

Penerangan soalan yang melibatkan pengiraan

Explanation of questions that involve calculations

Praktis 2

- 14 A Susunan elektron / *Electron arrangement*
= 2.6
- 16 C Bilangan proton / *Number of protons*
= 46 + 1 = 47
Nombor nukleon / *Nucleon number*
= 47 + 62 = 109
- 17 A Susunan elektron / *Electron arrangement* = 2.6
- 21 C Jisim atom relatif / *Relative atomic mass*
= $\frac{(36 \times 50) + (38 \times 20) + (39 \times 30)}{100}$
= 37.3
- 24 B Andaikan peratus kelimpahan ^{40}M
Assume the percentage abundance of $^{40}\text{M} = x\%$
 $\frac{38(100 - x) + 40x}{100} = 38.8$
 $x = 40\%$

Praktis 3

- 3 C Jisim atom relatif Sc / *Relative atomic mass of Sc*
= $\frac{5 \times 88}{11}$
= 40
- 4 D $40 + (2 \times 35.5) + 2[(2 \times 1) + 16] = 147$
- 5 A Anggap jisim atom relatif Al = x
Assume the relative atomic mass of Al = x
 $39 + x + 4(16 + 1) = 134$
 $x = 27$
- 6 D I Bilangan mol air / *The number of moles of water*
= $\frac{1.806 \times 10^{24}}{6.02 \times 10^{23}}$
= 3 mol
- II Bilangan mol CaO / *The number of moles of CaO*
= $\frac{56.0}{56}$
= 1 mol
- III Bilangan mol gas oksigen
The number of moles of oxygen gas
= $\frac{2400 \text{ cm}^3}{24\,000 \text{ cm}^3 \text{ mol}^{-1}}$
= 0.1 mol
- IV Bilangan mol magnesium
The number of moles of magnesium
= $\frac{6.02 \times 10^{23}}{6.02 \times 10^{23}}$
= 1 mol
- 7 D Bilangan ion OH^- / *Number of OH^- ions*
= $2 \times 3 \times 6.0 \times 10^{23}$
= 3.6×10^{24}

- 8 C Jisim molekul relatif C_4H_{10} / *Relative molecular mass of C_4H_{10}*
= $(4 \times 12) + (10 \times 1)$
= 58
Bilangan mol / *Number of moles*
= $\frac{12\,000 \text{ g}}{58 \text{ g mol}^{-1}}$
= 206.9 mol

9 B

Bahan <i>Substance</i>	Jisim molar <i>Molar mass</i>	Jisim (g) <i>Mass (g)</i>
Cl_2	$(2 \times 35.5) = 71$	$0.5 \times 71 = 35.5 \text{ g}$
NaCl	$23 + 35.5 = 58.5$	$1.0 \times 58.5 = 58.5 \text{ g}$
H_2O	$(2 \times 1) + 16 = 18$	$1.5 \times 18 = 27 \text{ g}$
H_2	$(2 \times 1) = 2$	$2.0 \times 2 = 4.0 \text{ g}$

- 12 A Jisim O_2 / *Mass of O_2*
= $\frac{960}{24\,000} \times 32 = 1.28 \text{ g}$
Isi padu NO_2 / *Volume of NO_2*
= $\frac{1.28}{46} \times 24\,000$
= 668 cm^3
- 13 C Bilangan mol Z / *The number of moles of Z*
= $\frac{1200}{24\,000} = 0.05 \text{ mol}$
 $\frac{2.8}{\text{JMR} / \text{RMM}} = 0.05 \text{ mol}$
 $\therefore \text{JMR} / \text{RMM} = \frac{2.8}{0.05} = 56$
- 14 A Bilangan molekul H_2O / *The number of H_2O molecules*
= $\frac{1}{2} \times 3.0 \times 10^{22}$
= 1.5×10^{22}
Bilangan mol H_2O / *The number of moles of H_2O*
= $\frac{1.5 \times 10^{22}}{6 \times 10^{23}}$
= 0.025 mol
Jisim H_2O / *Mass of H_2O*
= 0.025×18
= 0.45 g
- 15 A Formula molekul / *Molecular formula*
= (Formula empirik / *Empirical formula*) _{n}
 $n = \frac{60}{30}$
= 2

∴ Formula molekul *Molecular formula*
 = $(\text{CH}_2\text{O})_2$
 = $\text{C}_2\text{H}_4\text{O}_2$

16 D

Unsur / Element	Mg	N
Bilangan mol Number of moles	$\frac{2.16}{24} = 0.09$	$\frac{0.84}{14} = 0.06$
Nisbah mol terringkas The simplest mole ratio	3	2

17 B

Unsur Element	C	H	N
Peratusan Percentage	28.6	4.8	66.6
Bilangan mol Number of moles	$\frac{28.6}{12} = 2.4$	$\frac{4.8}{1} = 4.8$	$\frac{66.6}{14} = 4.8$
Nisbah mol terringkas The simplest mole ratio	1	2	2

18 B Anggap jisim atom relatif Cr / Assume relative atomic mass of Cr = x
 Jisim Cr dalam sampel / Mass of Cr in the sample
 = $(4.56 - 1.44) \text{ g} = 3.12 \text{ g}$
 Bilangan mol Cr / The number of moles of Cr = $\frac{2}{3}$
 Bilangan mol O / The number of moles of O = $\frac{2}{3}$

$$\frac{3.12}{x} = \frac{2}{3} \times \frac{1.44}{16}$$

$$\therefore x = 52$$

23 D Bilangan mol CO_2
 The number of moles of CO_2
 = $\frac{2.64}{44} = 0.06 \text{ mol}$

Bilangan mol O_2 diperlukan
 The number of moles of O_2 required

$$= \frac{5}{3} \times \text{Bilangan mol } \text{CO}_2 / \text{The number of moles of } \text{CO}_2$$

$$= \frac{5}{3} \times 0.06 \text{ mol}$$

$$= 0.1 \text{ mol}$$

Jisim O_2 / Mass of O_2

$$= 0.1 \times 32$$

$$= 3.2 \text{ g}$$

24 C Bilangan mol Mg yang bertindak balas
 The number of moles of Mg reacted

$$= \frac{1}{2} \times \text{Bilangan mol } \text{HNO}_3 / \text{The number of moles of } \text{HNO}_3$$

$$= \frac{1}{2} \times 0.10 = 0.05 \text{ mol}$$

Jisim Mg yang bertindak balas / Mass of Mg reacted

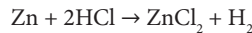
$$= 0.05 \times 24 = 1.2 \text{ g}$$

Jisim Mg yang tertinggal / Mass of Mg left

$$= (3.20 - 1.20) \text{ g}$$

$$= 2.0 \text{ g}$$

25 B Persamaan kimia / Chemical equation:



Bilangan mol ZnCl_2 / The number of moles of ZnCl_2

$$= \frac{2.72}{136} = 0.02 \text{ mol}$$

Bilangan mol Zn / The number of moles of Zn

= Bilangan mol ZnCl_2 / The number of moles of ZnCl_2

$$= 0.02 \text{ mol}$$

∴ Jisim Zn / Mass of Zn

$$= 0.02 \times 65$$

$$= 1.30 \text{ g}$$

Praktis 6

4 D $\text{pOH} = -\log 0.2 = 0.70$

$$\text{pH} = 14 - 0.70 = 13.3$$

12 A Andaikan JMR asid X = M

Assume RMM of acid X = M

Bilangan mol asid X

The number of moles of acid X

$$= \frac{2.96}{M} = \frac{0.16 \times 250}{1000}$$

$$\therefore M = 74$$

13 A JMR NaCl / RMM of NaCl = 58.5

$$\text{Kemolaran / Molarity} = \frac{25}{58.5}$$

14 A Bilangan mol / Number of moles

$$= \frac{MV}{1000}$$

$$= \frac{0.5 \times 200}{1000} = 0.1 \text{ mol}$$

15 B Bilangan mol MgSO_4 / The number of moles of MgSO_4

$$= \frac{MV}{1000}$$

$$= \frac{0.2 \times 250}{1000} = 0.05 \text{ mol}$$

Jisim MgSO_4 / Mass of MgSO_4

$$= 0.05 \times 120 = 6.0 \text{ g}$$

17 A $M_1V_1 = M_2V_2$

$$1.00 \times 10 = M_2 \times (10 + 40)$$

$$\therefore M_2 = 0.20 \text{ mol dm}^{-3}$$

18 C Andaikan isi padu air suling / Assume volume of distilled water = $x \text{ cm}^3$

$$M_1V_1 = M_2V_2$$

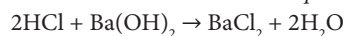
$$2.0 \times 10 = 0.5 \times (10 + x)$$

$$\therefore x = 30 \text{ cm}^3$$

20 A $\frac{1.0 \times V}{0.2 \times 25.0} = \frac{1}{2}$

$$V = 2.5 \text{ cm}^3$$

21 C Persamaan kimia / Chemical equation



$$\frac{M \times 25.0}{2.0 \times 10.0} = \frac{1}{2}$$

$$M = 0.4 \text{ mol dm}^{-3}$$

29 C Bilangan mol $\text{Mg}(\text{NO}_3)_2$ / The number of moles of $\text{Mg}(\text{NO}_3)_2$

$$\begin{aligned}
 &= 2 \times \text{Bilangan mol HNO}_3 / \text{The number of moles of HNO}_3 \\
 &= 2 \times 0.05 \\
 &= 0.1 \text{ mol} \\
 \frac{M \times 50.0}{1000} &= 0.1 \\
 M &= 2.0 \text{ mol dm}^{-3}
 \end{aligned}$$

Praktis 7

- 5 A Bilangan mol Zn yang bertindak balas

The number of moles of Zn reacted

$$= \frac{(2.0 - 1.35)}{65} = 0.01 \text{ mol}$$

Kadar keseluruhan / *The overall rate*

$$= \frac{0.01 \text{ mol}}{0.5 \text{ min}} = 0.02 \text{ mol min}^{-1}$$

- 7 B Kadar keseluruhan / *The overall rate*

$$= \frac{42.00 \text{ cm}^3}{150 \text{ s}} = 0.28 \text{ cm}^3 \text{ s}^{-1}$$

- 9 B Kadar purata / *The overall rate*

$$= \frac{(42.00 - 30.00) \text{ cm}^3}{(150 - 60) \text{ s}} = 0.133 \text{ cm}^3 \text{ s}^{-1}$$

Pentaksiran Sumatif

- 5 D Bilangan elektron dalam ion Cl⁻

The number of electrons in Cl⁻ ions

$$= 17 + 1$$

$$= 18$$

∴ Susunan elektron Cl⁻

Electron arrangement of Cl⁻

$$= 2.8.8$$

- 6 D Bilangan proton dalam atom K

The number of protons in atom K

$$= 2 + 8 + 5$$

$$= 15$$

Nombor nukleon / *Nucleon number*

$$= 15 + 16$$

$$= 31$$

- 9 C Jisim atom relatif / *Relative atomic mass*

$$= \frac{(27 \times 20) + (28 \times 65) + (30 \times 15)}{100}$$

$$= 28.1$$

- 10 A Bilangan atom dalam 0.4 mol gas oksigen, O₂

The number of atoms in 0.4 mole of oxygen gas, O₂

$$= 0.4 \times 2 \times N_A$$

$$= 0.8N_A$$

Bilangan atom dalam 51.2 g Cu

The number of atoms in 51.2 g of Cu

$$= \frac{51.2}{64} \times N_A$$

$$= 0.8N_A$$

Bilangan atom dalam 0.8 g H₂

The number of atoms in 0.8 g of H₂

$$= \frac{0.8}{2} \times 2 \times N_A$$

$$= 0.8N_A$$

Bilangan atom dalam 17.6 g CO₂

The number of atoms in 17.6 g of CO₂

$$= \frac{17.6}{44} \times 3 \times N_A$$

$$= 1.2N_A$$

Bilangan atom dalam 13.0 g Zn

The number of atoms in 13.0 g of Zn

$$= \frac{13.0}{65} \times N_A$$

$$= 0.2N_A$$

12 C

Unsur / Element	C	H	N	O
Jisim (g) / Mass (g)	27.59	1.15	16.09	55.17
Bilangan mol <i>The number of moles</i>	$\frac{27.59}{12}$ = 2.30	$\frac{1.15}{1}$ = 1.15	$\frac{16.09}{14}$ = 1.15	$\frac{55.17}{16}$ = 3.45
Nisbah mol terringkas <i>The simplest mole ratio</i>	$\frac{2.30}{2}$ = 1.15	$\frac{1.15}{1}$ = 1.15	$\frac{1.15}{1}$ = 1.15	$\frac{3.45}{3}$ = 1.15

Formula empirik *Empirical formula* = C₂HNO₃

Formula molekul *Molecular formula*

= (Formula empirik *Empirical formula*)_n

$$n = \frac{261}{87} = 3$$

∴ Formula molekul *Molecular formula*

$$= (\text{C}_2\text{HNO}_3)_3$$

$$= \text{C}_6\text{H}_3\text{N}_3\text{O}_9$$

- 27 B Bilangan mol Cu(NO₃)₂

The number of moles of Cu(NO₃)₂

$$= \frac{0.2 \times 250}{1000}$$

$$= 0.05 \text{ mol}$$

Jisim Cu(NO₃)₂ / *The mass of Cu(NO₃)₂*

$$= 0.05 \times 188$$

$$= 9.4 \text{ g}$$

- 28 B Andaikan isi padu air suling = V cm³

Assume the volume of distilled water = V cm³

$$10 \times 0.2 = (10 + V) \times 0.05$$

$$\therefore V = 30 \text{ cm}^3$$

- 33 B Bilangan mol CaCO₃

The number of moles CaCO₃

$$= \frac{15.0}{100}$$

$$= 0.15 \text{ mol}$$

Bilangan mol CO₂ / *The number of moles of CO₂*

= Bilangan mol CaCO₃

The number of moles of CaCO₃

$$= \frac{15.0}{100}$$

$$= 0.15 \text{ mol}$$

∴ Isi padu CO₂ / *Volume of CO₂*

$$= 0.15 \times 24 \text{ dm}^3$$

$$= 3.6 \text{ dm}^3$$

- 36 C Purata kadar tindak balas dari 60 s hingga 150 s

The average rate of reaction from 60 s to 150 s

$$= \frac{(28.80 - 16.80) \text{ cm}^2}{(150 - 60) \text{ s}}$$

$$= 0.133 \text{ cm}^3 \text{ s}^{-1}$$