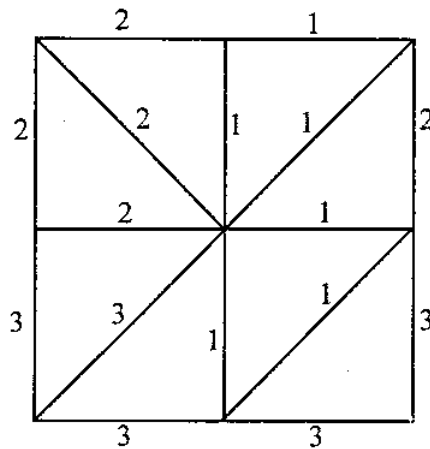
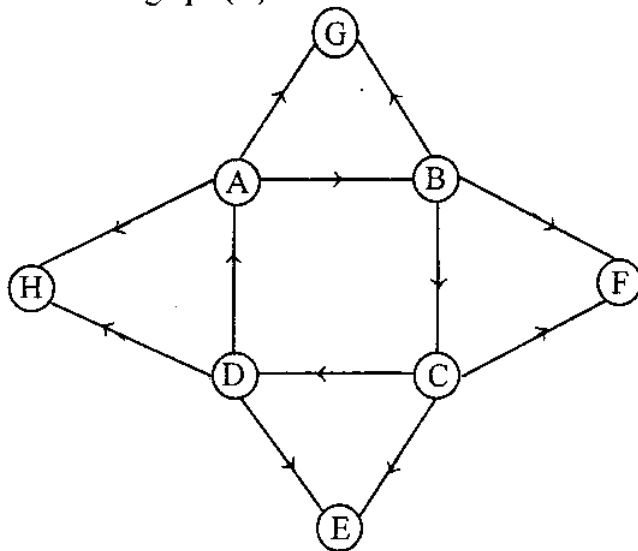


7



Consider graph (G)



- 7

CS/IT-305

Time : Three Hours

Maximum Marks : 70

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
- ii) All parts of each question are to be attempted at one place.
- iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.
- iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What are the goal of data structure. 2
- b) What do you mean by garbage collection. 2
- c) Difference between abstract data type specification and implementation. 3
- d) Give the simulation of recursive version of tower of Hanoi problem and simplify the simulation to produce a non recursive version. 7

How is physical memory allocated for a two dimension array? If each element of an array $x[20][50]$ requires 4 bytes of storage base address of DATA is 2000, determine the location of $x[0][10]$ when the array is stored as

- | | | |
|--------------|------------------|---|
| i) Row major | ii) Column major | 7 |
|--------------|------------------|---|

PTO

Unit - II

2. a) What is dangling pointer and how to avoid it? 2
 b) What are the disadvantage of representing a stack or queue by link list? 2
 c) Convert following infix notation into prefix and postfix.
 $-b + \sqrt{b^2 - 4ac} / 2a$ 3
 d) Design a C function for keeping two stack of integer within a single array main stack [space size] so that neither stack overflow until all of the memory is used and an entire stack is never shifted to a different location within the array. 7

OR

Suppose we wish to use an extra bit in a queue records to indicate whether a queue is empty modify the declaration and operation of circular queue to accomodate this feature.

7

Unit - III

3. a) Why complete binary tree structure considered as efficient space and time complexity? 2
 b) In an AVL tree at what condition the balancing is to be done. 2
 c) Prove that a tree with K nodes has exactly (k-1) edge or branches. 3
 d) The following data are to be inserted in an AVL tree in the following order.
 20, 25, 30, 40, 45, 60, 55, 57
 Show the tree every time balancing is required. 7

OR

Suppose A, B, C, D, E, F, G, & H are 8 data items and suppose they are assigned weights as

Data item	A	B	C	D	E	F	G	H
Weight	22	5	11	19	2	11	25	5

Construct the tree T with minimum weighted path length using above data and using Huffman's algorithm. 7

Unit - IV

4. a) Define the term 2
 i) Internal sorting
 ii) External sorting
 b) What are the disadvantages of sequential search? 2
 c) Describe the complexity of heap sort. 3
 d) Sort the following integers using quick sort 7
 25, 57, 48, 37, 12, 92, 86, 33.

OR

Construct a heap tree for following nodes
 5, 16, 22, 45, 2, 10, 18, 30, 50, 12, 1

7

Unit - V

5. a) What do you mean by graph and multi graph? 2
 b) Is it possible to connect a graph into tree if yes how. 2
 c) For following graph find 3
 i) In degree and out degree of each vertex
 ii) Strongly connected component
 iii) Adjacency matrix

