BACHELOR OF SCIENCE (COMPUTER SCIENCE) (CBCS - 2018 COURSE)
F.Y.B.Sc.(Computer Science) Sem-II : WINTER :- 2021
SUBJECT: GRAPH THEORY

Day : Friday
Date 21-01-2022

W-20080-2021

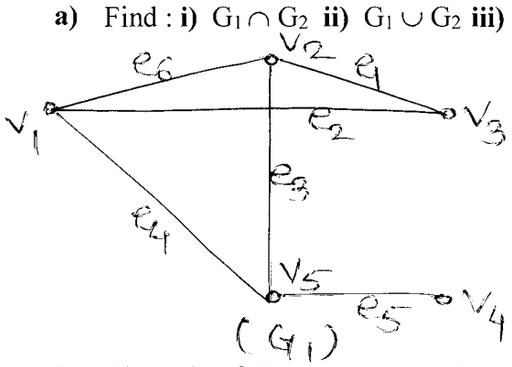
Time : 02:00 PM-05:00 PM
Max. Marks: 60

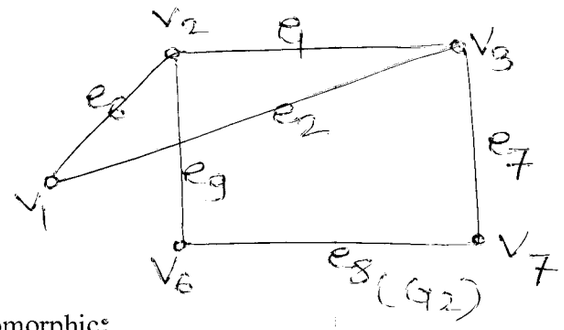
N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

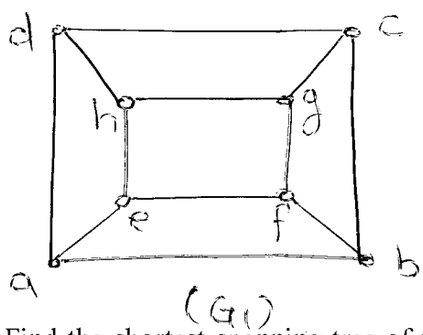
Q.1 Attempt **ANY TWO** of the following: **[12]**

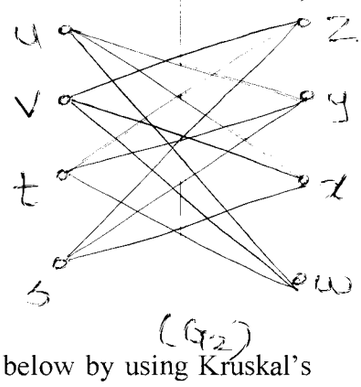
a) Find : **i)** $G_1 \cap G_2$ **ii)** $G_1 \cup G_2$ **iii)** $G_1 \oplus G_2$ for the following graphs G_1 and G_2.



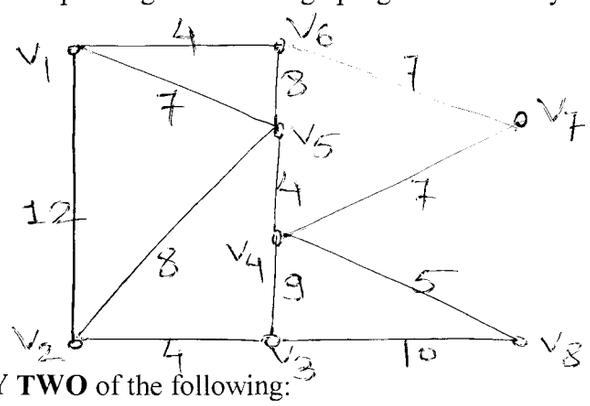


b) Show that following two graphs are isomorphic:



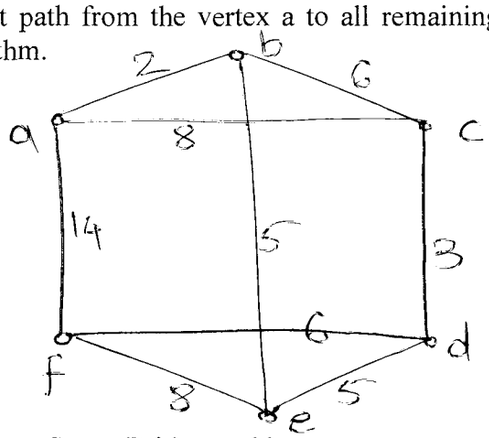


c) Find the shortest spanning tree of the graph given below by using Kruskal's algorithm.



Q.2 Attempt **ANY TWO** of the following: **[12]**

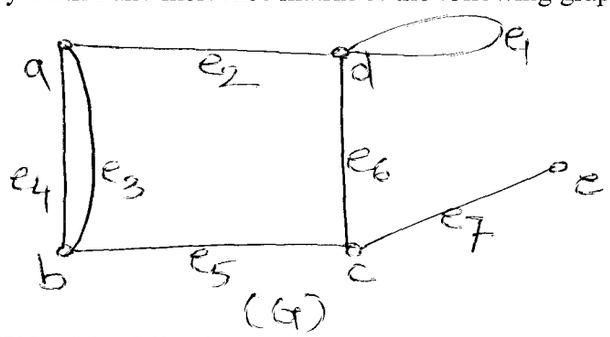
a) Find the shortest path from the vertex a to all remaining vertices by using Dijkstra's algorithm.



b) Explain Konigsberg Seven Bridge problem.

P.T.O.

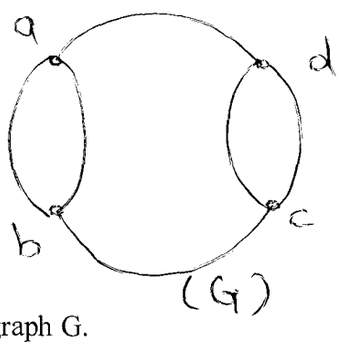
c) Find the adjacency matrix and incidence matrix of the following graph.



Q.3 Attempt **ANY TWO** of the following: **[12]**

a) Write the steps of Fleury's algorithm to find Eulerian tour in a Eulerian graph.

b) Find number of cycles in the following graph G.

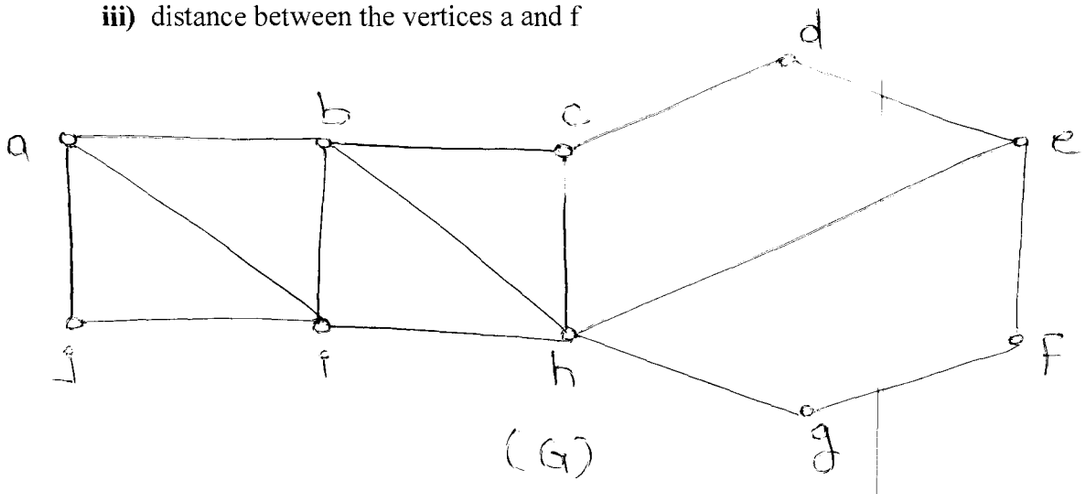


c) Find in a following graph G.

i) a path of length 8.

ii) a walk of length 7.

iii) distance between the vertices a and f



Q.4 Attempt **ANY THREE** of the following: **[12]**

a) What is the diameter of Peterson's graph?

b) Find maximum and minimum height of a binary tree with 13 vertices. Draw such trees.

c) Give an example of following graphs:

i) Both Hamiltonian and Eulerian.

ii) neither Hamiltonian nor Eulerian.

d) Define: **i)** Complete graph **ii)** Regular graph

iii) Bipartite graph **iv)** Complete-bipartite graph

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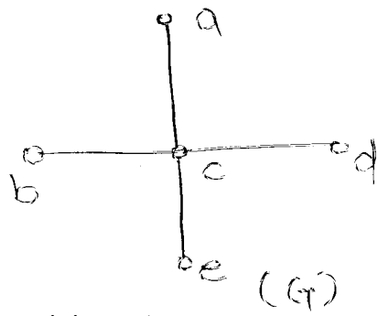
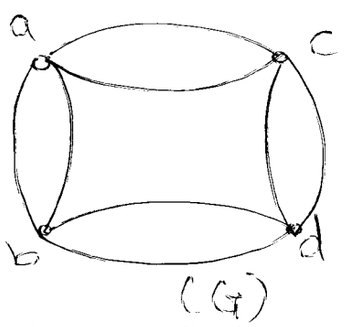
Q.5 Attempt **ANY FOUR** of the following: **[12]**

a) State and prove Handshaking Lemma.

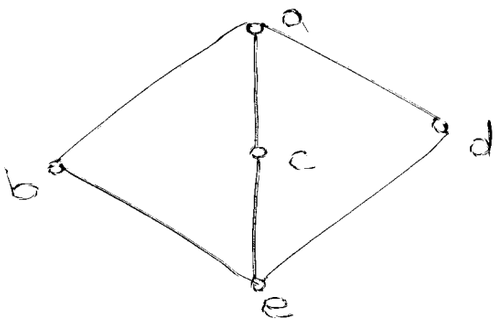
b) Draw the complement of the following graph G:



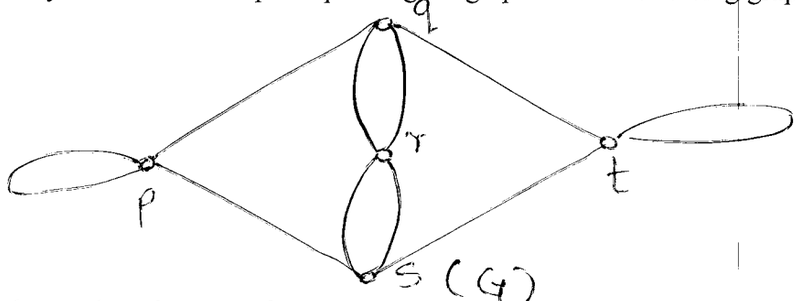
c) Find the edge connectivity and vertex connectivity of the following graph G:



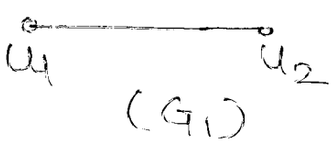
d) Show that following graph is not Hamiltonian.

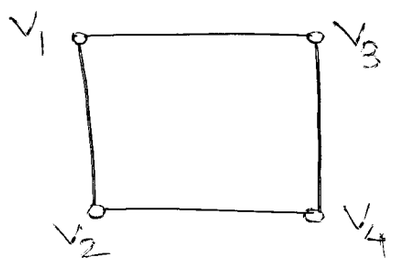


e) Draw any two non-isomorphic spanning subgraphs of the following graph G:



f) Find the product $G_1 \times G_2$ of the following graphs:





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