Tribhuvan University
Institute of Science and Technology
2081
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Bachelor Level / Second Year/ Third Semester/ Science   Full Marks: 60
Computer Science and Information Technology (CSC 206)   Pass Marks: 24
(Data Structure and Algorithms)   Time: 3 hours.
**(OLD COURSE)**

Candidates are required to give their answers in their own words as for as practicable.
The figures in the margin indicate full marks.

Section A

Attempt any TWO questions.   (2×10=20)

1. Explain stack as an ADT. Explain algorithm to convert an infix expression to postfix using stack? Use this algorithm to convert (A+ B) * (C–D) to postfix expression.   (2 + 4 + 4)

2. What is linked list? Compare singly linked list with doubly linked list. How do you insert and delete nodes in a singly linked list?   (2 + 3 + 5)

3. Explain breadth first search (BFS) algorithm. Show each step of this algorithm to traverse the graph given below.   (3 + 7)
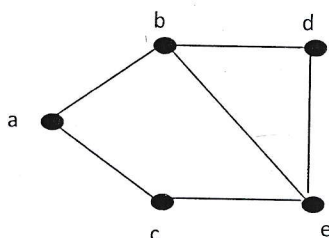
Section B

Attempt any EIGHT questions.   (8×5=40)

4. What is asymptotic analysis? Explain big oh notation with example.   (2 + 3)

5. Explain primitive queue operations. What are different applications of queue?   (2.5 + 2.5)

6. Define recursion. Compare recursion with iteration. Write a recursive function to implement factorial.   (1 + 2 + 2)

7. Trace bubble sort algorithm with array of numbers 37, 88, 16, 55, 10, 32, 23, 66, and 17.   (5)

8. Define hashing. Explain collision and collision resolution in hashing.   (2 + 3)

9. What is binary tree? Explain binary search tree with example.   (1.5 + 3.5)

10. Write a program to implement binary search.   (5)

11. Define spanning tree. Explain minimum spanning tree with example.   (1.5+3.5)

12. Write short notes on: (2 × 2.5 = 5)
    a) Abstract data type
    b) Stack as linked list