SULIT

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

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

JABATAN TEKNOLOGI KIMIA DAN MAKANAN

PEPERIKSAAN AKHIR

SESI I : 2024/2025

DMT10013: FUNDAMENTALS OF CHEMISTRY

TARIKH : 03 DISEMBER 2024
MASA : 2.30 PETANG – 4.30 PETANG (2 JAM)

Kertas ini mengandungi **ENAM (6)** halaman bercetak.

Subjektif (4 soalan)

Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1

SOALAN 1

CLO1 (a) Name **THREE (3)** properties of atom and molecules.

*Namakan **TIGA (3)** sifat atom dan molekul.*

[6 marks]
[6 *markah*]

CLO1 (b) Explain the arrangement of particles for solid, liquid and gaseous states.

Terangkan susunan zarah bagi pepejal, cecair dan gas.

[6 marks]
[6 *markah*]

CLO1 (c) A compound consists of 82.66% carbon and 17.34% hydrogen. (Relative Atomic Mass, RAM: C = 12, H= 1).

Satu sebatian mengandungi 82.66 % carbon dan 17.34% hydrogen. (Jisim Atom Relatif, RAM: C= 12, H = 1).

i. Express the empirical formula of the compound.

Zahirkan formula empirik bagi sebatian tersebut.

	C Element *Unsur C*	**H Element** *Unsur H*
Mass *Jisim*		
Number of moles (mol = mass/RAM) *Bilangan mol (mol = jisim/JAR)*		
Simplest ratio *Nisbah paling kecil*		
Empirical formula *Formula empirikal*		

[8 marks]
[8 *markah*]

ii. If the relative molecular mass is 58, express molecular formula for that compound. Given : (Empirical formula x n = 58)
Jika jisim molekul relatifnya adalah 58, zahirkan formula molekul bagi sebatian tersebut. Diberi: (Formula empirikal x n = 58)

[5 marks]
[5 *markah*]

QUESTION 2
SOALAN 2

CLO1 (a) Indicate definition of electrovalence, proton number and nucleon number.
Nyatakan definisi elektrovalensi, nombor proton dan nombor nukleon.

[6 marks]
[6 *markah*]

CLO1 (b) Explain **THREE (3)** characteristics of isotope.
*Terangkan **TIGA (3)** ciri-ciri isotop.*

[6 marks]
[6 *markah*]

CLO1 (c)

Table 2 (c)/*Jadual 2 (c)*

Atom *Atom*	**Proton Number** *Nombor proton*
A	3
B	17
C	18

i. Illustrate the electron arrangement for atom A and B.
Ilustrasikan susunan elektron untuk atom A dan B.

[5 marks]
[5 *markah*]

ii. Using Lewis structure, illustrate the formation of chemical bond that is formed between A and B .
Dengan menggunakan Struktur Lewis, ilustrasikan pembentukan ikatan kimia antara A dan B.

[8 marks]
[8 *markah*]

QUESTION 3
SOALAN 3

CLO1 (a) Indicate the definition of redox reaction, reduction reaction and oxidation reaction.
Nyatakan takrifan bagi tindakbalas redoks, tindakbalas penurunan dan tindakbalas pengoksidaan.

[6 marks]
[6 *markah*]

CLO1 (b) $Zn + Cu^{2+} \longrightarrow Zn^{2+} + Cu$

Restate this redox equation to oxidation reaction and reduction reaction.
Nyatakan semula tindakbalas redoks ini kepada tindakbalas pengoksidaan dan tindakbalas penurunan.

[6 marks]
[6 *markah*]

CLO1

(c) $CO_3^{2-} + H_2O \rightarrow HCO^{3-} + OH^-$

Oxidation number : O = -2, H = +1

i. Express the oxidation number of atom carbon as in ion CO_3^{2-} and HCO^{3-}.

Zahirkann nombor pengoksidaan atom karbon di dalam ion CO_3^{2-} dan HCO^{3-}

[7 marks]
[7 markah]

ii. Express the oxidation number of atom oxygen as in H_2O and ion OH^-

Zahirkan nombor pengoksidaam atom karbon di dalam H_2O and ion OH^-

[6 marks]
[6 markah]

QUESTION 4

SOALAN 4

CLO1

(a) Identify the base, conjugate acid and conjugate base in the following equation:

Kenal pasti bes, asid konjugat dan bes konjugat dalam persamaan berikut:

$$CH_3COOH + H_2O \longrightarrow CH_3COO^- + H_3O$$

[6 marks]
[6 *markah*]

CLO1

(b) Explain **THREE (3)** differences between strong base and weak base.

*Terangkan **TIGA (3)** perbezaan antara bes kuat dan bes lemah.*

[6 marks]
[6 *markah*]

CLO1

(c) i) Express the pH value of 0.025M NaOH solution.

Zahirkan nilai pH 0.025M larutan NaOH.

$pOH = - \log [OH^-]$

$pH + pOH = 14$

[5 marks]
[*5 markah*]

ii) Explain **TWO (2)** factors that affect rate of reaction in terms of effective collision.

*Terangkan **DUA (2)** faktor yang mempengaruhi kadar tindakbalas dari segi perlanggaran berkesan.*

[8 marks]
[*8 markah*]

SOALAN TAMAT