



- Notes :
1. All questions are compulsory.
 2. All questions carry equal marks.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Diagrams and Chemical equation should be given wherever necessary.
 6. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Write a brief note on asymptotic notations. Explain with example. **8**
 b) Explain master method for solving following recurrence equation $T(n) = 3.T(n/3) + n^2$. **8**

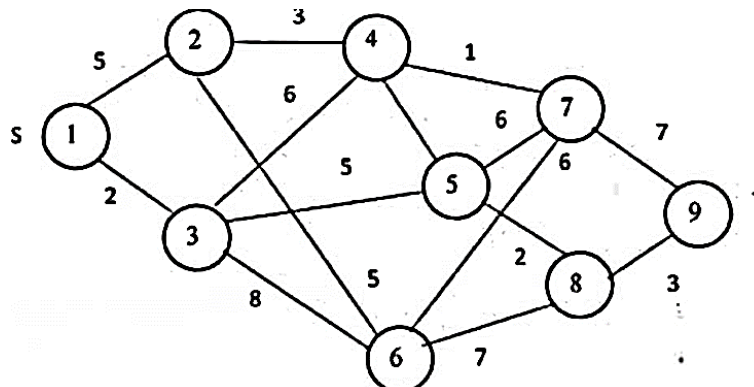
OR

2. a) Describe Analysis of Algorithms. Discuss Time and space complexity. **8**
 b) Explain potential method for amortized analysis of binary counter. **8**
3. a) Find optimal solution for the given Knapsacks problem $n = 4, m = 23$
 $P_i = \{10, 5, 5, 15\}$
 $W_i = \{20, 5, 15, 5\}$ **8**
 b) Find maximum profit value of $n = 5$ jobs. **8**

Deadline	2	1	3	2	1
Profit	60	100	20	40	20

OR

4. a) Write an algorithm for Binary Search. And find out average number of comparisons requires for successful and unsuccessful binary search on following array: -12, 23, 31, 45, 56, 78, 90, 103, 113, 126, 157. **8**
 b) Consider the following multi-stage graph: Find the minimum cost and shortest path in the graph. **8**



5. a) Explain travelling salesman problem with suitable example. **6**
- b) Determine cost and structure of optimal binary search tree for $n = 6$ keys. **10**

i	0	1	2	3	4	5	6
pi	-	0.12	0.06	0.10	0.06	0.10	0.10
qi	0.08	0.10	0.04	0.05	0.09	0.06	0.04

OR

6. a) Find an optimal Parenthesization of a matrix chain product is for the given dimensions.
 $P = (30, 35, 15, 5, 10, 20, 25)$ **10**
- b) Write algorithm and complexity of Floyd's Warshalls algorithm. **6**
7. a) Define Hash table and explain hash functions. **8**
- b) Write a note on open addressing. **8**

OR

8. a) Explain 8-Queens problem. Give suitable example. **8**
- b) Discuss graph colouring problem. What are its application? **8**
9. a) Write a note on: **8**
- i) NP-Hard
- ii) NP-Complete
- b) Write a program to implement non-deterministic search algorithms. **8**

OR

10. a) Differentiate P and Np-Class. **8**
- b) Show that the clique problem is np-hard using 3-SAT problem by reduction
 (note : consider any CNF function with 3-clauses) **8**
