CBCS SCHEME

USN | | | | | | | | | | |

15CS43

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Design and Analysis of Algorithms

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Define algorithm. What are the properties of an algorithm? Explain with an example. **(08 Marks)**
   b. Explain asymptotic notations, with examples. **(08 Marks)**

OR

2 a. Explain general plan of mathematical analysis of nonrecursive algorithm with example. **(08 Marks)**
   b. Define time and space complexity. Explain important problem types. **(08 Marks)**

Module-2

3 a. Explain divide and conquer technique. Write binary search algorithm. **(08 Marks)**
   b. Apply quick sort to sort the list 'QUESTION' in alphabetical order. Draw the tree of recursive calls made. **(08 Marks)**

OR

4 a. What is decrease and conquer approach? Explain the different major variations of decrease and conquer. **(08 Marks)**
   b. Design merge sort algorithm and discuss its best-case, average-case and worst-case efficiency. **(08 Marks)**

Module-3

5 a. Explain Geedy criterion. Write a Prim's algorithm to find minimum cost spanning tree. **(08 Marks)**
   b. Sort the given list of numbers using heap sort: 2, 9, 7, 6, 5, 8 **(08 Marks)**

OR

6 a. Construct a Huffman tree and resulting code word for the following:

Character	A	B	C	D	-
Probability	0.35	0.1	0.2	0.2	0.15

Encode the words DAD and ADD. **(08 Marks)**
   b. Write an algorithm to find single source shortest path. **(08 Marks)**

Module-4

7 a. Define transitive closure. Trace the following graph using Warshall's algorithm. **(08 Marks)**

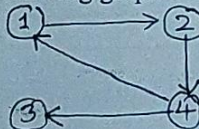Fig.Q.7(a)

   b. What is Dynamic programming? Explain in detail with suitable examples. **(08 Marks)**

8 a. Solve the following instance of knapsack problem using dynamic programming. The capacity of knapsack is W = 5.

OR

(08 Marks)

Item	Weight	Value
1	2	3
2	3	4
3	4	5
4	5	6

   b. Explain multistage graphs with example. Write multistage graph algorithm to forward approach.

(08 Marks)

Module-5

9 a. Solve subset sum problem for the following example S = {3, 5, 6, 7} and d = 15 construct a state space tree.

(08 Marks)

   b. Explain back tracking concept and how back tracking is used for solving 4-Queen's problem. Show the state space table.

(08 Marks)

OR

10 a. Explain LC branch and bound and FIFO branch and bound.

(08 Marks)

    b. Obtain the optimal solution for the given assignment problem as a matrix shown below using branch and bound method.

(08 Marks)

		Job1	Job2	Job3	Job4
	A	10	2	7	8
Person	B	6	4	3	7
	C	5	8	1	8
	D	7	6	10	4

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