Total No. of Questions : 8] *[Total No. of Printed Pages : 3*

Roll No .....

IT-221-CBCS

B.E., III Semester

Examination, June 2020

Choice Based Credit System (CBCS)

Analysis and Design of Algorithm

Time : Three Hours

Maximum Marks : 60

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Draw flow charts and diagram, where needed.

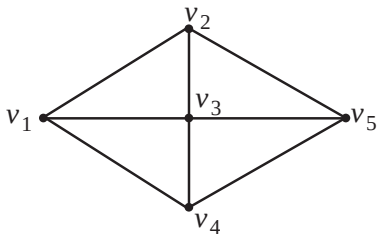
1. a) Define space complexity and time complexity.
   b) How can we prove that Strassen's matrix multiplications advantageous over ordinary matrix multiplications?

2. a) What is minimum spanning trees? Explain in detail.
   b) Consider three items along with their respective weights and values as;
   $I = < I_1, I_2, I_3 >$
   $W = < 5, 4, 3 >$
   $V = < 6, 5, 4 >$
   The Knapsack has the maximum weight capacity W=7 fill the Knapsack according to greedy strategy such that it can have optimum value.

3. a) What is Reliability design using dynamic programming? Explain with example.
   b) Solve the subset sum problem using Back tracking where n = 4, m = 18, w[4] = {5, 10, 8, 13}.

4. a) Show that Hamiltonian cycle in NP complete.

   b) Applying B backtracking technique to solve the 3 coloring problem for the graph shown below:



5. a) Differentiate between NP-Complete and NP hard problems.

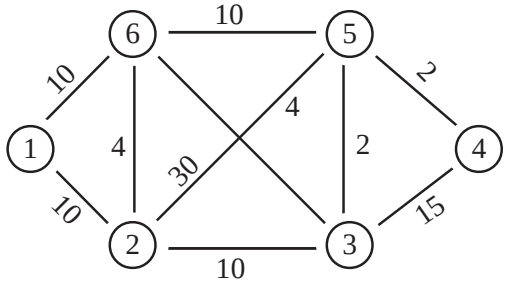
   b) Consider the travelling salesman on instance defined by cost matrix.

$$\begin{bmatrix} \infty & 7 & 3 & 12 & 8 \\ 3 & \infty & 6 & 14 & 9 \\ 5 & 8 & \infty & 6 & 18 \\ 9 & 3 & 5 & \infty & 11 \\ 18 & 14 & 9 & 8 & \infty \end{bmatrix}$$

   Obtain the reduced cost matrix and solve it.

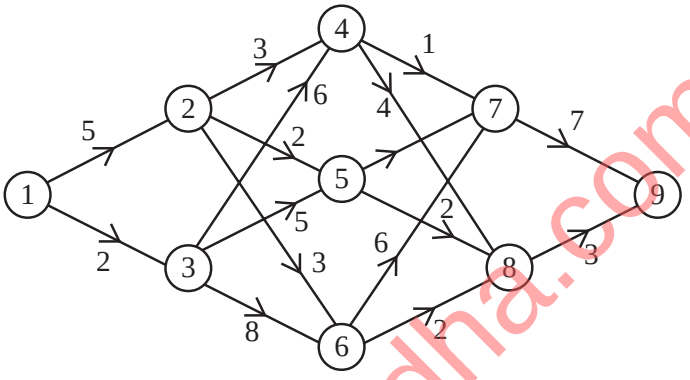
6. a) What are "Queues"? Explain how to insert and delete an element from queue with suitable algorithm.

   b) Find the Minimum cost spanning tree for the graph given below



7. a) Create a B-tree for the following list of elements L = {86, 50, 40, 3, 94, 10, 70, 90, 110, 113, 116} given minimization factor = 3, minimum degree = 2 and maximum degree = 5.

   b) Find a minimum cost path from 's' to 't' in multistage graph using dynamic programming.



8. Write short notes on:
   a) Least cost search
   b) Asymptotic notation
   c) Huffman coding
   d) Binary search

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