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GROUP 11

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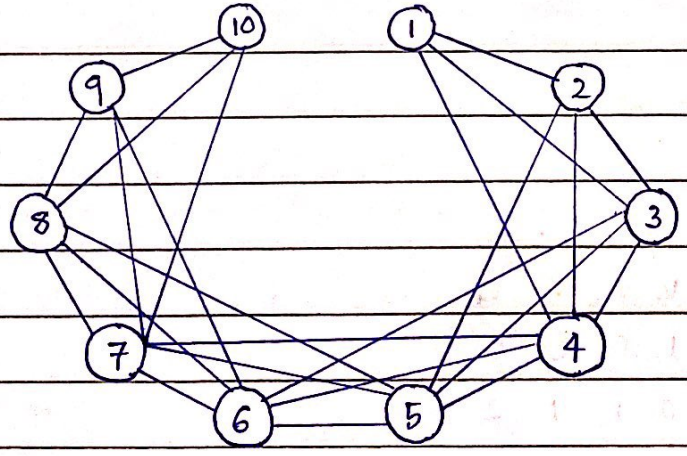
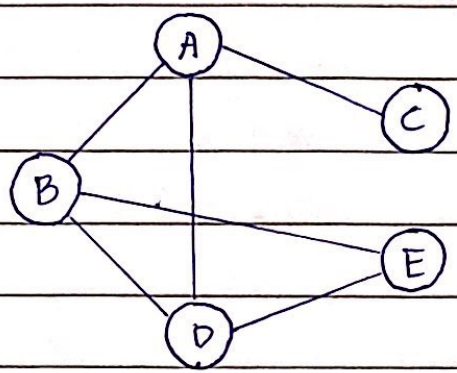
1.



$\therefore e(G) = 24$

2. (a) A = Ahmad C = Chong E = Ehsan

B = Bakri D = David



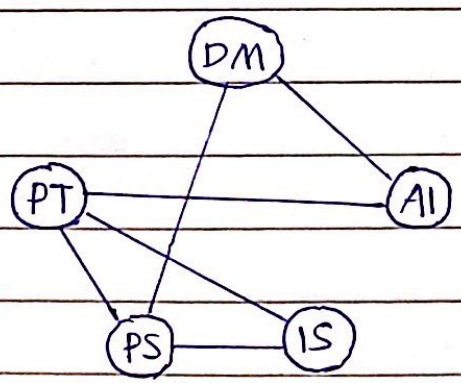
A_G =

	A	B	C	D	E
A	0	1	1	1	0
B	1	0	0	1	1
C	1	0	0	0	0
D	1	1	0	0	1
E	0	1	0	1	0

(b) DM = Discrete Mathematics PS = Probability Statistic

PT = ~~Programming~~ Programming Technique IS = Information System

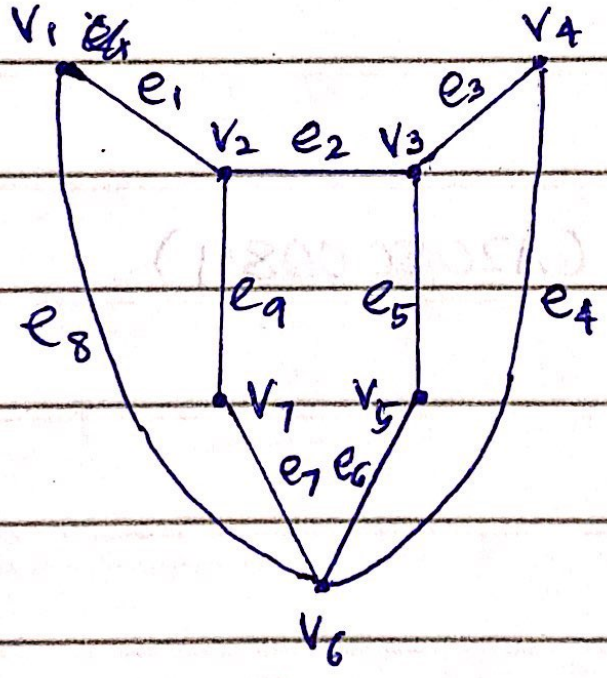
AI = Artificial Intelligence



A_G =

	DM	PT	AI	PS	IS
DM	0	0	1	1	0
PT	0	0	1	1	1
AI	1	1	0	0	0
PS	1	1	0	0	1
IS	0	1	0	1	0

3.



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4.

$A_G =$

	v_1	v_2	v_3	v_4
v_1	1	0	1	0
v_2	0	0	1	0
v_3	1	0	0	1
v_4	0	0	1	0

$A_H =$

	v_1	v_2	v_3	v_4
v_1	1	0	0	0
v_2	0	1	1	2
v_3	0	1	1	0
v_4	0	2	0	0

$I_G =$

	e_1	e_2	e_3	e_4	e_5	e_6
v_1	1	1	1	0	0	0
v_2	0	0	0	1	0	0
v_3	0	1	1	1	1	1
v_4	0	0	0	0	1	1

$I_H =$

	e_1	e_2	e_3	e_4	e_5	e_6
v_1	2	0	0	0	0	0
v_2	0	2	1	1	1	0
v_3	0	0	0	0	1	2
v_4	0	0	1	1	0	0

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5 (a) - Graph G1 and G2 have 5 vertices and 5 edges

- Both graph have 1 vertex with degree of 1, 3 vertices with degree of 2, 1 vertex with degree of 3

- $f(v_1) = u_5$, $f(v_2) = u_4$, $f(v_3) = u_2$, $f(v_4) = u_3$, $f(v_5) = u_1$

A_{G1} =

	v_1	v_2	v_3	v_4	v_5
v_1	0	1	0	1	0
v_2	1	0	1	0	0
v_3	0	1	0	1	1
v_4	1	0	1	0	0
v_5	0	0	1	0	0

A_{G2} =

	v_1	v_2	v_3	v_4	v_5
v_1	0	1	0	1	0
v_2	1	0	1	0	0
v_3	0	1	0	1	1
v_4	1	0	1	0	0
v_5	0	0	1	0	0

∴ G1 and G2 are isomorphic

(b) - Graph ~~G1~~ H1 and ~~G2~~ H2 have 5 vertices and 6 edges

~~Both graph~~

H1 : 2 vertices with degree of 1, 1 vertex with degree of 2, 1 vertex with degree of 3, 1 vertex with degree of 4

H2 : 1 vertex with degree of 1, 1 vertex with degree of 2, 3 vertices with degree of 3

Since A_{H_1} and A_{H_2} are different, H_1 and H_2 are not isomorphic

6) a) Trail

b) Walk

c) Closed walk

d) Circuit

e) Closed walk

f) Path

7) a) 3 paths

b) $(v_1, e_1, v_2, e_3, v_3, e_2, v_2, e_4, v_3, e_5, v_4)$, $(v_1, e_1, v_2, e_2, v_3, e_5, v_4)$
$(v_1, e_1, v_2, e_3, v_3, e_4, v_2, e_2, v_3, e_5, v_4)$, $(v_1, e_1, v_2, e_3, v_3, e_5, v_4)$
$(v_1, e_1, v_2, e_2, v_3, e_3, v_2, e_4, v_3, e_5, v_4)$, $(v_1, e_1, v_2, e_4, v_3, e_3, v_4)$
$(v_1, e_1, v_2, e_4, v_3, e_3, v_2, e_2, v_3, e_5, v_4)$
$(v_1, e_1, v_2, e_2, v_3, e_4, v_2, e_3, v_3, e_5, v_4)$
$(v_1, e_1, v_2, e_4, v_3, e_2, v_2, e_3, v_3, e_5, v_4)$

9 trails

c) Infinite

8) a) There is a Euler Circuit.
$(v_2, e_1, v_1, e_8, v_4, e_5, v_3, e_4, v_2, e_2, v_5, e_7, v_4, e_6, v_5, e_3, v_2)$

All vertices in graph (a) are even degree. It starts and ends at same vertex.

b) There is no Euler Circuit, because the edges will be repeated and $deg(v_4) = deg(v_8) = deg(v_7) = 3$ while $deg(v_1) = 5$, which are odd vertices.

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9) a) There is a Euler path from u to w,
$(u, v_1, v_0, v_7, u, v_2, v_3, v_4, v_2, v_6, v_4, w, v_6, v_5, w)$
and $\deg(u) = \deg(w) = 3$, which are odd vertices

b) There is no Euler path from u to w, because the edge will be repeated to reach w in the end.

10) No, there is no Hamiltonian circuit in both graph (a) and (b), because the vertices will be repeated.

11. $$\ell = \frac{(m-1)n+1}{m}$$
$$= \frac{(3-1)(100)+1}{3}$$
$$= 67$$

12. (a) a
(b) a, b, d, e, g, h, j, n
(c) c, f, i, k, l, m, r, s, o, p, q
(d) r, s
(e) b
(f) l, m
(g) a, d, j
(h) e, k, l, m, f, g, n, r, s

13. preorder : a, b, e, k, l, m, f, g, n, r, s, c, d, h, o, i, j, p, q
inorder : k, e, l, m, b, f, r, n, s, g, a, c, h, o, d, i, p, j, q
postorder : k, l, m, e, f, r, s, n, g, b, c, o, h, i, p, q, j, d, a

14.

AB 1	CG 6 (cancel)
GH 1	DH 6 (cancel)
BC 2	DE 7
AF 3	DG 7 (cancel)
BF 4 (cancel)	GF 8 (cancel)
CD 4	EH 8 (cancel)
BG 5	

$\therefore$ MST = 1 + 1 + 2 + 3 + 4 + 5 + 7
= 23

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15.

Iteration	S	N	L(M)	L(N)	L(O)	L(P)	L(Q)	L(R)	L(S)	L(T)
0	{}	{M,N,O,P,Q,R,S,T}	0	∞	∞	∞	∞	∞	∞	∞
1	{M}	{N,O,P,Q,R,S,T}	0	4	∞	2	∞	5	∞	∞
2	{M,P}	{N,O,Q,R,S,T}	0	4	∞	2	6	5	5	∞
3	{M,P,N}	{O,Q,R,S,T}	0	4	10	2	6	5	5	∞
4	{M,P,N,R}	{O,Q,S,T}	0	4	7	2	6	5	5	6
5	{M,P,N,R,S}	{O,Q,T}	0	4	7	2	6	5	5	6
6	{M,P,N,R,S,Q}	{O,T}	0	4	7	2	6	5	5	6
7	{M,P,N,R,S,Q,T}	{O}	0	4	7	2	6	5	5	6

∴ Shortest length = 6, Shortest path : M → R → T