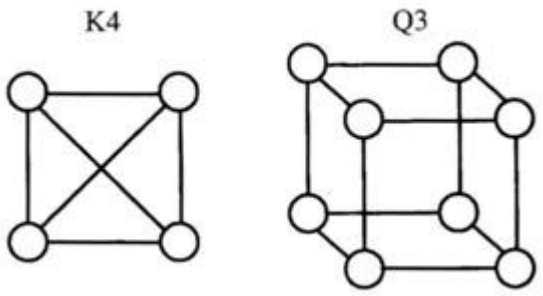
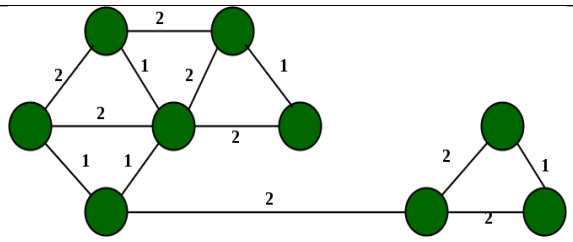
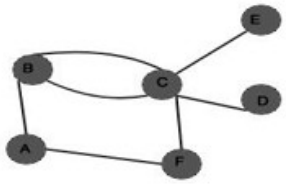
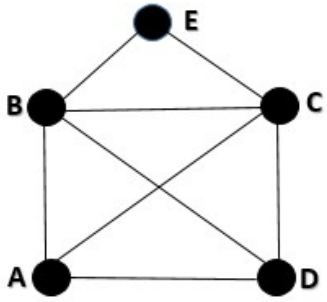
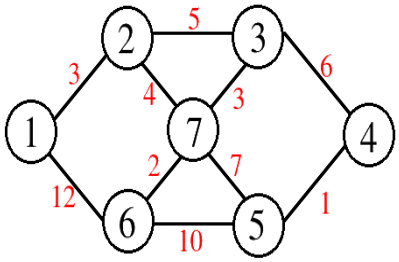
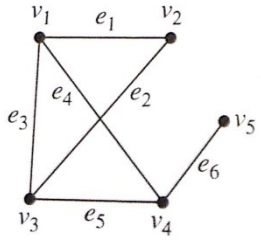
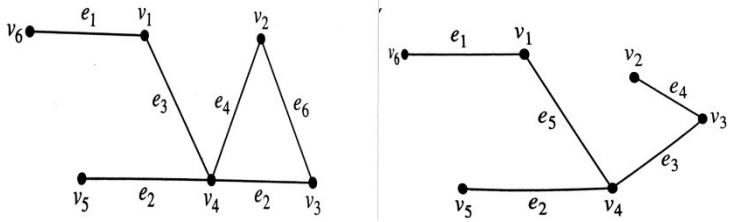
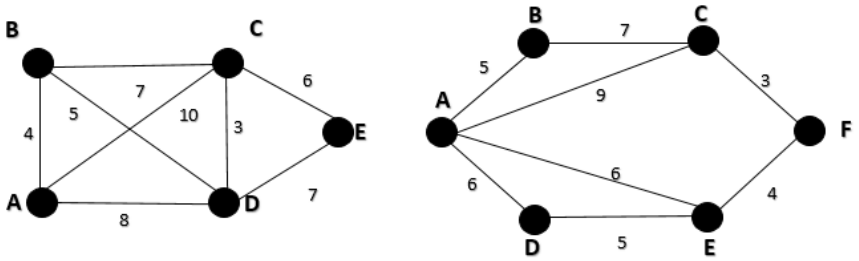
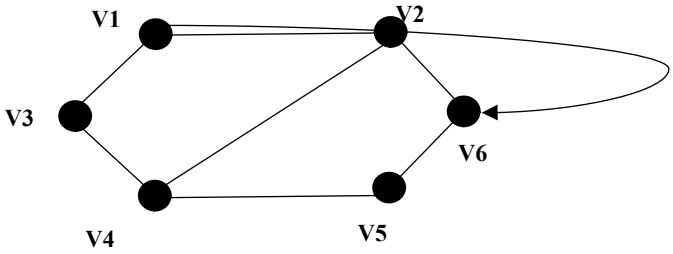
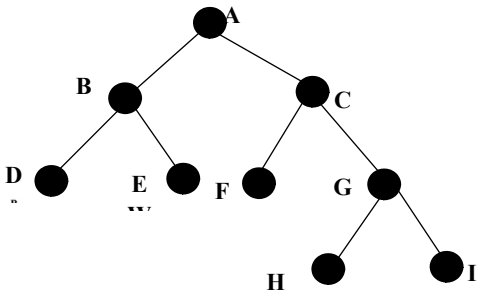
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, April/May 2018

Course: Discrete Mathematical Structures **Semester: II**
Program: BCA
Time: 03 hrs. **Max. Marks: 100**

SECTION A ***(All questions are compulsory)***

		Marks	CO
Q 1	Let A={0,1,2} and R={(0,0),(0,1),(0,2),(1,1),(1,2),(2,2)} and S={(0,0),(1,1),(2,2)} be 2 relations on A. Show (i)R is a partial order relation. (ii)S is an equivalence relation.	**4**	**CO1**
Q 2	Define Power set. Find out the all power sets of set A={1,2,3,4,5}	**4**	**CO1**
Q 3	Show that the maximum number of edges in simple graph with n vertices is n (n-1)/2.	**4**	**CO2**
Q 4	Define the following with example. a) Vector Space b) Spanning Set	**4**	**CO4**
Q 5	Explain Chromatic Polynomial for a graph G (V, E) with n vertices and λ be the largest number of colors.	**4**	**CO3**
	SECTION B ***(All questions are compulsory)***		
Q 6.	a) Let 'G' be a connected planar graph with 20 vertices and the degree of each vertex is 3. Find the number of regions in the graph. b) Find if the following two graphs are planar or not. 	**8**	**CO3**
Q 7	The number of distinct minimum spanning trees for the weighted graph below is	**8**	**CO2**

			
Q 8 **1.**	Find Hamiltonian path and Hamiltonian circuit if possible or disprove its existence in the graph:  	**8**	**CO2**
Q 9	a) Find the adjacency matrix for the following weighted undirected graph:  b) List out the four properties of Adjacency Matrix.	**8**	**CO3**
Q 10	a) Find Cut vertex and cut set for the following graph:  b) Find out eccentricity of each vertex, center and diameter for given graph.	**8**	**CO2, CO3**

			
	SECTION-C		
Q 11	Find minimum spanning tree using Prim's and Kruskal's Algorithm for the following graphs: 	**20**	**CO3**
Q 12	a) Name the Kuratowski's two most fundamental non-planar graphs. b) State and Prove Euler's Formula ***f=e-n+2*** for planar graphs having ***n*** vertices, ***e*** edges and ***f*** regions. c) Linear Independence ii)Spanning Set OR a) Find the edge connectivity and vertex connectivity of the given graph.  b) Find the pre-order, post-order and in-order traversals for the given binary tree. 	**20**	**CO2/ CO3/ C04**