

BACHELOR OF COMPUTER APPLICATIONS (CBCS - 2018 COURSE)

B.C.A. Sem-V : : SUMMER - 2022

SUBJECT : GRAPH THEORY

Day : Monday
Date : 30-05-2022

S-18790-2022

Time : 02:00 PM-05:00 PM
Max. Marks : 60

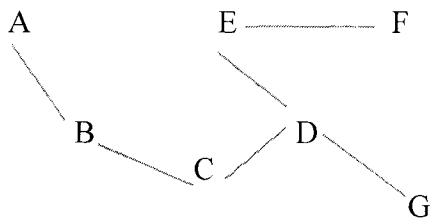
N.B.

- 1) Q.No. 4 from Section I is **COMPULSORY**.
- 2) Answer **ANY TWO** questions from Q.1,2,3 in Section – I.
- 3) Answer **ANY TWO** questions from Q.5,6,7 in Section – II.
- 4) All questions carry **EQUAL** marks.
- 5) Answer to both the sections should be written in **SAME** answer book.
- 6) Draw a labeled diagram **WHEREVER** necessary.

SECTION – I

Q.1 Answer the following : (6 marks x 2 = 12 marks)

- a) Suppose that in a group of 5 people A, B, C, D & E the following parts of people are acquainted with each other
 - A & C
 - A & D
 - B & C
 - C & D
 - C & E
- i) Draw a graph G to represent this situation
- ii) List the vertex set and the edge set using set notation.
- b) Perform a Breadth-First-Search (BFS) of the following graph. Where E is the starting node
 - i) Perform counter clockwise ordering from top
 - ii) Use clockwise ordering from top.



Q.2 Answer the following : (6 marks x 2 = 12 marks)

- a) Write and discuss 'Konigsberg Bridge Problem'.
- b) Explain the following graphs (Any Two) with neat diagram
 - i) Connected graph
 - ii) Multi-graphs
 - iii) Dual graphs.

Q.3 Answer the following : (6 marks x 2 = 12 marks)

- a) Write and Discuss 'Floyde's Algorithm'.
- b) What is meant 'Isomorphic graph'. Discuss with suitable example.

Q.4 Write short notes on **ANY THREE** of the following : (4 marks x 3 = 12 marks)

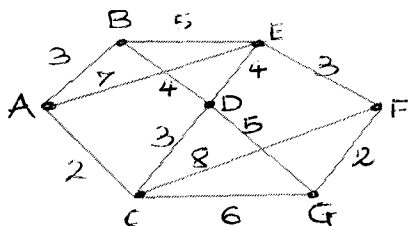
- a) Applications of Trees
- b) Vertex coloring
- c) Seating Arrangement Problem
- d) Euler's path

PTO

SECTION - II

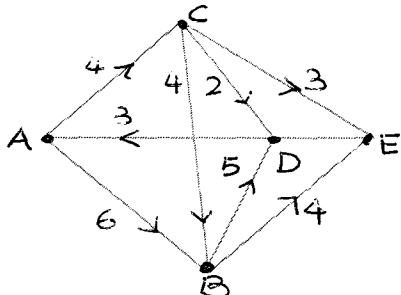
Q.5 Answer the following : (6 marks x 2 = 12 marks)

- a) Write Prim's Algorithm for finding minimal spanning tree.
- b) Find the shortest distance of all vertices from the vertex 'A' for the graph shown below. Use Dijkstra's Algorithm.



Q.6 Answer the following : (6 marks x 2 = 12 marks)

- a) Draw two 3-regular graphs with nine vertices.
- b) In the graph given below, capacity is given along each edge. Find the value of maximum flow from A to B in the network.



Q.7 Answer the following : (6 marks x 2 = 12 marks)

- a) What do you mean by a planar graph? Check whether $K_{2,3}$ is a planar graph.
- b) Find the minimum numbers of colors need to print the graph shown.

