2021/TDC/CBCS/ODD/
BVOCGE–302T/446

TDC (CBCS) Odd Semester Exam., 2021
held in March, 2022

INFORMATION TECHNOLOGY

(3rd Semester)

Course No. : BVOCGE–302T

(Data Structure)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, selecting **one** from each Unit

UNIT—I

1. *(a)* Differentiate between data and information. 1+1=2

(b) What do you mean by linear and non-linear data structures? Explain with example. 2+2=4

(c) Explain the representation of array in computer memory. 4

(d) Suppose base (A) = 300 and W = 4 words per memory cell for an array A. Find the address of A[10] and A[55]. 4

2. (a) Compare between array and linked list with suitable example. 5

(b) Compare between singly and doubly linked lists. 5

(c) Write short notes on any *two* of the following : 2×2=4

(i) Circular array

(ii) Sparse array

(iii) Dynamic data structure

(iv) Static data structure

UNIT—II

3. (a) Define stack. What are its main operations? Write an algorithm to perform the PUSH and POP operations onto a stack. 1+2+4=7

(b) Explain the application of stack. Write an algorithm for transforming infix expression to postfix. 3+4=7

4. (a) Explain the implementation of queue data structure using an array. 7

(b) Explain the different types of queue data structure. 7

UNIT—III

5. (a) What is tree? What are the advantages and disadvantages of tree? 2+2=4

(b) Define any *ten* of the following terminologies in short : 1×10=10

(i) Tree

(ii) Root

(iii) Parent node

(iv) Child node

(v) Siblings

(vi) Path

(vii) Height of node

(viii) Height of tree

(ix) Depth of node

(x) Degree of node

(xi) Edge

(xii) Level of node

6. (a) Discuss about the various types of traversals that can be performed in a binary tree with an example. 9

(b) Inorder and preorder of a tree are given below :

Inorder : D H B E A F C I G J

Preorder : A B D H E C F G I J

Construct the binary tree. 5

UNIT—IV

7. Write an algorithm for binary search. Show the steps to search the element 44 from the following elements stored in an array : 7+7=14

12 15 20 30 38 44 52 60

8. (a) What is insertion sort? Write the algorithm for insertion sort. 1+6=7

(b) What is bubble sort? Write the algorithm for insertion sort. 1+6=7

UNIT—V

9. (a) Define graph. Explain the BFS and DFS in a graph. 2+7=9

(b) Explain adjacency matrix and adjacency list. 5

10. What is hashing? What are the benefits of hashing? Explain the different types of hashing. 3+3+8=14

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