II Semester B.C.A. Examination, May/June 2018
(CBCS)
(F+R) (2014 – 15 & Onwards)
Computer Science
BCA203 : DATA STRUCTURES

Time : 3 Hours
Max. Marks : 70

Instruction : Answer all questions.

SECTION – A

Answer any 10 questions.

1. Define data structure.
2. What are linear data structures? Name any two linear data structures.
3. Define the terms:
   i) Space complexity.
   ii) Time complexity.
4. Mention the disadvantages of an array.
5. Define sparse matrix.
6. What is a linked list?
7. Mention various types of linked list.
8. Differentiate between stacks and queues.
9. Mention the applications of stack.
10. What is a circular queue?
11. Define the terms:
    i) Graph
    ii) Tree.
12. Give examples for:
    i) Complete binary tree.
    ii) Degree of vertex.
Answer any 5 questions: (10x5=50)

13. a) Explain various operations performed on data structures. 5
    b) Illustrate asymptotic notations with examples. 5

14. a) Write an algorithm for inserting an element into a linear array. 5
    b) Write a C program to sort N elements using bubble sort. 5

15. a) Explain the node structure of a singly linked list. Mention the advantages of linked list over arrays. 5
    b) Write an algorithm to insert a node at the end of the linked list. 5

16. Write a menu driven C program to implement stack operations. 10

17. a) Explain selection sort algorithm with an example. 5
    b) Evaluate the following postfix expression 65 * 78 + 87 - 45 * ++. 5

18. a) Explain BST. 5
    b) Write recursive functions for tree traversals. 5

19. a) Explain adjacency matrix and adjacency list with suitable examples. 5
    b) Write Depth First search algorithm to traverse a graph. 5

20. a) Explain any four mathematical functions. 4
    b) Write C functions to implement following string handling functions. 6
       i) String length
       ii) String concatenation.

       without using built in functions.
II Semester B.C.A. Degree Examination, May 2017
(F + R) (CBCS)
(2014-15 and Onwards)
COMPUTER SCIENCE
BCA – 203 : Data Structures

Time : 3 Hours
Max. Marks : 70

Instruction : Answer all Sections.

SECTION – A

Answer any ten questions. Each question carries two marks. (10×2=20)

1. What is linear data structure? Give an example.
2. Define space and time complexities of an algorithm.
3. What is recursion?
4. What is dynamic memory allocation?
5. Define stack.
6. Compare linear search and binary search methods.
7. What is circular queue?
8. Write the differences between stack and queue.
9. Give the node structure of a doubly linked list.
10. Define the terms:
    i) Binary tree.
    ii) Complete binary tree.
11. Mention the different ways of tree traversal.
12. Mention the graph traversal methods.

P.T.O.
SECTION - B

Answer any five questions. Each question carries ten marks. \( (5 \times 10 = 50 \) marks)

13. a) Explain various types of data structures. 6
    b) Briefly explain any four string handling functions. 4

14. a) Explain selection sort algorithm. 5
    b) Write an algorithm to delete an element from the array. 5

15. a) Define linked list. Mention the applications of the linked list. 5
    b) Write an algorithm for searching a node in the singly linked list. 5

16. a) Mention various applications of the stack. 5
    b) Evaluate the following postfix expression
       \[ 95 + 36 \times 97 - 1 \]. 5

17. a) Write C functions to perform insertion and deletion operations of a queue. 5
    b) What is queue? Mention its underflow and overflow conditions. 5

18. a) Briefly explain infix, prefix and postfix expressions. 5
    b) Convert the following infix expression into its equivalent postfix expression
       \[ (a + b) \times (m/n) + (x + y) \]. 5

19. a) Define the terms (a) Graph (b) Degree of a vertex. 4
    b) Write depth-first-search algorithm. 6

20. a) Define Binary search tree. Give an example. 4
    b) Briefly explain various tree traversal methods with suitable examples. 6
II Semester B.C.A. Degree Examination, May 2016
(F + R) (CBCS) (2014-15 and Onwards)
COMPUTER SCIENCE
BCA – 203 : Data Structures

Time : 3 Hours  Max. Marks : 70

**Instruction**: Answer all Sections.

**SECTION – A**

Answer any ten questions. Each question carries two marks. \(10 \times 2 = 20\)

1. What is Abstract Data Type?
2. What is time complexity?
3. Write an algorithm to traverse linear arrays.
4. Write C function to find the length of string without using built-in function.
5. What is circularly linked list?
6. Mention any two applications of linked list.
7. How is stack represented in memory?
8. Define recursion.
9. What is priority queue?
10. What is adjacency matrix? Give example.
11. Define graph.
12. Mention the different ways of tree traversal.

P.T.O.
SECTION – B

Answer any five questions. Each question carries ten marks. (5×10=50)

13. a) Explain various data structure operations performed on non-primitive data structures. 6
   b) Write a C program to copy one string into another without using built-in functions. 4

14. a) Write a C program to implement selection sort. 6
   b) Write an algorithm to delete an element from an array. 4

15. a) Explain various types of linked lists. 5
   b) Write an algorithm to insert a node at the beginning of linked list. 5

16. Write an algorithm to evaluate a valid postfix expression.
   Use the algorithm to evaluate the following postfix expression:
   
   \[ 6, 5, *, 3, 2, +, 8, 4, 1, - \] 10

17. a) Write a C program to implement stack operations. 7
   b) What is dequeue? Explain. 3

18. a) Write an algorithm to insert an element into circular queue. 6
   b) Explain queue overflow and underflow. 4

19. a) Explain sequential representation of graphs in memory. 4
   b) Mention the types of graph traversal algorithms. Explain any one. 6

20. a) List the properties of binary tree. 5
    b) Construct binary tree given inorder and postorder traversals.
       Inorder:  E A C K F H D B G
       Postorder: E C K A H B G D F.
       Also specify the pre-order traversal. 5
II Semester B.C.A. Degree Examination, April/May 2015
(CBCS) (2014-15 and Onwards)
COMPUTER SCIENCE
BCA 203 : Data Structures

Time : 3 Hours   Max. Marks : 70

Instruction: Answer all Sections.

SECTION - A

Answer any 10 of the following : (10x2=20)

1. What are linear data structures? Name any two linear data structures.
2. Explain the abstract data types.
3. What is sparse matrix?
4. Describe binary search technique.
5. What is garbage collection?
6. What is dynamic memory allocation?
7. What is stack overflow? Write the difference between stack and a queue.
8. Define recursion.
9. What is dequeue?
10. Explain circular queue with an example.
11. Differentiate between non-terminal node and a leaf node.
12. Define height of a binary tree.

SECTION - B

Answer any 5 of the following : (5x10=50)

13. a) Explain the classifications of data structures in detail.  5
    b) Explain the pattern matching algorithm of strings.  5

14. a) Describe the concept of linear search technique with an example.  5
    b) Write a program to sort N elements using selection sort.  5

P.T.O.
15. a) Explain various types of linked lists. 
   b) Write an algorithm to insert an element at the end of a linked list.

16. Write a program to insert, delete and display the elements of a circular queue using arrays.

17. a) Explain various types of queues.
   b) Write a procedure to evaluate the given postfix expression.

18. a) Write recursive functions for tree traversals.
   b) Define binary search tree. Give an example.

19. a) Explain various tree terminologies with a neat diagram.
   b) Explain graph traversal in detail.

20. a) What are non-primitive data structures? Explain the operations on non-primitive data structures.
   b) Demonstrate the working of insertion sort with an example.