P–1025

SET/CSE/SEC/2A2

B.C.A./B.Sc. (IT) / B.Sc. (CS)

(Fourth Semester)

EXAMINATION, 2023-24

(Elective Paper)

GRAPH PAPER

Two Hours]   [*Maximum Marks : 70*

(i) Attempt any *five* questions (out of seven questions) from Section A and any *three* questions (out of six questions) from Section B.

(ii) Answer each question of Section A within 50 words.

(iii) Limit your answes within the given answer book. Additional answer book (B-answer book) should not be provided or used.

P. T. O.

Section—A

Note : Attempt any *five* questions. Each question carries 5 marks.

1. What is the maximum number of edges in a simple graph with 7 vertices ? Justify your answer.

2. show that all vertices of an Euler graph G are of even degree.

3. Define walk, path and circuit.

4. Define fundamental circuits and fundamental cut sets.

5. Prove that edge connectivity of a graph cannot exceed the degree of the vertex with the smallest degree in G.

6. Define chromatic number. What is the chromatic number of a tree with two and more vertices ?

7. Construct the adjacency matrix and incidence matrix of the graph.
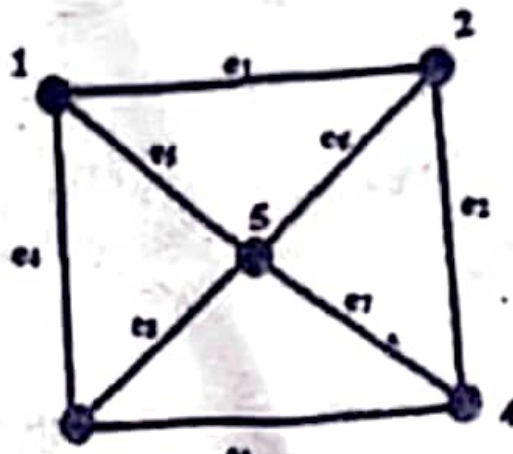
Section—B

Note : Attempt any *three* questions. Each question carries 15 marks.

8. Define Eulerian circuit and prove that a connected planar graph with n vertices and e edges has e-n+2 regions.

9. Write down Dijkstra's algorithm and use it to find the shortest path from s to t.
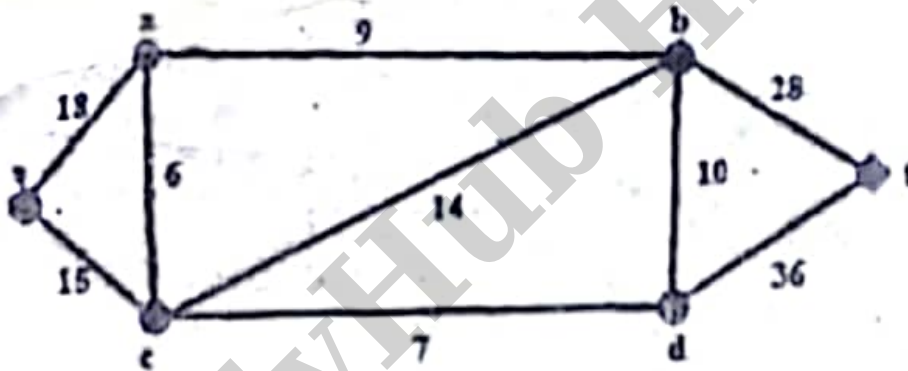
10. Define Hamiltonian circuits and paths with examples. Find out the number of edge-disjoint Hamiltonian circuits possible in a complete graph with five vertices.

11. Explain connectivity and seperability of a graph. What is the maximum vertex connectivity and edge connectivity for the graph shown in the following figure ?