CBCS SCHEME

USN

17CS33

Third Semester B.E. Degree Examination, Jan./Feb.2021
Data Structures & Applications

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain the four functions that support dynamic memory allocation. **(08 Marks)**

b. Write the pattern matching algorithm to compare given pattern P with each of the substring of T. **(08 Marks)**

c. Represent the following two polynomial diagrammatically using array and also declaration in C:

$A(x) = 5X^{14} + 3x^3 + 5$

$B(X) = X^3 + 10x^2 + 2$ **(04 Marks)**

OR

2 a. Write a C program with structure definition and variable declaration to read and display information about 10 items of super market using nested structure. Consider the following fields like Itemcode, Itemname, Itemprice, Itemexpirydate (DD,MM,YY). **(08 Marks)**

b. Define sparse matrix and explain triplet representation of sparse matrix with an example. **(07 Marks)**

c. Explain any two methods of storing strings. **(05 Marks)**

Module-2

3 a. Write a C program to implement stack operations. **(10 Marks)**

b. Convert the following infix expression into post fix form : $(A + B \uparrow D)/(E - F) + G$. **(05 Marks)**

c. Evaluate the following postfix expression,
1, 2, 3, +, *, 3, 2, 1, −, +, * **(05 Marks)**

OR

4 a. Define Ackermann's function and find the value of A(1, 3) using Ackermann's function. **(05 Marks)**

b. Write a C program to implement circular Queue operations. **(10 Marks)**

c. Explain the priority Queue and its operations. **(05 Marks)**

Module-3

5 a. Write a C functions to perform the following:
(i) To insert a newnode at the beginning of the Singly Linked List (SLL).
(ii) To delete a newnode at the end of Singly Linked List (SLL). **(10 Marks)**

b. With a neat diagram, explain the linked representation of sparse matrix,

$$\begin{bmatrix} 10 & 0 & 3 & 0 \\ 0 & 2 & 0 & 33 \\ 42 & 0 & 0 & 55 \\ 0 & 0 & 61 & 0 \end{bmatrix}$$

4×4 Sparse matrix **(10 Marks)**

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

6 a. Write a C program to insert a newnode at a specified position in a Doubly linked list. **(10 Marks)**

b. Write a C program to implement Queue operations using Singly Linked List (SLL). **(10 Marks)**

Module-4

7 a. Draw the Binary Search Tree (BST) for the following data and traverse the tree using inorder, preorder, postorder techniques 14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, 5 **(10 Marks)**

b. What are the advantages of threaded binary tree over binary tree? **(04 Marks)**

c. Explain the following with an example:
(i) Complete binary tree.
(ii) Height of the tree.
(iii) Leaf node.
(iv) Out degree of a node. **(06 Marks)**

OR

8 a. Construct the Binary Search Tree using given inorder and preorder sequence:
Inorder : A, D, E, F, G, H, J, M, P, Q, R, T
Preorder : J, D, A, G, E, F, H, R, M, P, Q, T **(07 Marks)**

b. Write a C function to search an element in a Binary Search Tree (BST). **(07 Marks)**

c. Write a C function to find minimum element in a Binary Search Tree. **(06 Marks)**

Module-5

9 a. Define graph and represent the graph using adjacency matrix. **(05 Marks)**

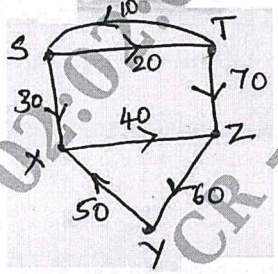

Fig. Q9 (a)

b. Explain hashing with an example. How do you resolve collision? **(10 Marks)**

c. Explain how does an append mode in a file operations differ from the write mode. **(05 Marks)**

OR

10 a. Write a C function to performa BFS of a graph. **(08 Marks)**

b. Summarise the features of relative file organization. **(06 Marks)**

c. Sort the following list of members using Radix sort,
1132, 8344, 2148, 5247, 6214, 9132, 0378, 3666, 4259, 7589 **(06 Marks)**

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