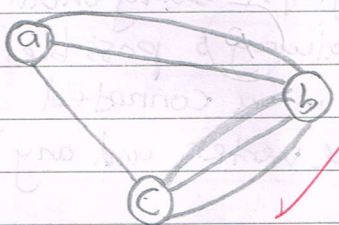


Question 1

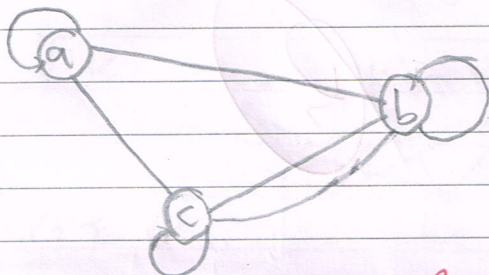
Illustrate and define a suitable graph for the graph terminology below

i) A multigraph



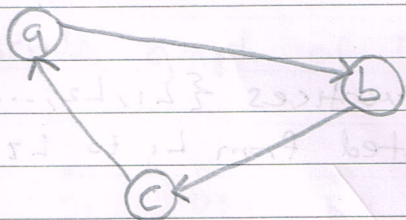
★ multigraph is a graph which is permitted to have multiple edges also called parallel edges,
★ No loops are allowed.

ii) A pseudograph



★ A graph that contains loops as well as multiple edges between vertices.

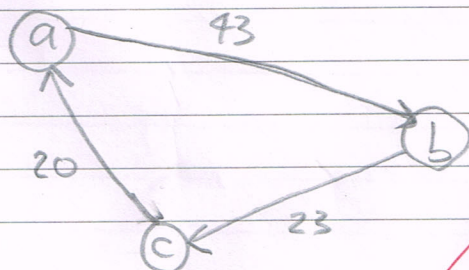
iii) A directed graph



★ A graph that is a set of vertices connected by edges, where the edges ~~are where~~ have a direction associated with them.

★ The directed edges are indicated by arrows.

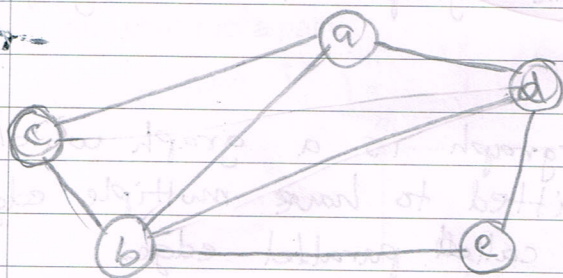
iv) A weight graph



★ A weighted graph is a graph in which each branch is given a numerical weight.

★ A weighed graph is a special type of labeled graph in which the labels are numbers.

v) A connected graph.



★ Connected graph a graph in which there is a path joining each pair of vertices, the graph being undirected. it is always possible to travel in a connected graph between one vertex and any other

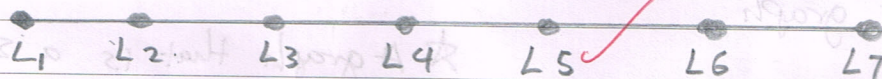
★ no vertex is isolated.

★ traverses every edge of the graph only once.

Question 2

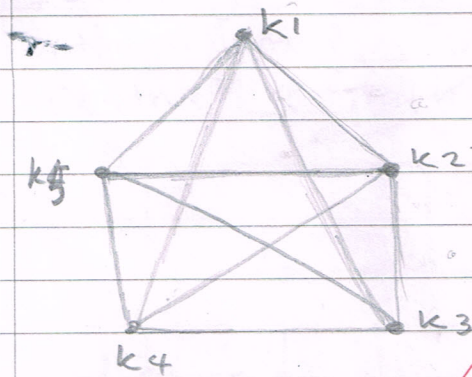
Draw the following graph

i) A linear graph of L_7



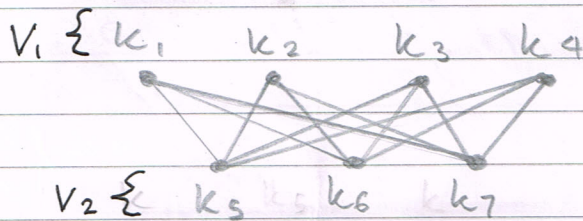
★ the graph with number vertices $\{L_1, L_2, \dots, L_7\}$ and with edges connected from L_1 to L_7 like a straight line.

ii) A complete graph of K_5



* A complete graph is a simple undirected graph in which every pair of distinct vertices is connected by a unique edge.

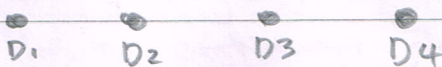
iii) A complete bipartite graph of $K_{4,3}$



* Bipartite if V can be partitioned into two disjoint subsets V_1 and V_2 such that every edge connects a vertex in V_1 and a vertex in V_2 .

* there are no edges which connect two vertices in V_1 or in V_2 .

iv) A discrete graph of D_4

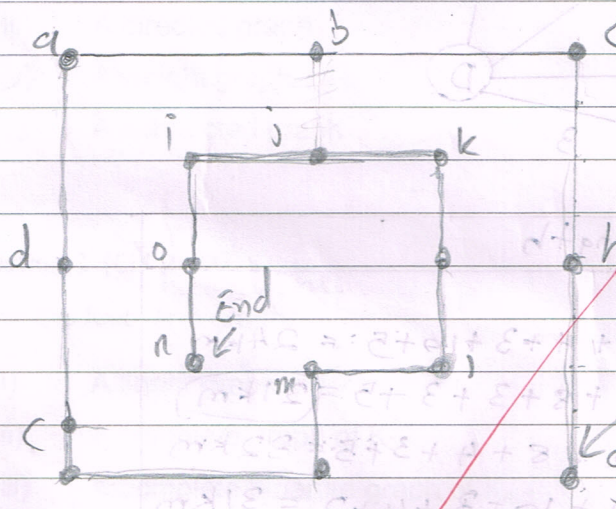
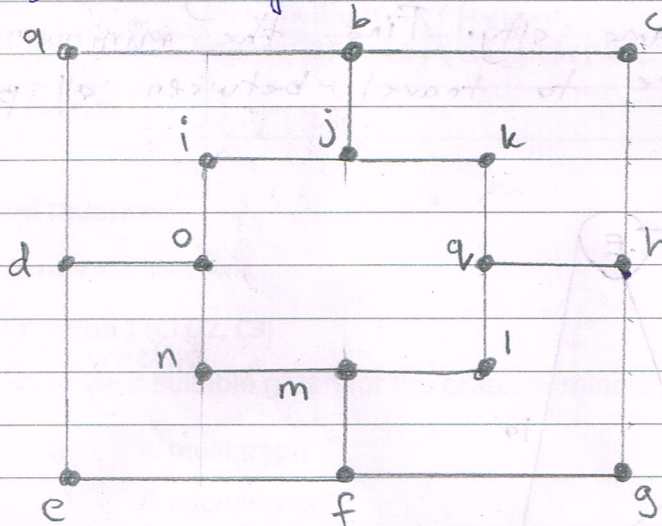


* The graph with number vertices and no edges

⑤

Question 3

Identify either the graph below has an Hamilton path or not? Justify your answer and construct a path



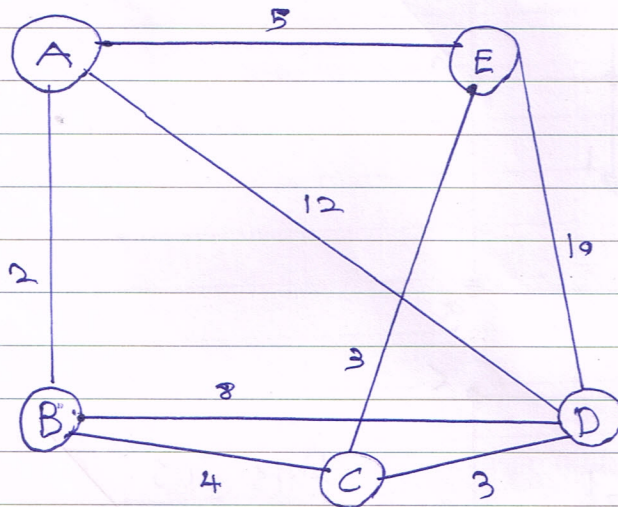
this is
Hamilton path

All ~~every~~ edges is connected by the vertices by a single in a continuous path or line.

H

Question 4.

Syukree want to do the sales for her product. She has to visit each one of the cities starting from A and returning to the same city. Find the minimum distance (km) Syukree have to travel between all pairs of cities.



Path	Length
A, B, C, D, E, A	$2 + 4 + 3 + 10 + 5 = 24\text{km}$
A, B, D, C, E, A	$2 + 8 + 3 + 3 + 5 = 21\text{km}$
A, D, B, C, E, A	$12 + 8 + 4 + 3 + 5 = 32\text{km}$
A, D, E, C, B, A	$12 + 10 + 3 + 4 + 2 = 31\text{km}$

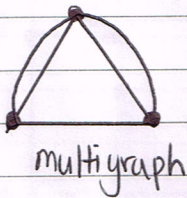
The minimum distance that Syukree have to travel between all pairs of cities is 21km.

✓ 6

Question 1

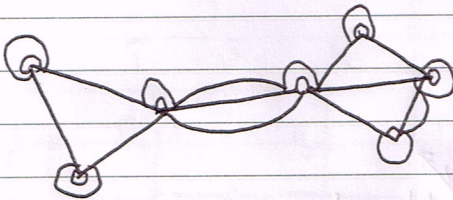
i) A multigraph

Graphs with multiple edges connecting the same vertices and no loops are allowed.



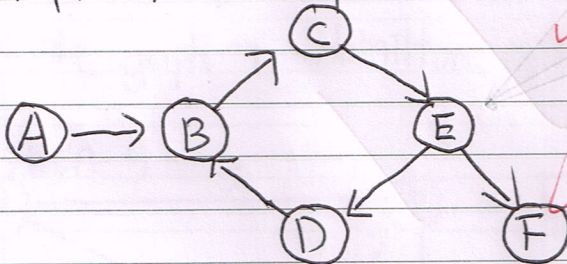
ii) A pseudograph

A graph in which loops and multiple edges are allowed.



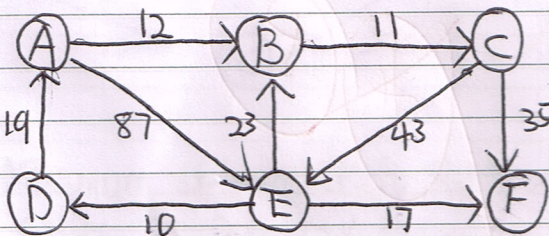
iii) A directed graph

Graph with no loops and no multiple edges



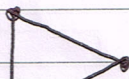
iv) A weight graph

A graph with numbers on the edges.



v) A connected graph

Connects all the vertices and that traverses every edge of the graph only once.



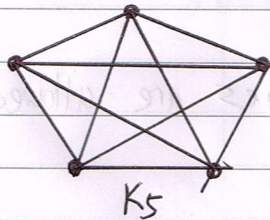
2008
2009
17
20

Q

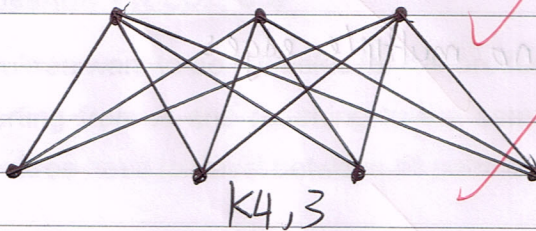
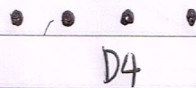
Question 2

i) A linear graph of L_7 .- The graph with n vertices and with edges.ii) A complete graph of K_5

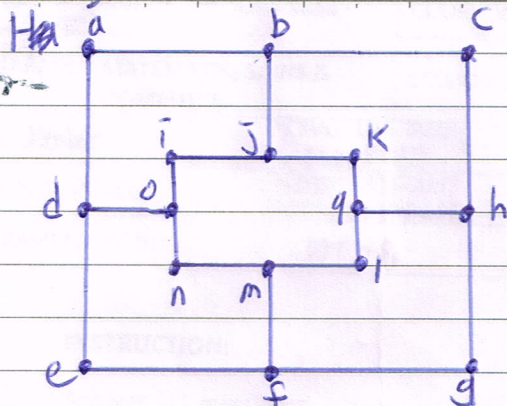
- One edge connect each pair of vertices

iii) A complete bipartite graph of $K_{4,3}$

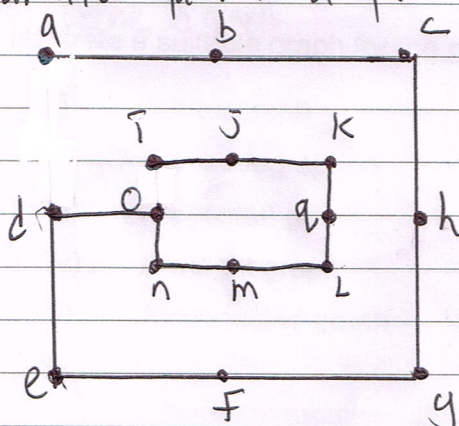
- IF and only IF it contains no odd cycles

iv) A discrete graph of D_4 - The graph with n vertices and no edges

Question 3



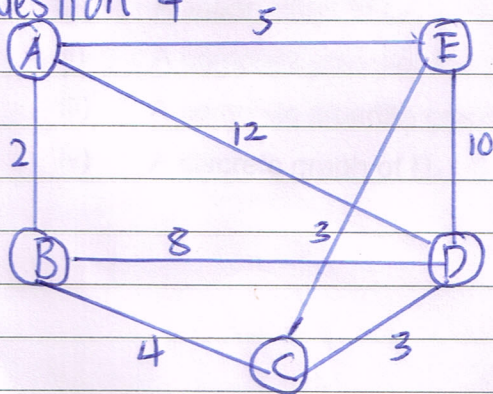
- Hamilton path is a path that contains / visits each vertex exactly once.



show
path

* The graph is Hamiltonian path.

Question 4

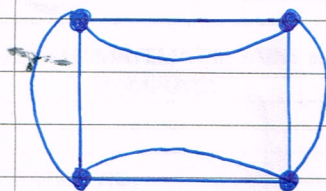


Path	length
A, E, D, C, B, A	$5 + 10 + 3 + 4 + 2 = 24$
A, E, C, D, B, A	$5 + 3 + 3 + 8 + 2 = 21$ ✓
A, D, E, C, B, A	$12 + 10 + 3 + 4 + 2 = 31$
A, B, C, D, E, A	$2 + 4 + 3 + 10 + 5 = 24$

* Minimum distance (km) Syukree have to travel between all pairs of cities is 21 km.

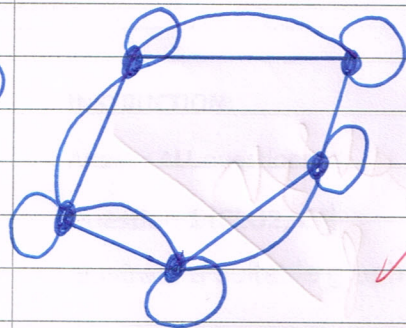
Question 1

i)



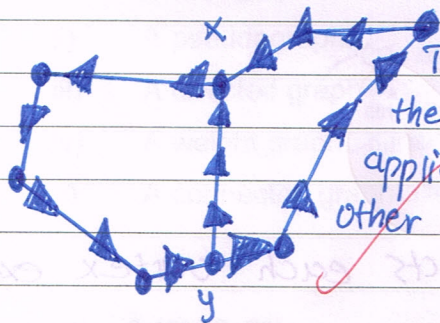
Multigraph refers to a graph in which multiple edges between nodes are either connected.

ii)



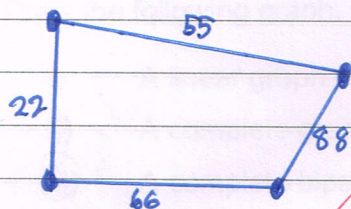
Pseudograph is a non-simple graph in which both graph loops and multiple edges are permitted.

iii)



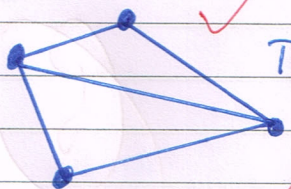
The edges are directed by arrows, indicating that the relationship represented by the edges only applies from one vertex to the other, but not the other way around.

iv)



Numerical values are assigned to each of the edges.

v)



There is a path of edges between every pair of vertices.

Question 2

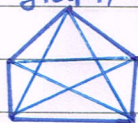
i)

Linear graph of L_n



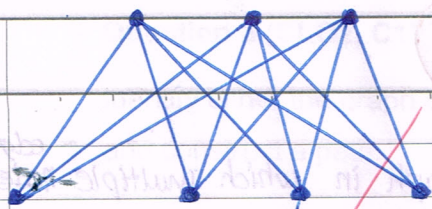
ii)

Complete graph of K_5



Definition

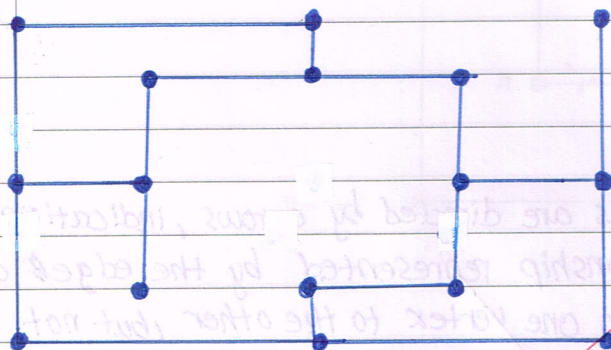
iii)



iv)



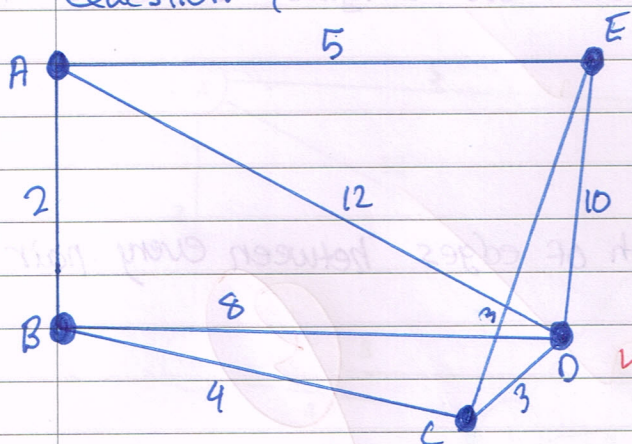
Question 3



Show the path

Hamilton Path is a path that connects each vertex exactly once.

Question 4



Path	Length	Total
A+E+C+D+B+A	5+3+3+8+2	21
A+E+D+C+B+A	5+10+3+4+2	24
A+D+E+C+B+A	12+10+3+4+2	31
A+B+C+D+E+A	2+4+3+10+5	24

30?