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**DIPLOMA ENGINEERING
DECVI / ACECVI**

Term-End Examination

December, 2013

OIEL-002 : DATA STRUCTURES

Time : 2 hours

Maximum Marks : 70

Note : Question No.1 is compulsory. Attempt any four questions from the rest. Assume any missing data if any.

1. State whether True/False.
- (a) The '*' is on indirection operator. 2
 - (i) True
 - (ii) False
 - (b) The communication between the calling program and the subprogram is done through arguments. 2
 - (i) True
 - (ii) False
 - (c) Recursion can be used to write simple, short and elegant programs. 2
 - (i) True
 - (ii) False
 - (d) A structure can be defined in C by the keyword 'main' followed by its name. 2
 - (i) True
 - (ii) False

Choose the correct answer.

- (e) The data arranged in an ordered and useful form is known as 2
- (i) raw data
 - (ii) raw item
 - (iii) information
 - (iv) all the above
- (f) 'fputs' function can be used for 2
- (i) send a string to a stream
 - (ii) send a character to a stream
 - (iii) send formatted data to a stream
 - (iv) none of above
- (g) A strictly binary tree with n leaves always contain exactly 2
- (i) $2n - 1$ nodes
 - (ii) $2n + 1$ nodes
 - (iii) $2n$ nodes
 - (iv) n nodes
2. (a) Write a 'C' function that will return the number of nodes in a circular linked list. 7
- (b) What is priority queue? How priority queue can be represented in memory? 7
3. (a) Explain the advantages of binary search over sequential search. 7
- (b) What are the different ways of representing a graph? Explain with suitable examples. 7
4. (a) Construct a binary tree whose nodes in in-order and pre-order are given as follows. 7
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|-------------|----|----|----|----|----|----|----|----|----|
| in-order : | 20 | 10 | 5 | 8 | 25 | 22 | 21 | 24 | 28 |
| pre-order : | 5 | 8 | 10 | 20 | 21 | 22 | 24 | 25 | 28 |
- (b) Write a function to represent polynomial by using an array. 7

5. (a) Differentiate between sequential and random access files. 7
(b) Compare structure and union with the help of examples 7
6. (a) Why hashing is necessary ? Explain various hash functions with examples. 7
(b) Write an algorithm to represent manipulation of polynomials using linked list. 7
7. (a) Consider the following array and show content of the array after applying quicksort. (consider 1st no is pivot). 7
array : 24 56 47 35 10 90 82 31
(b) Write a program to convert an infix expression into postfix expression. 7
8. Write short notes on **any four** of the following :
(a) Insertion sort and its complexity. 3.5x4=14
(b) Functions 'call by value' process.
(c) Recursive functions.
(d) Characteristics of a good program.
(e) Shortest path algorithm.
(f) Doubly linked list.
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