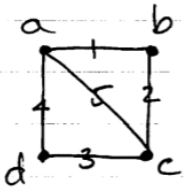
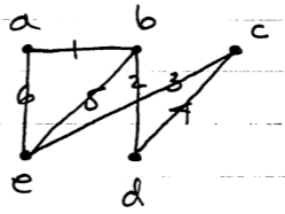
Q1. For each of the following graphs construct the adjacency and incidence matrices.

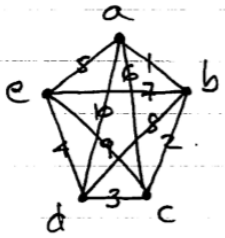
(i)



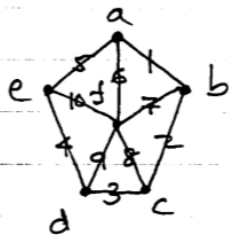
(ii)



(iii)



(iv)



Q2. For each of the following adjacency matrices, illustrate the associated graph.

(i) $\begin{pmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{pmatrix}$

(ii) $\begin{pmatrix} 0 & 1 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 1 \\ 1 & 1 & 0 & 1 & 0 \end{pmatrix}$

Q3. For each of the following incidence matrices, illustrate the associated graph

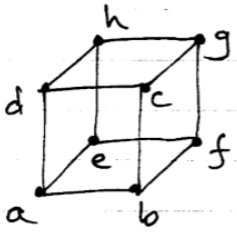
(i) $\begin{pmatrix} 1 & 1 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 & 0 \end{pmatrix}$

(ii) $\begin{pmatrix} 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 & 1 & 0 \end{pmatrix}$

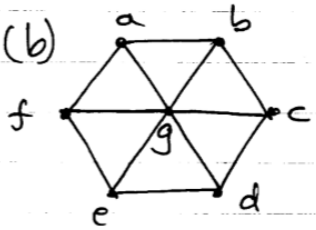
Q4. For each of the following graphs answer the following (give reasons for your answer).

(i) Is it bipartite?
(ii) If bipartite, illustrate the graph in partitioned form
(iii) Is it complete?
(iv) Is it complete bipartite?
(v) Does it have an Euler cycle?
(vi) Does it have an Euler path?

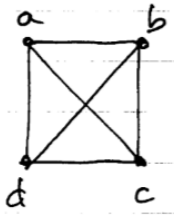
(a)



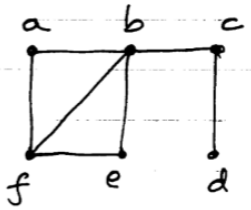
(b)



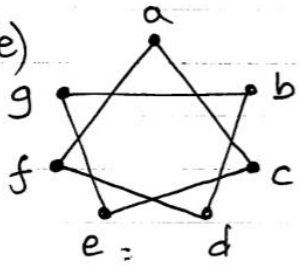
(c)



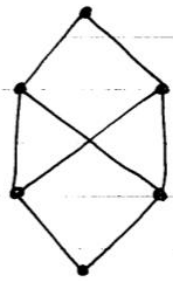
(d)



(e)

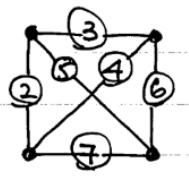


(f)

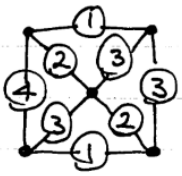


Q5. For each of the following graphs use Kruskal's algorithm to construct a minimal weight spanning tree.

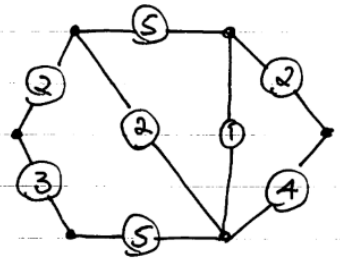
(i)



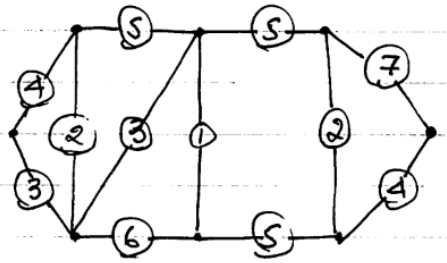
(ii)



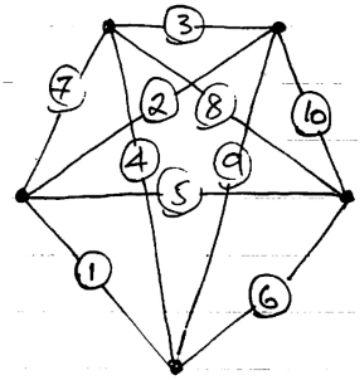
(iii)



(iv)



(v)



(vi)