D 51250 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCBCSS—UG)

Core Course

BCS 3B 04—DATA STRUCTURES USING C

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer **all** *the questions.*
Each question carries 1 *mark.*

1. What is a data ?
2. Briefly describe the notation of the space-time trade off of algorithm.
3. What is a linear array ?
4. What does each entry in the linear Linked List called ?
5. Explain Stack.
6. Write an algorithm to perform pop operation.
7. What is meant by overflow in Stack ? Explain.
8. Define a binary tree.
9. What is a direct graph ? Explain.
10. Define adjacency matrix.

(10 × 1 = 10 marks)

Section B (Paragraph Type Questions)

Answer **all** *the questions.*
Each question carries 3 *marks.*

11. What are the Various operations that can be performed on different Data Structures ?
12. What is the main difference between ARRAY and LINKED LIST ?
13. Consider the following arithmetic expression P, written in postfix notation :

    P : 12, 7, 3, –, /, 2, 1, 5, +, *, +

    (a) Translate P into equivalent infix expression, step by step.

    (b) Evaluate the infix expression.

Turn over

14. What are complete binary trees ? Explain.

15. Define multigraphs.

(5 × 3 = 15 marks)

Section C (Short Essay Type)

Answer any **five** *questions.*
Each question carries 5 *marks.*

16. What are the different categories of data structures ? Explain each.

17. What are the different ways to allocate memory in two dimensional arrays ? Explain.

18. Write a program to add two polynomial using arrays and user defined functions-pass arguments.

19. Explain circular queue ? Write an algorithm and function to add an element into a circular queue.

20. How to evaluate a postfix expression using stack ? Write algorithm with suitable example.

21. Differentiate Tree and Binary tree. Write an algorithm to insert an element as root of the binary tree.

22. Write an algorithm to add a new node to the binary search tree. Explain with suitable example.

23. How to sort a list of numbers using selection sort ? Explain with example.

(5 × 5 = 25 marks)

Section D (Long Essay Type)

Answer any **three** *questions.*
Each question carries 10 *marks.*

24. Explain complexity of an algorithm and the space-time trade-off of different Search and sort methods with example.

25. (a) What is an array ? Explain different demerits of array.

    (b) Write a program to implement array operations using functions and pass arguments.

26. How can we represent stack in linked list ? Write a program to push an element in a stack using linked list.

27. (a) What are the different types of notations ? Explain each.

    (b) Write an algorithm to convert infix to postfix notation. Convert$((A + b)*D)^{(E-F)}$ to postfix using conversion algorithm.

28. Write a short note on :

    (a) Priority queue.

    (b) Express tree.

    (c) Creation of binary search tree.

(3 × 10 = 30 marks)