PAPER ID—14532

Bachelor of Computer Application

EXAMINATION, 2024

(Third Semester)

DATA STRUCTURES–I

Code : BCA202

Time : 3 Hours — Maximum Marks : 80

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit from Section B. Q. No. **1** (Section A) is compulsory. All questions carry equal marks.

Section A
(Compulsory Question)

1. Explain the following in detail : 8×2=16

   (a) What is data structure ?

   (b) Define algorithm complexity.

   (c) What is garbage collection ?

   (d) Define circular linked list.

   (e) Storing strings.

   (f) What is recursion ?

   (g) What is difference between tree and graph ?

   (h) Why is binary tree used ?

Section B

Unit I

2. (a) Define data structure. Explain its categories and applications in detail. **8**

   (b) What do you mean by efficiency of an algorithm ? Explain the case of best case, average case and worst case time complexity. **8**

Or

3. What is string ? What are various string operations ? Also explain the pattern matching algorithms in detail. **16**

Unit II

4. What is a two dimensional array ? Describe the formula for calculating the address of any element of a two dimensional array. Also discuss sparse array. **16**

Or

5. (a) What is linked list ? What are the advantages and disadvantages of representing a group of items as an array versus a linear linked list ? **8**

   (b) Discuss the advantages and disadvantages of linked list over array. Also explain the usefulness of an array. **8**

Unit III

6. (a) What are the basic operations performed on stack ? Write down the steps to perform these operations. **8**

   (b) What is postfix notation ? Explain the methods of evaluating postfix expression by giving suitable example. **8**

Or

7. (a) Explain the different operations on stacks in detail through an example. **8**

   (b) What are queues ? Also explain the applications of queues in detail. **8**

Unit IV

8. What is binary tree ? Write the algorithms to traverse the tree in pre-order, in-order and post-order. **16**

Or

9. What is graph ? How to represent graph ? Explain with an example. **16**