

SULIT



KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN MATEMATIK, SAINS & KOMPUTER

PEPERIKSAAN AKHIR

SESI II : 2023/2024

DBM20083 : DISCRETE MATHEMATICS

TARIKH : 27 MEI 2024

MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas ini mengandungi **SEPULUH (10)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** the questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

CLO 1

- (a) Given the statements:

Diberi pernyataan – pernyataan :

H : Kayyisa is happy

H : Kayyisa gembira

P : Kayyisa paints a picture

P : Kayyisa melukis gambar.

A : Areeq is happy

A : Areeq gembira

- i. Express the following compound propositions in English:

Ungkapkan proposisi majmuk berikut dalam bahasa Inggeris:

a) $(H \vee P) \rightarrow A$

[2 marks]

[2 markah]

b) $\sim A \leftrightarrow (\sim H \wedge \sim P)$

[2 marks]

[2 markah]

c) $\sim P \vee (H \leftrightarrow A)$

[2 marks]

[2 markah]

ii. Express the following statements in symbolic form:

Ungkapkan pernyataan berikut dalam bentuk simbol:

a) Kayyisa is not happy if Areeq is not happy.

Kayyisa tidak gembira jika Areeq tidak gembira.

[2 marks]

[2 markah]

b) If Kayyisa paints a picture then Areeq is happy, if and only if Kayyisa is happy.

Jika Kayyisa melukis gambar, maka Areeq gembira jika dan hanya jika Kayyisa gembira.

[2 marks]

[2 markah]

CLO 1 (b) Answer the following questions:

Jawab semua soalan berikut:

i. Construct a truth table for the compound proposition $\sim(\sim Q \rightarrow P) \leftrightarrow Q$.

Bina jadual kebenaran untuk proposisi majmuk $\sim(\sim Q \rightarrow P) \leftrightarrow Q$.

[4 marks]

[4 markah]

- ii. Determine whether compound propositions $\sim P \rightarrow Q$ and $P \vee Q$ are logically equivalent.

Tentukan sama ada proposisi majmuk $\sim P \rightarrow Q$ dan $P \vee Q$ adalah setara secara logik atau tidak.

[4marks]

[4 markah]

- iii. Construct a truth table to show if $(\sim R \wedge Q) \rightarrow (\sim Q \rightarrow P)$ is a Tautology.

Bina jadual kebenaran untuk menunjukkan jika $(\sim R \wedge Q) \rightarrow (\sim Q \rightarrow P)$ adalah Tautologi.

[7 marks]

[7 markah]

QUESTION 2

SOALAN 2

- CLO 2 (a) Use a K Map to simplify the following expressions:
Gunakan K Map untuk memudahkan ungkapan berikut:

i. $x = \bar{B}C + \bar{A}\bar{B}\bar{C} + A\bar{B}\bar{C} + ABC$

[5 marks]

[5 markah]

ii. $y = ABC + \bar{A}B\bar{C} + \bar{C} + \bar{A}BC$

[5 marks]

[5 markah]

iii. $z = \bar{A} + A\bar{B}\bar{C}$

[5 marks]

[5 markah]

- CLO 2 (b) Answer the following questions:
Jawab semua soalan berikut:

- i. Calculate how many 6-digits even numbers that are greater than 400 000 can be formed using the digits 1,4,5,6,7 and 9 without repetition?

Berapa banyak 6-digit nombor genap yang lebih besar daripada 400 000 boleh dibentuk menggunakan digit 1,4,5,6,7 dan 9 tanpa ulangan?

[5 marks]

[5 markah]

- ii. A coach wants to choose 7 players to form a squash team. These 7 players are chosen from a group of 9 boys and 5 girls. Calculate how many ways the team can be formed so that it includes not more than 2 girls.

Seorang jurulatih ingin memilih 7 orang pemain untuk membentuk pasukan skuasy. 7 pemain ini dipilih daripada kumpulan 9 lelaki dan 5 perempuan. Kira bilangan cara jika pasukan itu dibentuk supaya ia terdiri daripada tidak lebih daripada 2 orang perempuan.

[5 marks]

[5 markah]

CLO 1

QUESTION 3**SOALAN 3**

- (a) Based on the information in Figure 3(a), answer the following questions:

Jawab kesemua soalan berikut berdasarkan Rajah 3(a):

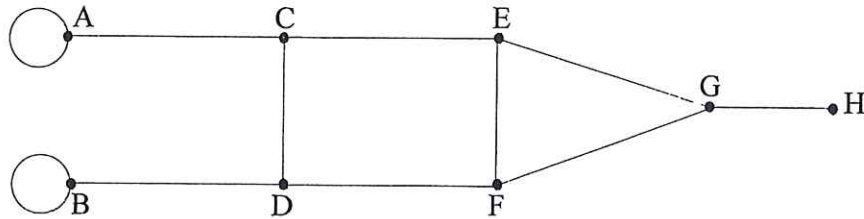


Figure 3(a) / Rajah 3(a):

- i. State the pendant vertex.

Nyatakan bucu loket.

[1 mark]

[1 markah]

- ii. Identify the degree of vertex A.

Tentukan darjah bagi bucu A.

[1 mark]

[1 markah]

- iii. Identify whether the graph is a simple graph.

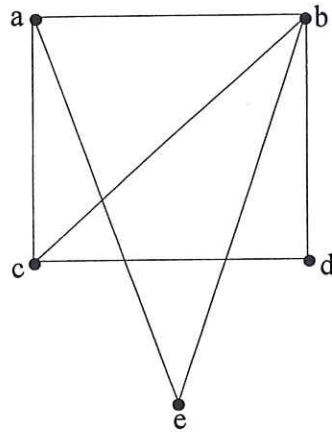
Tentukan samada graf tersebut merupakan graf mudah.

[1 mark]

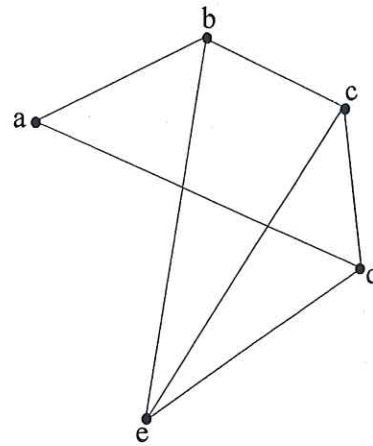
[1 markah]

CLO 1

- (b) Refer to the graphs in Figure 3(b):
Rujuk graf – graf dalam Rajah 3(b):



Graph A/Graf A



Graph B/Graf B

Figure 3(b) / Rajah 3(b)

- i. Identify if Graph A and Graph B are isomorphic.
Tentukan samada Graf A dan Graf B adalah isomorfik atau tidak.

[4 marks]
[4 markah]
- ii. Transform Graph A and Graph B into a planar graph.
Ubah Graf A dan Graf B kepada graf planar.

[4 marks]
[4 markah]
- iii. Show that Graph A is not a Bipartite graph. Explain your reason.
Tunjukkan Graf A ialah bukan graf Bipartite. Terangkan alasan anda.

[4 marks]
[4 markah]

CLO 1 (c) Refer to the graph in Figure 3(c):

Rujuk graf dalam Rajah 3(c):

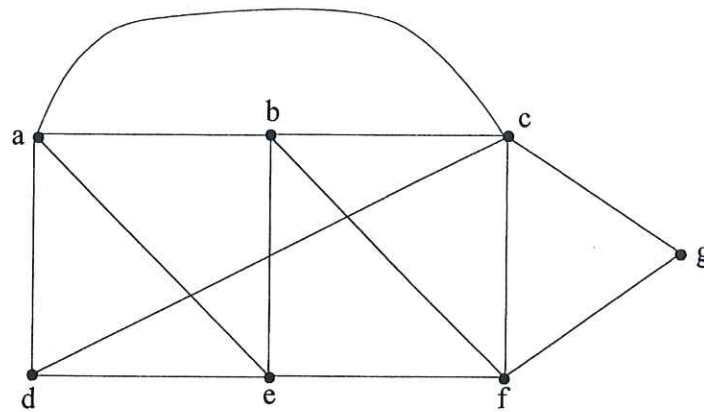


Figure 3(c) / Rajah 3(c)

- i. Identify whether Hamilton path exist in the graph. Hence, construct a Hamilton Circuit.

Tentukan samada laluan Hamilton wujud di dalam graf. Kemudian, bina satu litar Hamilton.

[4 marks]

[4 markah]

- ii. Construct an Euler path.

Bina satu laluan Euler.

[6 marks]

[6 markah]

QUESTION 4

SOALAN 4

- CLO 2 (a) Given the functions $f(x) = \frac{2x+1}{3}$ and $g(x) = 5x + 2$. Calculate:

Diberi fungsi $f(x) = \frac{2x+1}{3}$ dan $g(x) = 5x + 2$. Kira:

i. $gf(x)$

[3 marks]

[3 markah]

ii. $g^{-1}f(x)$

[6 marks]

[6 markah]

iii. the value of x if $f^{-1}g(x) = 10$

nilai x jika $f^{-1}g(x) = 10$

[6 marks]

[6 markah]

CLO 2

- (b) Compute the following:

Kira yang berikut:

i. $\left[\lfloor 3.1 \rfloor + 2.5 - \left\lfloor -\frac{5}{6} \right\rfloor \right] + \left[\lfloor 4.5 \rfloor - \lceil 4.3 \times 4 \rceil - \left\lceil \frac{7}{9} \right\rceil \right]$

[5 marks]

[5 markah]

ii. $\left[2.1 + \left\lceil -\frac{1}{3} \right\rceil + (9 \times 2.5) \right] - \left[\lceil 3.5 \rceil + \lfloor 4 \rfloor - 10.1 \right]$

[5 marks]

[5 markah]

SOALAN TAMAT

FORMULA DBM20083 - DISCRETE MATHEMATICS

RULES OF INFERENCE					
No.	Name	Rule of Inference	No.	Name	Rule of Inference
1.	Addition	$\frac{p}{\therefore p \vee q}$	4.	Disjunctive Syllogism	$\frac{p \vee q}{\sim q} \therefore p$
2.	Modus Tollens	$\frac{p \rightarrow q}{\sim q} \therefore \sim p$	5.	Hypothetical Syllogism	$\frac{p \rightarrow q}{q \rightarrow r} \therefore p \rightarrow r$
3.	Modus Ponens	$\frac{p \rightarrow q}{p} \therefore q$			

DE MORGAN'S LAW

For Basic Logic

1. $\sim (p \vee q) = \sim p \wedge \sim q$
2. $\sim (p \wedge q) = \sim p \vee \sim q$

For Set

1. $\overline{(A \cup B)} = \bar{A} \cap \bar{B}$
2. $\overline{(A \cap B)} = \bar{A} \cup \bar{B}$

PERMUTATION WITHOUT REPETITION

$$P(n, r) = \frac{n!}{(n-r)!}$$

COMBINATION WITHOUT REPETITION

$$C(n, r) = \frac{n!}{r!(n-r)!}$$

PERMUTATION WITH REPETITION

$$P(n, r) = n^r$$

COMBINATION WITH REPETITION

$$C(n, r) = \frac{(n+r-1)!}{r!(n-1)!}$$

