Seat No: _____ **Enrollment No:** _____

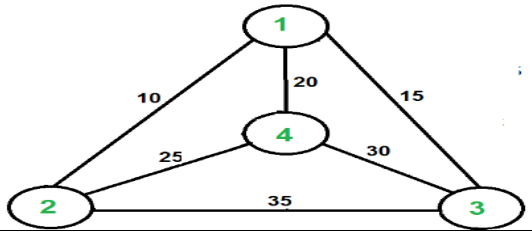
PARUL UNIVERSITY

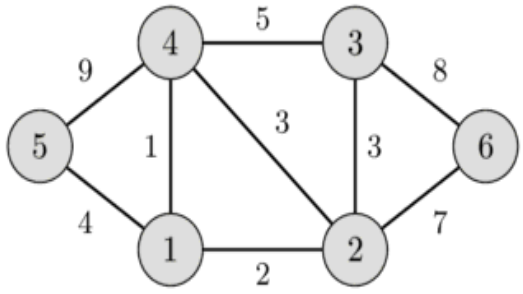
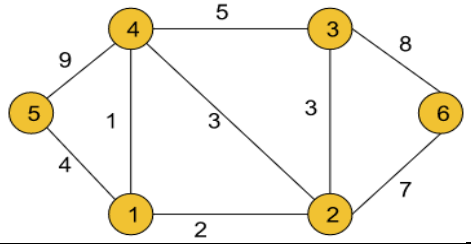
FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech/ M.Tech . Winter 2024 - 25 Examination

Semester: 5 **Date: 11/11/2024**
Subject Code: I03105301 **Time: 10:00am to 1:00pm**
Subject Name: Design and Analysis of Algorithms **Total Marks: 60**

Instructions:
1. This question paper comprises of two sections. Write answer of both the sections in separate answer books.
2. From Section I, **Q.1 is compulsory, attempt any THREE from Q. 2 to Q. 5**
3. From Section II, **Q.6 is compulsory, attempt any THREE from Q. 7 to Q. 10**
4. Make suitable assumptions wherever necessary.
5. Start new question on new page.

	Section-A (30 Marks)				
Q.1	**Objective Type Questions** - (State, Define, List, etc) (All are compulsory and each of two marks)	**(6)**	**CO**	**PO**	**Bloom's Taxonomy**
	1 What is Algorithm? Which are two main complexity used in Algorithm		**1**	**2**	**Knowledge**
	2. Define Asymptotic Notation? Explain Big Oh , Theta and Omega Notation with condition.		**2**	**2**	**Knowledge**
	3. Explain the difference between Tree and Graph		**2**	**2**	**Knowledge**
Q.2	**Answer the following questions**.				
	A) Write down any 4 String functions with example	**(2)**	**3**	**3**	**Analysis**
	B) Write down the formula of Master's Theorem along with the different cases? Solve the following function with T(n) =4T(n/2) +n	**(6)**	**2**	**4**	**Knowledge**
Q.3	**Answer the following questions**.				
	C) What is Directed Graph and Undirected Graph	**(2)**	**2**	**2**	**Knowledge**
	D) Apply Longest Common Subsequence on the following String: S1 =AGGTAB S2= GXTAYB	**(6)**	**3**	**3**	**Evaluation**
Q.4	**Answer the following questions**.				
	A) Stack follows First in First Out Mechanism(True/ False) B) In Stack, Push and Pop operation is used for Insertion and Deletion(True/False)	**(2)**	**1**	**1**	**Knowledge**
	C) Apply Matrix Chain multiplication on the following : A1 = 5*4 A2 =4*6 A3 =6*2 A4 =2*7	**(6)**	**3**	**3**	**Evaluation**
Q.5	**Answer the following questions**.				
	A) Explain the purpose of Dijkstra Algorithm	**(2)**	**2**	**2**	**Knowledge**
	B) Explain the concept of Travelling Salesman Problem 	**(6)**	**2**	**3**	**Analysis**
	Section-B (30 Marks)				
Q.6	**Objective Type Questions** - (State, Define, List, etc) (All are compulsory and each of two marks)	**(6)**			
	1. _____ notation is used for Best Case 2. _____ notation is used for Worst Case		**2**	**2**	**Knowledge**

	3. Explain with example the concept of Binary search		**2**	**3**	**Comprehension**
	3. Difference between P class Problem and NP class Problem		**1**	**1**	**Knowledge**
Q.7	**Answer the following questions**.				
	A) Explain the concept of Divide and Conquer? Which algorithm falls under Divide and Conquer method?	**(2)**	**3**	**3**	**Knowledge**
	B) Explain the concept of Kruskal Algorithm? Find out minimum spanning tree on the following graph: 	**(6)**	**3**	**4**	**Evaluation**
Q.8	**Answer the following questions**.				
	A) Find minimum weight cycle in an undirected graph 	**(2)**	**2**	**2**	**Evaluation**
	B) Explain the concept of Knapsack Algorithm of Dynamic approach and solve the following example: n=7, m=15 profit = (10,5,15,7,6,18,3) weight = (2,3,5,7,1,4,1)	**(6)**	**3**	**3**	**Analysis**
Q.9	**Answer the following questions**.				
	A) What do you mean by nodes and edges in graph with example?	**(2)**	**2**	**2**	**Comprehension**
	B) Explain the concept of Depth First Search and Breadth First Search with example	**(6)**	**3**	**4**	**Comprehension**
Q.10	**Answer the following questions**.				
	A) Explain the concept of Topological Sort with Example	**(2)**	**2**	**3**	**Synthesis**
	B) Explain the concept of Merge Sort using Divide and Conquer Method with example	**(6)**	**1**	**2**	**Analysis**