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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Second Semester, Master of Computer Applications (MCA)

Semester End Examination; June - 2016

Data Structures using C

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

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|---|----|---|---|
| 1 | a. | What is Abstract data type? Write ADT for array for the following basic operations on it; storing an element to the array and extracting an element from the array. | 6 |
| | b. | Write a C program to sort a list of names in alphabetical order. | 8 |
| | c. | Explain how structures are different from arrays. | 6 |
| 2 | a. | Explain the concept of pointers with an example program. | 4 |
| | b. | Write ADT for Rational numbers, with operations like add-rational, multi-rational and equality check-rational. | 8 |
| | c. | Differentiate between structures and unions. | 4 |
| | d. | Write C function to copy a string to another string without using library function. | 4 |

UNIT - II

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|---|----|---|---|
| 3 | a. | Define recursion. Write a C recursive program to find the factorial of a number. | 6 |
| | b. | Write a C program to implement binary search using recursive method. | 8 |
| | c. | Convert the following infix expressions to postfix and prefix expression : | |
| | | (i) $B^{\wedge}C^{\wedge}D/E$ | |
| | | (ii) $(A*B) \$ C+D$ | 6 |
| | | (iii) $A+B * C/D$ | |
| 4 | a. | List out the technical applications of stack. | 4 |
| | b. | Explain the stack overflow and underflow conditions of push and pop operations of the stack respectively. Write snippet code for the same in C. | 8 |
| | c. | Write a C program to evaluate a valid postfix expression. | 8 |

UNIT - III

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|---|----|--|----|
| 5 | a. | Write ADT for Queue operations: Q-Enqueue and Q-Dequeue. | 5 |
| | b. | Write a C function to insert an element to ascending priority Queue. | 5 |
| | c. | With neat diagram(s) explain the working of circular queue. Write snippet code wherever necessary. | 10 |
| 6 | a. | Write C functions for the following using SLL : | |
| | | (i) Deleting a node based on given information | 8 |
| | | (ii) Inserting a new node at the front. | |

Contd...2

- b. Explain how linked list is advantageous over arrays. 4
- c. Write a C function to add a new node and delete a node using DLL. 8

UNIT - IV

- 7 a. Write a C program to create a Binary search Tree and traverse the same using preorder, postorder and inorder traversal technique. 8
- b. Create a binary search Tree for the following Sequence: 120, 60, 80, 140, 100, 40 and write the order of traversals: preorder, postorder on the created Binary search tree. 8
- c. Write a note on threaded binary tree. 4
- 8 a. Write a C program to apply binary search technique on list of alphabetically sorted names. 10
- b. Explain linear search with an example. 10

UNIT - V

- 9 a. Write a C program to implement merge sort technique on a list of numerical values. 10
- b. Apply ascending heap sort technique on the following sequence : 10
40, 80, 60, 20, 50, 30, 70, 10
- 10 a. Write a C program to implement Bubble sort technique and trace the same for the following sequence : 10
5, 9, 8, 2, 3, 6
- b. Write a C program to implement Quick sort technique for integer list. 10

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