Practice Question Set For A-Level
Subject : Chemistry
Paper-2 Topic: Physical

Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

Compound **L** (M_r = 88.0) contains carbon, hydrogen and oxygen only.

A 6.56×10^{-4} mol sample of **L** burns completely in air to form 2.62×10^{-3} mol of water and 2.62×10^{-3} mol of carbon dioxide.

Deduce the formula of **L**.

Show your working.

Formula of **L** _____

(Total 4 marks)

Q2.

The concentration of dilute hydrochloric acid can be found by titration using a standard solution of barium hydroxide.

(a) Calculate the mass, in g, of solid barium hydroxide (M_r = 171.3) needed to prepare 250 cm^3 of 0.100 mol dm^{-3} barium hydroxide solution.

Mass _____ g

(1)

(b) The mass of barium hydroxide from part (a) is dissolved in a beaker containing 150 cm^3 of distilled water.

Describe how this solution is used to make 250 cm^3 of the 0.100 mol dm^{-3} barium hydroxide solution.

_____

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_____

(3)

(c) Before the first titration, the 25 cm^3 pipette is rinsed with a small volume of the 0.100 mol dm^{-3} barium hydroxide solution.

State why it is good practice to rinse the pipette in this way.

_____

_____

_____

(1)

(d) Hydrochloric acid is added to the burette using a funnel.

State why it is good practice to remove the funnel from the burette before the titration.

_____

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_____

(1)

(e) In a different experiment, 0.952 g of solid barium hydroxide is used to make 250 cm^3 of standard barium hydroxide solution.

25.0 cm^3 of this barium hydroxide solution reacts with exactly 24.50 cm^3 of hydrochloric acid.

Calculate the concentration of the hydrochloric acid.

Concentration _____ mol dm^{-3}

(3)

(f) The uncertainty in the 25.0 cm^3 of solution from the pipette is ±0.05 cm^3

The total uncertainty in the 24.50 cm^3 of solution from the burette is ±0.15 cm^3

Calculate the total percentage error in using the pipette and burette.

Percentage error _____

(1)

(Total 10 marks)

Q3.

A gas syringe that does not have any graduations is calibrated using a known mass of propanone (boiling point = 56.2 °C).

The sealed gas syringe contains 0.146 g of propanone (M_r = 58.0) at a temperature of 95 °C and a pressure of 103 kPa

(a) Calculate the volume, in cm^3, of propanone in the gas syringe.

The gas constant, R = 8.31 J K^{-1} mol^{-1}

Volume of propanone _____ cm^3

(4)

(b) The gas syringe is then cooled to 75 °C, without changing the pressure.

Calculate the decrease in volume.

(If you were unable to calculate the volume in part (a), you should use the volume 89 cm^3. This is not the correct answer.)

Decrease in volume _____ cm^3

(2)

(c) The total uncertainty in using the balance to measure the mass of propanone in part (a) is ±0.001 g

Calculate the uncertainty that this causes in the volume, in cm^3, of propanone calculated in part (a).

(If you were unable to calculate the volume in part (a), you should use the volume 89 cm^3. This is not the correct answer.)

Uncertainty _____ cm^3

(2)

(d) A 600 cm^3 sample of propanone is mixed with 2800 cm^3 of oxygen in a container at 60 °C and 100 kPa. The mixture is ignited.
When the reaction is complete, the remaining mixture of gases is cooled to 60 °C at 100 kPa

$$CH_3COCH_3(g) + 4\ O_2(g) \rightarrow 3\ CO_2(g) + 3\ H_2O(l)$$

Calculate the total volume of the remaining gas mixture.

Volume _____ cm^3

(2)

(Total 10 marks)