

B1.2-R5 : DISCRETE STRUCTURES**NOTE :**

1. Answer question 1 and any FOUR questions from 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

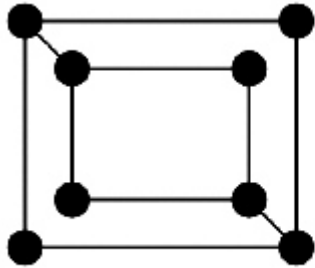
Total Time : 3 Hours**Total Marks : 100**

1. (a) Explain Empty and Universal Relations using suitable examples.
 (b) What is time complexity ? Explain with example.
 (c) Differentiate : BFS and DFS.
 (d) How many nodes are necessary to construct a graph with exactly 8 edges in which each node is of degree 2 ?
 (e) Rewrite the following statements using quantifier variables and predicate symbols :
 1. All birds can fly.
 2. Some women are genius.
 3. There is a student who likes Discrete Mathematics but not Probability and Statistics.
 (f) What is counting in probability ? Explain following terms with example.
 - I. Number of Outcomes of an Event
 - II. Addition rule of counting
 (g) Differentiate: Greedy algorithms and Dynamic Programming. (7x4)
2. (a) Solve the recurrence relation :
 $F_n = 2F_{n-1} - 2F_{n-2}$ where $F_0 = 1$ and $F_1 = 3$
 (b) Find if the following is a tautology, contradiction or contingency.

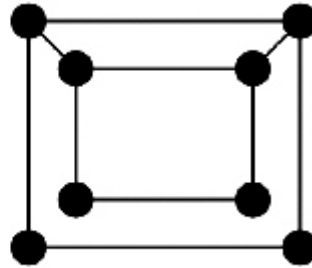
$$(p \rightarrow (q \rightarrow r)) \rightarrow ((p \rightarrow q) \rightarrow (p \rightarrow r))$$

 (c) Compare linear and binary search methods. (6+6+6)
3. (a) What is minimum spanning tree ? Name the algorithms which can be used to solve this problem ? Explain any one of them.
 (b) Explain Asymptotic Notations in detail. (10+8)
4. (a) Explain pigeonhole principle with example.
 (b) What is matrix chain multiplication ? Explain with example.
 (c) Apply quick sort algorithm to sort following data :
 44 33 11 55 77 90 40 60 99 22 88. Show the intermediate steps. (6+6+6)

5. (a) Determine the Longest Common Subsequence between following strings
 A = 10010101
 B = 010110110
- (b) Define Isomorphic Graphs. Verify the following graphs are Isomorphic or not (Justify).



G1



G2

(10+8)

6. (a) Explain travelling salesman problem with example.
 (b) Explain the principle of inclusion, exclusion and derangement in brief.
7. (a) Through example, explain permutation with repetition and without repetition.
 (b) Explain Dijkstra's algorithm with suitable example.

(10+8)

(10+8)

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