Essay {Paper02}

[SBPmidyearF508-09a,b]

a Sample answer :

$Zn + HNO_3 \rightarrow Zn(NO_3)_2 + H_2O$
$ZnCO_3 + HNO_3 \rightarrow Zn(NO_3)_2 + H_2O + CO_2$
$ZnO + HNO_3 \rightarrow Zn(NO_3)_2 + H_2O$ **2**
Any two

b (i)
- Methanoic acid partial ionizes in water **1**
- produce low concentration of hydrogen ion **1**

(ii)
- **Glacial** ethanoic acid has (neutral) **molecule** **1**
- Methanoic acid aqueous **ionizes in water** **1**
- to produce **free moving ion** **1**

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[SBPtrial05-09a,b]

(a) 1. Asid yang tercerai sepenuhnya apabila larut dalam air menghasilkan
2. kepekatan ion H^+ yang tinggi
3. Kekonduksian elektrik bagi asid hidroklorik lebih tinggi berbanding asid etanoik
4. bilangan ion yang bergerak bebas lebih banyak dalam asid hidroklorik berbanding asid etanoik
5. kerana asid hidroklorik ialah asid kuat
6. dan asid etanoik ialah asid lemah

(b) 1. asid hidroklorik ialah asid monobes manakala asid sulfurik ialah asid dwibes
2. kepekatan ion H^+ dalam asid sulfurik lebih tinggi berbanding asid hidroklorik
3. frekuensi perlanggaran berkesan antara ion H^+ dalam asid sulfurik dengan atom magnesium lebih tinggi berbanding asid hidroklorik
4. kadar tindakbalas asid sulfurik dengan logam magnesiumlebih tinggi berbanding asid hidroklorik

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[SBPtrial07-07a,b]

(a)	1. pH value of ethanoic acid is higher than nitric acid 2. ethanoic acid is a weak acid; nitric acid is a strong acid 3. ethanoic acid ionises partially in water to produce lower concentration of hydrogen ion 4. nitric acid ionises completely in water to produce higher concentration of hydrogen ion	1 1 1 1…4
(b)	1. ammonia exist as molecule in chloroform 2. there are no hydroxide ions present; the solution is not alkaline 3. when ammonia ionises partially in water to produce hydroxide ion 4. $NH_3 + H_2O \rightarrow NH_4^+ + OH^-$ 5. the presence of OH- ions makes the solution alkali	1 1 1 1 1

[MRSM05-07a]

(a) 1. Sulphuric acid is strong acid, and diprotic acid that when 1 mol ionises completely in water
2. to produce 2 mol /double concentration of hydrogen ion
3. hydrochloric acid is strong acid, and monoprotic acid that when 1 mol ionises completely in water
4. to produce 1 mol concentration of hydrogen ion

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[MRSM06-10a]

(a) 1. vinegar is weak acid, that ionise partially in water
2. produce low concentration of H+ ions
3. H+ ion that free to move, reacts with egg skin that made of Calcium Carbonate, $CaCO_3$
4. and releases bubbles gas, that is carbon dioxide, CO_3

Chemical equation:
$CaCO_3 + 2CH_3COOH \rightarrow (CH_3COO)_2Ca + CO_2 + H_2O$

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[MRSM04-09a,b]

(a) Chemical formula : $Mg(OH)_2$
Explanation:
1. $Mg(OH)_2$ dissolve in water in the mouth, and produce hydroxide ions, OH-
2. Hydroxide ions, OH- then react with acid that produce from bacteria activity in the mouth to neutralize it.

(b)

Solution X	**Solution Y**
1. Example : Hydrochloric acid	1. Example is sodium hydroxide, NaOH
2. is strong acid/ solution is acidic	2. is strong alkali/ solution is alkaline
3. react with blue litmus paper to red	3. react with red litmus paper to blue
4. taste sour	4. taste bitter and slippery

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[SBPtrial11-08]

(i) Solvent X : Water / H_2O
Solvent Y : Propanone / Methyl benzene /[any organic solvent]

(ii) 1. Hydrochloric in solvent X / water reacts with copper(II) oxide
2. Hydrochloric in solvent Y / propanone does not reacts with copper(II) oxide
3. Acid only shows its acidic properties when dissolve in water
4. In the present of water, hydrochloric acid ionize to form H+ ion

5. The H+ ion causes the hydrochloric acid reacts with copper(II) oxide //
6. H+ + CuO → Cu2+ + H2O
7. Produce copper(II) chloride / Cu2+ ion
8. In propanone, hydrochloric acid exist as molecule // In propanone, H+ ion is not present

(iii) 1. Neutralisation
2. Correct formulae of reactant and product
3. Balanced equation

$CuO + 2HCl \rightarrow CuCl_2 + H_2O$

4. Number of mole of HCl = (1 x 50)/1000 // 0.05

5. Number of mole of CuO = 0.05 / 2 // 0.025 mol

6. Mass of CuO = 0.025 X (64 + 16) g // 2.5 g

(b) 1. Sodium hydroxide is a strong alkali // Sodium hydroxide ionises completely in water
2. Ammonia is a weak alkali // ammonia ionises partially in water
3. The concentration of hydroxide ions in sodium hydroxide is higher than in ammonia solution.
4. When the concentration of hydroxide ion is higher, the pH value is higher

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[SBPdiag07-09]

(a)
1. Nitric acid is a strong acid and ethanoic acid is a weak acid 1
2. Nitric acid ionises completey in water to produce high concentration of hydrogen ions 1
3. ethnoic acid ionises partially in water to produce low concentration of hydrogen ions 1
4. the higher the concentration of hidrogen ion the lower the pH value. 1

(b) Procedure – 3 marks
Ionic equation -1 mark
Observation – 1 mark
Name of gas – 1 mark

Procedure 1
1. Pour [2- 5]cm^3 of acid solution into a test tube. 1
2. Add zinc / magnesium powder into the test tube. 1
3. Lower the burning wooden splinter into the test tube. 1
4. equation :$2H^+ + Mg \rightarrow Mg^{2+} + H_2$ 1
5. Observation : Gas burns with a 'pop' sound 1
6. Gas is Hydrogen

Or

1

1. Pour [2-5] cm^3 of acid solution into the test tube. 1
2. Add the calcium carbonate powder in the test tube. 1
3. Pass through the gas liberated into lime water. 1
4. equation :$2H^+ + CaCO_3 \rightarrow Ca^{2+} + CO_2 + H_2O$ 1
5. Observation : Lime water turns chalky/cloudy/milk 1
6. Gas is carbon dioxide

(c)(i) Solution with the exact concentration known. 1

(ii) 1.Materials : solid sodium hydroxide , water.
Apparatus : Electronic balance , beaker, 250cm^3 volumetric flask, glass rod. 1

Calculation :

2. No. Of moles of NaOH = $\frac{0.1(250)}{1000} = 0.025$ 1
3. Mass of NaOH = 0.025X 40g
= 1.0g 1

Procedure :

4. Weigh 1.0g of sodium hydroxide and dissolve it in 100 cm^3 of distilled water in a beaker. 1
5. Stir the solution using a glass rod. 1
6. Pour the solution into the volumetric flask using a filter funnel
7. Rinse the beaker, filter funnel with distilled water and after each rinse is transferred into the volumetric flask. 1
8. Add distilled water drop by drop into the volumetric until reaches the graduation mark. 1
9. Stopper the volumetric flask and shake the volumetric flask 1

1

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[MRSM07-08]

(a) 1. potassium hydroxide is strong alkali, that ionise completely in water
2. and produce high concentration of hydroxide ion, OH-
1. Ammonia is weak alkali, that ionise partially in water
2. and produce low concentration of hydroxide ion, OH-

(b) 1. put the blue litmus paper into the test tube contains 2 cm^3 of sulphuric acid solution
2. blue litmus will change to red. Show it acid
3. Put 2cm^3 $BaCl_2$ into the another test tube that contain 2 cm^3 of sulphuric acid solution
4. White precipitate formed, $BaSO_4$ show that SO_4^{2-} ion is present

(c) (i) 1. Ethanoic acid is a monoprotic acid because when 1 mol of ethanoic acid dissolve in water, it produce 1 mol of Hydrogen ion

Equation
$CH_3COOH \rightarrow CH_3COO^- + H^+$

(ii) 1. Glacial ethanoic acid cannot ionise and produce hydrogen ion. It exits as molecule
2. Ethanoic acid in aqueous solution can ionise and produce hydrogen ion, H+
3. H+ ion in the aqueous can move freely and react with another substance.

(iii) 1. Mol hydrogen gas = volume/molar volume
= (40/1000)/24
= 0.0017 mol

2. Ratio between H_2 to HCl

1	:	2
0.0017	:	0.0034

Mol HCl = MV/1000
Then change to

3. M = mol HCl X 1000/V
= 0.0034 X 1000/50
= 0.068 mol dm^{-3}

(e) 1. Acid rain will react with lime stone and marble (Calcium Carbonate) from the wall of building.
2. The building will be easily to collapse.

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[SPM09-10a,b]

(a) 1. $CH_3COOH + NaOH \rightarrow H_2O + CH_3COONa$

2. mol of CH_3COOH = MV/1000 = 0.1 X 50/1000 = 0.005 mol

3. ratio of CH_3COOH to NaOH

1mol	: 1 mol
0.005 mol	: 0.005 mol

4. mass NaOH = mol X molar mass = 0.005 X 40 = 0.2 g

(b) 1. L is water
2. M is methylbenzene (or any organic solution)
3. Hydrogen chlorine ionise in L and produce H+ ions.
4. Hydrogen ions then react with Zn to produce hydrogen gas, the bubbles of gas released
5. Hydrogen chlorine in M don't ionise, exist as molecule. It not react with Zn.

6. $Zn + 2\ HCl \rightarrow ZnCl_2 + H_2$

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[SPM08-10a,c]

(a)

Acid A	**Acid B**
Hydrochloric acid / nitric acid / sulphuric acid	Ethanoic acid / phosphoric acid / methanoic acid
Strong acid	Weak acid
Ionizes completely in water	Ionizes partially in water
Equation	Equation
Concentration H+ is high	Concentration H+ is low

(c) Substance : vinegar / ethanoic acid
reasons : 1. Weak alkali
2. Neutralize the alkali
3. Does not produce too much heat
4. Acid less corrosive

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[SBPmidyearF507-10a]

1. Use a pipette to draw up 25 cm^3 of an alkali (eg : sodium hydroxide)
2. Transfer sodium hydroxide solution into a conical flask.
3. Add 2-3 drops of indicator (eg :phenolphthalein)
4. Fill a burette with a standard acid solution (0.1- 2.0 mol/dm^3 hydrochloric acid) and record initial burette reading.
5. Add acid solution from the burette drop by drop into the alkali solution.
6. The mixture is continuously shaken.
7. Continue adding an acid solution until a permanent colour change of indicator is observed (eg : pink to colourless)
8. Record final burette reading.
9. [Result]
   Initial reading of burette = $x_1\ cm^3$
   Final reading of burette = $x_2\ cm^3$
   Volume of acid required = $x_2 - x_1 = x\ cm^3$

10 [Chemical equation]

11 $\frac{M_1V_1}{M_2V_2} = \frac{a}{b}$

12 $M_1 = \frac{aM_2V_2}{bV_1}$ mol dm^{-3}

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[MRSM03-09b]

(b) 1. Pipette 25 cm^3 of the NaOH solution. Then transfer it into the conical flask.
2. Put 3 drop of phenolphthalein into the conical flask.
3. Clamp the burette with retort stand. Then fill the burette with 1.0 mol dm^{-3} of the HCl solution.
4. Record the initial reading.
5. Adding HCl into NaOH until pink colour change to colourless.
6. stop the adding HCl and record the volume of HCl acid used.

Calculation :

7. HCl + NaOH → NaCl + H_2O

8. Mol HCl = MV/1000 = 1.0 X V/1000 = 0.0001V

9. Ratio between HCl to NaOH
1 mol : 1 mol
0.0001V : 0.0001V

10. Concentration of NaOH = mol NaOH X 1000/V
= 0.0001V X 1000/25
= 0.04 V mol dm^{-3}

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