No. of Printed Pages : 3

MCS-021

MCA (Revised) / BCA (Revised)

Term-End Examination

December, 2021

MCS-021 : DATA AND FILE STRUCTURES

Time : 3 hours *Maximum Marks : 100*

(Weightage : 75%)

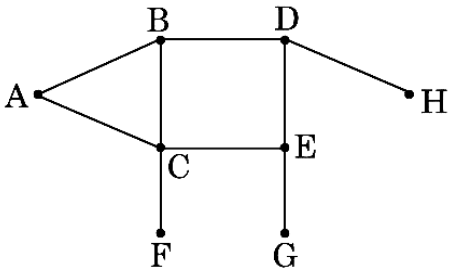
Note : *Question number **1** is **compulsory**. Attempt any **three** questions from the rest. All algorithms should be written near to 'C' language.*

1. (a) What is sparse matrix ? Explain 3-tuple representation of sparse matrix with the help of a suitable example. *10*

(b) Write the process for converting the following infix expression into postfix expression using stack : *10*

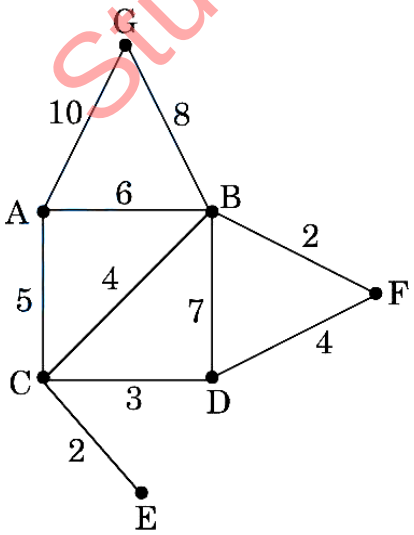
$$X * Y * (Z \mid P - Q) * T + R$$

(c) Find the Adjacency Matrix for the following graph : 5



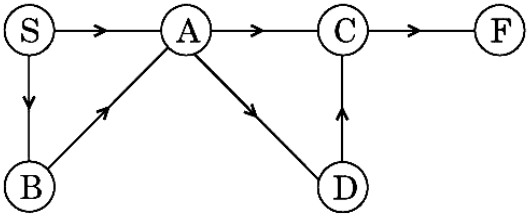
(d) Write an algorithm to create a doubly-linked list and addition of elements to it. 5

(e) Find the minimum cost spanning tree for the following graph using Prim's algorithm :



Show all the intermediate steps of the process. 10

2. (a) Write the Depth First Search (DFS) algorithm and travel the following graph using DFS algorithm : *10*



(b) Explain Indexed Sequential File organization with the help of an example. Also write its advantages. *10*

3. (a) Write an algorithm for addition of two polynomials. *10*

(b) What is Heap Sort ? What is its complexity ? Explain how a heap is created using an example. *10*

4. (a) Explain how Static memory allocation is different from Dynamic memory allocation. In which situation is Static memory allocation a better choice ? Explain briefly. *10*

(b) Briefly explain AA-Trees. *10*

5. (a) Write an algorithm to add two matrices using arrays. Also find the time complexity of this algorithm. *10*

(b) Write short notes on the following : *2×5=10*

(i) Forest

(ii) Priority Queue