CODE: A14301	R23	H.T.No:									

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech II Year I Semester Regular & Supplementary Exams November – 2025

Subject Name: **Discrete Mathematics & Graph Theory**

Branch: CSE

Time: 3 Hours **SET-1** **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Find the dual of the expression (p∧q)∨r.	2M	CO1	BTL1
	b	Give Truth table for the propositional formula $(p \rightarrow q) \rightarrow q$.	2M	CO1	BTL6
	c	Define Relation? List out the properties of Binary operations.	2M	CO2	BTL1
	d	Let f(x)=2x+3 and g(x)=x^2. Find (f∘g).	2M	CO2	BTL1
	e	Define permutation and combination	2M	CO3	BTL1
	f	Find the number of all possible five letter words from the word "DADDY".	2M	CO3	BTL2
	g	Determine the sequence generated by $f(x) = 2e^x + 3x^2$.	2M	CO4	BTL2
	h	Solve the recurrence relation $a_n = a_{n-1} + 1$, with $a_0 = 1$.	2M	CO4	BTL3
	i	Determine the number of edges in (i) Complete graph K_n (ii) Complete bipartite graph $K_{m,n}$	2M	CO5	BTL2
	j	Define Hamiltonian graphs.	2M	CO5	BTL1
PART-B					
UNIT-I					
2	a	Define NAND, NOR & XOR and give their truth tables.	5M	CO1	BTL3
	b	Show that $(\forall x)(P(x) \rightarrow Q(x)) \wedge (\forall x)(Q(x) \rightarrow R(x)) \Rightarrow (\forall x)(P(x) \rightarrow R(x))$	5M	CO1	BTL2
OR					
3	a	Define Quantifiers and types of Quantifiers with examples	5M	CO1	BTL3
	b	Show that $(\exists x)\ M(x)$ follows logically from the premises $(\forall x)(H(x) \rightarrow M(x))$ *and* $(\exists x)H(x)$	5M	CO1	BTL2
UNIT-II					
4	a	Let ∗ on R defined by a ∗b = a + b + 2ab ∀ a,b∈R. (i) Find (R, ∗) is semi group. (ii) Find the identity element. (iii) Which elements have inverse and what are they?	10M	CO2	BTL3
OR					
5	a	Find the Identity and Inverse elements of the group with the operator * defined as (i) (a, b) * (c, d) = {ad-bc, ac+bd} (ii) a*b = (ab)/3	5M	CO2	BTL2
	b	In how many ways can the 26 letters of the English alphabets be permuted so that none of the patterns CAR, DOG, PUN, BYTE occur?	5M	CO2	BTL2

UNIT-III					
6	a	In how many ways can the letters of the word COMPUTER be arranged? How many of them begin with C and end with R? How many of them do not begin with C but end with R?	5M	CO3	BTL5
	b	In a class, there are 40 Boys and 10 Girls, if a boy and a girl have to be chosen as class representative, how many ways the students can choose a CR?	5M	CO3	BTL3
OR					
7	a	Find the coefficient of $\mathbf{x^3z^4}$ in the expansion of $\mathbf{(x+y+z)^7}$?	5M	CO3	BTL5
	b	Enumerate the number of non negative integral solutions to the inequality $x_1 + x_2 + x_3 + x_4 + x_5 \le 19$.	5M	CO3	BTL2
UNIT-IV					
8	a	Solve $a_n - 3a_{n-1} + 2a_{n-2} = 0$, $a_0 = 1, a_1 = 2$.	5M	CO4	BTL1
	b	Solve the recurrence relation $a_n = a_{n-1} + \frac{n(n+1)}{2}$	5M	CO4	BTL1
OR					
9	a	Solve $a_n - 5a_{n-1} + 6a_{n-2} = 2^n, \quad n > 2$ with condition the initial $a_0 = 1, a_1 = 1$. Using generating functions.	5M	CO4	BTL2
	b	Using generating function solve $a_n = 3a_{n+1} + 2$, $a_0 = 1$	5M	CO4	BTL3
UNIT-V					
10	a	Apply Prim's algorithm and Krushkal's Algorithm to find the minimum spanning tree (MST) of the graph with edges: (A−B, 4), (A−C, 2), (B−C,1), (B−D, 5), (C−D, 3). Also find the total weight of the minimal spanning tree	10M	CO5	BTL4
OR					
11	a	Define Spanning tree and explain the algorithm for Breadth First Search (BFS) traversal of a graph with suitable example.	5M	CO5	BTL3
	b	Define Spanning tree and explain the algorithm for Depth First search (DFS) traversal of a graph with suitable example.	5M	CO5	BTL3

CODE: A12301 | **R23** | **SET-2**

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech II Year I Semester Regular Examinations November 2025

Subject Name: **Universal Human Values**

Time: 3 Hours Branch: CSE **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	What is meant by universal human values?	2M	CO1	L1
	b	List one negative consequence at the individual level due to false notions of happiness and prosperity.	2M	CO1	L2
	c	How can value education help individuals attain harmony within themselves?	2M	CO2	L1
	d	Define "Sensation" and explain its role in forming desires.	2M	CO2	L4
	e	How does trust contribute to harmony within a family?	2M	CO3	L2
	f	Define mutual happiness.	2M	CO3	L1
	g	What is the role of the Human Order in nature?	2M	CO4	L3
	h	What is meant by "harmony in nature" in the context of value education?	2M	CO5	L2
	i	What is meant by a Universal Human Order?	2M	CO5	L2
	j	Why is integrity important in maintaining professional ethics?	2M	CO6	L1
PART-B					
UNIT-I					
2	a	How can value education shape the character and behavior of students?	5M	CO1	L1
	b	Analyze the basic guidelines for value education. How do these guidelines ensure effective teaching and application of values?	5M	CO1	L4
OR					
3	a	What is human consciousness, and why is it important to understand it?	5M	CO1	L2
	b	Discuss the concept of happiness in terms of harmony and synergy. How do these concepts contribute to continuous happiness?	5M	CO1	L4
UNIT-II					
4	a	How does "Right Understanding" lead to definite human conduct and harmony?	5M	CO2	L2
	b	How do the physical needs of the body differ from the emotional and mental needs of the self?	5M	CO2	L3
OR					
5	a	How does a person's experiences shape the imagination and their ability to think creatively?	5M	CO2	L4
	b	How does the body recognize and fulfill its needs?	5M	CO2	L2
UNIT-III					
6	a	In what ways can family values help in creating harmony in society?	5M	CO3	L3
	b	Explain the concept of affection and its role in family relationships	5M	CO3	L4
OR					
7	a	What role does trust play in fostering mutual respect and understanding between individuals?	5M	CO3	L5
	b	Explain how societal differentiation based on wealth impacts mutual respect.	5M	CO3	L2
UNIT-IV					
8	a	Discuss the impact of human activities on the natural balance of the Plant/Bio Order and Material Order.	5M	CO4	L2
	b	Analyze the role of self-regulation in the natural world and its importance for maintaining harmony within the four orders of nature.	5M	CO4	L4
OR					
9	a	How do the four orders—Material, Plant, Animal, and Human— contribute to each other's existence?	5M	CO4	L2
	b	How does understanding the four orders of nature contribute to sustainable living practices?	5M	CO4	L3
UNIT-V					
10	a	Discuss the significance of self-exploration in realizing human values.	5M	CO5	L2
	b	What are the key principles of ethical human conduct, and why are they important in society?	5M	CO5	L4
OR					
11	a	How do humanistic approaches to education promote emotional intelligence and personal growth?	5M	CO6	L4
	b	What are the three parts of policy (Neethi) concerning the enrichment, protection, and utilization of resources?	5M	CO6	L2

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CODE: A10402 | **R23** | **H.T.No:** | | | | | | | | | | |

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN: KURNOOL

(AUTONOMOUS)

B.Tech II Year I Semester Regular Examinations November 2025

Subject Name: **Digital Logic and Computer Organization**

Time: 3 Hours Branch: CSE. **Max Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Explain universal gates with an example.	2M	CO1	L2
	b	Explain combinational circuit with an example.	2M	CO1	L2
	c	Illustrate the universal shift register.	2M	CO1	L2
	d	Classify the various computer types.	2M	CO1	L2
	e	How can we speed up the multiplication process?	2M	CO1	L2
	f	Specify the sequence of operation involved when an instruction is executed.	2M	CO1	L2
	g	What is cache memory?	2M	CO1	L2
	h	Classify the different types of semiconductor memories?	2M	CO1	L2
	i	Compare the different types of I/O interfaces?	2M	CO1	L2
	j	Contrast between parallel and serial communication interfaces?	2M	CO1	L2
PART-B					
UNIT-I					
2		Minimize the F(A,B,C,D) = $\sum$ (4,5,6,7,12,13,14) +d(1,9,11,15) using K-map.	10M	CO1	L6
OR					
3	a	Describe the process of minimizing logic expressions using Karnaugh maps.	5M	CO1	L6
	b	Design 3 to 8 line decoder with neat circuit diagram.	5M	CO1	L6
UNIT-II					
4	A	Explain the operation of a multiplexer and a demultiplexer.	5M	CO2	L2
	b	Discuss the various types of memory (RAM, ROM, Cache) and their characteristics	5M	CO2	L3
OR					
5	a	Explain the logic diagram of a SR flip-flop and its operation	5M	CO1	L2
	b	Draw and explain Von Neumann Architecture.	5M	CO2	L2
UNIT-III					
6		Write the algorithm for integer division with suitable examples.	10M	CO3	L3
OR					
7		Derive and explain an algorithm for adding and subtracting two floating point binary numbers.	10M	CO3	L3
UNIT-IV					
8		Explain the working principle of SRAM and how it stores data.	10M	CO4	L2
OR					
9	a	Explain the role of the memory manager in a computer system.	5M	CO4	L2
	b	Discuss the advantages and disadvantages of using ROM in computer systems.	5M	CO4	L2
UNIT-V					
10	a	Describe the role of the I/O system in a computer architecture.	5M	CO5	L2
	b	Explain how bus arbitration works.	5M	CO5	L2
OR					
11		Explain the working principle of DMA in data transfer between memory and I/O devices.	10M	CO5	L2

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CODE: A15302T **R23**

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech II Year I Semester Regular Examinations November 2025

Subject Name: **Advanced Data Structures & Algorithms Analysis**

Time: 3 Hours Branch: CSE **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Define the term algorithm and state the criteria the algorithm should satisfy	2M	CO1	L1
	b	What happens if balance factor > 1 or < -1 in an AVL tree?	2M	CO1	L2
	c	Distinguish between Breadth First Search and Depth First Search?	2M	CO2	L1
	d	What are the conditions of a binary heap?	2M	CO2	L2
	e	Define feasible solution and optimal solution.	2M	CO3	L1
	f	What is Bellman-Ford algorithm different from Dijkstra's algorithm.	2M	CO3	L1
	g	Suppose two queens are placed at positions (i,j) and (k,l). Write the condition for that those two queens are on the same diagonal.	2M	CO4	L2
	h	Define N-Queens problem.	2M	CO5	L1
	i	Define P and NP-problems.	2M	CO5	L1
	j	Write examples for deterministic problems	2M	CO6	L2
PART-B					
UNIT-I					
2	a	Define AVL Tree. Explain the process of insertion with an example and rotations used	5M	CO1	L3
	b	Explain the deletion operation in a B-tree with an example, highlighting underflow conditions and rebalancing.	5M	CO1	L3
OR					
3	a	Write algorithms for insertion and deletion in B-Trees and analyze their time complexity	5M	CO1	L4
	b	Insert 5,3,12,9,13,22,7,10,11,14,8,6 into a B-tree of order 4.	5M	CO1	L3
UNIT-II					
4	a	Write a program to implement a priority queue using a min-heap	5M	CO2	L4
	b	Explain the basic search algorithms for graphs, including DFS and BFS.	5M	CO2	L2
OR					
5	a	Explain Strassen's matrix multiplication algorithm and derive its time complexity?	5M	CO2	L3
	b	Sort the following number using merge sort. (310, 285, 179, 652, 351, 423, 861, 254, 450, 520)	5M	CO2	L2
UNIT-III					
6	a	Compare Greedy and Dynamic Programming methods with suitable examples.	5M	CO3	L3
	b	Solve the following job sequencing with deadlines. n = 4, (P1,P2,P3,P4) = (100,10,15,27) and (d1,d2,d3,d4)= (2,1,2,1)	5M	CO3	L5
OR					
7	a	Determine an optimal solution to the knapsack instance n = 5 objects and the capacity of knapsack M = 60. The profits and weights of the objects are (P1, P2, P3, P4, P5) = (30, 40, 45, 77, 90) and (W1, W2, W3, W4, W5) = (5, 10, 15, 22, 25) respectively	10M	CO3	L3
UNIT-IV					
8	a	Solve the 0/1 Knapsack Problem us backtrack and explain the steps with an example.	10M	CO4	L3

OR					
9	a	Explain the general method of backtracking with a suitable example	5M	CO4	L3
	b	Find FIFO Branch and bound solution for the knapsack instance n = 4, (P1,P2,P3,P4) = (10,10,12,18), (W1,W2,W3,W4) = (2, 4, 6,9), and m = 15.	5M	CO4	L3
UNIT-V					
10	a	Discuss the Chromatic Number Decision Problem (CNDP). Explain why it is classified as NP-Hard.	10M	CO6	L2
OR					
11	a	Describe the relationship among P, NP, NP-Complete and NP-Hard problems.	5M	CO5	L2
	b	What is the Chromatic Number Decision Problem, and why is it classified as an NP-Complete problem?	5M	CO5	L4

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CODE: A15303T	R23	H.T.No:									

RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations November 2025

Subject Name: **Database Management Systems**

Time: 3 Hours Branch: CSE **Max. Marks: 70**

Instructions:

1. Answer all 10 questions from Part-A. Each question carries two marks
2. Answer one full question from each unit in Part-B. Each full question carries 10 marks

PART-A					
1	a	Define DBMS. How does it overcome the problems of file system?	2M	CO1	L1
	b	List three key advantages of using a database system over a file system.	2M	CO1	L1
	c	What is a view? Explain its importance in DBMS	2M	CO2	L1
	d	What is SQL, and why is it essential for working with relational databases?	2M	CO2	L1
	e	What is the purpose of the GROUP BY clause in SQL?	2M	CO3	L1
	f	Define "aggregation" in SQL and give an example.	2M	CO3	L1
	g	Define First Normal Form?	2M	CO4	L1
	h	What is the purpose of the First Normal Form (1NF), and how is it achieved?	2M	CO4	L1
	i	Define "Recoverability" in the context of transactions	2M	CO5	L1
	j	What is a B+ Tree, and how does it support efficient data retrieval in databases?	2M	CO5	L1
PART-B					
UNIT-I					
2	a	List and explain the main functions of a database administrator.	5M	CO1	L4
	b	Compare and contrast centralized and client-server architectures.	5M	CO1	L3
OR					
3	a	Discuss the data abstraction provided by DBMS	5M	CO1	L3
	B	Draw E – R Diagram for the School Management system	5M	CO1	L4
UNIT-II					
4	a	Explain how relational calculus can be used to specify queries in relational databases.	5M	CO2	L2
	b	Describe the union operation in relational algebra. When can it be used?	5M	CO2	L3
OR					
5	a	Give an example of a query that could be expressed using relational calculus.	5M	CO2	L4
	b	How do you insert a new record into a table using SQL? Explain	5M	CO2	L2
UNIT-III					
6		With the help of a suitable example, explain the working of nested subqueries.	10M	CO3	L3
OR					
7	a	What is a join? Explain any two types of joins with suitable example.	5M	CO3	L3
	b	Write a query that combines results from two tables using UNION.	5M	CO3	L4
UNIT-IV					
8		Define functional dependency. Explain in detail about the lossless join decomposition?	10M	CO4	L2
OR					
9	a	Describe a scenario where normalization could improve the efficiency of a database.	5M	CO4	L4
	b	Describe Dependency Preserving Decomposition?	5M	CO4	L2
UNIT-V					
10	a	Describe Dependency Preserving Decomposition?	5M	CO5	L4
	b	Difference between conflict serializability and view serializability.	5M	CO5	L2
OR					
11	a	What is Recoverability? Discuss types of recoverable schedules?	5M	CO5	L2
	b	Explain the difference between the hash indexes and B+ tree indexes. In particular, discuss how quality and range searches work, using an example.	5M	CO5	L3

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