Seat Number

* 5 8 3 9 *

Analysis & Design of Algorithms
(176115)

P. Pages : 2

Time : Three Hours **Max. Marks : 80**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** questions from each unit.
5. Figures to write indicate full marks.
6. Assume suitable data if necessary.

UNIT - I

1. a) i) What is algorithm ? And state criteria's that are to be satisfied by an algorithm. **4**

ii) List and explain algorithmic complexity issues. **4**

b) Calculate time complexity for the following. **8**

i) $T(n)=4T\left(n/2\right)+n^2$ ii) $T(n)=3T\left(n/3\right)+\sqrt{n}$

c) Write Bubble sort algorithm and apply it on following list. **8**
B, U B, B, L, E, S, O, R, T.

UNIT - II

2. a) Write a note on : **8**
i) Hiring problem. ii) Randomized algorithms.

b) Apply quick sort algorithm on the list. **8**
1, 36, 40, 20, 35, 34, 19.

c) Apply Merge sort algorithm to the following list and calculate worst case & best case for it. **8**
15, 8, 7, 6, 5, 20, 18, 23

UNIT - III

3. a) State n-queens problem and draw state space tree for 4-queen problem and find at least two solutions for it. **8**

b) Consider the travelling sales person problem defined by the cost matrix. **8**

$$\begin{bmatrix} \infty & 22 & 33 & 9 & 8 \\ 12 & \infty & 24 & 5 & 1 \\ 13 & 7 & \infty & 6 & 2 \\ 5 & 8 & 33 & \infty & 3 \\ 8 & 10 & 44 & 9 & \infty \end{bmatrix}$$

Obtain the solution of the travelling sales person by using LCBB method.

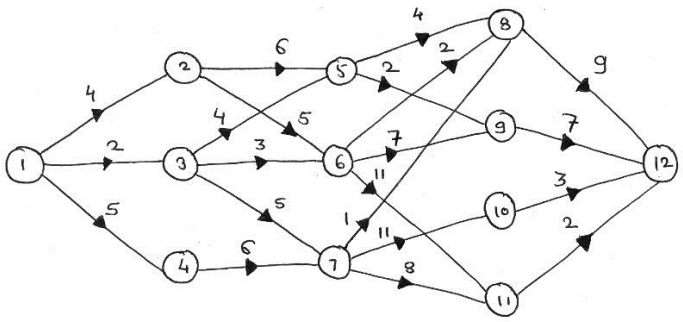
c) Explain graph-colouring problem with example. **8**

UNIT - IV

4. a) Write a short note on. **8**

i) Greedy algorithm. ii) Huffman code.

b) Calculate the minimum cost path from source to destination in multistage graph using dynamic strategy. **8**



c) Obtain the tour for given matrix using dynamic approach. **8**

$$\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$$

UNIT - V

5. a) i) Explain relationship between P, NP, NP complete and NP hard problems. **4**

ii) Explain code generation problem. **4**

b) Describe.

i) The zero-one principal. **4**

ii) Parallel merging network. **4**

c) i) Explain SAT problem. **4**

ii) Explain approximation problem. **4**

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