

**Vivekananda College of Engineering & Technology, Puttur**

[A Unit of Vivekananda Vidyavardhaka Sangha Puttur @]

Affiliated to VTU, Belagavi & Approved by AICTE New Delhi

CRM08

Rev 1.10

CSE

05/01/2022

**CONTINUOUS INTERNAL EVALUATION- 2**

Dept:CSE	Sem / Div:3/ A & B	Sub:Data Structures and its Applications	S Code:18CS32
Date:11/01/2022	Time: 3:00-4:30 pm	Max Marks: 50	Elective:N

Note: Answer any 2 full questions, choosing one full question from each part.

Q N	Questions	Marks	RBT	COs
<b>PART A</b>				
1 a	Give the node structure for the following operations on a singly linked list of integers. (i) Create a list which contains 3 nodes with data 100,150,200. Insert a node with data 400 at the end of the list. (ii) Insert a node with data 500 between the nodes having data values 100 and 150. (iii) Display the singly linked list. Write the C function for (i) and (iii)	9	L3	CO3,4
b	Write an algorithm to add 2 polynomials using circular singly linked list (CSLL). And also represent the given polynomial using CSLL. $P(x, y, z) = 6x^2y^2z - 4yz^5 - 4yz^5 + 3x^3yz + 2xy^5z - 2xyz^3$	8	L3	CO3,4
c	Write the C function for the following: a) Concatenation of 2 singly linked lists b) Reverse a single linked list	8	L2	CO3,4
<b>OR</b>				
2 a	What are the advantages of doubly linked list over singly linked list? Write a C function to perform the following operations on double linked list. (i) Inserting a node at the beginning. (ii) Deleting a node at the end.	9	L3	CO3,4
b	How can a stack be represented using a singly linked list? Write C functions for linked implementation of push and pop.	8	L3	CO3,4
c	Give the node structure of sparse matrix (header and element) and represent the following sparse matrix using header circular linked list. $A = \begin{bmatrix} 0 & 10 & 0 & 0 \\ 3 & 0 & 0 & 5 \\ 8 & 0 & 2 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 8 & 0 \end{bmatrix}$	8	L2	CO3,4
<b>PART B</b>				
3 a	Draw an expression tree for the following arithmetic expression $(A+B*C) + ((D*E+F)*G)$ Traverse the above generated tree using inorder, preorder and postorder.	9	L3	CO3,4
b	Explain the following trees with example i) Binary tree	8	L2	CO3,4

**CONTINUOUS INTERNAL EVALUATION- 2**

ii) Full binary tree iii) Complete binary tree iv) Skewed binary tree			
c Explain Array representation and linked representation of binary tree for the following example. Which representation is more suitable and why?	8	L3	CO3,4
<pre>                 graph TD                     A((A)) --- B((B))                     A --- C((C))                     B --- D((D))                     C --- E((E))                     C --- F((F))                 </pre>			
OR			
4 a Construct binary tree form following inorder and preorder sequence. Write C function for inorder, preorder and postorder traversal methods.  inorder: 5,10,12,11,18,22,26,30,31,35,44,50,66,70,80 preorder:30,11,10,5,12,22,18,26,50,35,31,44,70,66,80	9	L3	CO3,4
b Represent the following tree using i) Left Child- Right Sibling Representation ii) Degree-Two tree (Left child-Right Child Representation)	8	L3	CO3,4
<pre>                 graph TD                     A[A] --- B[B]                     A --- C[C]                     A --- D[D]                     B --- E[E]                     B --- F[F]                     E --- K[K]                     E --- L[L]                     C --- G[G]                     D --- H[H]                     D --- I[I]                     D --- J[J]                     H --- M[M]                 </pre>			
c Explain threaded binary tree with its data structures. Write threaded binary tree and its memory representation for the following binary tree.	8	L3	CO3,4
<pre>                 graph TD                     A((A)) --- B((B))                     A --- C((C))                     B --- D((D))                     B --- E((E))                     D --- H((H))                     D --- I((I))                     C --- F((F))                     C --- G((G))                 </pre>			