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

| Seat No. | |
|---|---|

# [4957]-1044

## S.E. (E&TC/Electronics) (First Semester) EXAMINATION, 2016

## DATA STRUCTURES AND ALGORITHMS

## (2012 PATTERN)

**Time : Two Hours** **Maximum Marks : 50**

***N.B.*** **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2** and Q. No. 3 *or* Q. No. **4** and Q. No. **5** *or* Q. No. **6** and Q. No. **7** *or* Q. No. **8**.

(*ii*) Assume suitable data, if necessary.

(*iii*) Write output of programs if necessary.

(*iv*) Draw neat diagrams wherever necessary.

(*v*) Figures to the right side indicate full marks.

**1.** (*a*) What is the difference between internal sorting and external sorting. Sort the following numbers using selection sort : [6]

25, 17, 31, 13, 2

(*b*) Explain the examples different types of data structures. [6[

*Or*

**2.** (*a*) Compare linear search and binary search. Write algorithm to search the element in list using linear search. [6]

(*b*) What is a pseudocode ? Write a pseudo code to find the factorial of *n* number. [6]

P.T.O.

**3.** (*a*) Write the limitations of arrays over linked list ? Represent the following polynomial using linked list : [6]

$$5x^4 + 2x^3 + 7x^2 + 10x - 8$$

(*b*) Define dequeue. Explain the variations of dequeue. [6]

*Or*

**4.** (*a*) Convert the following expression into postfix form. Show all the steps and stack content : [6]

4$2 * 3 – 3 + 8/4/(1 + 1)

(*b*) Draw and explain circular linked list. State the limitations of single linked list. [6]

**5.** (*a*) Explain with suitable example how will you represent a binary tree using linked list. [4]

(*b*) Define BST ? Create a BST for the following data : [5]

20, 17, 6, 8, 10, 7, 18, 13, 12, 5

(*c*) Write a pseudo code to search an element in binary search tree using assays. [4]

*Or*

**6.** (*a*) What is threaded binary tree. Draw the node structure of threaded binary tree. [4]

(*b*) Define traversal of binary tree ? Explain *three* popular methods of binary tree traversal. [5]

(*c*) What is AVL tree ? Write structure of AVL tree. [4]

**7.** (*a*) Define graph ? What are the types of graphs ? Explain with example. [4]

(*b*) Draw adjacency list and adjacency matrix for the following graph : [5]

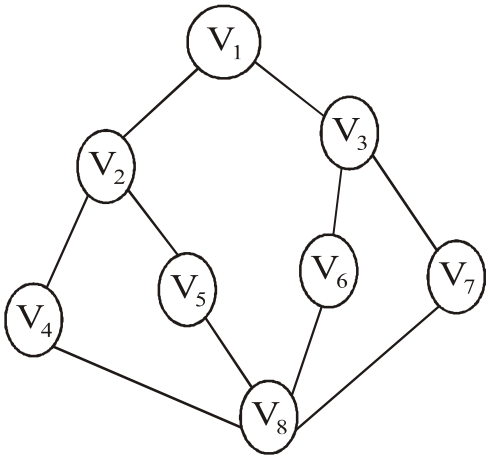


Fig. 1

(*c*) Write an algorithm for DFS traversal of graph. [4]

*Or*

**8.** (*a*) Define spanning tree ? Find all the spanning tree for graph given below : [4]

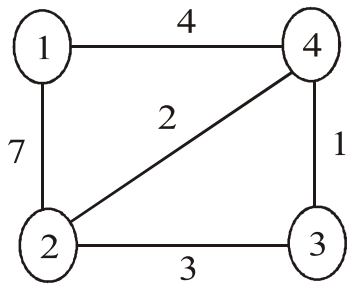


Fig. 2

(*b*) Explain Kruskal algorithm ? Find the minimum spanning tree for fig. Q. 2. [5]

(*c*) What is the difference between DFS and BFS methods. [4]