NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, December-2024 **R23**

Sub Code: R23CC2101 DISCRETE MATHEMATICS & GRAPH THEORY

Time: 3 hours (CSE, IT, CSE(AIML), AI, AIML,DS, CYS) Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No		Questions	KL	CO	M
1	a	Define tautology.	1	1	2M
	b	Show that P^(Q ^R) and (P^Q)^R are logically equivalent.	1	1	2M
	c	Define about finite and infinite sets.	1	2	2M
	d	Define Power set. If S = {a, b, c} then P(S) is?	1	2	2M
	e	In how many ways can 20 similar books be placed on 5 different shelves	2	3	2M
	f	Explain general solution and particular solution of recurrence relation	2	3	2M
	g	Illustrate the advantages of Matrix representation of graph.	2	4	2M
	h	Explain Hamiltonian graph with example	2	4	2M
	i	Explain multi graph with example	2	5	2M
	j	Define planar graphs with examples	1	5	2M

PART-B

Answer either 'a' or 'b' from each question of **PART-B** (5 x 10M = 50M)

Q.No		Questions	KL	CO	M
2		Unit-I			
	a	i) Check whether the following statements is a tautology or not (~P^(P^Q))->~Q	3	1	5M
		ii) Write each of the following statements in symbolic form *) Anil & Sunil are rich. *) Neither Ramu nor Raju is poor. *) It is not true that Ravi & Raju are both rich.	3	1	5M
		OR			
	b	i) Prove or disprove the validity of the following arguments using the rules of inference. *) All men are fallible *) All kings are men *) Therefore, all kings are fallible	3	1	5M
		ii) Obtain PDNF of following: (¬P) v Q	3	1	5M
3		Unit-II			
	a	i) Draw the Hasse diagram for the partial ordering {(A,B)|A ⊆B} on the power set P(S), where S = {a,b,c}.	2	2	5M
		ii) If A={1,2,3,4} and R,S are relations on A defined by R={(1,2), (1,3), (2,4), (4,4)} S={(1,1), (1,2), (1,3), (1,4), (2,3),(2,4)} find R o S, S o R, RoR, SoS, write down there matrices.	2	2	5M

		OR				
	b	i) Verify the following relation R on X = {1, 2, 3, 4} is an equivalence relation or not? Given R = {(1, 1), (1, 4), (4, 1), (2, 2), (2, 3), (3, 4), (3, 3), (3, 2), (4, 3), (4, 4)}.	2	2		5M
		ii) Let X={1,2,3,4} and a mapping f:X->X be given by f={(1,2),(2,3),(3,4),(4,1)}. Find the composition function f^2, f^3 and f^4. Where f^2=fof	2	2		5M
4		Unit-III				
	a	i) In how many ways can four students be selected out of twelve students if two particular students are not included at all?	2	3		5M
		ii) Define Generating function and explain the operations on generating functions?	2	3		5M
		OR				
	b	i) A women has 20 close relatives and she wishes to invite 7 of them to dinner. In how many ways she can invite Two particular persons will not attend together.	2	3		5M
		ii) Find the particular solution of the recurrence relation $a_{n+2} - 4a_{n+1} + 4a_n = 2^n$.	2	3		5M
5		Unit-IV				
	a	i) Define isomorphism? And explain isomorphism with suitable example.	2	4		5M
		ii) Define Eulerian circuit and Hamiltonian circuit, give an example of graph that has neither an Eulerian circuit nor Hamiltonian circuit.	3	4		5M
		OR				
	b	i) Explain properties of adjacency matrix by taking suitable graph with minimum 4 nodes 6 edges.	2	4		5M
		ii) Define Walk, Trail, Paths and circuit? Explain with suitable graphs examples.	2	4		5M
6		Unit-V				
	a	i) Explain in brief about Eulers Theorem with Example?	2	5		5M
		ii) Define spanning tree of a graph, and explain DFS algorithm to find spanning tree of a graph with suitable example?	2	5		5M
		OR				
	b	i) Show that in a connected planar graph G with n vertices and m edges has regions r = m-n+2 in every one of its diagram?	3	5		5M
		ii) Explain kruskal's algorithm to find minimal spanning tree of the graph with suitable example?	2	5		5M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, December-2024 **R23**

Sub Code: R23CC2102 **UNIVERSAL HUMAN VALUES**

Time: 3 hours (COMMON TO ALL BRANCHES) Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No		Questions	KL	CO	M
1	a	Describe the value education.	2	1	2M
	b	Differentiate between happiness and prosperity.	2	1	2M
	c	Define the concept of harmony in the human being.	1	2	2M
	d	Interpret the harmony in the self.	2	2	2M
	e	Describe the harmony in the family.	2	3	2M
	f	Differentiate between 'trust' and 'respect'.	2	3	2M
	g	List the four orders of nature.	2	4	2M
	h	Interpret the interconnectedness in nature	2	4	2M
	i	Define the term definitiveness of ethical human conduct.	1	5	2M
	j	Describe the natural acceptance.	2	5	2M

PART-B

Answer either 'a' or 'b' from each question of **PART-B** (5 x 10M = 50M)

Q.No		Questions	KL	CO	M
2		Unit-I			
	a	i) Explain the role of education in achieving holistic development.	2	1	5M
		ii)Outline the method to fulfill basic human aspirations.	2	1	5M
		OR			
	b	i) List the basic components of holistic development.	2	1	5M
		ii) Explain the current scenario concerning happiness and prosperity in society.	2	1	5M
3		Unit-II			
	a	i)Explain the co-existence of the self and the body.	2	2	5M
		ii)How do the needs of the self differ from the needs of the body?	2	2	5M
		OR			
	b	i) Briefly explain the role of health in ensuring harmony in the human being.	2	2	5M
		ii) Discuss the key components of a programme for self-regulation?	2	2	5M
4		Unit-III			
	a	i) Explain the significance of 'trust' as a foundational value in relationships.	2	3	5M
		ii) Explain why harmony in the family is considered the basic unit of human interaction.	2	3	5M

		OR			
	b	i) Explain the importance of harmony in society for the well-being of individuals.	2	3	5M
		ii) Mention two examples of other feelings that contribute to harmonious relationships.	2	3	5M
5		Unit-IV			
	a	i) Explain the concept of self-regulation in the four orders of nature.	2	4	5M
		ii) Explain the relationship between interconnectedness and coexistence.	2	4	5M
		OR			
	b	i) Explain the significance of coexistence in realizing existence	2	4	5M
		ii) How does nature achieve self-regulation without external intervention?	2	4	5M
6		Unit-V			
	a	i) Explain the significance of humanistic education in shaping individual behavior.	2	5	5M
		ii) Discuss the main features of value-based management models.	2	5	5M
		OR			
	b	i) Outline any one strategy for transitioning toward a value-based profession.	1	5	5M
		ii) How does a humanistic constitution contribute to a universal human order?	2	5	5M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

***

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, December-2024

R23

Sub Code: R23CC2106 **ARTIFICIAL INTELLIGENCE**

Time: 3 hours (CSE(AIML), AI, AIML) Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No		Questions	KL	CO	M
1	a	Define Artificial Intelligence.	K2	1	2M
	b	List any two components of problem-solving agents.	K2	1	2M
	c	What is the difference between Breadth-First Search and Depth-First Search?	K3	2	2M
	d	What is Alpha-Beta Pruning?	K3	2	2M
	e	What is a semantic net?	K3	3	2M
	f	What is constraint propagation?	K3	3	2M
	g	What is forward chaining?	K3	4	2M
	h	What is reinforcement learning?	K3	4	2M
	i	Define meta-knowledge in the context of expert systems.	K4	5	2M
	j	What is the role of heuristics in expert systems?	K4	5	2M

PART-B

Answer either 'a' or 'b' from each question of **PART-B** (5 x 10M = 50M)

Q.No		Questions	KL	CO	M
2		Unit-I			
	a	i) Explain the role of environments in designing intelligent agents.	K2	1	5M
		ii) Write a short note on the history and foundation of AI.	K2	1	5M
		OR			
	b	i) Discuss the characteristics of a rational agent.	K2	1	5M
		ii) Explain the concept of rationality and how it applies to intelligent agents.	K2	1	5M
3		Unit-II			
	a	i) Compare searching with partial information and heuristic search strategies.	K3	2	5M
		ii) What are optimal decisions in multiplayer games? Illustrate with an example.	K3	2	5M
		OR			
	b	i) Explain the Minimax algorithm and its role in game playing.	K3	2	5M
		ii) Explain the A* algorithm and its advantages over other search strategies.	K3	2	5M
4		Unit-III			
	a	i) Describe predicate logic and its role in knowledge representation.	K3	3	5M
		ii) Write a short note on frames and inheritance in AI.	K3	3	5M

		OR			
	b	i) Discuss the significance of reasoning under uncertainty in AI systems.	K3	3	5M
		ii) Explain Bayes' probabilistic inference with a suitable example.	K3	3	5M
5		Unit-IV			
	a	i) Explain the differences between propositional inference and first-order logic inference.	K3	4	5M
		ii) Write a short note on statistical learning methods.	K3	4	5M
		OR			
	b	i) What is explanation-based learning? Provide a suitable example.	K3	4	5M
		ii) Describe how decision trees are used in inductive learning.	K3	4	5M
6		Unit-V			
	a	i) Discuss the roles and applications of expert systems in decision-making.	K4	5	5M
		ii) Compare expert systems with conventional problem-solving systems.	K4	5	5M
		OR			
	b	i) What are expert system shells? Provide examples and their significance.	K4	5	5M
		ii) Describe the role of expert systems in solving real-world problems.	K4	5	5M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, December-2024

Sub Code: R23CC2104 **ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS**

Time: 3 hours (CSE, IT, CSE(AIML), AI, AIML,DS, CYS) Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

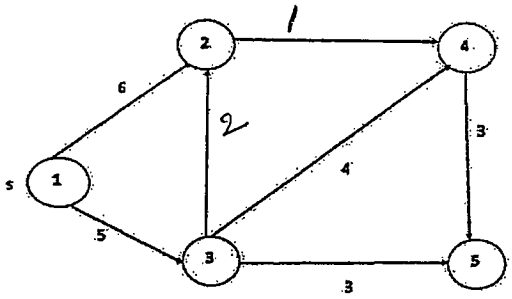
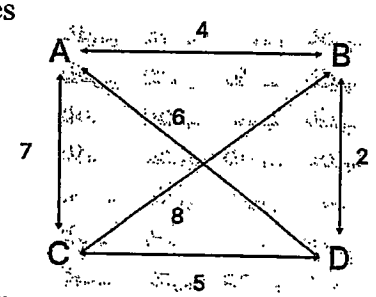
PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No		Questions	KL	CO	M
1	a	Compare the different algorithmic complexities notations.	1	1	2M
	b	Define self balancing trees	1	1	2M
	c	Differentiate between connected and bi connected components	1	2	2M
	d	Find total number of comparisons made in quick sort for sorting a file of size n.	2	2	2M
	e	Write the control abstraction of Divide and Conquer method	1	3	2M
	f	Summarize feasible and optimal solution.	1	3	2M
	g	What are tractable and non-tractable problems?	1	4	2M
	h	Discuss the principle of backtracking.	2	4	2M
	i	What does NP-hard mean? State approximation algorithm for NP hard problem.	1	5	2M
	j	State the subset sum problem.	1	5	2M

PART-B: Answer either 'a' or 'b' from each question of **PART-B** (5 x 10M = 50M)

Q.No		Questions	KL	CO	M
2		Unit-I			
	a	i) How can we find the time complexity of an Algorithm? Explain with example?	2	1	5M
		ii) Suppose $T1(n)$ is $W(f(n))$ and $T2(n)$ is $W(g(n))$. Which of the following statements are true? i. $T1(n) + T2(n)$ is $W(\max(f(n), g(n)))$. ii. $T1(n)T2(n)$ is $W(f(n)g(n))$. Some authors define big omega by saying $f(n)$ is $W(g(n))$ if there is some n_0 and c > 0 such that for all $n \geq n_0$ we have $f(n) \geq cg(n)$.	3	1	5M
		OR			
	b	i) Explain AVL tree and perform LL,RR,LR and RL rotations on sample data	2	1	10M
3		Unit-II			
	a	(a) i) Explain the Properties of Min Heap and Max Heap	2	2	4M
		ii) Explain why there are no forward Non-tree edges with respect to a BFS tree constructed for a directed graph. Explain with one example graph.	2	2	6M
		OR			
	b	i) How quickly can you multiply a $kn \times n$ matrix by an $n \times kn$ matrix, using Strassen's algorithm as a subroutine? Answer the same question with the order of the input matrices reversed.	3	2	5M
		ii) Apply Quick sort on a given sequence 7 11 14 6 9 4 3 12. What is the sequence after first phase, pivot is first element?	3	2	5M

		Unit-III			
4	a	i) Construct job sequencing schedule for n=7, (p1, p2, p3, p4, p5, p6, p7) = (100,10,15,27,120,55,40) and deadlines (d1, d2, d3, d4) = (2,1,2,1,4,3,1).	3	3	5M
		ii) Find the below directed graph. Consider the node 0 as source node and find the single shortest paths to remaining vertices. 	3	3	5M
		OR			
	b	i) Explain how dynamic program is efficient than greedy method.	2	3	5M
		ii) Plan the following instance of the 0/1, knapsack problem given the knapsack capacity in W=5 using dynamic programming and explain it.	3	3	5M
		Item | Weight | Value 1 | 4 | 10 2 | 3 | 20 3 | 2 | 15 4 | 5 | 25			
		Unit-IV			
5	a	i) The N-queens problem is to place n-queens on an n x n chess board. What are the constraints in placing n-queens? Explain how backtracking can be used to solve the problem.	3	4	5M
		ii) Draw the state space tree for n=3 and m=3 colors.	3	4	5M
		OR			
	b	i) Draw the portion of State space tree generated by LCBB for the knapsack problem of the instance N = 5, (p1, p2, ..., p5) = (13, 15, 7, 2, 4), (w1, w2, ..., w5) = (4, 6, 3, 4, 2) and m = 12 by using fixed tuple size information.	3	4	10M
		Unit-V			
6	a	i) Describe the Clique Decision Problem(CDP).	2	5	10M
		OR			
	b	i) Explain about Non-deterministic algorithms. Provide the examples for P and NP algorithms.	2	5	5M
		ii) Solve the following Travelling Sales person problem. 	3	5	5M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, December-2024

Sub Code: R23CC2105 **OBJECT ORIENTED PROGRAMMING THROUGH JAVA**

Time: 3 hours (CSE, IT, CSE(AIML), AI, AIML,DS, CYS) Max. Marks: 70

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answering all the questions from Part-A is compulsory (10 x 2M = 20M)

Q.No		Questions	KL	CO	M
1	a	Differentiate break and continue statements.	2	1	2M
	b	Compare the Relational Operators and Boolean Logical Operators.	2	1	2M
	c	What do you mean by Object? Define class.	1	2	2M
	d	How is an argument passed to a method? Can the argument have the same name as its parameter?	1	2	2M
	e	When is the memory allocated for an array?	1	3	2M
	f	Define the keywords private and protected.	1	3	2M
	g	What do you understand by inner class?	1	4	2M
	h	Write the importance of finally block.	1	4	2M
	i	List all File Stream classes	1	5	2M
	j	What is Thread Life Cycle?	1	5	2M

PART-B: Answer either 'a' or 'b' from each question of **PART-B** (5 x 10M = 50M)

Q.No		Questions	KL	CO	M
2		Unit-I			
	a	i) Explain in detail about the different features of Object Oriented Programming.	1	1	5M
		ii) Explain and write Java Program to find the largest of three numbers using Ternary Operator and smallest of three numbers using Ternary Operator.	3	1	5M
		OR			
	b	i) List out the decision making statements available in Java. Explain with example.	1	1	5M
		ii) Write a program that reads an integer between 0 and 1000 and adds all the digits in the integer. For example, if an integer is 932, the sum of all its digits is 14.	3	1	5M
3		Unit-II			
	a	i) Explain how you can pass and return objects using methods.	2	2	5M
		ii) What is the purpose of 'this' and 'static' keyword? Write a java program to explain this.	2	2	5M
		OR			
	b	i) Explain method overriding with example.	2	2	5M
		ii) Define a recursive method for computing x raised to power y by doing repetitive multiplication where x and y are positive integer numbers. Define main to use above method.	2	2	5M

4		Unit-III			
	a	i) Describe Inheritance and its type with suitable example.	2	3	5M
		ii) Declare an array reference variable for a two-dimensional array of int values, create a 4-by-5 int matrix, and assign it to the variable.	3	3	5M
		OR			
	b	i) Differentiate between Interface and abstract class. When Interface is preferred over abstract class. Explain.	2	3	5M
		ii) The abstract vegetable class has three subclasses named Potato, Brinjal and Tomato. Write a java prog. That demonstrates how to establish this class hierarchy. Declare one instance variable of type String that indicates the color of a vegetable. Crete and display instances of these objects. Override the toString() method of object to return a string with the name of vegetable and its color.	3	3	5M
5		Unit-IV			
	a	i) What is package? What are the benefits of package? Explain Java API packages.	2	4	5M
		ii) What is Stream Class? Explain input stream class and output stream class in details.	2	4	5M
		OR			
	b	i) What is an Exception? Explain different types of Exception?	2	4	5M

		ii) Consider following code fragment:
		try {
		statement1;
		statement2;
		statement3;
		} catch (Exception1 ex1) {
		} finally {
		statement4;
		}
		statement5;
		1. Which Statements will execute if no exception is occurs.
		2. Which Statements will execute if Exception 1 is occurs at statement
			3	4	5M

6		Unit-V			
	a	i) Write a java program to explain the use of File class and its methods.	2	5	5M
		ii) Explain comparable interface and cloneable with example.	2	5	5M
		OR			
	b	i) Write a Java program that creates three threads. First thread displays — Good Morning! every one second, the second thread displays- Hello! every two seconds	2	5	5M
		ii) Write a java program to implement join() method in multithreading.	3	5	5M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

* * *