

Structure {Paper02}

[SBPTrial10-03]

(a) (i) Solvent P : ...water.....

Solvent Q : ...benzene/ toluene/ methanol [sebarang pelarut organik]

(ii) Bubbles gas released // Magnesium ribbon became thinner

(iii) 1. P is water, so Ethanoic acid ionise partially in water

2. That produce low concentration of Hydrogen ions

3. The exist of H⁺ ions show the acidic properties

(b) (i) 1. Increases [jadi lebih cair, sbb tu pH tinggi]

2. The concentration of Hydrogen ion is decreases

(ii) Dilution, used formula $M_1V_1 = M_2V_2$

$$\begin{aligned} V_1 &= M_2V_2 / M_1 \\ &= 0.04 \times 250 / 0.5 \\ &= 20 \text{ cm}^3 \end{aligned}$$

[SBPdiag07-05]

(a) (i) water

(ii) methylbenzene // any organic solvent

b ions

c 1.X ionises in water to produce hydrogen ions,

2.Y has neutral molecules and cannot ionise

d (i) neutralization



(iii) 1.No. Of mole, HCl= $0.6 \times 8.0 = 0.0048$

$$\frac{\text{-----}}{1000}$$

2. No. Of mole Ba(OH)₂ = $0.0048/2 = 0.0024$

3. Concentration of Ba(OH)₂ = 0.0024×1000

$$\frac{\text{-----}}{8} //$$

$$= 0.3$$

[SBPdiag06-06]

- (a) (i) Blue to red
- (ii) H^+
- (b) 1. No
2. No water / H^+ ions
- (c) 1. Ethanoic acid is weak acid, hydrochloric acid is strong acid
2. The concentration of H^+ ions in ethanoic acid is lower / The concentration of H^+ ions in hydrochloric acid is higher.
- (d) $CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$
- (e) 1. [Material : name of reactive metal / name of carbonate salt]
2. [To test gas produced]
3. [Observation]
- Example 1
Procedure:
1. Magnesium ribbon is added into the aqueous solution X
2. Lower a lighted wooden splinter
Observation:
A “pop” sound is heard

Example 2*Procedure:*

1. Calcium carbonate is added into the aqueous solution X
2. Passing the gas through lime water

Observation:

Lime water turns milky

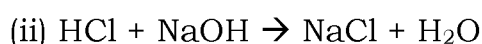
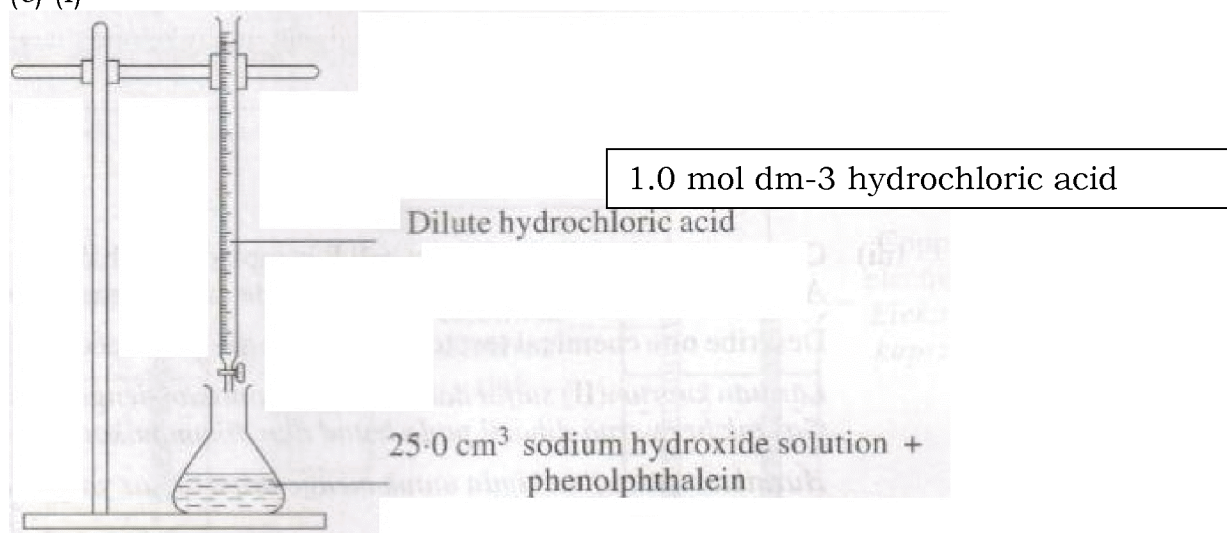
[MRSM09-04]

- (a) (i) molecule
(ii) No reaction [sbb acid not ionise]
- (iii) 1. Bubbles gas released // Magnesium ribbon became thinner / dissolved
2. Because ethanoic acid ionise in water and produce H^+ ions, that react with magnesium.

(b) Dilution $M_1V_1 = M_2V_2$

$$\begin{aligned}
 M_2 &= M_1V_1 / V_2 \\
 &= 1.0 \times 50 / 100 \text{ [100 sbb 2 larutan ditambah]} \\
 &= 0.5 \text{ mol dm}^{-3}
 \end{aligned}$$

(c) (i)



$$a=1, b=1$$

$$M_a V_a / a = M_b V_b / b$$

$$\begin{aligned} V_a &= M_b V_b / b \times a / M_a \\ &= 0.5 \times 25 / 1 \times 1 / 1.0 \\ &= 12.5 \text{ cm}^3 \end{aligned}$$

[SPM11-04]

(a) Chemical substances that ionise in water and produce hydrogen ions

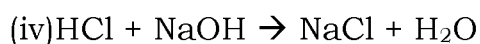
(b) hydrochloric acid ionise completely in water and produce high concentration of hydrogen ion

(c) (i) Solution P // P

(ii) Solution P has higher concentration of hydrogen ions

(d) (i) neutralisation

(ii) Pink to colourless



$$A=1, b=1$$

$$M_a V_a / a = M_b V_b / b$$

$$\begin{aligned} V_a &= M_b V_b / b \times a / M_a \\ &= 0.1 \times 25 / 1 \times 1 / 0.1 \dots [\text{M1}] \\ &= 25 \text{ cm}^3 \dots [\text{M2}] \end{aligned}$$

[SBPdiag05-04]

(a) Substance that ionise partially in water to produce low concentration of hydrogen ions

(b) Hydrogen /gas

(c)

Solvent	Methylbenzene	Water
Type of particles	molecule	ions

(d) Bubbles gas released

(e) 1. Acid in experiment III

2. Sulphuric is strong acid that ionise completely in water that produce high concentration of H⁺ ions

3. Ethanoic acid is weak acid that ionise partially in water that produce low concentration of H⁺ ions

(f) $\text{Mg} + \text{H}_2\text{SO}_4 \rightarrow \text{MgSO}_4 + \text{H}_2$

(g) Mol sulphuric acid = $\text{MV} / 1000$

$$= 1.0 \times 20 / 1000$$

$$= 0.02 \text{ mol}$$

1 mol H₂SO₄ released 1 mol H₂

0.02 mol H₂SO₄ released 0.02 mol H₂

Volume H₂ = mol H₂ X Molar volume

$$= 0.02 \times 24 = 0.48 \text{ dm}^3$$

[MRSM11-02]

(a)(i) neutral: X

(ii) alkaline: : ..Y // Z // Y and Z

(b) (i) the **highest concentration** of hydrogen ion : ...V...

(ii) the highest concentration of hydroxide ion :Z

(c) (i) Sulphuric acid, H₂SO₄ / hydrochloric , HCl / nitric acid, HNO₃

(ii) React with metal/ metal oxide/ metal carbonate/ alkali/ base

Acid + metal → salt + hydrogen gas

(d) (i) Potassium hydroxide, KOH, sodium hydroxide NaOH

(ii) Dilution, $M_1V_1 = M_2V_2$

$$M_2 = M_1V_1 / V_2$$

$$= 0.1 \text{ [dr soalan di atas sekali] } \times 20 / 100$$

$$= 0.02 \text{ mol dm}^{-3}$$

[SPM06-04]

- (a) (i) Concentration – the quantity (or amount) of solute (grams) dissolves in a given volume(1 dm³) of solution
- (ii) Molarity – the number of moles of solutes that are present in 1 dm³ of solution.
- (iii) $n = MV(\text{cm}^3) / 1000$ or $n = MV(\text{dm}^3)$
- (iv) $n = 8/40 = 0.2$ mole , $M = 0.2 \times 1000/1000$, $M = 0.2 \text{ mol dm}^{-3}$
- (b) (i) Parameter I : mass (moles of NaOH)
Parameter II : volume of solution (distilled water)
- (ii) No traces of sodium hydroxide is left on the filter funnel or beaker for accurate concentration or amount of solute used is accurate and not less
- (iii) Add distilled water drop by drop until the meniscus is at the calibration mark
- (iv) Measures the volume accurately
- (v) To prevent evaporation or evaporation of water can cause the changes in concentration or easy to swirl the solution

[MRSM10-04]

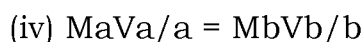
- (a) (i) Chemical substances that ionise partially in water and produce low concentration of H⁺ ions
- (ii) 1. Hydrochloric acid is strong acid, that ionises completely in water to produce high concentration H⁺ ions
2. Oxalic acid is strong acid, that ionises partially in water to produce low concentration H⁺ ions
- (b) (i) $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- (ii) $M_a V_a / a = M_b V_b / b$
- $M_a = M_b V_b / b \times a / V_a$
 $= 0.1 \times 25 / 1 \times 1 / 12.5$
 $= 0.2 \text{ mol dm}^{-3}$

[SPM10-06]

(a) (i) Neutralisation // acid with alkali



(iii) Pink to colourless



number of mole NaOH = $(0.1 \times 25) / 1000 = 0.0025 \text{ mol}$ [1]

$$\begin{aligned} \text{Molarity} &= (0.0025 \times 1000) / 20 \\ &= 0.125 \text{ mol dm}^{-3} \end{aligned}$$

(b) X: ...sulphuric // diprotic acid

Y: ...hydrochloric acid // monoprotic acid

- (c) 1. Add hydrochloric acid/ nitric acid into the test tube contains solution
2. Then followed by barium chloride solution
3. White precipitate form

[SBPdiag08-05]

(a)

Final reading/cm ³	burette	25.55	1
Initial reading/cm ³	burette	0.55	1
Volume of acid/cm ³		25.00	

(b) pink to colourless



(d) $\frac{M_a V_a}{M_b V_b} = \frac{1}{1}$

$$\frac{1.0 \times 25.0}{M_b \times 25.0} = \frac{1}{1}$$

$$M_b = 1.0 \text{ mol dm}^{-3}$$

(e) 12.5 cm³

Sulphuric acid is a diprotic acid.

has 2 times the concentration of H⁺ ions compared to hydrochloric acid.

[SBPdiag06-04]

- (a) Neutralization/ Neutralisation 1
- (b) $\text{H}_2\text{SO}_4 + 2\text{KOH} \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$ 1
- (c)(i) K^+ , OH^- , SO_4^{2-} 1
- (ii) K^+ , SO_4^{2-} , H^+ 1
- (d) 5.00/ 5.0/ 5 cm^3 1
- (e) 1. $\frac{M_a V_a}{M_b V_b} = \frac{a}{b}$ find mol for acid = 0.005 mole 1
2. $\frac{1.0 (5.0)}{M_b (25)} = \frac{1}{2}$ 1 mol acid react with 1 mol base 1
3. $M_b = \frac{2(1.0)(5.0)}{25} = 0.4 \text{ mol dm}^{-3}$ 1
- (f) 1. $10.0 \text{ cm}^3 / 0.01 \text{ dm}^{-3}$ 1
2. nitric acid is monoprotic acid / / sulphuric acid is diprotic acid 1

[SBPtrial04-03] {Translate}

- (a) Asid yang mencerai(mengion) lengkap apabila larut dalam air menghasilkan ion H^+ (H_3O^+)
- (b) $\text{H}_2\text{SO}_4 + 2\text{KOH} \rightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$
- (c) (i) 25.10, 25.00, 24.90
[Ketiga-tiga isipadu asid betul kepada 2 tempat perpuluhan]
- (ii) $\frac{25.10 + 25.00 + 24.90}{3} / 25.00$
- Nota* terima error carry forward dari (c)(i)
- (iii) $\frac{M_{\text{alkali}} \times 25}{1.0 \times 25} = \frac{2}{1}$
- $$M_{\text{alkali}} = \frac{1.0 \times 25}{2 \times 25} /$$
- $$= 0.5 \text{ mol dm}^{-3}$$
- *Nota terima error carry forward dari (c)(ii)
- (d) (i) 50 cm^3
- (ii) 1. Asid hidroklorik monobes manakala asid sulfurik dwibes
2. Kepekatan ion hidrogen yang dihasilkan adalah sama

[SBPtrial06-04] {Translate}

(a) 1. Alkali / bahan kimia yang mengion/mencerai dengan lengkap dalam air
2. untuk menghasilkan ion-ion hidroksida yang berkepekatan tinggi.

(b) Pipet 25cm³/ buret

(c) Sebagai penunjuk / untuk menentukan takat akhir .

(d) (i) Peneutralan



(iii) kuning kepada jingga

(e) (i) Bilangan mol asid yang telah digunakan = $\frac{0.1 \times 20.0}{1000}$
= 0.002 mol

(ii) Daripada persamaan,

1 mol asid sulfurik meneutralkan 2 mol kalium hidroksida. [markah 1]

∴ 0.002 mol asid sulfurik meneutralkan 2 x 0.002 mol kalium hidroksida = 0.004 mol

∴ bilangan mol kalium hidroksida dalam kelalang kon = 0.004 mol [Markah 2]

[MRSM08-04]

(a) Chemical substance that ionise partially in water to produce low concentration of H⁺ ion

(b) Pink to colourless

(c) (i)

Volume of NaOH used / cm ³	23.40	23.60	23.50
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(ii) average volume = $\frac{23.40 + 23.60 + 23.50}{3} = 23.50 \text{ cm}^3$

(d) (i) Mol = $\frac{MV}{1000}$
= $0.10 \times 23.50 / 1000$
= 0.00235 mol

(ii) Mol = $\frac{MV}{1000}$

M = $\frac{\text{mol} \times 1000}{V}$
= $\frac{0.00235 \times 1000}{25}$
= 0.094 mol dm⁻³

(e) 1. Hafn / 11.75 cm³

2. Barium hydroxide is dibase, that produce double concentration OH⁻ ions than sodium hydroxide

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