F.Y. B. SC. (Computer Science) SEM –II (CBCS - 2016 COURSE) :
SUMMER - 2019
SUBJECT: GRAPH THEORY

Day: Friday
Date: 12/04/2019

S-2019-1081

Time: 03.00 PM TO 06.00 PM
Max. Marks: 60

N.B:

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

Q.1 A) Choose the correct alternatives: **(06)**

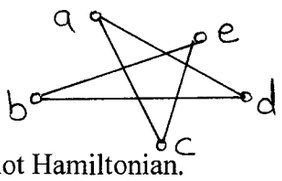
i) If G be a simple graph with atleast two vertices then_____

a) $G \cong K_3$
b) G has atleast two vertices of same degree
c) $G \cong K_{2,4}$
d) G is null graph

ii) Consider a simple connected graph G with n vertices and n edges (n > 2) then_____

a) G has atleast one cycle
b) G has exactly one cycle
c) G has no cycle
d) None of these

iii) Following graph is _____



a) Eulerian but not Hamiltonian.
b) Hamiltonian but not Eulerian.
c) Both Eulerian and Hamiltonian.
d) Only Eulerian.

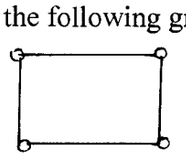
iv) The idea of Kruskal's algorithm is to always pick the smallest edge but avoid creating any cycle. The statement is _____.

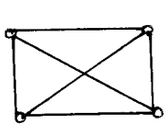
a) True
b) Sometimes False
c) False
d) Sometimes true

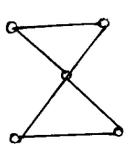
v) Let V is vertex of tree T. It is cut vertex iff_____.

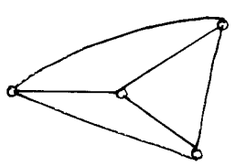
a) d (v) >, 2
b) d (v) = 1
c) d (v) >, 2
d) d (v) = 0

vi) Which of the following graph has cut vertex

a) 

b) 

c) 

d) 

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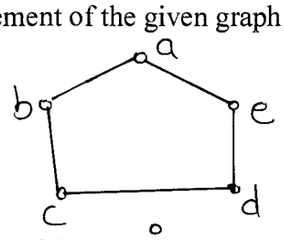
B) Attempt all of the following: **(06)**

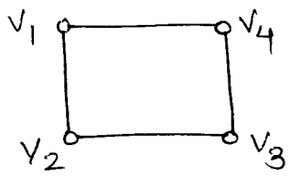
i) Draw the graph $K_{2,3}$.

ii) Define self complementary graph with an example.

iii) Draw the complement of the given graph G



iv) Show that closure of this graph is K_4

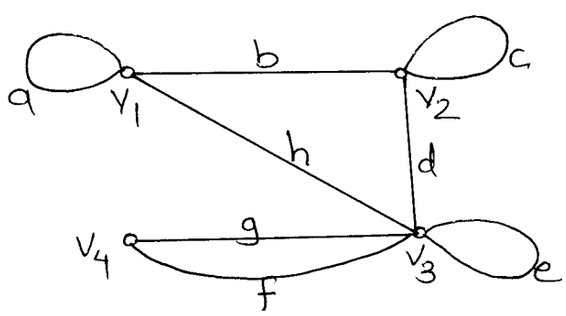


v) Draw binary tree on 7 vertices of height 2.

vi) Define Eulerian graph.

Q.2 Attempt **ANY THREE** of the following: **(12)**

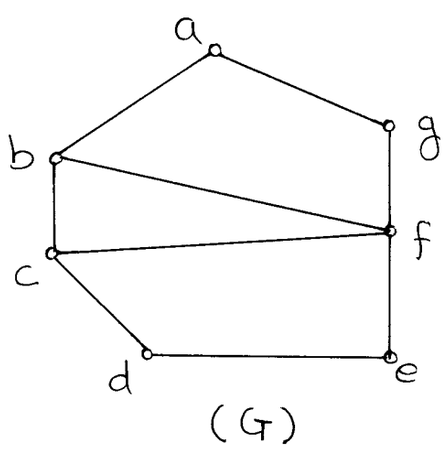
a) Find the adjacency matrix and incidence matrix of the graph



b) Explain Chinese Postman problem briefly.

c) The number of vertices in a self- complementary graph is of type 4K or 4K+1; where K is a integer.

d) Find the eccentricity of each vertex of graph G and hence find ventre of graph G.



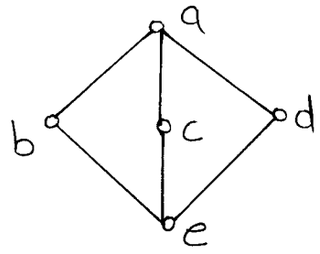
(G)

P.T.O.

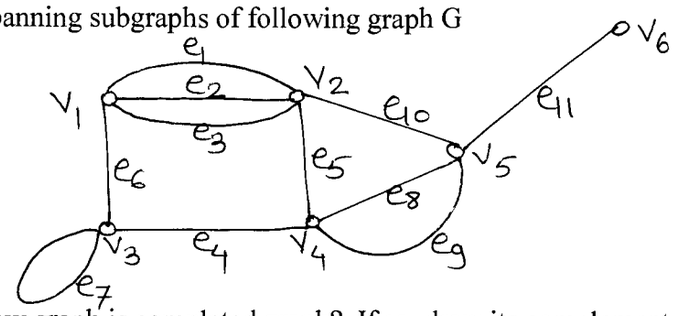
Q.3 Attempt any four of the following: **(12)**

a) Find the diameter of Peterson's graph.

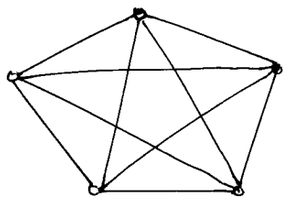
b) Show that following graph is not Hamiltonian.



c) find all spanning subgraphs of following graph G



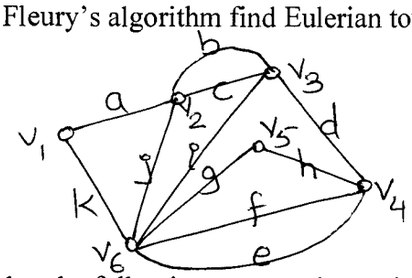
d) Is the below graph is completed graph? If so, draw its complement.



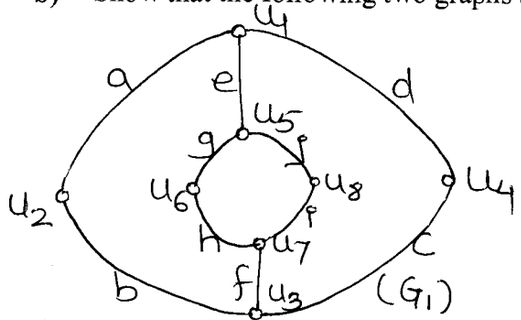
e) Determine whether the following statement is true of false.
"Every disconnected graph has an isolated vertex".

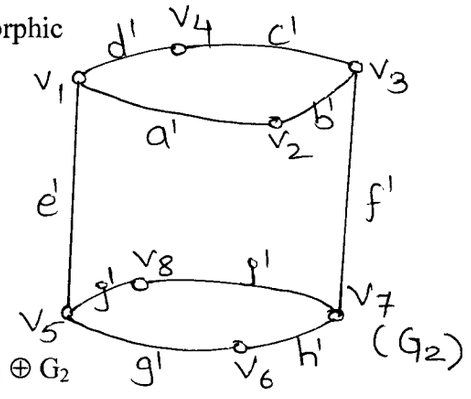
Q.4 Attempt **ANY TWO** of the following: **(12)**

a) Using Fleury's algorithm find Eulerian tour in the following graph.

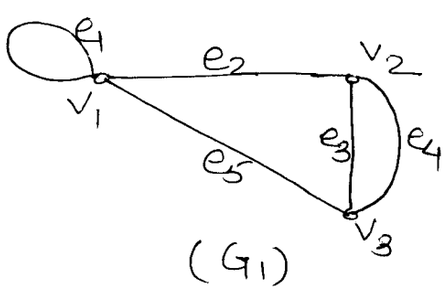


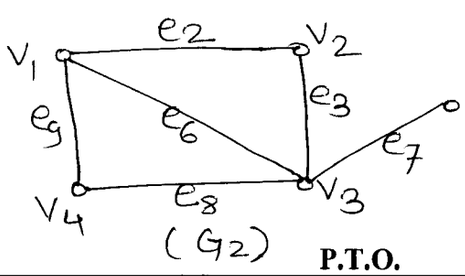
b) Show that the following two graphs are isomorphic





c) Find : i) $G_1 \cup G_2$ ii) $G_1 \cap G_2$ iii) $G_1 \oplus G_2$ for the following graphs G_1 & G_2.

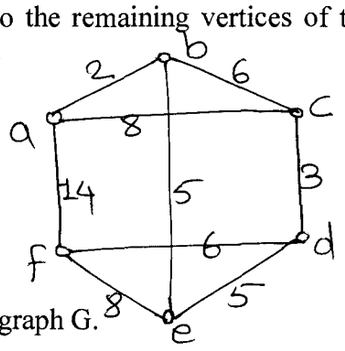




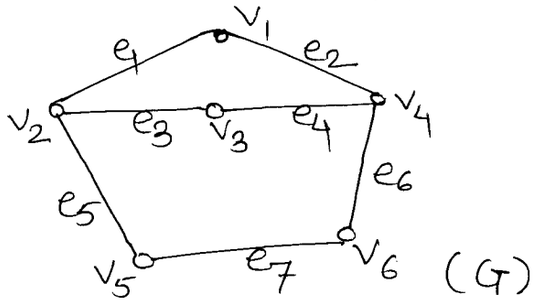
P.T.O.

Q.5 Attempt **ANY TWO** of the following: **(12)**

a) Find shortest path from vertex b to the remaining vertices of the following graph by using dijkstra's algorithm.



b) Find atleast 6 spanning trees of the graph G.



c) Explain Konigsberg Seven Bridge problems. Briefly.

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