2015

(October)

COMPUTER SCIENCE

(Elective/Honours)

(Data Structure using C)

Marks : 37

Time : 2 hours

The figures in the margin indicate full marks for the questions

Answer *any* **one** question from each Unit

UNIT—I

1. *(a)* What is data type? What are different data types available in C? Explain with examples. 1+2½=3½

(b) Differentiate between structure and union using suitable example. 2

(c) What are static variables? Explain their scope and lifetime taking an appropriate sample program fragment. ½+3=3½

2. *(a)* What is function definition? How do you call a function? Differentiate between actual parameters and formal parameters. 1+1+1½=3½

(b) How is a single-dimensional array passed to a function? Give example. 2½

(c) Define the following : 1½+1½=3

(i) Self-referential structure

(ii) Enumeration

UNIT—II

3. *(a)* What is linked list? Give an algorithm to traverse a singly linked list pointed by 'P'. 1+2=3

(b) What is stack? Write an algorithm to transform an infix expression into a postfix expression. ½+3=3½

4. *(a)* Define linear queue and explain its operations. What are the advantages of circular queue? 2+1½=3½

(b) Write short notes on any *two* of the following : 1½×2=3

(i) Time-space tradeoff

(ii) Rate of growth of algorithm

(iii) Big O notation

UNIT—III

5. *(a)* What is binary search tree? Write an algorithm to search for a particular element in a binary search tree. 1+3½=4½

(b) What is meant by threaded binary tree? How is threaded binary tree represented in the computer's memory? Explain its advantages over binary search tree. 1½+1½+1=4

6. *(a)* Write an algorithm for pre-order traversal of a binary tree. 2½

(b) Write short notes on the following : 2×3=6

(i) AVL tree

(ii) B-tree

(iii) Complete binary tree

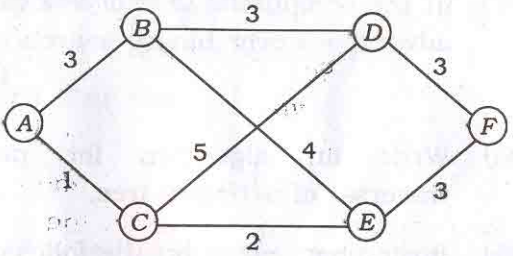
UNIT—IV

7. *(a)* What is graph? Explain its two representations used. 1+2=3

(b) Write Dijkstra's algorithm for finding the shortest path between two vertices in a weighted graph. 3½

8. *(a)* Write an algorithm to delete an edge (A, B) from a graph G. Assume that A and B are both nodes in the graph G represented by an adjacency matrix. 3½

(b) For the weighted graph given below, construct the minimal spanning tree using Kruskal's algorithm : 3



UNIT—V

9. *(a)* What is hashing? Explain any two hashing methods. 1+2=3

(b) Write an algorithm to sort an array using bubble sort. Write its complexity for best, worst and average cases. 2½+1=3½

10 *(a)* What is collision? Explain any three collision resolution techniques commonly used while hashing. 1+3=4

(b) Compare between linear search algorithm and binary search algorithm. 2½

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