Answer all the following questions:
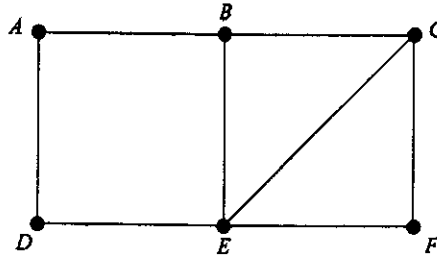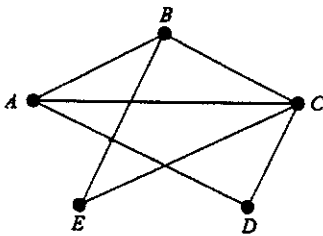
Q.1

(A) Define each of the following concepts: Directed Graph- Regular Graphs- Spanning Trees.

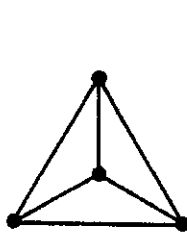(B) State the difference between Relation and Function.

(C) Consider the following graphs

(i) Describe G formally, that is, find the set $V(G)$ of vertices of G and the set $E(G)$ of edges for each graph G.
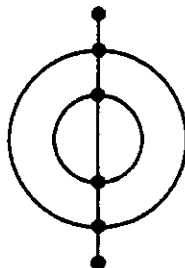
(ii) Find the degree of each vertex and verify Theorem that illustrates the relation among the vertices and edges for each graph G.
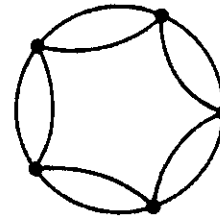

(D) Count the number V of vertices, the number E of edges, and the number R of regions of each map of the following Figures; and verify Euler's formula. Also find the degree d of the outside region
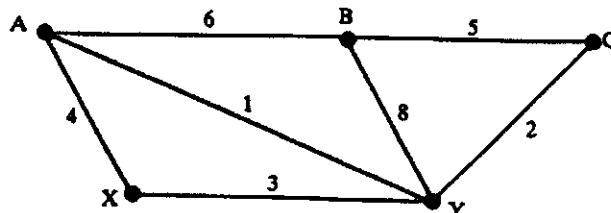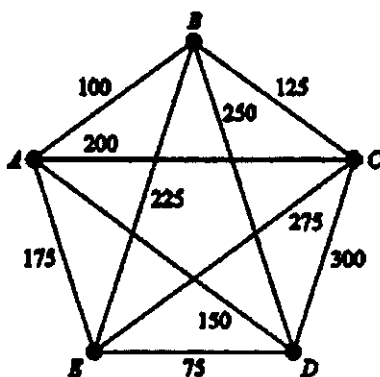

(a) (b) (c)

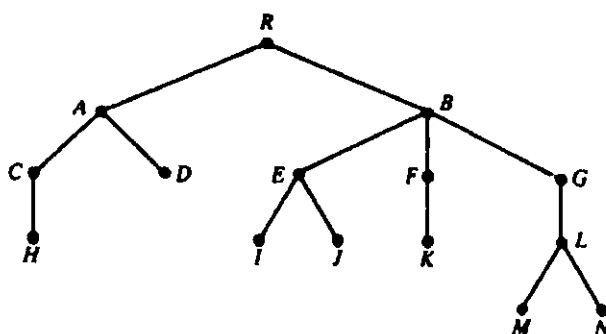(E) Find the weight matrix $W = [w_{ij}]$ of the weighted graph G in the following Figure.

(a)

Q.2	(A) Apply the nearest-neighbor algorithm to the complete weighted graph G in Fig. (a) Beginning at:(i) vertex A; (ii) vertex D.

(B) Let T be the rooted tree in the following Figure
    (i) Identify the path α from the root R to each of the following vertices, and find the level number n of the vertex: (i) H; (ii) F; (iii) M.
    (ii) Find the siblings of E.
    (iii) Find the leaves of T.

(C)Write the dual of each Boolean equation:
  (i) $(a * 1) * (0 + a') = 0$;
  (ii) $a + a'b = a + b$.

(D) Let p be "It is cold" and let q be "It is raining". Give a simple verbal sentence which describes each of the following statements: (a) $\neg p$; (b) $p \wedge q$; (c) $p \vee q$; (d) $q \vee \neg p$.

(E) Find the truth table $of \neg p \wedge q$.

(F) Consider the relation $R = \{(a, a), (a, b), (b, c), (c, c)\}$ on the set $A = \{a, b, c\}$. Find: (i) reflexive(R); (ii) symmetric(R); (iii) transitive(R).

With my best wishes

	Q1(1-a)	Q1(1-b)	Q1(1-c) , Q3(1-g)	Q1(1-e)	Q3(1-f)	Q1(1-h)
Question Number	Q2(2-a)	Q4(1-d)	Q2(2-c)	Q2(2-b)	Q4(1-e)	Q2(2-d)
Skills	Knowledge & understanding Skills			Intellectual Skills		Professional Skills