $C_4H_8O_2$. Explain in detail, how you arrive at your conclusion :

(i) Triplet, δ 1.25 (3H)

(ii) Singlet, δ 2.00 (3H)

(iii) Quartet δ 4.15 (2H).

(b) How does the following are related :

(i) Frequency and magnetic strength

(ii) δ(delta) and chemical shift

(iii) δ(delta) and τ(Tau). **4½,1½**

Section B

6. (a) Explain Mutarotation with Mechanism.

(b) Convert :

(i) D-Arabinose into D-Glucose

(ii) D-Glucose into D-Fructose. **3,3**

7. (a) What are Epimers and Anomers ? Explain with examples.

(b) Draw Haworth projection formula of 'Lactose'. Explain, why it is reducing disaccharide. **3,3**

8. (a) Differentiate :

(i) Ether linkage and Glucosidic linkage

(ii) Amylose and Cellulose

(iii) Pyranose and Furanose.

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GSQ/D-16 1168

PLANT PHYSIOLOGY

Paper : I

Time : Three Hours] [Maximum Marks : 40

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

1. Define/Explain the following : 1×8=8
(a) Semipermeable membrane
(b) Diffusion
(c) Endosmosis
(d) Apoplast movement
(e) Guttation
(f) Hydroponics
(g) Oxidative Phosphorylation
(h) Protoplasmic Respiration.

Section A

2. Explain the various theories concerned with the Ascent of sap in plants. 8

3. What are Macronutrients ? Discuss in detail the role of Nitrogen and Calcium in plants. 8

4. Discuss translocation of organic solutes in plants. Describe the mechanism of its translocation in detail. 8

5. Define transpiration. Discuss the mechanism of stomatal movement in detail. Also give the significance of transpiration. 8

Section B

6. Write short notes on the following : 4×2=8
(a) Hill Reaction
(b) Kranz Anatomy.

7. Describe the mechanism of non-cyclic photosynthetic electron transport chain in the synthesis of NADPH and ATP. 8

8. Write briefly on the following : 4×2=8
(a) Krebs Cycle
(b) Fermentation.

9. Discuss briefly about : 4×2=8
(a) Seed Dormancy
(b) Seed Germination.

Roll No. .....

Total Pages : 02

GSQ/D-16 **1169**

BOTANY

Paper II

Ecology

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. Draw diagrams wherever necessary.

1. Explain the following :

(i) Biosphere

(ii) Ecological niche

(iii) Ephemerals

(iv) Phytosociology

(v) Climatic climax

(vi) Eutrophication

(vii) Halophytes

(viii) Smog. **1×8=8**

Unit I

2. Write upon the following :

(i) Importance of ecology **3**

(ii) Humidity as an ecological factor. **5**

3. (a) Explain the adaptations of plants shown towards extremes of temperature. **4**

(b) Write importance of water to plants. **2**

(c) Soil texture. **2**

4. Explain the following :

(i) Competition **3**

(ii) Parasitism **3**

(iii) Soil Density. **2**

5. Describe the following characters of a population :

(i) Age structure **3**

(ii) Natality **3**

(iii) Biotic potential. **2**

Unit II

6. Write notes on the following :

(i) Synthetic characters of a community **5**

(ii) Causes of plant succession. **3**

7. Explain the following :

(i) Trophic levels **3**

(ii) Ecological pyramids. **5**

8. Define biogeochemical cycling. Explain nitrogen cycle in nature. **8**

9. Write notes on the following :

(i) Control of air pollution **4**

(ii) Greenhouse effect. **4**

Roll No. ..... Total Pages : 02

GSQ/D-16 1170

ZOOLOGY

Environmental Biology

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions each from Section A and Section B. Q. No. 1 is compulsory. Support your answer with neat and labelled diagram(s) wherever necessary.

1. Explain the following in brief :
   (a) Hibernation
   (b) Ecological equivalents
   (c) Primary productivity
   (d) Ecotone
   (e) Biogeochemical cycles
   (f) Carrying capacity
   (g) Endangered species
   (h) Anadromous migration
   (i) Population density
   (j) Eutrophication. 10×1.5=15

Section A

2. Discuss the effects of light as a climatic factor on animals. 6¼

3. What is ecological pyramid ? Describe different types of ecological pyramids found in an ecosystem. 6¼

4. Define gaseous cycle. Explain the carbon cycle. Why is it called a perfect cycle ? 6¼

5. (a) Desert ecosystems. 3¼
   (b) Ecotone and Edge effect. 3

Section B

6. (a) Define growth curve. Describe *two* types of growth curves. 3¼
   (b) Explain the relationship of biotic potential and environmental resistance with population growth. 3

7. (a) What is biodiversity ? Describe various levels of biodiversity. 3
   (b) Describe *ex-situ* conservation of biodiversity. 3¼

8. (a) Explain biological magnification and acid rains. 3
   (b) Solid waste pollution. 3¼

9. Define interactions. Describe any *two* negative inter-specific interactions with at least *two* suitable examples of each. 6¼

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GSQ/D-16 1171

EVOLUTION AND DEVELOPMENTAL BIOLOGY

Paper : II

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* question from each Section A and B. Q. No. **1** is compulsory. All questions carry equal marks.

(Compulsory Question)

1. Explain the following : **1½×10=15**

(a) Protobionts
(b) Phylogency
(c) Neo-Darwinism
(d) Deme
(e) Convergent and divergent evolution
(f) Protandry and Protogyny
(g) Significance of Parthenogenesis
(h) Regeneration
(i) Ooplasmic determinants
(j) Spermatogenesis.

Section A

2. (a) Describe the theory of Special Creation. **3¼**
(b) Write a note on Spontaneous Generation. **3**

3. (a) What are Connecting Links ? Explain them with the help of suitable examples. **4¼**
(b) Write a brief note on Homologous organs. **2**

4. (a) Discuss the mechanisms of reproductive isolation. **4**
(b) Write a note on ancestors of man. **2¼**

5. (a) Explain the general characteristics of the Species. **3¼**
(b) Discuss the significance of Biological Species concept. **3**

Section B

6. (a) Describe in detail the natural parthenogenesis. **3¼**
(b) Explain the various types of eggs. **3**

7. Give an account on regeneration in animals. **6¼**

8. Explain the process of :
(a) Gastrulation in frog's blastula **4**
(b) Blastulation in chick. **2¼**

9. (a) Give an account on cell differentiation. **3**
(b) Discuss the mechanism to control the differentiation. **3¼**

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

GSO/D-16 **1174**

ELECTRONICS

First Paper (Theory)

Microprocessor Architecture and Programming-I

Time : Three Hours] [Maximum Marks : 40

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

Compulsory Question

1. (a) The positive clock edge occurs halfway through each state in SAP-I. Why ? **4×2**

   (b) Explain DAA instruction of 8085.

   (c) Explain RLC instruction of SAP-III with example.

   (d) Explain implied addressing in SAP-II with example.

Unit I

2. Discuss SAP-I Architecture in detail. **8**

3. Discuss fetch and execution cycle of SUB instruction and draw its timing diagram. **8**

Unit II

4. (a) Describe with example one byte, two byte and three byte instructions of SAP-II computers. 4

   (b) Write a detailed subroutine for SAP-II computer to introduce time delay of 1 milli sec using only one register. The clock frequency of the system is 1 MHz. 4

5. (a) Discuss the memory reference instructions of SAP-II. 4

   (b) Write a program in assembly language for SAP-2 computer that multiply decimal numbers 8 and 12, stores the answer at 3500 H. 4

Unit III

6. (a) What is the difference between stack and stack pointer ? 4

   (b) Discuss PUSH and POP instructions in detail. 4

7. (a) Explain Indirect Instructions of SAP-3 computer. 4

   (b) Suppose that 256 bytes of data are stored in memory between address 3000H to 30FFH. Write a program that copies these bytes at address 5000H to 50FFH. 4

Unit IV

8. (a) Explain Fetch-execute overlap. 4

   (b) Explain the following instructions : 4

   LDAX rp, SHLD address, STAX rp, LHLD address.

9. Draw and discuss the architecture of 8085 microprocessor. 8

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

GSO/D-16 **1175**

ELECTRONICS

Paper II (Theory)

Electronic Communication

Time : Three Hours] [Maximum Marks : 40

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

1. (a) How many AM broadcast stations can be accommodated in a 100 kHz bandwidth if the highest frequency modulating carrier is 5 kHz. 1½

(b) What is Compatibility ? Explain it. **3**

(b) Discuss bandwidth in respect of AM and FM. **2**

(c) Define Luminance, hue and saturation. 1½

Unit I

2. (a) Derive expression which relates total power in the Amplitude Modulated wave to the unmodulated carrier power. **5**

(b) The total power contents of an AM wave is 600 Watt. Find percent modulation of the signal if each side band contains 75 Watt. **3**

3. (a) Draw and explain the working of Grid Modulation AM circuit. **5**

(b) Explain DSB-SC, SSB-TC and SSB-SC. What amount of power is carried by each when modulation is 100 per cent. **3**

Unit II

4. (a) Define frequency modulation with neat and clean diagram. **2**

(b) Derive expression for FM wave. **4**

(c) Define the terms :

(i) Modulation Index m_f

(ii) Frequency deviation f_d. **2**

5. (a) Compare AM with FM. **4**

(b) Explain circuit of diode detector for AM signal. **2**

(c) What is the role of LIMITER in FM ? List its requirements. **2**

Unit III

6. What is progressive and interlaced scanning ? How interlaced scanning reduces flicker. **8**

7. (a) Discuss components of composite video signal in brief. **5**

(b) Explain why the number of lines in a TV system are kept odd. **3**

Unit IV

8. Draw and discuss block diagram of monochrome TV transmitter. **8**

9. Explain how luminance and colour difference signals are generated in coloured TV. **8**

Roll No. ..... Total Pages : 02

GSQ/D-16 1176

COMPUTER SCIENCE

Paper I

Fundamentals & Database

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. (a) Differentiate Data and Information. 2(1)
   (b) Define Foreign and Alternate key. 2(1)
   (c) Define Domain, Attribute. 2(1)
   (d) Define Logical Data Independence. 1(1)
   (e) What is External/Conceptual Mapping ? 1(1)

Unit I

2. Define Database and give its components. Explain difference between Traditional file system and Database system. 8(5)

3. Explain functions of DBMS with advantages and disadvantages. 8(5)

Unit II

4. (a) Write a note on DBA, its working and features.
   (b) Explain three levels of schemas. 8(5)

5. (a) What is Mapping ? Discuss types of mapping. 2(1)
   (b) What is Data Independence ? 2(1)
   (c) Write *two* commands for each component of SQL. 4(3)

Unit III

6. (a) Explain physical and conceptual data model.
   (b) Define relationship, relation, entity and attribute. 8(5)

7. Discuss E-R diagrams. Explain concept using Inventory System. 8(5)

Unit IV

8. Explain Relational Model and its properties and operations. 8(5)

9. Write notes on the following :
   (a) Client Server Database
   (b) Integrity Constraints. 8(5)

Roll No. ..... Total Pages : 02

GSQ/D-16 1177

COMPUTER SCIENCE

Paper : II

Web Designing

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

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

1. Explain the following with examples : **4×2=8(4×1¼=5)**

(a) Colors

(b) Links

(c) URL's

(d) Internet.

Unit I

2. What are various Searching Tools available in Search Engine ? **8(5)**

3. What is the History of WWW ? **8(5)**

Unit II

4. What are key points to be considered while planning a web site ? **8(5)**

5. Differentiate between web publishing and web site Hosting. Illustrate their procedure also. **8(5)**

Unit III

6. Make a static web page for a college using different tags for header, background, text and links. **8(5)**

7. What are the salient features of HTMC ? **8(5)**

Unit IV

8. Explain Tags for Images and Tables. **8(5)**

9. Make a website of your choice consisting of Forms and Menus. **8(5)**

Roll No. ..... Total Pages : 02

GSQ/D-16 1177

COMPUTER SCIENCE

Paper : II

Web Designing

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

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

1. Explain the following with examples : **4×2=8(4×1¼=5)**
   (a) Colors
   (b) Links
   (c) URL's
   (d) Internet.

Unit I

2. What are various Searching Tools available in Search Engine ? **8(5)**

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Unit II

4. What are key points to be considered while planning a web site ? **8(5)**

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Unit III

6. Make a static web page for a college using different tags for header, background, text and links. **8(5)**

7. What are the salient features of HTMC ? **8(5)**

Unit IV

8. Explain Tags for Images and Tables. **8(5)**

9. Make a website of your choice consisting of Forms and Menus. **8(5)**

Roll No. ..... Total Pages : 02

GSO/D-16 1176

COMPUTER SCIENCE

Paper I

Fundamentals & Database

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. (a) Differentiate Data and Information. **2(1)**

(b) Define Foreign and Alternate key. **2(1)**

(c) Define Domain, Attribute. **2(1)**

(d) Define Logical Data Independence. **1(1)**

(e) What is External/Conceptual Mapping ? **1(1)**

Unit I

2. Define Database and give its components. Explain difference between Traditional file system and Database system. **8(5)**

3. Explain functions of DBMS with advantages and disadvantages. **8(5)**

Unit II

4. (a) Write a note on DBA, its working and features.

(b) Explain three levels of schemas. **8(5)**

5. (a) What is Mapping ? Discuss types of mapping. **2(1)**

(b) What is Data Independence ? **2(1)**

(c) Write *two* commands for each component of SQL. **4(3)**

Unit III

6. (a) Explain physical and conceptual data model.

(b) Define relationship, relation, entity and attribute. **8(5)**

7. Discuss E-R diagrams. Explain concept using Inventory System. **8(5)**

Unit IV

8. Explain Relational Model and its properties and operations. **8(5)**

9. Write notes on the following :

(a) Client Server Database

(b) Integrity Constraints. **8(5)**

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

GSQ/D-16 1178

COMPUTER APPLICATION

Paper I

Desktop Publishing

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) Write uses of control palette.

(b) What is a pasteboard ?

(c) What do you mean by text wrap ?

(d) Define indent.

Unit I

2. Define DTP. What are the applications of DTP ? Explain any *four* DTP packages.

3. (a) Explain various features of PageMaker.

(b) Explain various tools of toolbox in PageMaker.

Unit II

4. Define formatting. Explain various types of formatting in PageMaker. Explain various options of character specifications dialog box and Paragraph specifications dialog box.

5. Define styles. Explain various steps to create new styles and import a style.

Unit III

6. Write short notes on the following :
   (a) Insert Objects
   (b) Paste Special
   (c) Linking the Graphics
   (d) Link information.

7. (a) What is a story editor ? What are its advantages ? Write the steps to open the story editor.
   (b) Explain various steps to find and change a word in a publication.

Unit IV

8. (a) What is a frame ? Write the steps to import text into a frame.
   (b) Write the steps to add page numbers to a publication.

9. (a) Write the steps to apply and edit colors to different objects in PageMaker.
   (b) Explain various steps to edit and format text in a table by using example.

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

GSQ/D-16 **1179**

COMPUTER APPLICATION

Paper : II

Programming Using C++

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. Explain the following : 8

(i) Local Class

(ii) Nested Class

(iii) This pointer

(iv) Destructor

(v) Inline function

(vi) Scope resolution operator

(vii) New operator

(viii) Delete operator.

Unit I

2. Explain various important features of object oriented programming in detail. **8**

3. (a) Explain the dfferences between class and structure with suitable examples. **8**

   (b) Explain the static data member and member function with example.

Unit II

4. (a) What is Constructor ? What is its use ? **8**

   (b) What is constructor overloading ? Explain with example.

5. Explain various unformatted I/O functions with example. **8**

Unit III

6. What is Manipulator ? Explain various manipulators with suitable examples. **8**

7. Explain friend function with suitable example. Also explain friend class. **8**

Unit IV

8. What is Polymorphism ? How many types of polymorphism are there ? Explain with example. Write a program to implement binary operator overloading. **8**

9. What is function overloading ? Explain. Write a program in C++ to find area of different shapes. **8**

Roll No. ..... Total Pages : 02

GSQ/D-16 1181

ANIMAL BIOTECHNOLOGY

Paper XI

Time : Three Hours] [Maximum Marks : 40

Note : Attempt Q. No. **1** and *Four* others selecting *two* questions from each Unit.

1. Write short notes on the following :

(a) Infinite Cell Lines

(b) Cell fusion methods

(c) Organ culture

(d) Selectable markers. **2×4=8**

Unit I

2. What are scopes of animal cell and tissue culture ? Discuss major advantages and disadvantages of animal tissue culture . **8**

3. Write short notes on the following :

(a) Feeder layer

(b) Suspension culture

(c) Artificial skin

(d) Serum free media. **2×4=8**

4. What are different methods available for disaggregation of animal tissue ? Describe briefly. **8**

Unit II

5. Describe briefly :

(a) Applications of transgenic animals

(b) Vectors used in gene therapy. **4×2=8**

6. How foreign genes can be cloned and expressed in animal cells ? Discuss briefly. **8**

7. Write short notes on the following :

(a) Animal Cloning

(b) Artificial Insemination

(c) Transfection

(d) Gene targetting. **2×4=8**

Roll No. ..... Total Pages : 02

GSQ/D-16 1182

BIOTECHNOLOGY

Paper XII

Plant Biotechnology

Time : Three Hours] [Maximum Marks : 40

Note : Attempt Q. No. **1** (compulsory) and *four* others, selecting *two* questions from each Unit. All questions carry equal marks.

(Compulsory Question)

1. (a) Define totipotency. **1**

(b) Define vitrification. **1**

(c) Describe the PDR with examples. **2**

(d) Describe the main contribution of the scientists 'Skoog and Miller' in plant tissue culture. **2**

(e) What is the role of vir–E and B genes in *Agrobacterium* mediated plant transformation ? **2**

Unit I

2. (a) Write an account on somatic embryogenesis. **4**

(b) What are the advantages and limitations of callus and suspension cultures ? **4**

3. (a) Discuss the applications of plant tissue culture. **4**

(b) Describe the importance and methods of selection of hybrid fusion products. **4**

4. (a) Discuss the role of different plant growth regulators in plant tissue culture. **4**

(b) Write a note on embryo rescue technique. **3**

(c) Write the names of enzymes used in the isolation of protoplasts. **1**

Unit II

5. (a) Write a note on structural organization of Ti plasmid. **3**

(b) Discuss the advantages of antibodies production in plants. **3**

(c) Write a brief account on biotransformation with examples. **2**

6. Write notes on the following :

(a) Production of useful secondary metabolites through plant cell cultures **4**

(b) Carbohydrates enhancement in transgenic plants. **4**

7. Write notes on the following :

(a) Seed storage protein enhancement in transgenic plants **4**

(b) Cryopreservation. **4**

Roll No. ..... Total Pages : 02

OGSQ/D-16 1197

COMPUTER SCIENCE

Paper : I

Programming in C++

Time : Three Hours] [Maximum Marks : 25

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. Explain the following : 5
   (i) Static Member Function
   (ii) Bitwise Operator
   (iii) Data hiding
   (iv) Unary Operator
   (v) Preprocessor directives
   (vi) Derivations.

Unit I

2. What are classes in C++ ? Explain the difference between Class and Structure. 5

3. What is Inline function ? Explain it with example. 5

Unit II

4. Explain formatted I/O function by giving example. 5

5. What are Manipulators ? Explain. 5

Unit III

6. What do you mean by overloading of an operator ? Explain function overloading by an example. 5

7. What do you mean by Inheritance ? Explain Multiple Inheritance. 5

Unit IV

8. Write a Program for exception handling. 5

9. What are template classes ? Explain with example. 5

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

OGSQ/D-16 **1198**

COMPUTER SCIENCE

Paper : II

Introduction to Database Systems

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

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

(Compulsory Question)

1. (a) Define foreign key.

(b) Weak entities do not have their own key attributes. Justify the statement.

(c) Define database system.

(d) Define meta-data.

(e) List one of the cases where use of NULL value would be appropriate.

(f) What does manipulating and sharing of a database mean ?

Unit I

2. Discuss the capabilities that should be provided by DBMS.

3. (a) What are the different types of database end users ? Discuss activities of each.

   (b) Give example of systems in which it may make sense to use traditional file processing instead of a database approach.

Unit II

4. Discuss with example, the main categories of Data Models.

5. Explain centralized and two-tier client/server architecture for DBMS.

Unit III

6. (a) What is a relationship type ? Explain differences between a relationship instance and a relationship type.

   (b) Describe in brief basic concept of Network Model.

7. Discuss with example, the conventions for displaying an ER schema as an ER diagram.

Unit IV

8. Discuss the entity integrity and referential integrity, constraints with example. Why is each considered important ?

9. Explain the following keys used in relational data model with example :

   (a) Primary key

   (b) Secondary key

   (c) Candidate key

   (d) Alternate key

   (e) Super key.

Roll No. .....

Total Pages : 03

OGSQ/D-16 **1203**

PHYSICAL CHEMISTRY

Paper XVI (CH-302)

Time : Three Hours] [Maximum Marks : 26

Note : Attempt *Five* questions in all, selecting at least *two* questions from each Section.

Section A

1. (a) Define Photoelectric effect. Why this phenomenon not explained by classical mechanics ? **3**

   (b) To show that the eigan values of a Hermitian operator are all real. **3**

2. (a) Define Schrödinger wave equation with the help of postulates of quantum mechanics. **3**

   (b) Calculate the average value of kinetic energy of an electron which is moving in one-dimensional box of length a. the wave function of an electron is

   $$\psi = \sqrt{\frac{2}{a}} \sin \frac{n\pi}{a} x .$$ **2**

3. (a) Evaluate the following :

(i) $x \cdot \frac{d}{dx}$

(ii) $x \cdot \frac{d}{dx}\left(x \cdot \frac{d}{dx}\right)$ 3

(b) Write the important application of dipole moment measurement. 2

4. (a) Explain the Gouy's method. 2

(b) Explain additive and constitutive properties with suitable examples. 3

Section B

5. (a) Why band spectrum is observed in electronic spectra of a molecule ? 3

(b) Calculate the vibrational degree of freedom of the following :

(i) SO_3

(ii) CO_2

(iii) H_2O. 3

6. (a) The rotational spectrum of HI consists of a series of equally spaced lines with $\Delta\bar{\nu} = 12.8\ cm^{-1}$. what is the :

(i) moment of inertia

(ii) bond length. 3

(b) Write a note on relative intensities of rotational spectral lines of diatomic molecule. 2

Unit IV

7. (a) Describe vibrational-rotational spectra of diatomic molecule. 3

(b) Among the following molecules, which are infra red active : 2

(i) Cl_2

(ii) CO_2

(iii) H_2O

(iv) HCl.

8. (a) Explain, what type rotational-vibrational Raman spectrum is obtained for a diatomic molecule. 3

(b) Define Polarizability and its types. 2

8. What is hepatic coma ? Describe various causes, symptoms and dietary modifications. 8

यकृत कोमा (Hepatic coma) किसे कहते हैं ? इसके विभिन्न कारण, लक्षण एवं आहारीय बदलावों का वर्णन कीजिए ।

9. Explain the following : 4×2=8

(a) Causes and symptoms of Jaundice

(b) Dietary treatment for Gout.

निम्नलिखित का वर्णन कीजिए :

(अ) पीलिया के कारण एवं लक्षण

(ब) वात रोगों का आहारीय उपचार ।

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

GSQ/D-16 1214

DIETETICS-I

Course No. 301

Time : Three Hours] [Maximum Marks : 40

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

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

(Compulsory Question)

(अनिवार्य प्रश्न)

1. Answer the following : 2×4=8

(a) Health hazards of obesity

(b) Etiology of constipation

(c) Mechanically soft diet

(d) *Three* basic functions of liver.

निम्नलिखित का उत्तर दीजिए :

(अ) मोटापे के स्वास्थ्य सम्बन्धी खतरे

(ब) कब्ज होने के कारण

(स) यांत्रिकी (Mechanically) कोमल आहार

(द) यकृत के तीन मुख्य कार्य ।

Unit I

इकाई I

2. Write various objectives of diet therapy. Explain therapeutic adaptations of the normal diet. 8

आहारीय उपचार के उद्देश्य लिखिए । सामान्य आहार में क्या-क्या बदलाव लाकर इसे रोगी के लिए उपयुक्त बनाया जा सकता है, वर्णन कीजिए ।

3. Explain the formation of Ulcer. What factors cause ulcer formation ? Give some dietary guidelines. 8

अलसर कैसे बनता है ? अलसर बनने के क्या-क्या करण हैं ? अलसर ग्रस्त रोगी के लिए आहारीय दिशा-निर्देशों की व्याख्या कीजिए ।

4. Discuss the nutritional needs and dietary modifications for patients who had undergone different type of surgeries. 8

विभिन्न प्रकार की शल्य चिकित्सा वाले रोगियों की पौष्टिक आवश्यकताओं एवं आहारीय बदलाव का वर्णन कीजिए ।

5. Describe the following : 2×4=8

(a) Dietary treatment of chronic diarrhoea

(b) Dietary treatment in chronic fever.

निम्नलिखित का वर्णन कीजिए :

(अ) दीर्घकालिक अतिसार का आहारीय उपचार

(ब) दीर्घकालिक ज्वर का आहारीय उपचार ।

Unit II

इकाई II

6. Explain the principles of dietary management, nutritional recommendations, dietary restrictions and a day's diet for a person suffering from obesity. 8

मोटापे से ग्रस्त व्यक्ति के लिए आहार प्रबन्धन के सिद्धान्त, पौष्टिक तत्त्वों की प्रस्तावित मात्राएँ एवं आहारीय प्रतिबन्ध बताइए तथा मोटे व्यक्ति के लिए एक दिन का आहार आयोजन कीजिए ।

7. Describe various symptoms, dietary modifications, do'es and donot's for atherosclerosis. 8

ऐथेरोस्क्लीरोसिस के विभिन्न लक्षण एवं आहार में बदलाव के विषय में बताइए तथा इस रोग में क्या-क्या भोज्य पदार्थ देने चाहिए एवं क्या-क्या वर्जित हैं ।

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

GSQ/D-16 **1215**

ADVANCE APPAREL AND TEXTILE DESIGNING

Paper : 302

Time : Three Hours] [Maximum Marks : 40

Note : Attempt *Five* questions in all, selecting *two* questions from each Unit. Q. No. **9** is compulsory. All questions carry equal marks.
प्रत्येक इकाई से **दो** प्रश्न चुनते हुए, कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या **9** अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

Unit I
इकाई I

1. Define fashion. Discuss principles of fashion. 8
फैशन को परिभाषित कीजिए । फैशन के सिद्धान्तों का वर्णन कीजिए ।

2. What is body proportion ? How would you select clothing and accessories for stout women ? Explain. 8
शारीरिक अनुपात क्या है ? आप मोटी महिला के लिए किस प्रकार के वस्त्रों तथा सहउपकरणों का चुनाव करेंगे ? व्याख्या कीजिए ।

Unit II

इकाई II

3. Define Fitting. Discuss any *four* fitting problems with their remedies. 8

फिटिंग को परिभाषित कीजिए । किन्हीं **चार** फिटिंग समस्याओं तथा उनको ठीक करने के लिए अपने सुझाव दीजिए ।

4. Discuss in detail the factors favouring and retarding fashion.

फैशन के प्रेरक तत्त्व तथा फैशन में बाधक तत्त्वों के बारे में विस्तारपूर्वक लिखिए । 8

Unit III

इकाई III

5. Write the classification of different dyes. Mention the dyes used for dying cotton fabric. 8

रंगों के वर्गीकरण के बारे में लिखिए । सूती कपड़ा रंगने के लिए कौन-कौनसे रंग प्रयोग में लाये जाते हैं बताइए ।

6. Explain the different methods used in tie and dye to produce different effects. 8

बाँध कर कपड़ा रंगने में विभिन्न प्रभाव उत्पन्न करने के लिए किने तरीकों का प्रयोग किया जाता है, वर्णन कीजिए ।

Unit IV

इकाई IV

7. Explain the techniques used in Hand Printing. 8

हाथ द्वारा छपाई में प्रयुक्त होने वाली तकनीकों का वर्णन कीजिए ।

8. Discuss in detail the meaning and importance of Textile Designing. 8

टेक्सटाइल डिजाइनिंग के अर्थ तथा महत्त्व के बारे में विस्तारपूर्वक लिखिए ।

(Compulsory Questions)

(अनिवार्य प्रश्न)

9. Write briefly on the following : 4×2

(a) Figure Types

(b) Resist Dyeing

(c) Duplex Printing

(d) Sources of Fashion.

निम्नलिखित को संक्षेप में लिखिए :

(अ) फिगर के प्रकार

(ब) अवरोधक रंगाई

(स) डुप्लेक्स छपाई

(द) फैशन के स्रोत ।

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

GSQ/D-16 1216

EARLY CHILDHOOD EDUCATION AND CHILDREN WITH SPECIAL NEEDS

Paper 303

Time : Three Hours] [Maximum Marks : 40

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

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

(Compulsory Question)

(अनिवार्य प्रश्न)

1. Define the following : **2×4=8**

(a) Counselling

(b) Therapy

(c) Early Child Education

(d) Children with special need.

निम्नलिखित को परिभाषित कीजिए :

(अ) परामर्श

(ब) उपचार

(स) पूर्वबाल्यावस्था शिक्षा

(द) विशिष्ट आवश्यकता वाले बालक ।

Unit I
इकाई I

2. Explain the importance and objectives of early childhood education. 8
पूर्व बाल्यावस्था शिक्षा के महत्त्व व उद्देश्यों का वर्णन कीजिए।

3. Write short notes on the following : 4+4=8
(a) Play centers
(b) Kindergarten.
निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए :
(अ) खेल केन्द्र
(ब) किंडरगार्टन ।

4. Explain the factors affecting selection of indoor and outdoor equipments. 8
अन्दर व बाहर के उपकरणों के चुनाव को प्रभावित करने वाले कारकों का वर्णन कीजिए ।

5. Discuss the Gandhian theory on nursery school education. 8
नर्सरी स्कूल शिक्षा पर गाँधी विचारधारा का उल्लेख कीजिए ।

Unit II
इकाई II

6. Explain the characteristics and needs of the children with special need. 8
विशिष्ट आवश्यकता वाले बालकों की विशेषताओं व जरूरतों का वर्णन कीजिए ।

7. Explain the role of parents and community in case of a mentally retarded child. 8
मानसिक रूप से विकलांग बालक के लिए अभिभावक व समुदाय के योगदान का वर्णन कीजिए ।

8. Discuss the educational provisions for the children suffering from speech disorders. 8
भाषा सम्बन्धी विकार से ग्रसित बालक के लिए शैक्षिक प्रावधानों का उल्लेख कीजिए ।

9. Explain the significance of welfare programme meant for children with special needs. 8
विशिष्ट आवश्यकता वाले बालकों के लिए बने कल्याणकारी कार्यक्रमों के महत्त्व (दृष्टिकोण) का वर्णन कीजिए ।

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

GSQ/D-16 **1217**

HOUSING

Paper 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. Answer the following :

   (i) *Two* disadvantages of owning a house

   (ii) Passages

   (iii) Staircases

   (iv) Loans from different agencies. 2×4=8

   निम्नलिखित के उत्तर दीजिए :

   (i) अपने मकान की दो [illegible]

   (ii) [illegible]

   (iii) [illegible]

   (iv) [illegible]

Unit I
इकाई I

2. Write down advantages and disadvantages of renting a house. 8
किराये के मकान के लाभ और हानियाँ बताइये ।

3. What will you consider while selecting a site for a house ? 8
मकान के लिए स्थान का चुनाव करते समय आप कौनसी बातों का ध्यान रखोगे ?

4. How can you arrange loan for housing from cooperative banks ? 8
आप कोआपरेटिव बैंक से मकान के लिए ऋण कैसे ले सकते हैं ?

5. Describe various characteristics of glass and plastic for constructing a house. 8
मकान के निर्माण के लिए ग्लास और प्लास्टिक की विभिन्न विशेषताओं का वर्णन कीजिए ।

Unit II
इकाई II

6. Prepare any *four* types of commonly used symbols for house plan. 8
घर का नक्शा बनाने हेतु कोई **चार** सामान्य रूप में प्रयोग किए जाने वाले सांकेतिक चिह्न बताइए ।

7. Plan the space a furniture for a bed room of high income family keeping in view the privacy. 8
उच्च वर्गीय परिवार के लिए सोने के कमरे के लिए एकान्तता का ध्यान रखते हुए जगह और फर्नीचर का आयोजन कीजिए।

8. Describe about role of ventilation and flexibility in house plan. 8
मकान के आयोजन में संवातन या लचीलापन की भूमिका बताइये।

9. Write down the role of asthetics in house plan. 8
मकान के आयोजन में सौन्दर्य की भूमिका के बारे में बताइए।

Roll No. ..... Total Pages : 02

BCA/D-16 1230

WEB DESIGNING FUNDAMENTALS

BCA-351

Time : Three Hours] [Maximum Marks : 80

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

(Compulsory Question)

1. (a) Briefly explain Internet Protocol version 6.

(b) How DNS is converted into IP Address ?

(c) What is purpose of vlink attribute in body tag ?

(d) What is use of colspan and rowspan attribute in <table> tag ?

(e) How are multiple items selected using select box control ? Give example. **4,4,2,3,3**

Unit I

2. (a) Explain the working of Web Server.

(b) What is the purpose of Proxy Server. **12,4**

3. (a) What is meant by Search Engine ? Explain its working.

(b) Briefly explain features of two popular search engines. **10,6**

Unit II

4. What are Principles of Good Web Design ? Explain. **16**

5. Explain the Web Publishing Process. **16**

Unit III

6. (a) What are the attributes used in <font> tag for setting font size, style and color to the text ? Explain giving example.

(b) What is the purpose of <basefont> tag ? **12,4**

7. (a) What are the attributes used for setting background image, background colour and link colour in body tag ? Give example.

(b) Explain the purpose of <Marquees> tag. **10,6**

Unit IV

8. How is image placed in HTML page ? Explain <IMG> tag along with its attributes **16**

9. Use Frameset tag to divide the browser screen into different frames so that each frame should display a separate web page by taking a suitable example. **16**

Roll No. .....

Total Pages : 03

BCA/D-16

1231

OPERATING SYSTEM-I

BCA-352

Time : Three Hours]

[Maximum Marks : 80

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

Compulsory Question

1. (a) Explain network operating system.

(b) Define system calls with example.

(c) What do you mean by CPU scheduling ?

(d) What do you mean by deadlock prevention ?

(e) What is deadlock ?

(f) Define multithreading.

(g) What do you mean by thread ?

(h) Explain system program with example. **2×8**

Unit I

2. (a) Define Operating System. List out the various functions performed by an operating system. **8**

(b) Explain the main functions of Kernal. **8**

3. (a) What is layered structure operating system ? Expalin 8

(b) Explain the architecture of operating system. 8

Unit II

4. (a) Define CPU scheduling. Explain various scheduling policies. 8

(b) What is scheduler ? Explain various types of schedulers with examples. 8

5. (a) Differentiate between preemptive and non-preemptive scheduling. 8

(b) Define dispatcher. Explain its need with example. 8

Unit III

6. (a) What do you mean by deadlock ? Explain the necessary and sufficient conditions for deadlock. 8

(b) Explain various methods for handling deadlock. 8

7. (a) Distinguish between deadlock avoidance and dealock prevention. 8

(b) What is dealock avoidance ? How can you avoid deadlock ? 8

Unit IV

8. (a) Explain the concept of segmentation. Explain the advantages and disadvantages of segmentation. 8

(b) Explain various page replacement policies. 8

9. (a) Define thrashing. Explain various methods to handle it. 8

(b) Explain fixed partioned memory scheme by giving suitable example. 8

Roll No. ..... Total Pages : 02

BCA/D-16 1232

ARTIFICIAL INTELLIGENCE

BCA-353

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory. In addition to compulsory question, attempt *four* more questions by selecting at least *one* question from each Unit.

Compulsory Question

1. (a) What are goals of Natural Language Processing ? 3
   (b) What is Knowledge Pyramid ? 2
   (c) What is the role of Inference Engine ? 3
   (d) Define Mean End Analysis Process. 3
   (e) Name steps for developing expert system. 2
   (f) What is the function of turing test ? 3

Unit I

2. Define AI. What are the methods for problem representation in AI and also give their characteristics. 16

3. Write notes on the following :
   (a) Turing Test and Received Turing Test 8
   (b) History of AI. 8

Unit II

4. (a) Explain Expert System Life Cycle. 10
   (b) What are limitations of Expert System with example ? 6

5. (a) Explain various categories of Expert System. 8
   (b) Write at least four applciation areas of AI. 8

Unit III

6. Explain Brute Force Search Techniques with suitable example. 16

7. Explain the following :
   (a) A* Algorithm 8
   (b) Hill Climbing Algorithm 8

Unit IV

8. (a) What are the solutions of Natural Language Processing Problems ? 6
   (b) What are the advantages of Speech Recognition ? 6
   (c) Explain need of natural language processing. 4

9. What is Robotics ? What are parts of a Robot and how it will be controlled ? How Mobile Robots are useful in general life ? 16

Roll No. ..... Total Pages : 02

BCA/D-16 1233

COMPUTER NETWORKS

BCA-354

Time : Three Hours] [Maximum Marks : 80

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

Compulsory Question

1. (a) Write short note on Network Interface Card.
(b) What is Web based Model ?
(c) What do you mean by bandwidth ?
(d) Differentiate between digital and analog transmission of data.
(e) Distinguish between ALOHA and Slotted ALOHA.
(f) What do you mean by wireless LAN ?
(g) Write short note on Routing.
(h) Write short note on Security Certificate. **8×2=16**

Unit I

2. What is Computer Network ? Explain various network topologies. **16**

3. Write short notes on the following :
(a) Bridges
(b) Routers
(c) Gateway
(d) Repeaters. **4×4=16**

Unit II

4. What do you mean by Multiplexing ? Explain various types of Multiplexing. **16**

5. (a) Explain Cable Modem and DSL Model. **8**
(b) What is an Optical Fibre ? How is it used for data communications ? What are its advantages and disadvantages ? **8**

Unit III

6. Explain Sliding Window Protocols. **16**

7. What is Bluetooth ? Explain the architecture and applications of Bluetooth. **16**

Unit IV

8. (a) What is Firewall ? Explain various tyeps of Firewall. **8**
(b) What are the security requirement for network ? Explain security threats and attacks. **8**

9. Explain Distance Vector Routing algorithm by using an example. **16**

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

BCA/D-16 1234

PROGRAMMING USING VISUAL BASIC

BCA-355

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all. Question No. 1 is compulsory. In addition to compulsory question, student allotted will have to attempt *four* more questions selecting *one* question from each Unit. All questions carry equal marks.

(Compulsory Question)

1. (a) What is the significance of visual language and what is the reason to say VB as visual language ?

   (b) Explain various types of variables in visual basic with examples.

   (c) Differentiate between static and dynamic arrays in Visual Basic.

   (d) Discuss the concept of general and event procedures in Visual basic. 4×4=16

Unit I

2. Explain the concept of procedural, object-oriented, object-based and event-driven programming languages along with examples of each of them. How do they differ from each other ? 16

3. What is VB Environment ? Explain its various components in detail with examples. 16

Unit II

4. How do we carry out input and output in Visual Basic ? Explain the various controls for input and output wit examples. 16

5. Discuss the following with examples in Visual Basic :
   (a) Named and Intrinsic Constants 8
   (b) Scope and Lifetime of Variables. 8

Unit III

6. Explain various decision control statements in Visual Basic. Write their syntax and give examples. Write a program in visual basic to design calculator for basic operations of addition, subtraction, multiplication and division. 16

7. Discuss the following and give examples in Visual Basic :
   (a) One-dimensional, Two-dimensional and Multi-dimensional arrays 8
   (b) Do-loop and for-next statements. 8

Unit IV

8. Discuss the following in Visual Basic with examples :
   (a) Arguments passing Mechanisms 8
   (b) Functions Returning Custom Data Types. 8

9. Write programs in Visual Basic for :
   (a) Searching 8
   (b) Sorting. 8

Roll No. .....

Total Pages : 02

BCA/D-16 1235

MULTIMEDIA TOOLS

BCA-356

Time : Three Hours] [Maximum Marks : 80

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

1. (a) What is Hypermedia ? **8×2=16**

(b) What is Digital Video ?

(c) What is Analog Audio ?

(d) What is Data Compression ?

(e) JPEG stands for.....

(f) GIF stands for.....

(g) BMP stands for.....

(h) PNG stands for.....

Unit I

2. What is Multimedia ? Discuss various applications of Multimedia. **16**

Or

What is Multimedia Authoring ? Discuss various Authoring Tools.

Unit II

3. Discuss the following video file formats :

AVI, WMV, MPEG and MP4. **16**

Or

Discuss the following analog video standards : NTSC, PAL and SECAM.

Unit III

4. Explain the following audio file formats : 3GP, AMR, WAV and MP3. **16**

Or

Describe the MIDI (Musical Instrument Digital Interface) Standard.

Unit IV

5. Discuss the following lossless compression algorithms : **16**

(i) Huffman

(ii) Shannon-Fano

(iii) Adaptive Huffman.

Or

Differentiate between JPEG and MPEG.

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

OBCA/D-16 1236

INTRODUCTION TO OBJECT ORIENTED PROGRAMMING

BCA-351

Time : Three Hours] [Maximum Marks : 80

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

(Compulsory Question)

1. (a) What are Bitwise Operator ? Differentiate between left shift and right shift operators.

(b) Is it necessary to overload operators ? Justify your answer.

(c) What is Ostream Class ? What are the members function in Ostream ?

(d) What is Constructor ? Is it necessary to have a constructor ?

(e) What is reference operator ?

(f) What are the uses of pointer ?

(g) What is #include directive ?

(h) What is data hiding ? **16**

Unit I

2. Write short notes on the following :
   (a) Data Abstraction
   (b) Encapsulation
   (c) Classes
   (d) Polymorphism. **16**

3. (a) What do you mean by namespace ? How can you create namespace ? **8**
   (b) What are the preprocessor-directive ? Is it necessary to have them in the beginning of a program ? **8**

Unit II

4. What is Copy Constructor ? How is it different from default constructor ? Explain it with example. **16**

5. Explain formatted console input/output with example. **16**

Unit III

6. How can we pass class objects as arguments of a function ? Illustrate using example. **16**

7. (a) What is friend function ? What are the advantages and disadvantages of using friend function ? **8**
   (b) Explain delete operator with example. **8**

Unit IV

8. What is function overloading ? What are its benefits ? Write a program to add two numbers using function. overloading. **16**

9. (a) What are inline function ? What are the advantages and disadvantages of creating inline function ? Explain with example. **10**
   (b) What is conditional operator ? Explain it with example. **6**

Roll No. ..... Total Pages : 02

OBCA/D-16 1238

SOFTWARE ENGINEERING

BCA-353

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *Five* questions in all including Q. No. **1** (which is compulsory) and attempt remaining *four* questions by selecting *one* question from each Unit.

(Compulsory Question)

1. (a) What is the need of evolutionary model ? **3**

(b) Define quality assurance. **3**

(c) What is the need of ERD ? **3**

(d) Explain cause effect graphing. **3**

(e) What is boundary value analysis ? **2**

(f) Explain integration testing. **2**

Unit I

2. Compare and contrast waterfall model and spiral model for software development. **16**

3. Write notes on the following :

(a) Project Scheduling

(b) COCOMO Model. **16**

Unit II

4. What are the major tools of structured analysis ? Construct a data flow diagram of a restaurant system. **16**

5. Discuss various fundamentals of Software Design. Differentiate between coupling and cohesion. **16**

Unit III

6. Discuss various programming styles. What are the characteristics of a good code ? **16**

7. What is loop testing ? Differentiate between control flow based and data flow based testing. **16**

Unit IV

8. Differentiate between the following : **16**

(a) Verification and Validation

(b) Alpha and Beta testing.

9. What are the critical issues of maintenance process ? Discuss various types of maintenance. **16**

Roll No. .....

Total Pages : 03

OBCA/D-16

1239

COMPUTER NETWORKS

BCA-354

Time : Three Hours]

[Maximum Marks : 80

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

1. Explain the following terms in brief :
   (a) Web-based network model
   (b) Node and Host
   (c) DSL
   (d) Digital Carrier System
   (e) Bluetooth
   (f) Hub
   (g) Internetworking
   (h) Congestion.

Unit I

2. (a) What do you mean by Frame-Relay and X.25 ? Discuss in detail. Also distinguish between the two.

   (b) Discuss the various types of computer networks.

3. Explain the layered architecture of OSI reference model along with explanation of each layer in detail. **16**

Unit II

4. What do you mean by switching ? Describe various types of switching for establishing communication network along with advantages and disadvantages of each of the methods. **16**

5. (a) How data can be represented using analog and digital signals ? Distinguish between analog and digital data communication. **8**

   (b) Differentiate between FDM, TDM and WDM. **8**

Unit III

6. What do you mean by error detection and correction ? Explain various methods for error detection and correction using suitable examples. **16**

7. What is Ethernet ? Explain various types of Ethernet in in detail. **16**

Unit IV

8. How is link state routing different from distance vector routing ? When are flooding and shortest path routing used in link state routing ? **16**

9. What is the need of network security ? Discuss various types of security threats ? Describe various types of security measures in detail. **16**

Roll No. ..... Total Pages : 02

OBCA/D-16 1240

COMPUTER GRAPHICS

BCA-355

Time : Three Hours] [Maximum Marks : 80

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. (a) Name few popular Graphics input devices. 2
   (b) Write advantages of interactive graphics. 3
   (c) What is Shearing ? 3
   (d) Name *two* circle drawing algorithms ? 2
   (e) Differentiate between Geometric and Coordinate Transformation ? 3
   (f) What do you mean by Zooming ? 3

Unit I

2. (a) Explain Bresenham's Circle Drawing algorithm ? 10
   (b) Write about Ellipse Generating algorithm ? 6

3. Explain any *two* Line Drawing algorithm with suitable examples. 16

Unit II

4. (a) Write down various application areas of Computer Graphics. 8
   (b) Differentiate between Raster Scan and Random Scan. 8

5. Explain the following : 4×4=16
   (a) DVST (Direct View Storage Tube)
   (b) Shadow Mask Method
   (c) Plasma Panel
   (d) LCD.

Unit III

6. Explain various 2D Geometric Transformations ? 16

7. Perform a 45° rotation of a triangle whose coordinates are A(0, 0), B(1, 1), C(5, 2) about the point P(–1, –1). 16

Unit IV

8. (a) Differentaite between Parallel and Perospective Projection ? 6
   (b) Write Hidden Surface Elimination algorithm ? 10

9. Write short notes on the following :
   (a) Mid-Point Subdivision Line Clipping. 8
   (b) Polygon Clipping. 8

Roll No. .....

Total Pages : 03

OBCA/D-16

1241

WEB DESIGNING-II

BCA-356

Time : Three Hours]

[Maximum Marks : 80

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

1. (i) How Client Side Scripting is different from Server Side Scripting ?

   (ii) Explain Title Bar and Menu Bar of Front Page.

   (iii) What is the purpose of Marquee and Mouseover in CSS ?

   (iv) What are different features of XML ? 4×4=16

Unit I

2. (a) What is Common Geteway Interface (CGI) ? Discuss functions of CGI program.

   (b) What are Active Server Pages ? Discuss its features.

3. Describe the role of Macromedia Flash and Dreamweaver in Website development. **16**

Unit II

4. Explain Standard and Formatting Toolbars with examples in Front Page. **16**

5. (a) Describe the ways of starting Photoshop. Explain the components of Photoshop Window.

   (b) How is the text added to the image in Adobe Photoshop ?

   (c) What is a Drop Shadow ? How is it created ? Discuss. **8,5,3**

Unit III

6. Discuss with examples the common tasks of Adding Tables, Forms, Images and Sound with CSS. **16**

7. (a) Explain Event Handling in DHTML.

   (b) Discuss the concept of Links in DHTML with syntax and examples. **8,8**

Unit IV

8. (a) How would you change various aspects of text using XML ?

   (b) Discuss color and background properties in context of XML. **8,8**

9. What is the purpose of Document Type Definitions (DTD) in XML ? Explain its types with advantages and disadvantages. **16**

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

BSIT/D-16 12611

COMPUTER SYSTEM ARCHITECTURE-I

BSIT-501

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) Differentiate between linear and non-linear pipelining.

(b) List the data hazards in pipeline.

(c) What is stored program concept ?

(d) Why is data bus bidirectional ? **2 each**

Unit I

2. What is the difference among an immediate, a direct and an indirect address instruction ? Explain giving suitable examples. How many reference to a memory are needed for each type of instruction to being an operand into a processor register ? **8**

3. With the help of block diagram of basic computer system depicting how various registers are connected to the common bus and explain why each of the following micro-operations cannot be executed during a single clock pulse in the system. Also specify a sequence of micro-operations that will be performing the operation :

(i) $IR \leftarrow M[PC]$

(ii) $AC \leftarrow AC + TR$

(iii) $DR \leftarrow DR + AC$ (AC does not change) **8**

Unit II

4. Design a typical stage that implements the following logic micro-operations :

P6 : $A \leftarrow A \vee \overline{B}$ P8 : $A \leftarrow \overline{A \vee B}$

P7 : $\overline{A} \leftarrow A \boxtimes B$ P9 : $A \leftarrow \overline{A \wedge B}$

5. If the contents of register A is 1101 and that of B is 0110, show that either one of the micro-operation sequences listed below produce the difference 0111. **8**

(a) $T_1 : B \leftarrow \overline{B}$

$T_2 : B \leftarrow B + 1$

$T_3 : A \leftarrow A + B$

(b) $T_1 : B \leftarrow \overline{B}$

$T_2 : EA \leftarrow A + B$

$ET_3 : A \leftarrow A + 1$

Unit III

6. What is the difference among hardware, software and firmware implementation ? Consider the multiplication of two binary numbers and explain how this operation is implemented in each of the three methods. Discuss the advantages and disadvantages among the three implementations. **8**

7. (a) A microprogram control unit contains 1024 words of 100 bits each. If only 120 different bit combinations are used, how many bits can be saved by using a nanomemory ? What would be the sizes of the micromemory and nanomemory ? **4**

(b) Define the following terms :

(i) control memory

(ii) micro-operation

(iii) macro-operation

(iv) dynamic micro-programming. **4**

Unit IV

8. (a) Why parallelism is required ? How processor level parallelism is achieved ? **5**

(b) Perform the logic AND, OR and XOR with the two binary strings 10011100 and 10101010. **3**

9. (a) Explain pipeline for RISC architecture. **4**

(b) How interrupts are prioritized ? Explain various techniques. **4**

Roll No. .....

Total Pages : 02

BSIT/D-16 12612

PROGRAMMING IN C++

BSIT-502

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. Write short notes on the following :
   (a) Object and Class
   (b) This Pointer
   (c) Enumeration
   (d) Function Template.

Unit I

2. Explain the structure of C++ program. Write a program to find prime numbers between 3 to 100.

3. Explain various type of operators used in C++ and explain their precedence.

Unit II

4. (a) Differentiate between Structure and Union.
   (b) What do you mean by pointer and what operations can be performed on it ?

5. (a) Explain 1D and 2D array and explain, how are they represented in memory.
   (b) Write a program to search an element from a list.

Unit III

6. (a) Describe inline function with a suitable example.
   (b) Explain the concept of Function Overloading.

7. Distinguish between :
   (a) Library and user define function.
   (b) Call by value and call by references.

Unit IV

8. Describe various types constructors with their syntax and usages.

9. Write notes on the following :
   (a) Static Class member
   (b) Class Scope.

Roll No. ..... Total Pages : 02

BSIT/D-16 12613

WEBSITE DESIGN IMPLEMENTING BASIC DESIGN TOOLS-I

BSIT-503

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. Write a short notes on the following :
   (a) Hypertext
   (b) Line Break Tag
   (c) Unordered List
   (d) Caption Tag. 8

Unit I

2. Describe the basic structure of HTML document. 8

3. (a) What are the methods to view pages in different browsers ?

(b) Describe HTML colours using Hexadecimal numbers. 8

Unit II

4. (a) Discuss various headsection elements.
   (b) Explain the various phrase elements. 8

5. Describe various block level and text level elements. 8

Unit III

6. Explain the various types of linking in HTML. 8

7. Discuss the following :
   (a) Linking with specific E-mail address
   (b) Jump to named anchor. 8

Unit IV

8. Explain the following :
   (a) Attributes of Table Tag
   (b) Attributes to Table Row (TR) Tag. 8

9. Discuss the colspan and Rowspan attributes of <TH> or <TD> using suitable example. 8

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

BSIT/D-16 12615

MICROPROCESSOR ARCHITECTURE AND PROGRAMMING-III

BSIT-505

Time : Three Hours] [Maximum Marks : 40

Note : There are *nine* questions in this paper. All questions carry equal marks. Q. No. **1** is compulsory. Attempt remaining *four* questions by selecting only *one* question from each Unit.

Compulsory Question

1. (a) What is the difference between hardware and software interrupts ? **2**

(b) What is the maximum memory, in terms of bytes, that can be interfaced with the 8086 ? Why ? **1.5**

(c) What are the two main parts in the 8087 and their function ? **1.5**

(d) Describe the function of EOC and SC signals in ADC interface to the 8086. **1**

(e) What are the advantages of the 80486 over the 80386 ? **2**

Unit I

2. (a) Define a stack. What is the role of stack segment register and stack pointer register ? What are the different uses of a stack in a microprocessor ? 4

(b) What is the difference between a macro and a subroutine ? Explain how will you define and call a macro without parameters. 4

3. (a) What do you mean by non-maskable and maskable interrupts ? Explain in detail INTR interrupt. 4

(b) Explain in detail the stack operation during a CALL and RET instruction. 4

Unit II

4. (a) Explain the procedure of interfacing dynamic RAM with a CPU. 4

(b) Sketch and epxlain the interface of 32K × 16 read/write memories using a decoder in minimum mode. 4

5. (a) What are the differences in interfacing read/write memories while 8086 is in minimum and maximum modes ? 4

(b) Explain memory-mapped method of interfacing input/output devices. 4

Unit III

6. Draw and explain the block diagram of the 8087 and the main signals in the 8087. 8

7. Explain in detail the interfacing of dual slope A/D converter with a microprocessor 8

Unit IV

8. (a) What are the comparisions between 8086, 80286, 80386 and Pentium ? 4

(b) Explain the basic features of a RISC processor. 4

9. (a) Discuss in brief the design issues of a RISC processor. 4

(b) List the major hardware and software features that the 80186 microprocessor has beyond those in 8086. 4