

S.Y.B.Sc (Computer Science)

Foundation Course

Aug
2018

Con. 337-18.

HP-6642

(3 Hours)

[Total Marks : 100

- N.B. :** (1) All questions are compulsory.
(2) Figures to the right indicate full marks.

Section I

1. Write note on any **three** of the following :— 18
(a) Violation of the Right to Women
(b) Air Pollution
(c) Importance of Technology
(d) Right to health
(e) Non-verbal communication.
2. Attempt any **two** questions of the following :— 16
(a) Explain in detail the Right to Equality provided in the Indian Constitution.
(b) Explain the differences between Science and Technology.
(c) Explain in detail the effects of Disaster on human life.
3. Attempt any **two** of the following :— 16
(a) Define Communication. Elaborate Barriers of Effective Communication.
(b) Explain various obstacles in Free and Compulsory Education in India.
(c) Define the term Leadership. Explain the Styles of Leadership.

Section II

4. Write note on any **three** of the following :— 18
(a) Eco-Feminism
(b) Goal setting
(c) Competitive Exams
(d) Causes of Social tensions
(e) Waste Management.
5. Attempt any **two** of the following :— 16
(a) Discuss the need and objectives of Consumer Protection Act.
(b) Discuss the Self Actualization Theory of Prof. Maslow.
(c) Explain the various applications of Nano Technology.
6. Attempt any **two** of the following :— 16
(a) Explain the meaning and feature of Right to Information
(b) Explain the use and misuse of technology in modern living.
(c) Explain disparity of infra-structure in Rural-Urban region.

[TURN OVER

Con. 337-18.

HP-6642

(2 Hours)

[Total Marks : 80

- N.B. : (1) All questions are compulsory.
 (2) Figures to the right indicate full marks.

Section I

1. Answer any **four** questions from the following :— 20
 (a) Explain the Right to Equality provided in the Indian constitution.
 (b) Distinguish between Science and Technology.
 (c) Explain the effects of Natural Disaster on human life.
 (d) Elaborate Barriers of Effective Communication.
 (e) Discuss the various obstacles in Free and Compulsory Education in India.
 (f) Explain the Styles of Leadership.
2. Answer any **four** questions from the following :— 20
 (a) Explain the Violation of Women Right.
 (b) Discuss the causes and consequences of Air Pollution.
 (c) Elaborate the Importance of Technology.
 (d) Explain the Right of health.
 (e) Write a note on Non-verbal communication.
 (f) Explain the Nature of Science.

Section II

3. Answer any **four** questions from the following :— 20
 (a) Discuss the objectives of Consumer Protection Act.
 (b) Discuss the Self Actualization Theory of Prof. Maslow.
 (c) Explain the various applications of Nano Technology.
 (d) Explain the feature of Right to Information.
 (e) Explain the misuse of technology in modern living.
 (f) Give the features of rural society.
4. Answer any **four** questions from the following :— 20
 (a) Explain the moral responsibility of man towards environment.
 (b) Write a note on "Goal setting".
 (c) Discuss about the various Competitive Exams conducted for employment purpose.
 (d) Discuss the causes of Social Tensions.
 (e) Write a note on "Waste Management".
 (f) Explain in short the types of Ecology.
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S.Y. B.Sc (Computer Science)

Mathematics - (Paper - II)

Aug
2018

P4-Exam.-2018-1-8
Con. 338-18.

HP-6428

(3 Hours)

[Total Marks : 80

- N.B.** (1) All questions are compulsory.
(2) Each question carries 16 marks.
(3) Internal choices are there in each question.
(4) Figures to the right indicate full marks.

Q.1 Attempt any four questions from the following :-

16

(a) Find the Rank of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$

(b) Find the inverse of the matrix $A = \begin{bmatrix} 4 & -5 & -2 \\ 5 & -6 & -2 \\ -8 & 9 & 3 \end{bmatrix}$

(c) Solve by Cramer's rule :
 $7x + 5y - 3z = 16, 3x - 5y + 2z = -8, 5x + 3y - 7z = 0$

(d) Find Eigen values of the matrix $\begin{bmatrix} 1 & 22 & 3 \\ 0 & 5 & 6 \\ 0 & 0 & -3 \end{bmatrix}$

- (e) Find Eigen values of $A^3 + A + 3I$ if A has Eigen values 1 & 3.
(f) Prove that Eigen space W is a subspace of a vector space.

Q.2 Attempt any four questions from the following :-

16

- (a) Show that a subset of a linearly independent set is linearly independent.
(b) Define following with examples (i) Basis (ii) Subspace
(c) Show that the Vectors $X_1 = (1, 1), X_2 = (2, 4) & X_3 = (3, 5)$ are linearly dependent.
(d) Prove that the set $S = \{(x, 0, x) / x \text{ is real}\}$ is a subspace of R^3 .
(e) If $W_1 & W_2$ are subspaces of a vector space V . Prove that $W_1 \cap W_2$ is always a subspace.
(f) Let V be a Vector space of dimension n and V_1, V_2, \dots, V_n be linearly independent vectors in V . Prove that $\{v_1, v_2, \dots, v_n\}$ forms a basis of V .

Q.3 Attempt any four questions from the following :-

16

- (a) Let V be inner Product space. If x, y are any two vectors in V then prove that
 $\|x + y\| \leq \|x\| + \|y\|$
(b) Use Gram-Schmidt process to find orthonormal basis for R^3 for the vectors
 $X_1 = (1, 2, 2)$ and $X_2 = (-1, 0, 2) & X_3 = (0, 0, 1)$
(c) Prove that $\|x\| = 0$ iff $x = 0$
(d) State and prove Parallelogram Equality of inner product space.
(e) Define and explain orthogonal basis with an Example.
(f) Show that the function $\langle x, y \rangle = ap + bq$ where $x = (a, b)$ and $y = (p, q)$ define on R^2 is inner product.

[TURN OVER

Q.4 Attempt any four questions from the following :-

16

- Prove that $A (\text{Adj}A) = |A| I$
- Prove that for 2×2 matrices A and B , $\det (AB) = \det (A) \det (B)$.
- Prove that $(AB)^{-1} = B^{-1} A^{-1}$
- Find $\text{Adj}A$ for the matrix $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$
- Eigen values corresponding to distinct Eigen values are L.I.
- Find Eigen values of A^{-1} for the matrix $A = \begin{bmatrix} 1 & 3 \\ 3 & 4 \end{bmatrix}$.

Q.5 Attempt any four questions from the following :-

16

- Define Kernel of T and image of T
- Show that $T : P_2[x] \rightarrow R^3$ given by $T (a_2x^2 + a_1x + a_0) = (0, a_1, a_2)$ is a linear Transformation.
- Let $T: R^2 \rightarrow R^2$ be a linear Transformation such that $T(1, 2) = (5, -1)$ & $T(3, 1) = (1, 4)$ find $T(1, 1)$.
- Let $T : R^2 \rightarrow R^2$ be a linear Transformation such that $T (x, y) = (y, -x)$. Prove that T is invertible.
- Let V be a Vector space and $T : V \rightarrow V$ is a linear transformation. Prove that T is injective iff $\ker T = \{0\}$.
- Let V be vector spaces over \mathbb{R} and $T : V \rightarrow V$ is a linear transformation then prove that $T(-v) = -v$ and $T(v - w) = T(v) - T(w)$.

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Con. 338-18.

HP-6428

(3 Hours)

[Total Marks : 100

N.B. (1) All questions are compulsory.

(2) From question 2 to 7, subquestion (a) is compulsory and attempt any one from remaining.

Q.1 Attempt any one :-

10

(a) Let W_1 and W_2 be subspaces of Vector space V . Then prove that $W_1 + W_2$ is also a subspace of V . Further prove that $\dim(W_1 + W_2) = \dim W_1 + \dim W_2 - \dim(W_1 \cap W_2)$.

(b) Let $B = \{v_1, v_2, \dots, v_n\}$ be finite set of a vectors in V . Then following statements are equivalent.

(i) B is a basis of V

(ii) B is a maximal linearly independent set in V

(iii) B is minimal set of generators of V .

Q.2 (a) Show that any square matrix A can be expressed as sum of symmetric and Skew-symmetric matrices. 8

(b) Reduce the matrix $A = \begin{bmatrix} 4 & -5 & -2 \\ 5 & -6 & -2 \\ -8 & 9 & 3 \end{bmatrix}$ in to Row echelon form. 7

OR

(c) Solve the following by using Gauss elimination method. 7

$$x + 2y + z = 1,$$

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

$$2x + y + 5z = 6$$

Q.3 (a) Let V be a Vector space and $S = \{v_1, v_2, \dots, v_n\}$ be a finitely linearly independent set in V , prove that if $y \in L(S)$ iff $S \cup \{y\}$ is linearly dependent. 8

(b) Show that the Vector $X_1 = (1, 0, 1)$, $X_2 = (1, 2, 0)$ & $X_3 = (0, 0, 5)$ are linearly independent. 7

OR

(c) Define Subspace of a vector space and prove that the set $= \{(x, y, x + y) / x, y \text{ are real}\}$ is a subspace of R^3 . 7

Q.4 (a) State and prove Cauchy Schwartz inequality of inner product space. 8

(b) Use Gram-Schmidt process to find orthonormal basis for R^3 for the vectors 7

$$x_1 = (1, 2, 1) \text{ and } x_2 = (1, 0, 2) \text{ and } x_3 = (0, 0, 2)$$

OR

(c) If U is a subset of V , then Complement of U is a subspace of V . 7

[TURN OVER



Q.5 (a) State and prove Rank Nullity Theorem. 8

(b) Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be a linear Transformation such that $T(-1, 1) = (2, -1)$ and $T(1, 4) = (-1, 3)$ find $T(x, y)$ for all (x, y) in \mathbb{R}^2 and hence find $T(4, 5)$ 7

OR 7

(c) Show that $T : P_2[x] \rightarrow \mathbb{R}^2$ given by $T(a_2x^2 + a_1x + a_0) = (a_0, a_1 + a_2)$ is a linear Transformation. Is it Invertible? Justify your answer. 8

Q.6 (a) State & Prove Parallelogram law of inner product space. 8

(b) Find the inverse of $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & -1 \\ 3 & 3 & 2 \end{bmatrix}$ by using adjoint method. 7

OR 7

(c) Solve the following system by using Cramer's rule
 $x + y + z = 7, x + 2y + 3z = 6, x + 3y + 4z = 2$

Q.7 (a) Find the Eigen values and Eigen vectors for $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 0 & -3 \\ 3 & -3 & 2 \end{bmatrix}$ 8

(b) Define Eigen Space and prove that Eigen space is a subspace of a Vector space. 7

OR 7

(c) Prove that if x is an Eigen value of matrix A then x^k is an eigen value of A^k where k is a natural number.

S.V.B.Sc (Computer Science)

Mathematics - (Paper III)

Aug
2018

Con. 343-18.

(2 Hours)

HP-6734

[Total Marks : 48

- N.B 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 Attempt any TWO of the following.

8 M

- Check whether the following graphs are planar or not. a) K_4 b) K_5 .
- Solve $y'(x) = x^2 + y^2$ with $y(0) = 1$ by Euler's method.
- State and prove handshaking lemma.
- Find the volume of solid obtained by revolving ellipse $x=2\cos t$ and $y=3\sin t$ about y axis where $0 \leq t \leq \pi$.

Q.2 Attempt any TWO of the following.

10M

- Write an algorithm to find sum of first five odd integers.
- Draw all possible sub graphs of K_4 .
- Build a binary search tree for the number 17, 12, 15, 21, 26, 8, 20, 11, 30.
- Describe an algorithm that finds factorial of positive integer.

Q.3 Attempt any Two of the following.

10M

- Design an algorithm to find whether an input number is even or odd.
- Show that the number of odd degree vertices in any graph are even in number.
- Define Eulerian and Hamiltonian graph with examples.

d) Draw a multiple graph corresponding to the matrix

$$\begin{bmatrix} 1 & 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 2 & 1 & 1 & 1 & 0 \end{bmatrix}$$

Q.4 Attempt any TWO of the following.

10M

- Evaluate $\int_0^{\infty} \frac{1}{1+t^2} dt$.
- Using the bisection method, find an approximate root of the equation $x^6 - x - 1 = 0$ upto three iteration.
- Find the root of equation $\cos x = x$ by false position method.
- Find the area of $y=x$ about y-axis from 0 to 2.

Q.5 Attempt any TWO of the following.

10M

- Evaluate $\int_{-\infty}^{\infty} \frac{dx}{e^x + e^{-x}}$.
- Derive a formula to calculate square root of positive real number by Newton Raphson method.
- By Taylor's method solve $\frac{dy}{dx} = 1 + y^2$ find $y(0.3)$ given $y(0) = 1$.
- Solve $x+y+z=10$, $3x-2y+z=8$ and $x+0y-8z=10$ by using Dolittle's decomposition method.

[TURN OVER

N.B 1) All questions are compulsory. MM: 90M
 2) Figures to the right indicate full marks.
 3) From Q.1 to Q.6 , Sub question a) is compulsory and attempt any one sub question out of b) and c)

Duration: 3hrs

Q.1

a) Design an algorithm that decided whether a given integer is even or odd. Trace it for the value $n=8$ and $n=15$ 08

b) Use the Euclidean algorithm to find $\gcd(123, 277)$. 07

OR

c) Design an algorithm for addition of two matrices trace it for $A = \begin{bmatrix} 1 & 5 \\ 2 & -2 \end{bmatrix}$ and 07

$$B = \begin{bmatrix} -3 & -2 \\ 1 & 1 \end{bmatrix}$$

Q.2

a) Draw the following graph. 1) non – complete bipartite 2) complete graph which is complete bipartite . 3) Regular graph but not complete. 4) Star of outside 5 vertices. 08

b) Let G be a graph with p vertices r of which have degree k and the other degree $k+1$. Prove that $r = (k + 1)p - 2q$ where q is the number of edges in G . 07

OR

c) In a graph G , prove that there exist a path from the vertices u to the vertex v if and only if there exist a walk from u to v . 07

Q.3

a) Let T be a graph with n vertices the prove that following statements are equivalent . 08
 1) T is a tree. 2) T contains no circuit and has $n-1$ edges. 3) T is connected and has $n-1$ edges 4) T is connected and every edge is cut edge. 5) Any two vertices of T are connected by exactly one path. 6) T contains no circuit but the additional of any new edge creates exactly one circuit.

b) Form a Binary search tree for the words in the sentence " The Quick brown fox jumps over the lazy dog." Using alphabetical order. 07

OR

c) Discuss a) Prim's Algorithm b) Kruskal Algorithm. 07

Q.4

a) State and prove stirling formula. 08

b) Find the volume of the solid generated by revolving the ellipse $4x^2 + 9y^2 = 36$ the major axis. 07

OR

c) Evaluate $\int_{-\infty}^{+\infty} \frac{dx}{1 + 4x^2}$ and discuss the convergence. 07

Q.5

- a) Find the root of the equation $x^3 - 5x + 1 = 0$ using bisection method upto five iteration. 08
- b) Use secant method to determine the root of the equation $\cos x - xe^x = 0$. Take the initial approximation is $x_0 = 1$ and $x_1 = 1$ 07

OR

- c) Find the root of the equation $e^x - 3x = 0$ by using Newton Raphson method. 07

Q.6

- a) Find the multiple root of the equation $27x^5 + 27x^4 + 36x^3 + 28x^2 + 9x + 1 = 0$. 08

- b) Factorize the matrix $A = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 5 & 2 \\ 1 & 2 & 8 \end{bmatrix}$ by using Cholesky's method. 07

OR

- c) Solve the equation $y'(x) = x^2 + y^2, y(0) = 0$ and estimate $y(0.1)$, $y(0.2)$ and $y(1)$. 07



(2 Hours)

[Total Marks : 48

- N.B. : (1) All questions are compulsory.
(2) All questions carry equal marks.
(3) Draw diagram wherever necessary.

Section I

1. Attempt the following (any two) 8
- (a) Find the explicit formula for the sequence defined by the following recurrence relation using Backtracking techniques. $a_n = a_{n+1} + 18, a_1 = 2$
- (b) $A = \{1, 2, 3, 4, 5\}$
 $R = \{(1, 2), (1, 3), (2, 5), (3, 2), (3, 3), (4, 5), (5, 1), (5, 2)\}$
Draw a diagram and give matrix of R.
- (c) State & prove De Morgan's Law.
- (d) Consider $a_0 = 1$ and $a_1 = 2$. Find first 5 terms in sequence $\{a_n\}$ whose recurrence relation is $a_n = 5a_{n-1} - 3a_{n-2}$.
2. Attempt any two questions from the following : 8
- (a) Write an algorithm for searching and inserting an element in binary search tree.
- (b) Let E denote the following algebraic expression.
 $[a + (b + c)] * [(d - e) / (f + g - h)]$
Represent E with binary tree T. Also state the pre order traversal of E
- (c) State the Depth First Algorithm.
- (d) Let E denote the following algebraic expression:
 $[a + (b - c)] * [(d - e) / (f + g - h)]$.
3. Attempt any two questions from the following : 8
- (a) Suppose a department contain 13 professors. Show that at least 2 of them have their birthdays in the same month.
- (b) Explain pigeonhole principle.
- (c) Find number of permutation for the letter EXPRESSION and LAMINATION.
- (d) How many 4 digit numbers can be formed by using the digits 2, 4, 6, 8 when repetition of digit is allowed ?

[TURN OVER

Section II

4. Attempt any two questions from the following : 8
- (a) Write application of computer graphics.
 - (b) Explain DDA algorithm.
 - (c) Short note on (i) Scaling (ii) Translation.
 - (d) Derive an expression for rotation about the origin.
5. Attempt any two questions from the following : 8
- (a) Discuss properties of Bezier curves.
 - (b) Explain Character clipping and its techniques.
 - (c) Consider the Bresenham's line drawing algorithm with example.
 - (d) Write a short note on Point Clipping.
6. Attempt any two questions from the following : 8
- (a) Discuss Z-buffer algorithm.
 - (b) Explain components of Animation System.
 - (c) Write short note on Texture Mapping.
 - (d) Differentiate between Diffuse and Point Source Illumination.
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- N.B. :** (1) All questions are **compulsory**.
 (2) All questions carry **equal marks**.
 (3) Draw diagram wherever **necessary**.

Section I

1. Attempt the following (any two) 10
- (a) Find the explicit formula for the sequence defined by the following recurrence relation using Backtracking techniques.

$$a_n = a_{n+1} + 18, a_1 = 2$$
- (b) $A = \{1, 2, 3, 4, 5\}$
 $R = \{(1, 2), (1, 3), (2, 5), (3, 2), (3, 3), (4, 5), (5, 1), (5, 2)\}$
 Draw a diagram and give matrix of R.
- (c) State & prove De Morgan's Law.
2. Attempt any two questions from the following : 10
- (a) Write an algorithm for searching and inserting an element in binary search tree.
- (b) Let E denote the following algebraic expression.

$$[a + (b + c)] * [(d - e) / (f + g - h)]$$

 Represent E with binary tree T. Also state the pre order traversal of E.
- (c) State the Depth First Algorithm.
3. Attempt any two questions from the following : 10
- (a) Suppose a department contain 13 professors. Show that at least 2 of them have their birthdays in the same month.
- (b) Find number of permutation for the letter EXPRESSION and LAMINATION.
- (c) How many 4 digit numbers can be formed by using the digits 2, 4, 6, 8 when repetition of digit is allowed.

[TURN OVER

Section II

4. Attempt any **two** questions from the following : 10
- (a) Write application of computer graphics.
 - (b) Short note on (i) Scaling (ii) Translation.
 - (c) Derive an expression for rotation about the origin.
5. Attempt any **two** questions from the following : 10
- (a) Discuss properties of Bezier curves.
 - (b) Consider the Bresenham's line drawing algorithm with example.
 - (c) Write a short note on Point Clipping.
6. Attempt any **two** questions from the following : 10
- (a) Discuss Z-buffer algorithm.
 - (b) Write short note on Texture Mapping.
 - (c) Differentiate between Diffuse and Point Source Illumination.
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Con. 345-18.

HP-6632

(2 Hours)

[Total Marks : 48

- N.B. : (1) All questions are compulsory.
(2) Attempt any **TWO** sub-questions from each question.
(3) Each sub-question is of 4 marks.

1. Answer any **two** questions of the following. 8
 - (a) Define class and explain member function in class in C ++
 - (b) Write a C++ program to find factorial of any number
 - (c) Explain Scope resolution operator with example.
 - (d) Write a note on constructors and destructors.

2. Answer any **two** questions of the following. 8
 - (a) Explain operator overloading with example.
 - (b) Explain Abstract class and virtual base class.
 - (c) Write a note on polymorphism.
 - (d) Explain different data types in C++.

3. Answer any **two** of the following. 8
 - (a) Define Exception. Explain Exception handling mechanism with suitable example.
 - (b) What is STL? Write its components.
 - (c) Explain Class templates and member function templates.
 - (d) Explain opening and closing of file in C++ with suitable example.

4. Answer any **two** of the following. 8
 - (a) Write Arithmetic and logical operators in Java.
 - (b) Explain public access and private access control in Java.
 - (c) Write a note on constructor overloading and method overloading.
 - (d) Explain while loop and do while loop with suitable example in Java.

5. Answer any **two** of the following. 8
 - (a) Differentiate between byte stream classes and character stream classes.
 - (b) Explain any three Java built in exceptions.
 - (c) Explain exception handling using try and catch method.
 - (d) Explain the following keywords in java "extends" "super"

6. Answer any **two** of the following. 8
 - (a) What is Applet? Differentiate between applet and application.
 - (b) Explain AWT controls: labels and Buttons with example.
 - (c) Write a note on event handling.
 - (d) Define graphic class and painting and updating an applet.

[TURN OVER

(2 Hours)

[Total Marks : 60

- N.B. :** (1) All questions are **compulsory**.
(2) Attempt any **TWO** sub-questions from **each** question.
(3) **Each** sub-question is of **5** marks.

1. Answer any **two** questions of the following : 10
 - (a) Explain copy constructor and dynamic constructor.
 - (b) Write a C++ program to find Sum of even numbers between 1 and n
 - (c) Explain Scope resolution operator with example.

 2. Answer any **two** questions of the following : 10
 - (a) Explain single and multilevel inheritance.
 - (b) Explain unary and binary operator overloading.
 - (c) Write a note on virtual functions.

 3. Answer any **two** of the following : 10
 - (a) Define exception. Explain throwing and catching mechanism in exception.
 - (b) What is STL? Write its components.
 - (c) Explain Class templates and function templates with multiple parameters.

 4. Answer any **two** of the following : 10
 - (a) Write increment decrement and assignment operators in Java.
 - (b) Explain public access and private access control in Java.
 - (c) Write a note on parameterized constructor and "this" keyword in Java

 5. Answer any **two** of the following : 10
 - (a) Differentiate between byte stream classes and character stream classes.
 - (b) Write super and sub classes in Java.
 - (c) Explain exception handling using try and catch method.

 6. Answer any **two** of the following : 10
 - (a) What is Applet? Explain the life cycle of an applet.
 - (b) Explain AWT controls: labels and textfield with example.
 - (c) Write a note on event handling.
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S.Y.B.Sc (Comp. Science)
Computer Science (Paper - III)

Con. 339-18.

(OLD COURSE)

HP-6766

(2 Hours)

[Total Marks : 48

- N.B. :** (1) All questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Mixing of sub-questions is not allowed.

Section I

1. Attempt any two questions from the following :- 8
- (a) How to represent a weak entity set in ER diagram ? Quote suitable example.
 - (b) Define the following terms
 - (i) Primary Key
 - (ii) Cardinality
 - (iii) Domain
 - (iv) Aggregation
 - (c) What is attribute ? Explain different types of attributes with example.
 - (d) Discuss views.
2. Attempt any two questions from the following :- 8
- (a) Explain any four String functions.
 - (b) Illustrate different types of joins.
 - (c) Write note on Trigger.
 - (d) List any 4 limitations of DBMS.
3. Answer any two questions from the following :- 8
- (a) Write SQL queries for the following tables.
Emp (Eid, Ename, Ecity, Estreet)
Company (Cid, Cname, City)
Works (Eid, Cid, Salary)
 - 1. Find all employees and their salary who works for 'ABC Ltd'
 - 2. Give a raise of 10% in salary for those staying in 'Mumbai'.
 - 3. Find all employee id who live in same cities as the company for which they work.
 - 4. Find the highest paid employee.
 - (b) What is a NULL value ? How is it handled in RDBMS.
 - (c) What are stored procedures and their benefits.
 - (d) Discuss different types of database users.

[TURN OVER

Section II

4. Attempt any **two** questions from the following :— 8
- (a) Write and draw the different phases of Waterfall model.
 - (b) What is the need of Feasibility study in software development ?
 - (c) What is meant by Software and Software Engineering ?
 - (d) How to design a good user interface ?
5. Attempt any **two** questions from the following :— 8
- (a) What is the difference between black box and white box testing ?
 - (b) State the characteristics of SRS.
 - (c) Write about alpha and beta testing.
 - (d) Draw ERD Banking System.
6. Attempt any **two** questions from the following :— 8
- (a) What is role of verification and validation in various phase of SDLC ?
 - (b) Draw a Zero and First level DFD for College Admission System.
 - (c) Discuss Prototyping.
 - (d) What is Data Modeling ? Give 4 examples of data model.
-

- N.B. : (1) All questions are compulsory.
 (2) All questions carry equal marks.
 (3) Draw diagrams wherever necessary.

Section I

1. Attempt any two questions from the following :—
- (a) Define Normalization. Explain the 3 Normal Forms giving example. 5
- (b) Explain the 3 level schema architecture of DBMS. 5
- (c) Differentiate between file processing system and database management system. 5
2. Attempt any two questions from the following :—
- (a) What is attribute ? Explain different types of attributes with example. 5
- (b) Explain the following functions with example. 5
- (i) Date ()
- (ii) Curdate()
- (iii) Rtrim()
- (iv) Right()
- (v) Ceiling()
- (c) Write SQL queries for the following tables. 5
- Emp (Eid, Ename, Ecity, Estreet)
- Company (Cid, Cname, City)
- Works (Eid, Cid, Salary)
1. Write Create command for above tables.
2. Give a raise of 10% in salary for those staying in 'Mumbai'.
3. Find all employee id who live in same cities as the company for which they work.
4. Find the highest paid employee.
3. Attempt any two from the following :—
- (a) State advantages and disadvantages of View. 5
- (b) Discuss types of joins. 5
- (c) What is Trigger ? Explain with example. 5

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Section II

4. Attempt any two from the following :—
- (a) How is Waterfall model different from Spiral model ? 5
 - (b) Explain Analysis and Design phase of SDLC. 5
 - (c) Write the role of metric and models in project management. 5
5. Attempt any two from the following :—
- (a) What is meant by Software and Software Engineering ? 5
 - (b) What is the difference between black box and white box testing ? 5
 - (c) What is the importance of Use-case diagram ? Draw & name the symbols used in Use-case diagram. 5
6. Attempt any two from the following :—
- (a) What is Verification and Validation ? Explain in detail. 5
 - (b) Differentiate between Coupling and Cohesion. 5
 - (c) Discuss about Software Quality Assurance. 5
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