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OIEL-002

DIPLOMA – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI) / ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRONICS AND COMMUNICATION ENGINEERING (ACECVI)

Term-End Examination

December, 2015

OIEL-002 : DATA STRUCTURES

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any* ***five*** *questions. Question no.* ***1*** *is* ***compulsory.*** *All questions carry equal marks.*

1. Choose the correct answer. *7×2=14*

(a) What is the index number of the last element of an array with 19 elements ?

(i) 19

(ii) 18

(iii) C

(iv) None of the above

(b) Which of the following is the proper declaration of a pointer ?

(i) int x

(ii) int &x;

(iii) ptr x;

(iv) int *x;

(c) The complexity of merge sort algorithm is

(i) O(n log n)

(ii) O(n)

(iii) O(log n)

(iv) None of the above

(d) The order followed by a queue is

(i) FIFO

(ii) LIFO

(iii) Random

(iv) None of the above

(e) A pointer is a variable which contains the address of another variable. (True/False)

(f) An array element need not occupy contiguous memory locations. (True/False)

(g) A function can return only one value at a time. (True/False)

2. (a) What is a function ? What are the differences between user defined functions and library functions ? 7

(b) Write a program to count the number of lines in a file. 7

3. (a) Write a program to find the product of two matrices. 7

(b) What is a pointer ? Why do we use pointers in C ? How can a pointer be used in a multidimensional array ? 7

4. (a) Define a linked list. Write a 'C' program to delete the first node of a linked list. 7

(b) Explain Hashing. Describe the various hash functions with examples. 7

5. (a) Write the algorithm : 7

(i) To insert an element into a queue

(ii) To delete an element from a queue

(b) Write the algorithm to convert an infix expression to a prefix expression. 7

6. (a) Write a program to search an element, using linear search techniques. 7

(b) Explain Breadth first search techniques for graph traversal using suitable examples. 7

7. (a) A binary tree has nine nodes. Its inorder and preorder traversal node sequences are as follows :

Inorder : E, A, C, K, F, H, D, B, G

Preorder : F, A, E, K, C, D, H, G, B

Draw the tree. 7

(b) Write a program to sort the elements of an array using selection sort technique. 7

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Representation of a Graph

(b) Minimal Spanning Tree

(c) Depth First Search

(d) Binary Search

(e) Structure

(f) Recursive Function