F.Y.B.Sc. (Computer Science)
MATHEMATICS
MTC-122: Graph Theory
### (2019 Pattern) (Semester-II) (Paper-II)

[Time: 2 Hours]

[Max. Marks: 35]

Instructions to the candidates:

1) All questions are compulsory.
2) Figures to the right indicate full marks.
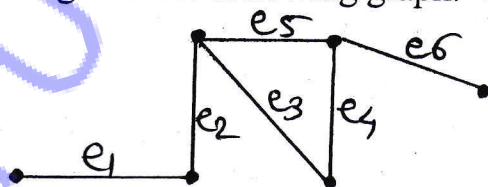3) Neat diagrams must be drawn wherever necessary.

Q1) Attempt any five of the following [10]

a) Define complete graph with example.

b) Draw the following graphs: $3R_6$, C_7

c) Define connected graph with one example.

d) What is the number of connected components in the following graph?
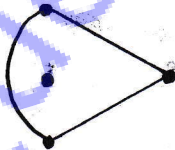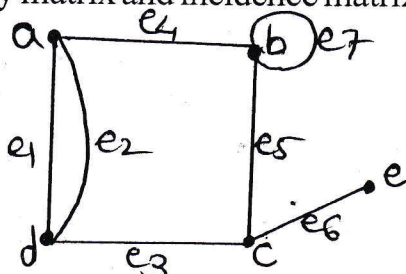

e) Find cut edges in the following graph.

f) Define center of a tree.
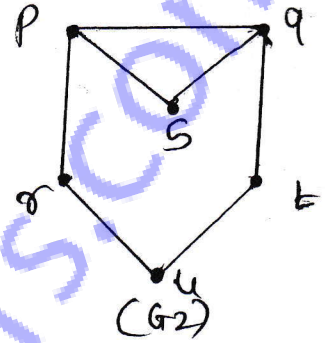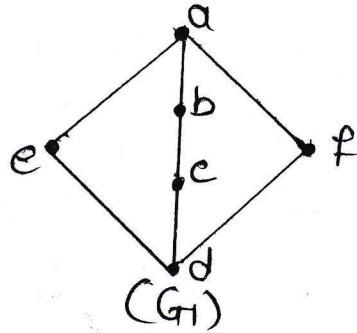
g) Define symmetric digraph with example.

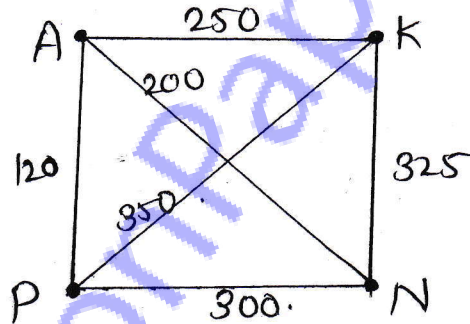**Q2)** Attempt any three of the following. [15]

a) Write the adjacency matrix and incidence matrix for the following graph G.
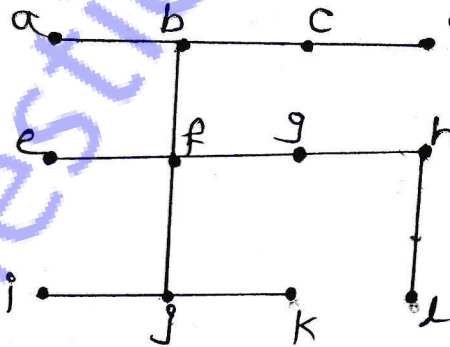
b) Determine whether the following graphs G_1 & G_2 are isomorphic or not

(G1)

(G2)

c) Draw 10 non isomorphic simple graphs with 4 vertices.

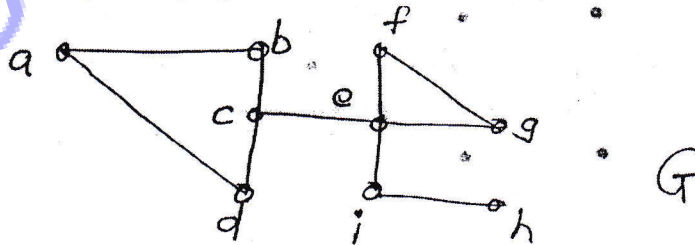d) Solve travelling salesmen problem for the following graph.

e) Find radius, Centre and diameter of the following tree.


Q3) Attempt any one of the following. [10]

a) For the given graph G answer the following questions

i) List all cut vertices in G.

ii) List all cycles in G.

iii) List any two distinct paths from the vertex a to vertex h in G.

iv) Verify Handshaking lemma for this graph.

v) Minimal degree of graph G.

P.T.O.

b) i) Use Kruskal's algorithm to find a minimum spanning tree in the following weighted graph given below.
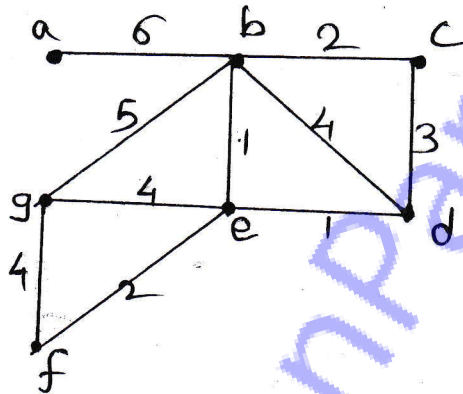
ii) Give an example of a graph which is Hamiltonian but not Eulerian graph

***