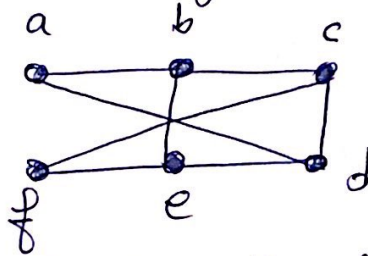


Home Work 2 (Math 151)

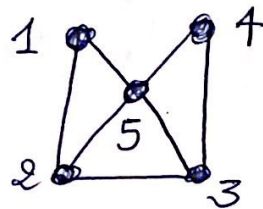
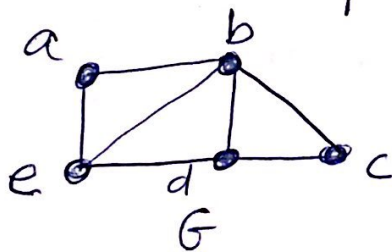
Q₁] Does exist a simple graph with the degree of its vertices are 1, 2, 3, 3, 3, 4, 5?

Q₂] Does exist a regular graph with 8 vertices and 18 edges?

Q₃] Determine whether the following graph is bipartite or not? justify your answer.



Q₄] Determine whether the following graphs are isomorphic or not?



Q₅] The adjacency matrix of simple graph G is

$$A = \begin{pmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{pmatrix}$$

(i) Find the number of edges of \overline{G} .

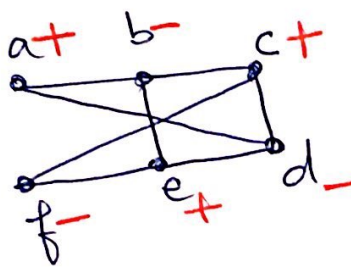
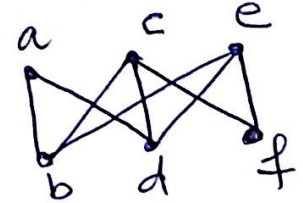
(ii) Is it self-complementary? justify your answer.

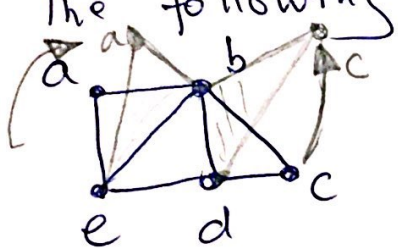
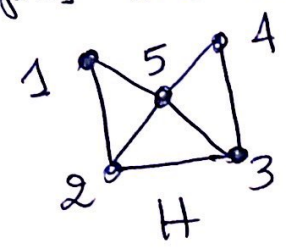
Answer sheet Homework n°-2 (Dr Borhen)

Q₁) It does not exist because it does not verify $\sum_{x \in V} \deg(x) = \underbrace{2|E|}_{\text{even}}$

$$1+2+3+3+3+4+5 = 21 \text{ (odd)}$$

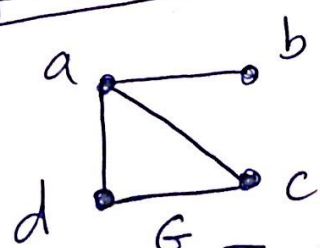
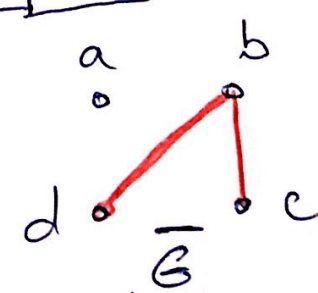
Q₂) Suppose that there exist a r-regular graph G then $\frac{8r}{2} = 18$ so $r = 4.5 \nexists$
So it does not exist.

Q₃)  Yes, it is bipartite graph because it does not contain odd cycles and it's isomorphic to 

Q₄) The following graphs are isomorphic  

Because there exists an isomorphism f:

$x \in V(G)$	a	b	c	d	e
$f(x) \in V(H)$	1	5	4	3	2

Q₅) (i)  then 

So \bar{G} has only 2 edges.

(ii) No; $G \not\cong \bar{G}$ because $|E(G)| = 4$ but $|E(\bar{G})| = 2$.