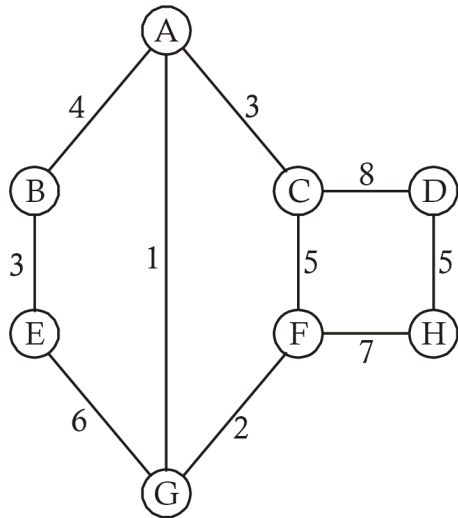


8. What is a minimum spanning tree ? Give Kruskal's algorithm to find a minimum spanning tree. Determine the minimum spanning tree of the following graph :



9. Define tree traversals of a binary tree and find a binary tree whose preorder, in-order traversals are given :

Preorder : G B Q A C P D E R

In-order : Q B C A G P E D R

MSCCS-07/MSCCS-201/ MSCCSC-201/MCA-201

June – Examination 2022

MSCCS (Final)/MCA (IInd Year) Examination

Data Structure and Algorithm

Paper : MSCCS-07/MSCCS-201/MSCCSC-
201/MCA-201

Time : 1½ Hours]

[Maximum Marks : 80

Note :- The question paper is divided into two Sections A and B. Write answers as per the given instructions.

Section-A

4×4=16

(Very Short Answer Type Questions)

Note :- Answer any *four* questions. As per the nature of the question delimit your answer in one word, one sentence or maximum up to **30** words. Each question carries 4 marks.

1. (i) Define Tree. Prove that a tree with n vertices has exactly $n - 1$ edges.
- (ii) Mention the demerits of linked list. Give an example.
- (iii) Explain *four* major operations of linear data structure in short.
- (iv) Convert the infix $(a+b)*(c+d)/f$ into postfix and prefix expression.
- (v) What do you mean by Abstract Data Types ? Give some examples.
- (vi) Write an algorithm of binary search. Give its time complexity.
- (vii) What do you mean by Planar Graph ? Give an example.
- (viii) A college bus moving between different routes in working days is as follows :
Route1(R1), Route2(R2), Route3(R3),
Route4(R4), Route5(R5).
Represent the way through which the college bus moves between different stops listed above using an appropriate data structure.

Section-B

4×16=64

(Short Answer Type Questions)

Note :- Answer any *four* questions. Answer should not exceed **200** words. Each question carries 16 marks.

2. What is a Graph ? Explain how graphs are represented with suitable examples.
3. What is Quick Sort ? Write its algorithm. Compare its complexity with bubble sort.
4. What is Linked List ? How is it represented in memory ? Briefly explain header linked list.
5. Write a program/algorithm to check if the array has duplicate values or not. Find its complexity also.
6. What is Stack ? What are the basic operations associated with stack ?
7. What is analysis of algorithm ? Explain the Asymptotic Notations (Big O, Ω , θ) used while analyzing an algorithm.