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MCA (DUAL DEGREE)
(SEM-VIII) THEORY EXAMINATION 2018-19
GRAPH THEORY

Time: 3 Hours | *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.
2. Any special paper specific instruction.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a. What is a complete graph?
b. Define walk and path in a graph.
c. What are the applications of Planar graph?
d. In simple graph with 35 edges.4 vertices of degree 5, 5 vertices of degree 4, vertices of Degree 3 find the no of vertices with degree 2?
e. Define the equivalence relation.
f. Explain the circuit matrix of a digraph.
g. What do you mean by isomorphic graphs?
h. Write down the difference between Full and Complete Binary Tree.
i. Explain the Radius and diameter of a graph.
j. What do you understand by Proper coloring a graph?

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a. Prove that every connected graph has at least one spanning tree.
b. Explain the different types of operation are performing over a graph. Also illustrate the same with examples.
c. Describe the Kuratowski's graphs and their applications.
d. Find the chromatic polynomial of a connected graph on three vertices.
e. Discuss the digraphs and its different types with examples.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

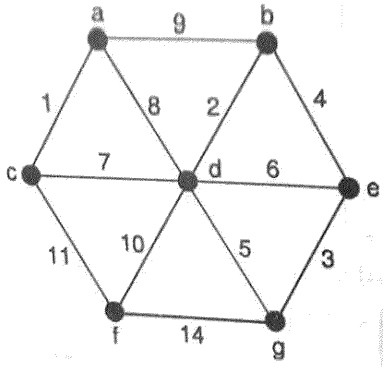
(a) Write down and discuss the steps for detection of planarity.
(b) Explain the Euler diagraph. Also discuss hand shaking dilemma.

4. Attempt any *one* part of the following: **10 x 1 = 10**

(a) What do you understand by network flow? Discuss in detail with an example.
(b) Prove that the maximum no of edge in a simple graph with n vertices is n (n-1)/2.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Show how Kruskal's algorithm find a minimum spanning tree of the following graph



(b) Define center and show that every tree has either one or two centers.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Describe steps to find incidence matrix and adjacency matrix for directed graph With suitable example.

(b) Show that every planar graph can be properly colored with five colors.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain about fundamental circuit and fundamental cut set in graph with suitable example.

(b) Construct the circuit matrix and path matrix of the following graph: