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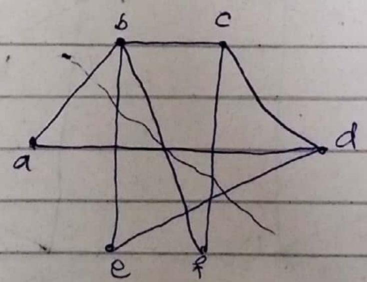
Question No 1

Ans:

Part A:

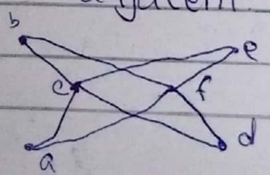
For the graphs given above, they are bipartite showing that they are 2-colorable.

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

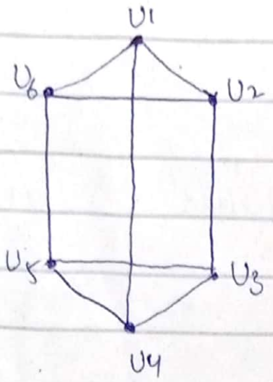


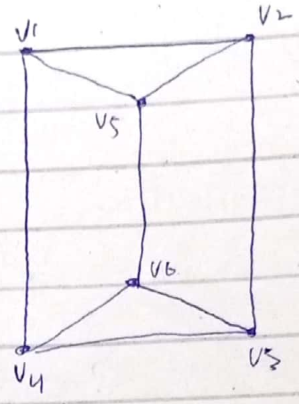
Part b: For the given graph above, they are bipartite showing they are 2-colorable

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



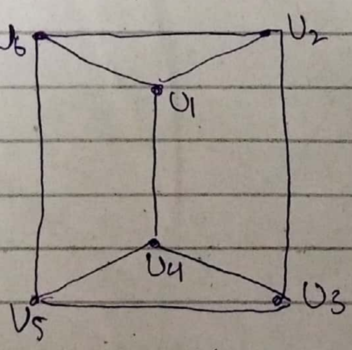
Question No:2

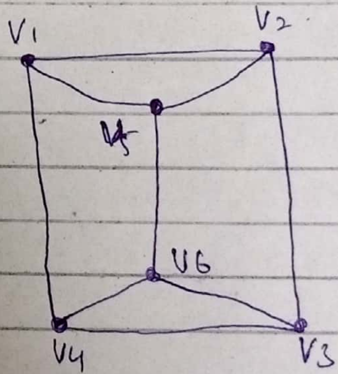




Answer: first we see the given graphs, they are Isomorphic because when we keep vertic U1 and U4 under the Squre, U1 and V5 are same, U4 and V6 are same, therefore they are isomorphic

Example:

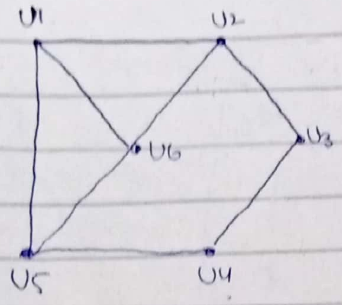


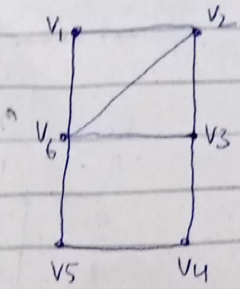


{same}

Question No2

Part2:





Answer:

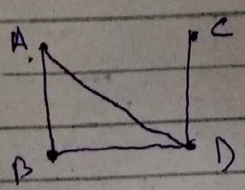
first we See the give graphs; they are Non-Isomorphic because when we compair vertics U and V they are not Same, there fore they are Not-Isomorphic.

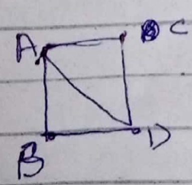
Question No 3

Part1:

$$\begin{array}{c|cccc} & A & B & C & D \\ \hline A & 0 & 1 & 0 & 1 \\ B & 1 & 0 & 0 & 1 \\ C & 0 & 0 & 0 & 1 \\ D & 1 & 1 & 1 & 0 \end{array} \qquad \begin{array}{c|cccc} & A & B & C & D \\ \hline A & 0 & 1 & 1 & 1 \\ B & 1 & 0 & 0 & 1 \\ C & 1 & 0 & 0 & 1 \\ D & 1 & 1 & 1 & 0 \end{array}$$

Solution





Adjacency lists:-

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

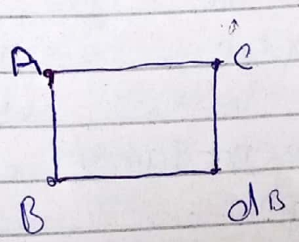
a = C, B, d
b = A, d
c = A, d
d = A, B, C

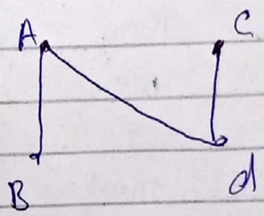
⇒ Not Isomorphic

Part: 2

$$\begin{array}{c|c} & \begin{matrix} A & B & C & d \end{matrix} \\ \begin{matrix} A \\ B \\ C \\ d \end{matrix} & \begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix} \end{array} \qquad \begin{array}{c|c} & \begin{matrix} A & B & C & d \end{matrix} \\ \begin{matrix} A \\ B \\ C \\ d \end{matrix} & \begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix} \end{array}$$

Solution :





Adjacency lists:

A : C, B
B : A, d
C : A, d
d : B, C

A : B, d
B : A
C : d
d : A C

Not Isomorphic :-

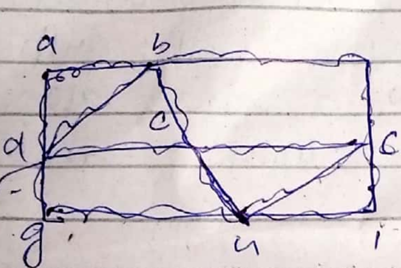
Q4

Answer

Eulae circut means a graph where we allow loops and parallel edges

and the path has the same initial and terminal vertices, we call it an Eulae circut.

(i)



Eulae path.

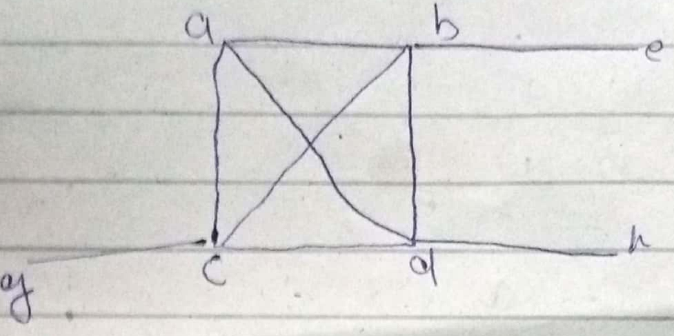
initial path terminal points is once

Start from a and End to a

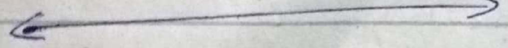
it is a Eulae circut.

Question No: 5. part: A

Solution



The graph doesnot have a Hemiltion path Since there are two verties of degree one. however if there are a hemition path then that are at 2 verties of degree 1



Question No 5 Part B

Solution

Let us determine the degree of every veltics in the given graph

$\deg(a) = 2$
$\deg(b) = 4$
$\deg(c) = 2$
$\deg(d) = 3$
$\deg(e) = 3$

We then note that dirac's theorem is not satisfied (Since some degrees are less than $n/2 = 5/2 = 2.5$), but this does not necessarily mean that no hamilton circuit exists

However, we do note that given graph contain the cycle C_5 and the Cycle C_5 with in the given graph forms a Hamilton circuit (as the circuit) will pass through all veltices exactly ones).

A possible Hamilton circuit is thus the path of C_5 = a, b, c, d, e, a