Bachelor of Science (B.Sc.) Semester—III Examination

COMPUTER SCIENCE (Data Structures)

Optional Paper—I

Time : Three Hours] [Maximum Marks : 50

Note :— (1) All questions are compulsory and carry equal marks.

(2) Draw neat and labelled diagrams wherever necessary.

EITHER

1. (a) What is linked list ? Give array representation of linked list. 5

(b) Write an algorithm to count the number of nodes in the single linked list. 5

OR

(c) Write an algorithm to insert node at the begining of double linked list. 5

(d) Write an algorithm to delete the last node of single linked list. 5

EITHER

2. (a) Write an algorithm for Tower of Hanoi problem. 5

(b) What is Stack ? Explain Push Operation and Pop operation used in Stack. 5

OR

(c) Explain quick sort method with suitable example. 5

(d) Convert the following expression into prefix and postfix notation :

(i) $\frac{a^x + b^y}{a^x - b^y}$.

(ii) $ax^4 + bx^3 + cx^2 + dx + e$. 5

EITHER

3. (a) Write an algorithm for Insertion sort method. 5

(b) Define Priority Queue. Explain the array representation of priority queue in memory. 5

OR

(c) Explain Merge sort method with suitable example. 5

(d) What is Queue ? Write a procedure to insert element in queue. 5

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EITHER

4. (a) Write an algorithm for Depth-First Search (DFS) method. 5

(b) What is tree ? Explain representation of Binary tree in memory. 5

OR

(c) What is graph ? Explain representation of Graph in memory. 5

(d) Given :

Inorder : $n_1, n_2, n_3, n_4, n_5, n_6, n_7, n_8, n_9$

Postorder : $n_1, n_3, n_5, n_4, n_2, n_8, n_7, n_9, n_6$

Draw the tree. 5

5. (a) Define double linked list. 2½

(b) Solve the Tower (3, BEG, AUX, END). 2½

(c) Explain memory representation of Queue. 2½

(d) Explain Binary Search tree. 2½

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