Name :- Amir Zaman

Class :- BS (Computer Science)

Subject :- Descrete Structure

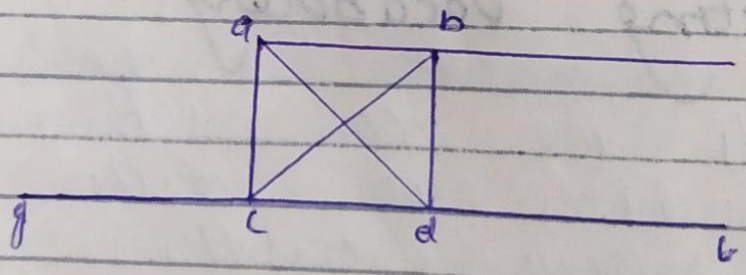
Semester :- 2nd Semester

Roll No :- 16390

Questions:- 5

Determine whether the given graph has a Hamilton circuit. . . . . exists:

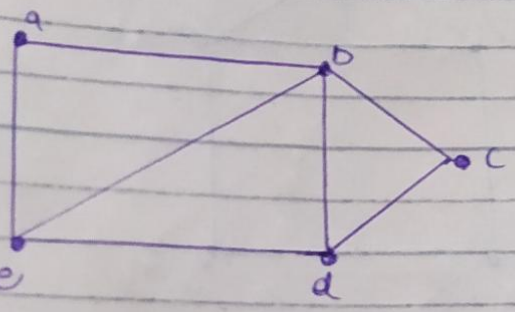
Answer:



⇒ The graph doesn't have a Hamilton path since

There are three vertices of degree 1 (e,g,f)
Therefore if there are a Hamilton path then there are at most 2 vertices of degree 1.

B :-



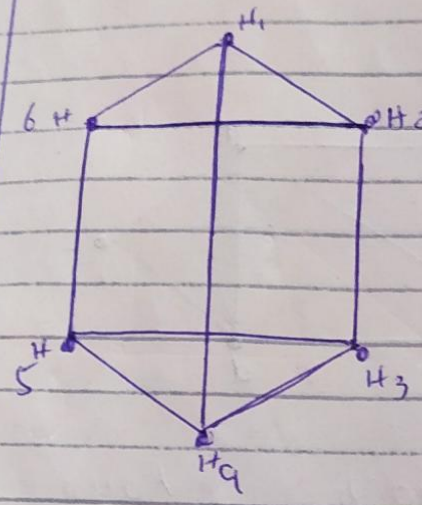
⇒ The graph have Hamilton path.
(a,b,e), (d), (c)
So the graph Show that (a,b,e), (d), (c) and The graph have Hamilton path.

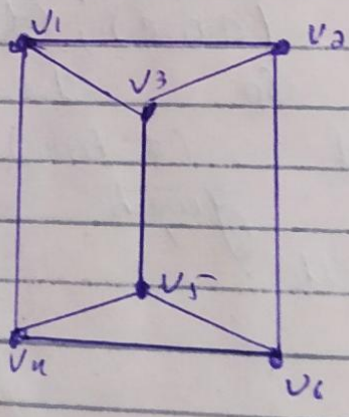
Question :- 2

Determine whether the given pair of graph is isomorphic

Answer:

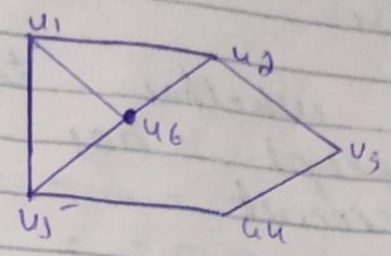
As:-

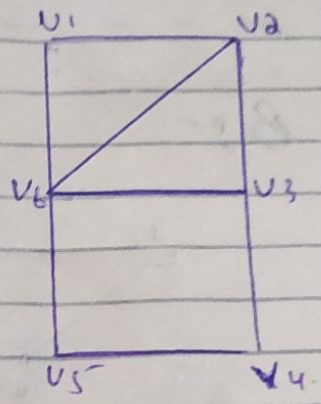




⇒ The graph is isomorphic. one ismorphism is $f(u_1) = v_5$, $f(u_2) = v_2$ $f(u_3) = v_3$ $f(u_4) = v_6$ $f(u_5) = v_4$ and $f(u_6) = v_1$.

B:-





⇒

The degree of the graph are

deg (u1) = 2 deg (u2) = 3

deg (u3) = 3 deg (u4) = 3

deg (u5) = 3

Deg (v1) = 2 deg (v2) = 3

deg (v3) = 3 deg (v4) = 2

deg (v5) = 4

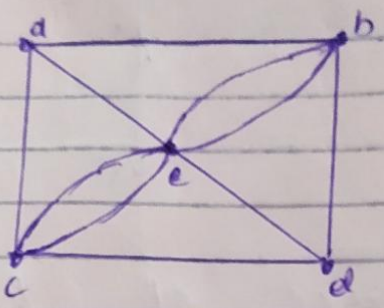
Since the second graph has vertex of degree 4 and there is no such vertex in the first graph, the graph are not isomorphic.

Question # 4

Determine whether the given graph has an Euler circuit - exists.

Answer:

Ans:-

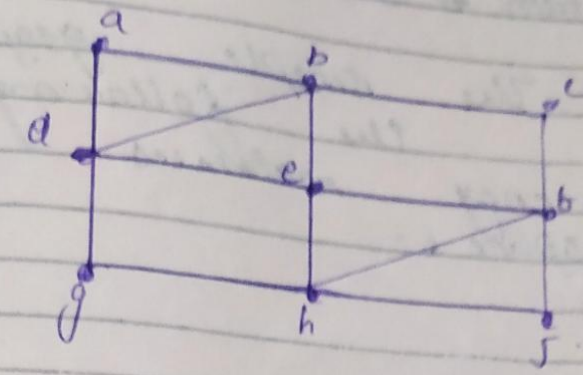


⇒ (1) A Euler circuit in a graph G is a simple circuit containing every edge of G.

(2) A Euler path in a graph G is a simple path containing every edge of G.

(3) A connected multi graph has a Euler path but not a Euler circuit if ~~Not~~ and only if it has exactly two vertices of odd degree.

As-



⇒ A Euler circuit in a graph G1 is a simple ~~Path~~ circuit containing every edge of G1.

⇒ A connected multi graph with at least two vertices has a Euler circuit if and only if each of its vertices has even degree.

⇒ It has Euler circuit and Euler circuit exist in the graph.

⇒ Initial and terminal point is once start from a and end to a.

It is a Euler circuit.

Question # 3

Are the simple graph with the following adjacency matrices isomorphic.

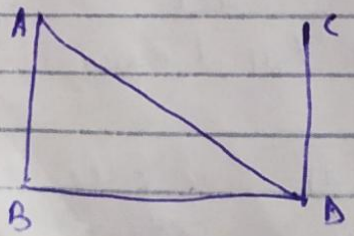
Answer:

As:-

$$\begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{bmatrix}$$

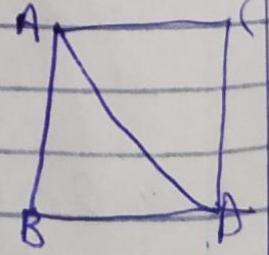
$$\begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{bmatrix}$$

⇒



adjacency list

a = b, d
b = A, d
C = d
d = A, B, C



a = C, B, a
b = A d
C = A d
d = A, B, C

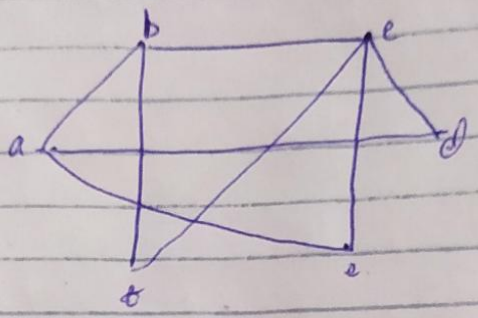
=> Not Isomorphic

Question #1

Determine whether the graph are bipartite.

Answer:

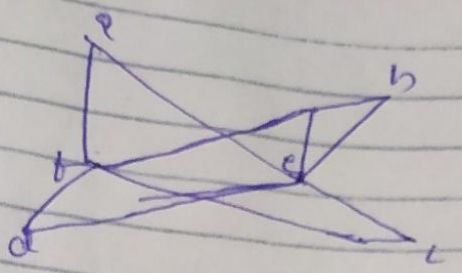
As.



for the graphs given above, they are bipartite showing that they are 2 colorable.

The easy ones are the ones that are 2 colorable you just find a 2 coloring i-e a coloring of vertices of the same color are never adjecent along an edge

Part #B



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