Assignment - 1

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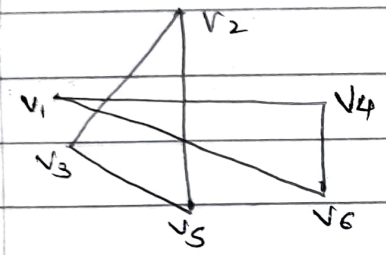
Sem : IV th
Branch : Artificial Intelligence
Section/Roll no : A - 58
Subject : Graph Theory

3.1.

i)



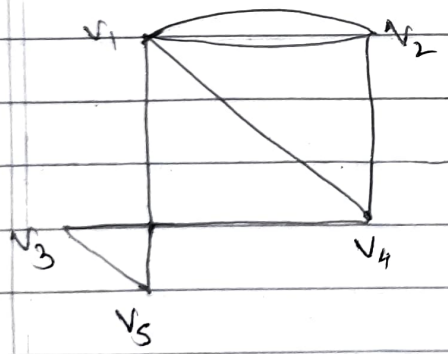
i.) Vertex Set :

$V(G) = \{v_1, v_2, v_3, v_4, v_5, v_6\}$

ii.) $E(G) = \{(v_1, v_4), (v_4, v_6), (v_1, v_6), (v_2, v_3), (v_2, v_5), (v_3, v_5)\}$

iii.) $Deg_G(v_1) = 2$, $Deg_4(v_2) = 2$
$Deg_G(v_3) = 2$, $Deg_G(v_4) = 2$
$Deg_G(v_5) = 2$, $Deg_G(v_6) = 2$

ii.)

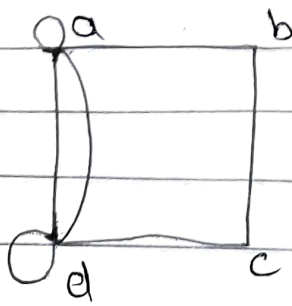


i.) $V(G) = \{v_1, v_2, v_3, v_5, v_5\}$

ii.) $E(G) = \{(v_1, v_2), (v_1, v_2), (v_2, v_4), (v_1, v_4), (v_1, v_5), (v_3, v_4)\}$

iii.) $Deg_G(v_1) = 4$ $Deg_G(v_5) = 2$
$Deg_G(v_2) = 3$
$Deg_G(v_3) = 2$
$Deg_G(v_4) = 3$

iii)

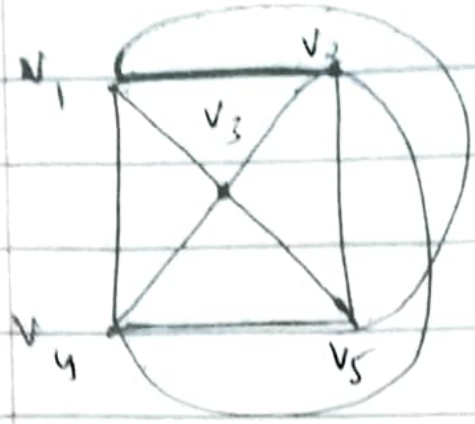


i.) $V(G) = \{a, b, c, d, e\}$

ii.) $E(V) = \{(a,a), (a,b), (b,c), (c,d), (a,d), (a,d), (d,d)\}$.

iii.) $Deg_G(a) = Deg_G(d) = 5$ | $Deg_G(e) = 0$
$Deg_G(b) = Deg_G(c) = 2$

d) G.



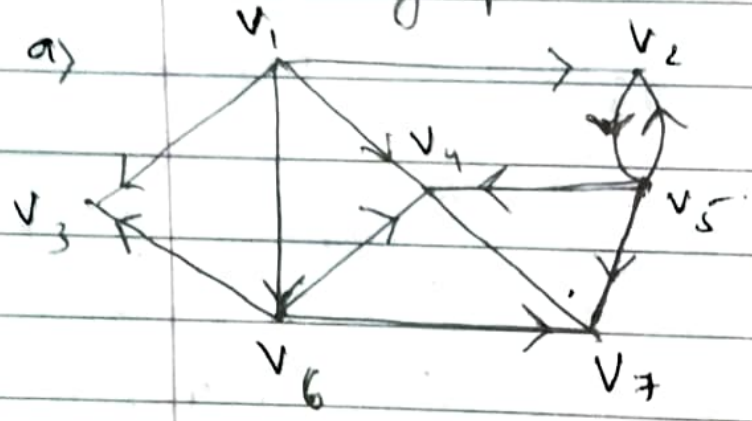
i) $V(G) = \{ v_1, v_2, v_3, v_4, v_5 \}$

$E(G) = \{ (v_1, v_2), (v_2, v_5), (v_5, v_4), (v_1, v_4), (v_1, v_3), (v_2, v_3), (v_3, v_5), (v_3, v_4), (v_1, v_5), (v_2, v_4) \}$

iii) $Deg_G(v_1) = Deg_G(v_2) = Deg_G(v_3) = Deg_G(v_4) = Deg_G(v_5) = 4$

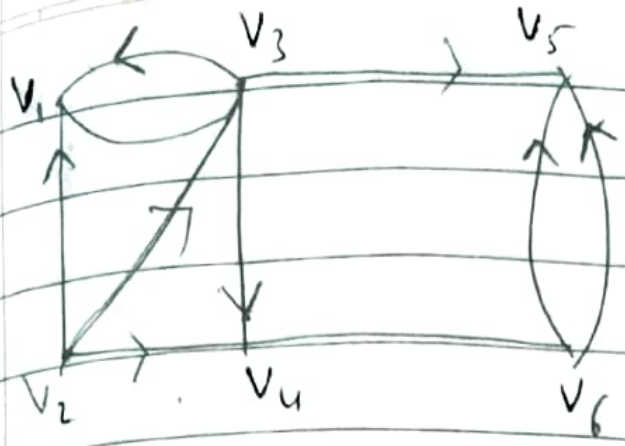
3) find the indegree & outdegree of each vertex in the graph shown in below:

a)



Vertex	In degree	Out degree
V_1	0	4
V_2	2	1
V_3	2	0
V_4	3	0
V_5	1	3
V_6	1	3
V_7	2	0

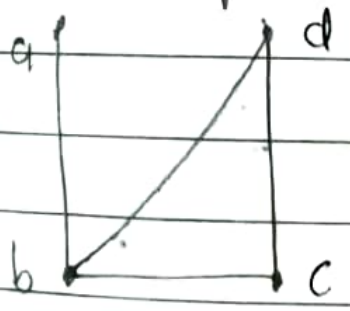
b)

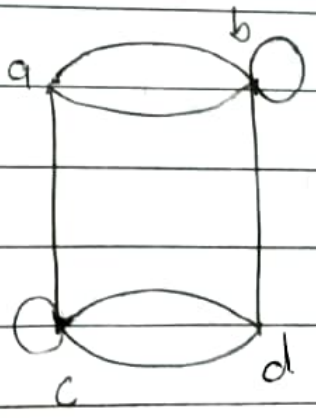


Vertex	In degree	Out degree.
V_1	2	0
V_2	0	3
V_3	1	3
V_4	2	0
V_5	3	0
V_6	0	2.

4) Determine whether the graphs shown in a simple graph, a multigraph, a pseudograph and explain it.

a)





c)

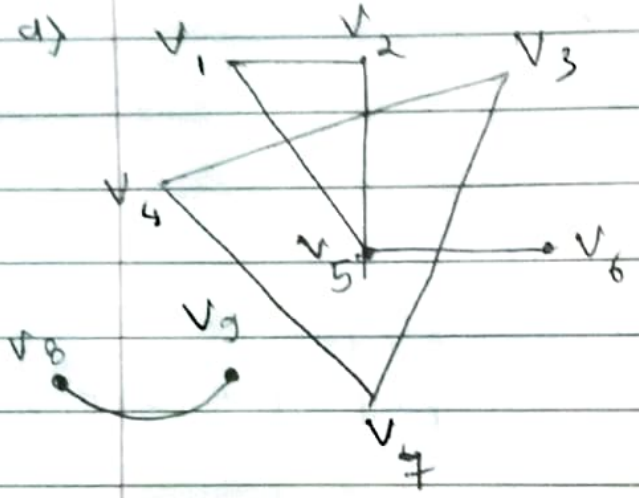
Ans) a) Since graph has no loops and now multiple edges therefore it is a simple graph.

b) since graph has self loop at b & c and also have multiple edge, hence it is a pseudograph.

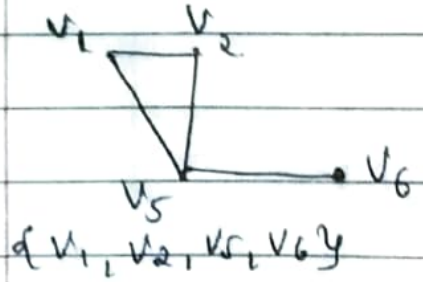
c) Since graph does not have any loop but have multiple edge, hence it is a multiple graph.

Q2) find the connected components of the graph.

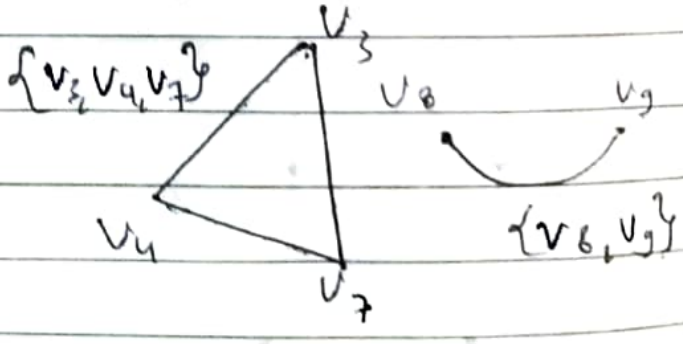
a)



Ans) This graph has 3 components:

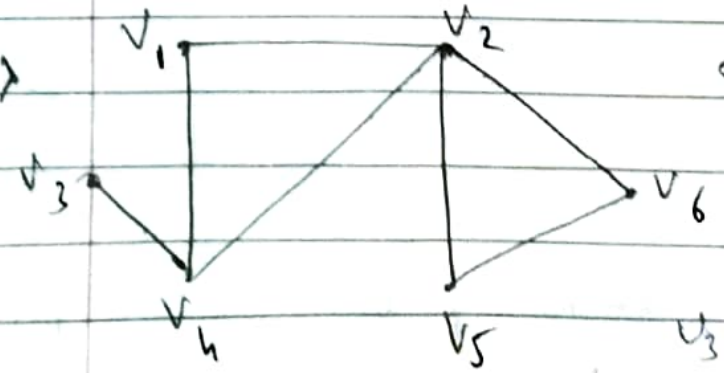


$\{v_1, v_2, v_5, v_6\}$

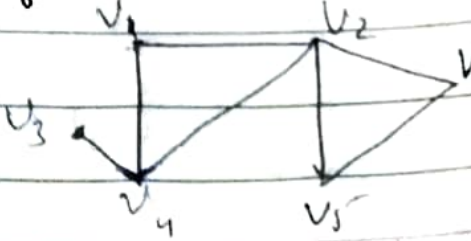


$\{v_8, v_9\}$

b)



This graph has one component:



$\{v_1, v_2, v_3, v_4, v_5, v_6\}$