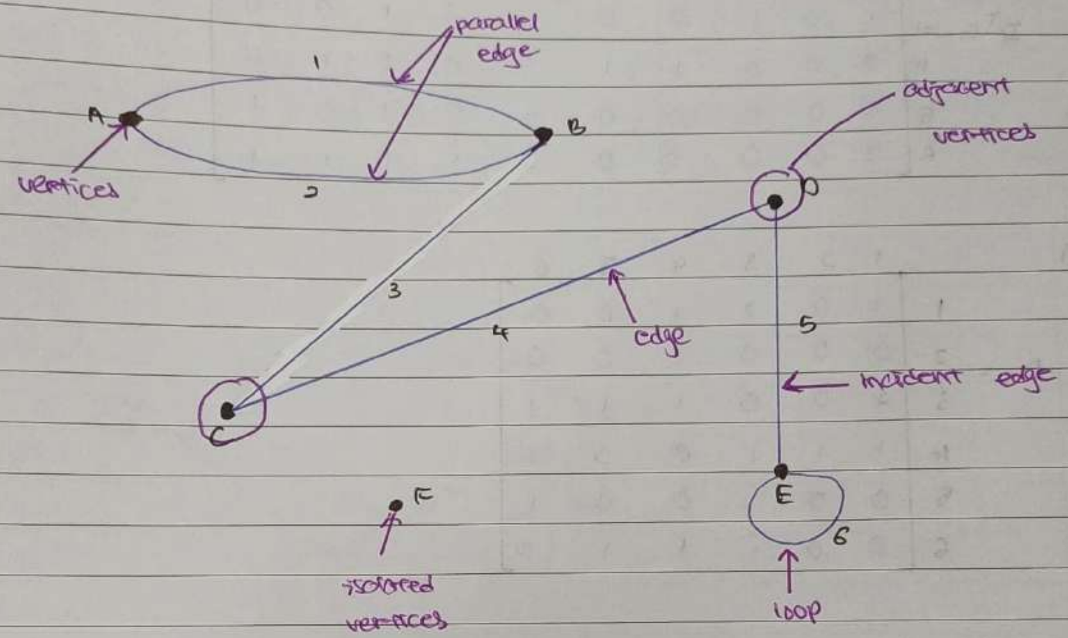
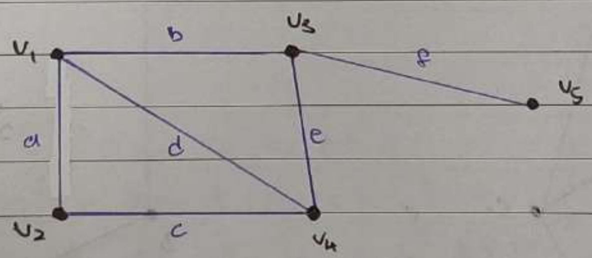
8) Loop : Edge with just one endpoint.

9) Parallel edge = Two or more distinct edge with the same set of endpoints.



Question 4 =



$\deg(v_1) = 3$

$\deg(v_2) = 2$

$\deg(v_3) = 3$

$\deg(v_4) = 3$

$\deg(v_5) = 1$

UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING

SEMESTER 1

2023/2024

SECI 1013 - DISCRETE STRUCTURE

SECTION 2

LECTURER: DR. NOORFA HASZLINNA BINTI MUTAFFA

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Subject :

No :
Date :

Question 1 :

a.) Pigeonholes (k) = 101 (score 0 - 100)
Pigeon (n) = students

$$k < n$$
$$101 < n$$
$$n = 102$$

∴ 102 students in a class can guarantee that at least 2 students received the same score on the final exam.

b.) Pigeonholes (m) = 5   k = 6
Pigeons (n) = ?

$$k = \frac{n}{m} \qquad k = \frac{n}{m}$$
$$6 = \frac{n}{5} \qquad 5 = \frac{n}{5}$$
$$n = 30 \qquad n = 25$$

$$25 < n \leq 30$$
$$\therefore \text{minimum } n = 26$$

∴ The minimum number of students required in a structure discrete class is 26 students.

Question 2 :

A = Customers purchased Brand 1
B = Customers purchased Brand 2
W = Those who purchase mobile phone, purchase extended warranty.

a) $P(A) = 0.7$

b) $P(B) = 0.3$

c) $P(W \mid A) = 0.2$

Subject :

Date :

d) $P(A \cap W)$

$$P(W|A) = \frac{P(A \cap W)}{P(A)}$$

$$0.2 = \frac{P(A \cap W)}{0.7}$$

$$P(A \cap W) = 0.14$$

e) $P(B \cap W)$

$$P(W|B) = \frac{P(B \cap W)}{P(B)}$$

$$0.4 = \frac{P(B \cap W)}{0.3}$$

$$P(B \cap W) = 0.12$$

f) $P(W) = P(W|A)\,P(A) + P(W|B)\,P(B)$

$= (0.2)(0.7) + (0.4)(0.3)$

$= 0.14 + 0.12$

$= 0.26$

g) $P(A|W) = \frac{P(A \cap W)}{P(W)}$

$= \frac{0.14}{0.26}$

$= 0.5385$

Questions 3 :

a) Vertices : Point or dot in a graph

b) Edges : A line that connects one or two vertices with each other.

c) Adjacent vertices : Two vertices that are connected by an edge.

d) Incident edge : Edge that is connected by a certain vertex.

e) Isolated vertex : Vertex that is not incident with any edge.

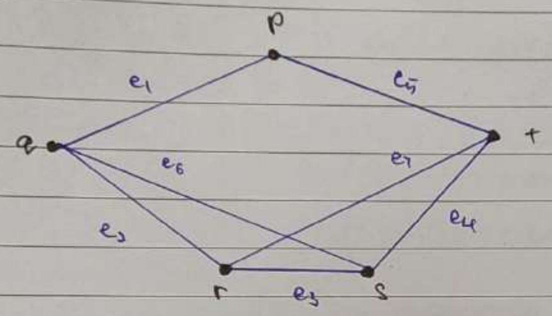
No :

Date :

$$A_Y = \begin{array}{c|cccccc} & F & E & D & C & B & A \\ \hline F & 0 & 0 & 1 & 1 & 1 & 0 \\ E & 0 & 0 & 0 & 1 & 1 & 0 \\ D & 1 & 0 & 0 & 1 & 1 & 1 \\ C & 1 & 1 & 1 & 0 & 0 & 0 \\ B & 1 & 1 & 1 & 0 & 0 & 1 \\ A & 0 & 0 & 1 & 0 & 1 & 0 \end{array}$$

$$A_Z = \begin{array}{c|cccccc} & 1 & 2 & 3 & 4 & 5 & 6 \\ \hline 1 & 0 & 0 & 1 & 1 & 1 & 0 \\ 2 & 0 & 0 & 0 & 1 & 1 & 0 \\ 3 & 1 & 0 & 0 & 1 & 1 & 1 \\ 4 & 1 & 1 & 1 & 0 & 0 & 0 \\ 5 & 1 & 1 & 1 & 0 & 0 & 1 \\ 6 & 0 & 0 & 1 & 0 & 1 & 0 \end{array}$$

Question 7 :



i) $(p, e_1, q, e_2, r, e_3, s, e_4, t)$
$(p, e_1, q, e_6, s, e_3, r, e_7, t)$
$(p, e_1, q, e_2, r, e_7, t)$
$(p, e_1, q, e_6, s, e_4, t)$
(p, e_5, t)

ii) $(p, e_5, t, e_4, s, e_3, r, e_7, t)$ (p, e_5, t)
$(p, e_5, t, e_7, r, e_3, s, e_4, t)$
$(p, e_5, t, e_7, r, e_2, q, e_6, s, e_4, t)$
$(p, e_5, t, e_4, s, e_6, q, e_2, r, e_7, t)$

iii) Longest = $(p, e_1, q, e_2, r, e_3, s, e_4, t)$ & $(p, e_1 q, e_6, s, e_3, r, e_7, t)$
Shortest = (p, e_5, t)

iv) Longest = $(p, e_5, t, e_7, r, e_2, q, e_6, s, e_4\ t)$ & $(p, e_5, t, e_4, s, e_6, q, e_2, r, e_7, t)$
Shortest = $(p, e_5, t, e_7, r, e_2, q, e_6, s, e_4, t)$ & $(p, e_5, t, e_4, s, e_6, q, e_2, r, e_7, t)$

Question 5 :

i)

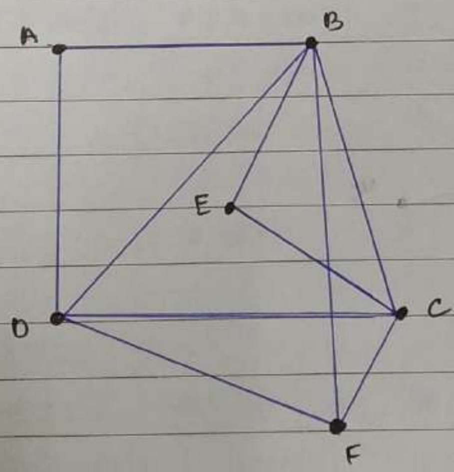
$$I_G = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \end{array} \begin{array}{c} \begin{array}{cccccccccc} a & b & c & d & e & f & g & h & i & k \end{array} \\ \left[\begin{array}{cccccccccc} 1 & 2 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{array}\right] \end{array}$$

ii)

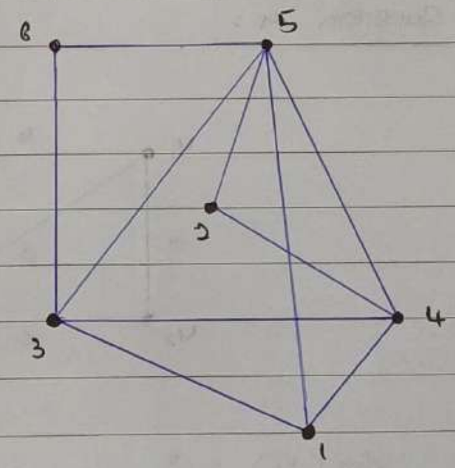
$$A_G = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \end{array} \begin{array}{c} \begin{array}{cccccc} 1 & 2 & 3 & 4 & 5 & 6 \end{array} \\ \left[\begin{array}{cccccc} 1 & 0 & 2 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \\ 2 & 0 & 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{array}\right] \end{array}$$

Question 6 :

Graph Y



Graph Z



$n(V) = 6$

$n(E) = 9$

$n(\Sigma d) = 18$

$n(V) = 6$

$n(E) = 9$

$n(\Sigma d) = 18$

$f(A) = 6$ $f(E) = 2$

$f(B) = 5$ $f(F) = 1$

$f(C) = 4$

$f(D) = 3$

$\therefore$ Proven that Graph Y & Graph Z is isomorphic