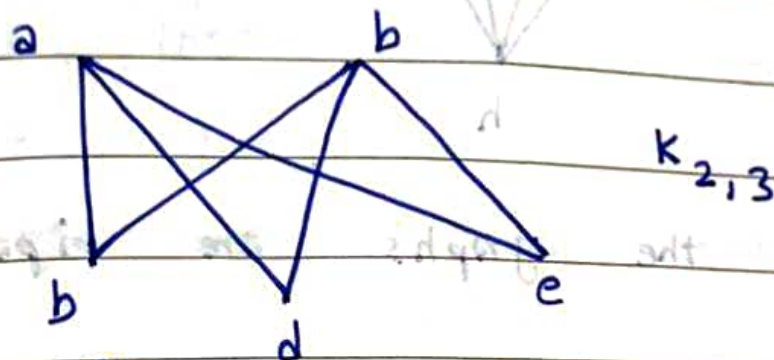


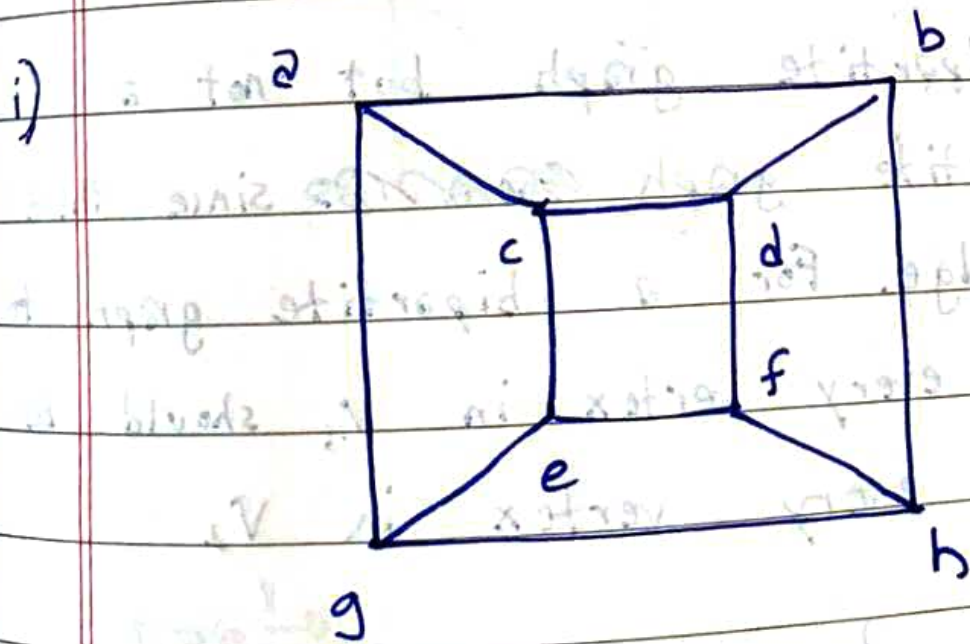
Complete Bipartite Graph:

If each vertex in V_1 is joined with every vertex in V_2 , then we have a complete bipartite graph which is represented as $K_{m,n}$

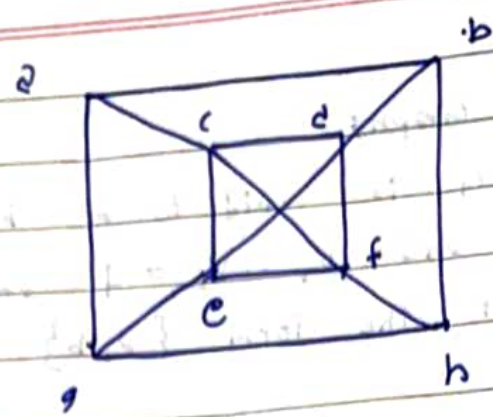


$$V_1 = \{a, b\}$$

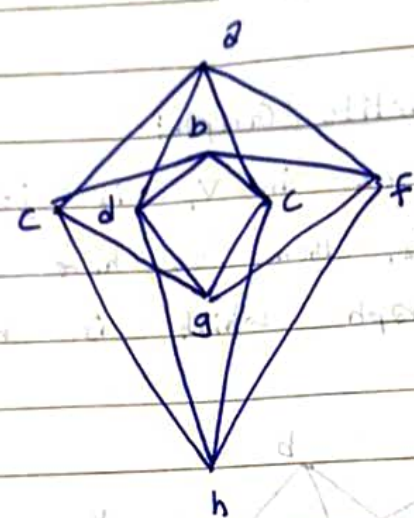
$$V_2 = \{c, d, e\}$$



ii)



iii)



Check if the graphs are bipartite or not

i) $V_1 = \{a, d, e, h\}$
 $V_2 = \{b, c, f, g\}$

$\{d, g\} = V$
 $\{a, b, c, e, f, h\} = V$

It is a bipartite graph but not a complete bipartite graph ~~there is~~ since there is no $a-f$ edge. For a bipartite graph to be complete, every vertex in V_1 should be connected to every vertex in V_2 .

ii) $V_1 = \{a, d, e, h\}$
 $V_2 = \{b, c, g, f\}$

It is not a bipartite graph since there

is an $a-d-e$ edge

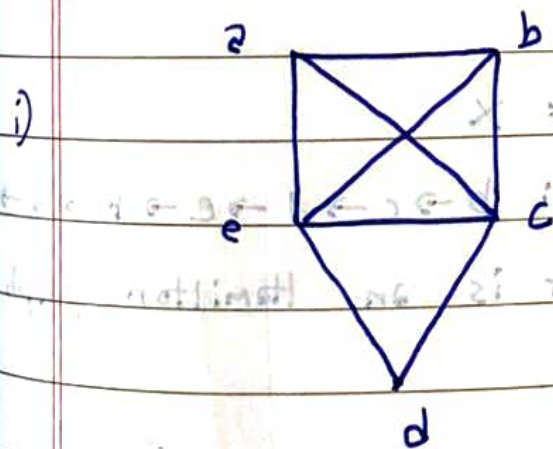
(iv) $V_1 = \{a, b, g, h\}$
 $V_2 = \{c, d, e, f\}$

It is said to be a complete bipartite graph

* Hamilton Path and Cycle:

If G is a graph or a multigraph with cardinality of graph is greater than 3, then we say that G has hamilton cycle, if there is a cycle in G that contains every vertex in G .

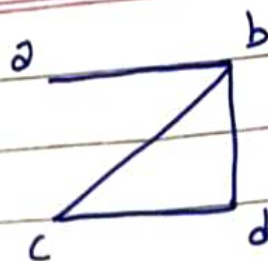
Q1. Determine which of the following have hamilton path and ~~cycle~~ cycle



$a \rightarrow b \rightarrow c \rightarrow d \rightarrow e \rightarrow f \rightarrow a$

It has hamilton cycle

ii)

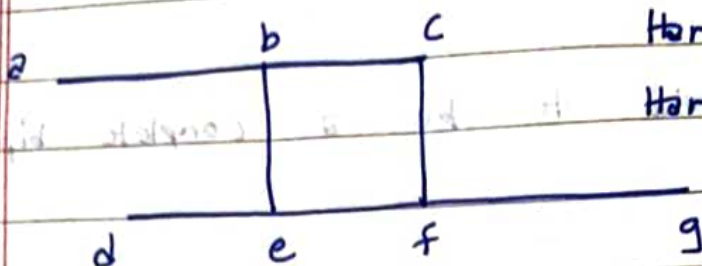


$a \rightarrow b \rightarrow d \rightarrow c$

is a Hamilton path ✓

Hamilton cycle X

iii)

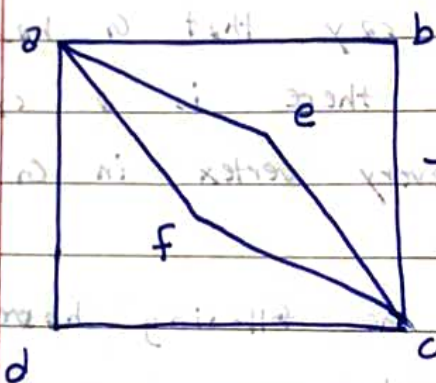


Hamilton path X

Hamilton cycle X

Q2 Which of the following has Euler's circuit or Hamilton cycle

i)

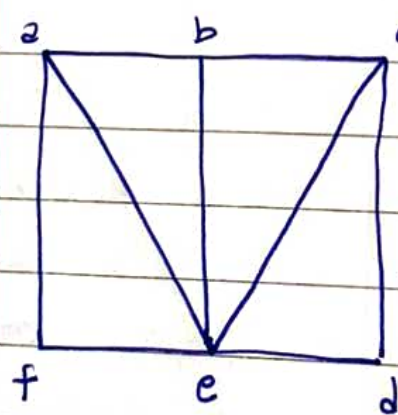


EC: $a \rightarrow b \rightarrow c \rightarrow e \rightarrow a \rightarrow f \rightarrow c \rightarrow d \rightarrow a$

HC: X

It is an Eulerian graph

ii)

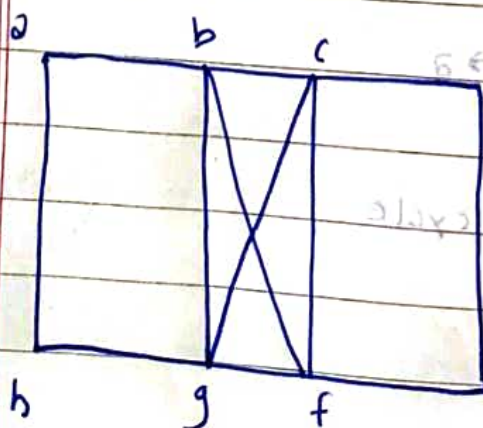


EC: X

HC: $b \rightarrow c \rightarrow d \rightarrow e \rightarrow f \rightarrow a \rightarrow b$

∴ It is an Hamilton graph

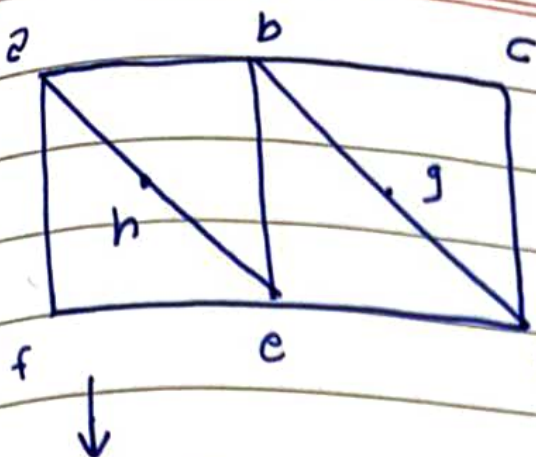
iii)



HC: $a \rightarrow b \rightarrow c \rightarrow d \rightarrow e \rightarrow f \rightarrow g \rightarrow h \rightarrow a$

~~EC: $a \rightarrow b \rightarrow f \rightarrow e \rightarrow d \rightarrow c \rightarrow g \rightarrow h \rightarrow a$~~

iv)



EC: $a \rightarrow h \rightarrow g \rightarrow f \rightarrow b \rightarrow c$
 $\rightarrow d \rightarrow e \rightarrow f \rightarrow c \rightarrow g \rightarrow b \rightarrow a$

It is Euler and Hamilton graph

$a \rightarrow h \rightarrow e \rightarrow b \rightarrow g \rightarrow d \rightarrow c \rightarrow b \rightarrow a \rightarrow f \rightarrow e \rightarrow b$

It is an Euler's trail or semi-Euler's Graph

$f \rightarrow a \rightarrow h \rightarrow e \rightarrow b \rightarrow g \rightarrow d \rightarrow c$

It is an Hamilton path or semi-Hamilton graph