RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: Advanced Data Structures & Algorithms Analysis
Branch: CSE

Time: 3 Hours   **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 are the various asymptotic notations? Define them.	2M	CO5	L1
	b	What is Time complexity? Give an example.	2M	CO5	L2
	c	Write the difference between Max heap and min heap.	2M	CO1	L2
	d	Define convex hull. Give an example.	2M	CO2	L1
	e	Define Spanning tree. What are the various algorithms used to find minimum cost spanning trees.	2M	CO2	L1
	f	What is String editing problem?	2M	CO6	L2
	g	Define Sum of subsets problem.	2M	CO6	L1
	h	What is state space tree?	2M	CO3	L2
	i	State Cook's theorem.	2M	CO5	L1
	j	What is Node Cover Decision Problem?	2M	CO4	L2
		PART-B			
		UNIT-I			
2	a	Explain about various asymptotic notations.	5M	CO5	L2
	b	What is Space complexity? Find the space complexity of an algorithm for finding the sum of n integers of an array.	5M	CO5	L2
		OR			
3	a	Construct AVL tree by inserting the following values one by one. 45,32,90,21,78,65,87,132,90,96,41,74, 92.	5M	CO1	L3
	b	Explain about insertion of elements into a B-tree of order 4.	5M	CO1	L3
		UNIT-II			
4	a	Explain adjacency matrix and adjacency list representation of an undirected graph.	5M	CO2	L4
	b	Explain about BFS traversal of a graph.	5M	CO2	L2
		OR			
5	a	Sort the following number using merge sort. (310, 285, 179, 652, 351, 423, 861, 254, 450, 520)	5M	CO4	L3
	b	Derive the time complexity of Strassen's matrix multiplication.	5M	CO5	L4

		UNIT-III			
6	a	Solve the following 0/1 knapsack problem using dynamic programming. n = 3, (w1, w2, w3) = (2, 3, 4), (P1, P2, P3) = (1, 2, 5), m = 6.	5M	CO6	L3
	b	Write Greedyknapsack algorithm.	5M	CO6	L2
		OR			
7	a	Solve the following travelling sales person problem using dynamic programming. $$\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$$	5M	CO4	L5
	b	Write the control abstraction for Greedy method.	5M	CO3	L2
		UNIT-IV			
8	a	Explain the general method of backtrack. Provide a detailed algorithm and its applications.	10M	CO6	L2
	b	Discuss about graph coloring problem.	5M	CO4	L2
		OR			
9	a	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
	b	Explain about 8-Queen's problem.	5M	CO4	L2
		UNIT-V			
10	a	Write the strategy we adopt to show that a problem L2 is NP-hard.	5M	CO6	L2
	b	Draw the Commonly believed relationship among P, NP, NP-hard and NP-Complete problems.	5M	CO3	L4
		OR			
11	a	Explain about Job Shop Scheduling.	5M	CO6	L2
	b	What is the Chromatic Number Decision Problem, and why is it classified as an NP-Complete problem?	5M	CO4	L4

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RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: Database Management Systems
Branch: CSE

Time: 3 Hours   **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	BTL1
	b	Differences between external, conceptual, and internal schemas.	2M	CO1	BTL1
	c	What is a domain in the relational model, and why is it important?	2M	CO2	BTL1
	d	How do null values differ from zero or empty strings in a database?	2M	CO2	BTL1
	e	What is the purpose of the GROUP BY clause in SQL?	2M	CO3	BTL1
	f	What are nested queries? What is correlation in nested queries?	2M	CO3	BTL1
	g	What is a functional dependency in the context of a relational database?	2M	CO4	BTL1
	h	What is the purpose of the First Normal Form (1NF), and how is it achieved?	2M	CO4	BTL1
	i	How does a recovery manager work to maintain consistency after a system failure?	2M	CO5	BTL1
	j	What is a B+ Tree, and how does it support efficient data retrieval in databases?	2M	CO5	BTL1
		PART-B			
		UNIT-I			
2	a	List and explain the main functions of a database administrator.	5M	CO1	BTL4
	b	Define data model. Explain the entity relationship model with a neat diagram.	5M	CO1	BTL3
		OR			
3	a	Discuss the data abstraction provided by DBMS	5M	CO1	BTL3
	b	Explain how to build ER model for university with entities department, instructor, student, and class. Instructors and students belong to one department only. Instructors and students related to a class with many to many relations. Assume suitable attributes. Explain how the ER model can be translated to relations.	5M	CO1	BTL2
		UNIT-II			
4	a	Explain how relational calculus can be used to specify queries in relational databases.	5M	CO2	BTL2
	b	Describe the union operation in relational algebra. When can it be used?	5M	CO2	BTL3

		OR			
5	a	Give an example of a query that could be expressed using relational calculus.	5M	CO2	BTL4
	b	How do you insert a new record into a table using SQL? Explain	5M	CO2	BTL2
		UNIT-III			

6	a	Consider the following schema to write queries in SQL:
		    Students(sid,sname,total-credits)
		    Course(cid,cname,credits)
		    Enroll(sid,cid,grade)
		    Grade A – 100%credits, GradeB-80%credits, GradeC-60%crdeits, GradeD – Fail. A student scores credits only when passed.
		(i) Find the list of students enrolled for 'computer organization'.
		(ii) Find the course name which has no enrollment.
		(iii) Compute the total credits and enter its value for student with id 585.
		(iv) Find the students who scored maximum credits.
		(v) Find the student who has enrolled for two courses but not for 'Programming'.
			10M	CO3	BTL3

		OR			
7	a	Explain the difference between PRIMARY KEY and FOREIGN KEY constraints.	5M	CO3	BTL3
	b	Describe the purpose of a nested query and provide an example.	5M	CO3	BTL4
		UNIT-IV			
8	a	Write the relationship between lossless join and dependency preservation when normalizing tables.	5M	CO4	BTL2
	b	Explain the conditions that must be met for a table to be in BCNF.	5M	CO4	BTL3
		OR			
9	a	Describe a scenario where normalization could improve the efficiency of a database.	5M	CO4	BTL4
	b	How does 5NF prevent certain types of redundancy in complex relationships? Explain	5M	CO4	BTL2
		UNIT-V			
10	a	Explain each of the ACID properties with examples.	5M	CO5	BTL3
	b	Difference between conflict serializability and view serializability.	5M	CO5	BTL2
		OR			
11	a	Explain how read and write operations are handled in a timestamp ordering protocol.	5M	CO5	BTL4
	b	Describe methods for preventing and detecting deadlocks.	5M	CO5	BTL3

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RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: **Digital Logic and Computer Organization**
Branch: CSE

Time: 3 Hours   **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 different classifications of binary codes?	2M	CO1	L2
	b	Reduce (i) a(b+bc')+ab' (ii) a(a+b)	2M	CO1	L2
	c	Illustrate the D FF is known as Delay FF?	2M	CO1	L2
	d	Define Register and Shift Register.	2M	CO1	L2
	e	Explain Add/subtract rule for floating point numbers.	2M	CO1	L2
	f	Draw the IEEE standard floating point format for double precision.	2M	CO1	L2
	g	Explain virtual memory.	2M	CO1	L2
	h	Contrast the between secondary storage and Primary storage.	2M	CO1	L2
	i	Illustrate the components of System bus.	2M	CO1	L2
	j	Explain the difference between address, data, and control buses.	2M	CO1	L2
		PART-B			
		UNIT-I			
2	a	Demonstrate the fixed point and floating point representations with an example.	5M	CO1	L2
	b	Convert the following. i) $(BC)_{16} = ( )_{10}$ ii) $(2314)_8 = ( )_{10}$ iii) $(27.315)_{10} = ( )_2$	5M	CO6	L3
		OR			
3	a	Simplify the following Boolean functions to minimum number of literals. i) F=xy+x'z+yz. ii) F=x'y'z+x'yz+xy'	5M	CO1	L2
	b	Design 8:1 Multiplexer with neat diagram.	5M	CO6	L6
		UNIT-II			
4		Design 4 bit Ripple counter with D flip flop and draw the logic diagram.	10M	CO6	L6
		OR			
5	a	Explain the different functional units of a computer with a neat diagram.	5M	CO2	L2
	b	Explain briefly about multiprocessors and multicomputers.	5M	CO2	L2
		UNIT-III			
6		Explain carry look ahead adder with neat sketch.	10M	CO3	L3
		OR			
7		Discuss in detail about the hardwired control unit with block diagram.	10M	CO3	L2

		UNIT-IV			
8	a	Describe the role of cache memory in a computer system.	5M	CO4	L2
	b	What is a Read-Only Memory (ROM) and how does it differ from RAM?	5M	CO4	L2
		OR			
9	a	Explain briefly about DRAM.	5M	CO4	L3
	b	Explain the fundamental concepts of memory organization in computer systems and discuss the trade-offs between memory speed, size, and cost.	5M	CO4	L2
		UNIT-V			
10		What is DMA? Explain the structure of a DMA controller and how the data transfer takes place through DMA.	10M	CO5	L2
		OR			
11	a	Write the steps involved in processing an interrupt?	5M	CO5	L3
	b	Explain the different types of I/O interfaces with examples.	5M	CO5	L2

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RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: **Discrete Mathematics & Graph Theory**
Branch: CSE

Time: 3 Hours **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 converse, inverse with an example	2M	CO1	L1
	b	Construct the Truth Table for P→(~QVR)	2M	CO1	L6
	c	Define Relation? List out the properties of Binary operations.	2M	CO2	L1
	d	Define an equivalence relation?	2M	CO2	L1
	e	Define permutation and combination	2M	CO3	L1
	f	Find the number of arrangements of the letters in the word ACCOUNTANT.	2M	CO3	L2
	g	Determine the sequence generated by $f(x) = 2e^x + 3x^2$.	2M	CO4	L2
	h	Find the coefficient of x^{20} in $(x^2 + x^3 + x^4 + x^5 + x^6)^5$?	2M	CO4	L3
	i	Determine the number of edges in (i) Complete graph K_n (ii) Complete bipartite graph $K_{m,n}$	2M	CO5	L2
	j	Give an example of a graph which is Eulerian but not Hamiltonian.	2M	CO5	L1
		PART-B			
		UNIT-I			
2	a	Explain the connectives with their truth tables and also Construct the truth table for the formula $\neg(\neg P \vee \neg Q)$	5M	CO1	L3
	b	Show that $(\forall x)(P(x) \to Q(x)) \wedge (\forall x)(Q(x) \to R(x)) \Rightarrow (\forall x)(P(x) \to R(x))$	5M	CO1	L2
		OR			
3	a	Define Quantifiers and types of Quantifiers with examples	5M	CO1	L3
	b	Show that $(\exists x) M(x)$ follows logically from the premises $(\forall x)(H(x) \to M(x))$ and $(\exists x)H(x)$	5M	CO1	L2
		UNIT-II			
4	a	If $f : R \to R$ and $g : R \to R$ defined by $f(x) = x^3 - 4x, g(x) = \dfrac{1}{(x^2 + 1)}, h(x) = x^4,$ find the following omposition functions: a) $(f \circ g \circ h)(x)$ b) $(h \circ g \circ f)(x)$ c) $(g \circ g)(x)$ d) $(g \circ h)(x)$	10M	CO2	L3
		OR			
5	a	Define Relation? List out the properties of Binary operations	5M	CO2	L2
	b	Let X= {1, 2, 3, 4} and $X = \{(1,1),(1,4),(2,2),(2,3),(3,2),(3,3),(4,1),(4,4)\}$. Then prove that R is an equivalence relation.	5M	CO2	L2
		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	L5
	b	Out of 9 girls and 15 boys, how many different committees can be formed each consisting of 6 boys and 4 girls?	5M	CO3	L5

<div align="center">OR</div>

7	a	What is the co-efficient of (i) $x^3 y^7$ in $(x+y)^{10}$ (ii) $x^2 y^4$ in $(x-2y)^6$	5M	CO3	L5
	b	Enumerate the number of non negative integral solutions to the inequality $x_1 + x_2 + x_3 + x_4 + x_5 \leq 19$.	5M	CO3	L2

<div align="center">UNIT-IV</div>

8	a	Solve the Recurrence relation $a_{n+2} - 2a_{n+1} + a_n = 2^n$ with initial condition $a_0 = 2, a_1 = 1$	5M	CO4	L1
	b	Solve the recurrence relation $a_n = a_{n-1} + \dfrac{n(n+1)}{2}$	5M	CO4	L1

<div align="center">OR</div>

9	a	Solve $a_n - 5a_{n-1} + 6a_{n-2} = 2^n$, $n > 2$ with condition the initial $a_0 = 1, a_1 = 1$. Using generating functions.	5M	CO4	L2
	b	Using generating function solve $a_n = 3a_{n+1} + 2$, $a_0 = 1$	5M	CO4	L3

<div align="center">UNIT-V</div>

10	a	Let G be a 4 – Regular connected planar graph having 16 edges. Find the number of regions of G. and also draw the graph represented by given Adjacency matrix (i) $\begin{bmatrix} 1 & 2 & 0 & 1 \\ 2 & 0 & 3 & 0 \\ 0 & 3 & 1 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix}$ (ii) $\begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix}$	5M	CO5	L3

<div align="center">OR</div>

11	a	Show that the two graphs shown below are isomorphic?	5M	CO5	L3
	b	Define Spanning tree and explain the algorithm for Depth First search (DFS) traversal of a graph with suitable example.	5M	CO5	L3

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RAVINDRA COLLEGE OF ENGINEERING FOR WOMEN
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June 2025
Subject Name: **Universal Human Values**

Branch: CSE

Time: 3 Hours **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	Why is happiness considered more important than prosperity?	2M	CO1	L1
	b	What are the three criteria that answers must fulfill to be considered from natural acceptance?	2M	CO1	L1
	c	What are the primary differences between the needs of the self and the body?	2M	CO2	L2
	d	Define "Sensation" and explain its role in forming desires.	2M	CO2	L2
	e	Describe the concept of reverence in relationships.	2M	CO3	L3
	f	How does showing respect contribute to harmony within a family?	2M	CO3	L3
	g	Describe one example of harmony observed in natural ecosystems.	2M	CO4	L1
	h	How does understanding harmony in nature influence human behavior towards the environment?	2M	CO4	L2
	i	What does a holistic understanding of ethics mean in a professional context?	2M	CO5	L2
	j	Define Utility Value (Upayogita Mulya).	2M	CO6	L4
		PART-B			
		UNIT-I			
2	a	How does value education address the deficiencies in the current education system? Discuss its potential impact on improving educational outcomes.	5M	CO1	L1
	b	Define Svatva, Swatantrata, and Swarajya. Explain their significance in the context of personal and societal values.	5M	CO1	L2
		OR			
3	a	What is meant by natural acceptance, and how can it improve human relationships?	5M	CO1	L2
	b	How do modern notions of wealth and prosperity impact ecological and social issues? Discuss the implications for human and environmental well-being.	5M	CO1	L6
		UNIT-II			
4	a	How does "Right Understanding" lead to definite human conduct and harmony?	5M	CO2	L3

	b	Why is it important to balance the needs of the body and the self for overall health and happiness?	5M	CO2	L4
OR					
5	a	Discuss how imagination can be used as a tool for problem-solving and personal growth.	5M	CO2	L6
	b	How do the physical needs of the body differ from the emotional and mental needs of the self?	5M	CO2	L2
UNIT-III					
6	a	Discuss the importance of gratitude in strengthening family bonds.	5M	CO3	L2
	b	Why is self-respect important, and how does it impact one's relationships with others?	5M	CO3	L1
OR					
7	a	Explain how societal differentiation based on wealth impacts mutual respect.	5M	CO3	L4
	b	Discuss the importance of communication in maintaining harmony within families and communities.	5M	CO3	L6
UNIT-IV					
8	a	Discuss the implications of misunderstanding the natural characteristics of the material and plant orders in Modern society, especially regarding the pursuit of growth and development.	10M	CO4	L4
OR					
9	a	Describe the mutual fulfillment among the four orders of nature. How do the needs of one order contribute to the well-being of another?	5M	CO4	L3
	B	Explain the four orders of nature (material, plant, animal, and human). How are these orders interconnected and interdependent in maintaining the overall balance of nature?	5M	CO4	L5
UNIT-V					
10	a	Discuss the implications of value-based living across all four levels: Individual, family, society, and nature. Provide specific examples for each level.	5M	CO5	L5
	b	How does ethical conduct affect personal integrity and social trust?	5M	CO5	L4
OR					
11	a	Elaborate on the comprehensive human goal and its relevance to professional ethics. How can professionals align their activities with this goal?	10M	CO6	L4

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