UG Even Semester (CBCS) Exam., May—2017

COMPUTER SCIENCE

(4th Semester)

Course No. : CS–401 (O)

(Design and Analysis of Computer Algorithm)

Full Marks : 75

Pass Marks : 26

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, selecting **one** from each Unit

UNIT—I

1. *(a)* Explain asymptotic notation with example. 7

(b) What is an algorithm? Write its properties. 8

2. *(a)* What is time complexity? How is it measured? 7

(b) What do you mean by stack overflow? How is it handled in algorithm? 8

UNIT—II

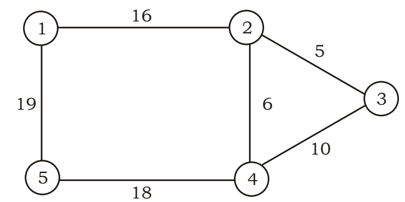
3. *(a)* What is divide and conquer strategy? Explain. 6

(b) Write the algorithm for merge sort. 7

(c) What is heap? 2

4. *(a)* Write down the algorithm for heap sort. 7

(b) For the graph given below, find out the minimal-cost spanning tree using Prim's algorithm and Krushkal's algorithm :



4+4=8

UNIT—III

5. Write short notes on the following : 5×3=15

(a) Reliability design

(b) Travelling sales person problem

(c) 8 queens problem

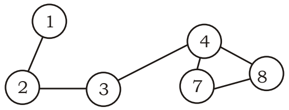
6. *(a)* Use dynamic programming approach to solve the following Knapsack problem : 10

$n = 3$, $(W_1, W_2, W_3) = (2, 3, 4)$
$(P_1, P_2, P_3) = (1, 2, 5)$ and $m = 6$

(b) What is greedy method? Explain with examples. 5

UNIT—IV

7. *(a)* For the graph below, find out the articulation points and draw the biconnected components : 8



(b) Compare breadth-first search algorithm and depth-first search algorithm. 7

8. *(a)* Explain pre-order, in-order and post-order traversal. 9

(b) What is binary search tree? 2

(c) Explain biconnected graph. 4

UNIT—V

9. Write short notes on the following : 5×3=15

(a) Backtracking

(b) Best-case analysis

(c) Worst-case analysis

10. Write short notes on the following : 5×3=15

(a) NP–Hard problem

(b) NP–Complete problem

(c) Optimization problem

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