Q1.

Complete combustion of 0.0100 mol of an organic acid produced 0.0200 mol of carbon dioxide.

The same amount of the acid required 20 cm^3 of 1.00 mol dm^{-3} NaOH (aq) for neutralisation.

Which could be the formula of the acid?

A HCOOH ⬭

B CH_3COOH ⬭

C HOOCCOOH ⬭

D $HOOCCH_2COOH$ ⬭

(Total 1 mark)

Q2.

In a titration, 0.52 g of a diprotic acid, H_2X, reacts exactly with 100 cm^3 of 0.10 M sodium hydroxide.

$$H_2X + 2NaOH \rightarrow Na_2X + 2H_2O$$

The acid could be

A ethanedioic

B propanedioic

C butanedioic

D pentanedioic

(Total 1 mark)

Q3.

An excess of methanol was mixed with 12 g of ethanoic acid and an acid catalyst. At equilibrium the mixture contained 8 g of methyl ethanoate. The percentage yield of ester present was

A 11

B 20

C 54

D 67

(Total 1 mark)

Q4.

On complete combustion, 0.0150 mol of an organic acid produced 735 cm^3 of carbon dioxide (measured at 101 kPa and 298 K). The same amount of acid required 15.0 cm^3 of 2.00 M

sodium hydroxide solution for neutralisation. Which one of the following could be the formula of the acid?

A HCOOH

B CH_3COOH

C HOOCCOH

D $HOOCCH_2CH_2COOH$

(Total 1 mark)

Q5.

Which one of the following compounds contains the smallest percentage, by mass, of oxygen?

A $CH_3OCH_2CH_3$

B $CH_3OCH_2NH_2$

C COS

D $C_4H_9Al(OH)_2$

(Total 1 mark)

Q6.

What is the percentage atom economy for the production of ethanol from glucose?

$$C_6H_{12}O_6 \rightarrow 2\ C_2H_5OH + 2\ CO_2$$

A 25.6% ⬭

B 27.1% ⬭

C 51.1% ⬭

D 54.2% ⬭

(Total 1 mark)

Q7.

Which compound needs the greatest amount of oxygen for the complete combustion of 1 mol of the compound?

A ethanal ⬭

B ethanol ⬭

C ethane-1,2-diol ⬭

D methanol ⬭

(Total 1 mark)

Q8.

Nitration of 1.70 g of methyl benzoate (M_r = 136.0) produces methyl 3-nitrobenzoate (M_r = 181.0). The percentage yield is 65.0%

What mass, in g, of methyl 3-nitrobenzoate is produced?

A 0.830 ⬭

B 1.10 ⬭

C 1.47 ⬭

D 2.26 ⬭

(Total 1 mark)

Q9.

What is the minimum volume of 0.0500 mol dm^{-3} aqueous bromine needed to react completely with 0.0200 g of buta-1,3-diene?

(M_r of buta-1,3-diene = 54.0)

A 7.40 cm^3 ⬭

B 14.8 cm^3 ⬭

C 29.6 cm^3 ⬭

D 67.5 cm^3 ⬭

(Total 1 mark)

Q10.

What is the minimum volume, in cm^3, of 0.02 mol dm^{-3} $KMnO_4$ solution needed to oxidise 0.01 mol of VO^{2+}?

$$5\ VO^{2+} + MnO_4^- + H_2O \rightarrow 5\ VO_2^+ + Mn^{2+} + 2\ H^+$$

A 10 ⬭

B 50 ⬭

C 100 ⬭

D 200 ⬭

(Total 1 mark)

Q11.

A student rinsed the apparatus before starting an acid-base titration.
The results of the titration showed that the volume of acid added from the burette was larger

than expected.

Which is a possible reason for this?

A The conical flask was rinsed with water before the titration. ⬭

B The walls of the conical flask were rinsed with water during the titration. ⬭

C The pipette was rinsed only with water. ⬭

D The burette was rinsed only with water. ⬭

(Total 1 mark)

Q12.

The equation below represents the complete combustion of butane.

$$C_4H_{10}(g) + 6\tfrac{1}{2}O_2(g) \rightarrow 4CO_2(g) + 5H_2O(g)$$

20 cm^3 of butane are completely burned in 0.20 dm^3 of oxygen.
Which statement is correct?

All volumes are measured at the same temperature and pressure.

A 40 cm^3 of carbon dioxide are formed ⬭

B 0.065 dm^3 of oxygen react ⬭

C 70 cm^3 of oxygen remain ⬭

D 0.50 dm^3 of steam are formed ⬭

(Total 1 mark)

Q13.

What is the percentage yield when 20 g of aluminium are produced from 50 g of aluminium oxide?

$$2Al_2O_3 \rightarrow 4Al + 3O_2$$

A 76% ⬭

B 40% ⬭

C 33% ⬭

D 19% ⬭

(Total 1 mark)

Q14.

Which amount of sodium hydroxide would react exactly with 7.5 g of a diprotic acid, H_2A (M_r = 150)?

A 50 cm^3 of 0.05 mol dm^{-3} NaOH(aq) ⬭

B 100 cm^3 of 0.50 mol dm^{-3} NaOH(aq) ⬭

C 100 cm^3 of 1.0 mol dm^{-3} NaOH(aq) ⬭

D 100 cm^3 of 2.0 mol dm^{-3} NaOH(aq) ⬭

(Total 1 mark)

Q15.

Lead(II) nitrate and potassium iodide react according to the equation

$$Pb(NO_3)_2(aq) + 2\ KI(aq) \rightarrow PbI_2(s) + 2\ KNO_3(aq)$$

In an experiment, 25.0 cm^3 of a 0.100 mol dm^{-3} solution of each compound are mixed together.

Which amount, in mol, of lead(II) iodide is formed?

A 1.25×10^{-3} ⬭

B 2.50×10^{-3} ⬭

C 1.25×10^{-2} ⬭

D 2.50×10^{-2} ⬭

(Total 1 mark)

Q16.

A 30 cm^3 sample of nitrogen was reacted with a 60 cm^3 sample of fluorine according to the equation

$$\frac{1}{2}N_2(g) + \frac{3}{2}F_2(g) \rightarrow NF_3(g)$$

What is the volume of the gas mixture after the reaction, at constant temperature and pressure?

A 20 cm^3 ⬭

B 30 cm^3 ⬭

C 40 cm^3 ⬭

D 50 cm^3 ⬭

(Total 1 mark)

Q17.

A student devised an experiment to find the concentration of sulfuric acid in a sample of battery acid.

- A measuring cylinder was used to transfer 10 cm^3 of battery acid to a volumetric flask.
- Distilled water was added to the volumetric flask until the volume reached 250 cm^3
- A 25.0 cm^3 sample of diluted acid was transferred from the volumetric flask to a conical flask using a pipette.
- A few drops of methyl orange indicator were added to the acid in the conical flask before titrating the acid with sodium hydroxide.
- The titration was repeated five times but concordant results were **not** obtained. (Note: Methyl orange is red in acid and yellow in alkali.)

Which suggestion would improve the chances of obtaining concordant titres?

A Invert the volumetric flask several times after adding the distilled water. ⬭

B Wash the pipette with distilled water between each titration. ⬭

C Add extra drops of indicator to the sample when nearing the end point in each titration. ⬭

D Use a more concentrated solution of sodium hydroxide in the burette. ⬭

(Total 1 mark)

Q18.

A student devised an experiment to find the concentration of sulfuric acid in a sample of battery acid.

- A measuring cylinder was used to transfer 10 cm^3 of battery acid to a volumetric flask.
- Distilled water was added to the volumetric flask until the volume reached 250 cm^3
- A 25.0 cm^3 sample of diluted acid was transferred from the volumetric flask to a conical flask using a pipette.
- A few drops of methyl orange indicator were added to the acid in the conical flask before titrating the acid with sodium hydroxide.
- The titration was repeated five times but concordant results were **not** obtained. (Note: Methyl orange is red in acid and yellow in alkali.)

Which suggestion about rinsing the conical flask between each titration would improve the accuracy of the titrations?

A Rinsing with acid. ⬭

B Rinsing with alkali. ⬭

C Rinsing with water. ⬭

D No rinsing with any liquid. ⬭

(Total 1 mark)

Q19.

A student devised an experiment to find the concentration of sulfuric acid in a sample of battery acid.

- A measuring cylinder was used to transfer 10 cm^3 of battery acid to a volumetric flask.
- Distilled water was added to the volumetric flask until the volume reached 250 cm^3
- A 25.0 cm^3 sample of diluted acid was transferred from the volumetric flask to a conical flask using a pipette.
- A few drops of methyl orange indicator were added to the acid in the conical flask before titrating the acid with sodium hydroxide.
- The titration was repeated five times but concordant results were **not** obtained. (Note: Methyl orange is red in acid and yellow in alkali.)

Which suggestion would reduce the overall measurement uncertainty in the titration?

A Use less concentrated alkali in the burette. ⬭

B Use phenolphthalein indicator instead of methyl orange. ⬭

C Use smaller samples of the diluted acid in each titration. ⬭

D Begin each titration with the burette filled to the 0.00 cm^3 mark. ⬭

(Total 1 mark)

Q20.

A student devised an experiment to find the concentration of sulfuric acid in a sample of battery acid.

- A measuring cylinder was used to transfer 10 cm^3 of battery acid to a volumetric flask.
- Distilled water was added to the volumetric flask until the volume reached 250 cm^3
- A 25.0 cm^3 sample of diluted acid was transferred from the volumetric flask to a conical flask using a pipette.
- A few drops of methyl orange indicator were added to the acid in the conical flask before titrating the acid with sodium hydroxide.
- The titration was repeated five times but concordant results were **not** obtained. (Note: Methyl orange is red in acid and yellow in alkali.)

Which of these is important in ensuring that the student's experiment is safe?

A Do the titration in a fume cupboard. ⬭

B Wear gloves when measuring out the battery acid. ⬭

C Wash hands before doing the titration. ⬭

D Carry the burette horizontally when collecting the apparatus. ⬭

(Total 1 mark)

Q21.

A student devised an experiment to find the concentration of sulfuric acid in a sample of battery acid.

- A measuring cylinder was used to transfer 10 cm^3 of battery acid to a volumetric flask.
- Distilled water was added to the volumetric flask until the volume reached 250 cm^3
- A 25.0 cm^3 sample of diluted acid was transferred from the volumetric flask to a conical flask using a pipette.
- A few drops of methyl orange indicator were added to the acid in the conical flask before titrating the acid with sodium hydroxide.
- The titration was repeated five times but concordant results were **not** obtained. (Note: Methyl orange is red in acid and yellow in alkali.)

Which colour change is observed at the end point in each titration?

A Yellow to red ⬭

B Red to orange ⬭

C Yellow to orange ⬭

D Red to yellow ⬭

(Total 1 mark)

Q22.

Ethanol can be made from glucose by fermentation.

$$C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$$

In an experiment, 268 g of ethanol (M_r = 46.0) were made from 1.44 kg of glucose (M_r = 180.0).

What is the percentage yield?

A 18.6% ⬭

B 36.4% ⬭

C 51.1% ⬭

D 72.8% ⬭

(Total 1 mark)

Q23.

Some 1.0 mol dm^{-3} solutions were mixed using equal volumes of each solution.

Which pair of solutions would give the greatest mass of solid?

A $Ba(OH)_2$ and $MgCl_2$ ⬭

B $Ba(OH)_2$ and $MgSO_4$ ⬭

C $Ba(OH)_2$ and NaCl ⬭

D $Ba(OH)_2$ and Na_2SO_4 ⬭

(Total 1 mark)

Q24.

A 4.85 g sample of anhydrous sodium sulfate is dissolved in water and the solution made up to 250 cm^3 in a volumetric flask.

What is the concentration in mol dm^{-3} of sodium sulfate in the solution?

A 0.0341 ⬭

B 0.137 ⬭

C 0.163 ⬭

D 0.273 ⬭

(Total 1 mark)

Q25.

25.0 cm^3 samples of NaOH solution were taken by pipette from a beaker. These were then titrated with an aqueous solution of ethanoic acid. The concentration of ethanoic acid calculated from the experimental results was found to be lower than the actual value.

Which of these could explain the difference?

A Rinsing the pipette with distilled water before filling with NaOH ⬭

B Rinsing the burette with distilled water before filling with ethanoic acid ⬭

C Rinsing the walls of the conical flask with distilled water during the titration ⬭

D Rinsing the beaker with distilled water before filling with NaOH ⬭

(Total 1 mark)

Q26.

A 20.0 cm^3 sample of a 0.400 mol dm^{-3} aqueous solution of a metal bromide (MBr_n) reacts exactly with 160 cm^3 of 0.100 mol dm^{-3} aqueous silver nitrate.

What is the formula of the metal bromide?

A MBr ⬭

B MBr_2 ⬭

C MBr_3 ⬭

D MBr_4 ⬭

(Total 1 mark)

Q27.

What is the burette reading for this transparent liquid?

A 24.10 cm^3 ⬭

B 24.30 cm^3 ⬭

C 25.70 cm^3 ⬭

D 25.90 cm^3 ⬭

(Total 1 mark)

Q28.

A volumetric flask was used to prepare 250 cm^3 of a solution.

The solute was added from a plastic weighing container.

	Mass / g
Weighing container with solute	10.13

Weighing container after solute added to volumetric flask	4.48

Each reading from the balance has an uncertainty of ±0.005 g

What is the percentage uncertainty in the mass of the solute used?

A 0.09% ⬭

B 0.11% ⬭

C 0.18% ⬭

D 0.22% ⬭

(Total 1 mark)

Q29.

A sample of 2.0 mol dm^{-3} acid has a volume of 100 cm^3

What volume of water, in cm^3, should be added to this acid to dilute the sample to a concentration of 1.5 mol dm^{-3}?

A 25 ⬭

B 33.3 ⬭

C 50 ⬭

D 66.7 ⬭

(Total 1 mark)

Q30.

What is the mass, in mg, of carbon formed when 3.0×10^{-3} mol of propene undergoes incomplete combustion?

$$2C_3H_6 + 3O_2 \longrightarrow 6C + 6H_2O$$

A 9.0×10^{-3} ⬭

B 3.6×10^{-2} ⬭

C 1.08×10^{2} ⬭

D 2.16×10^{2} ⬭

(Total 1 mark)

Q31.

The equation for the reaction between zinc and hydrochloric acid is

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

What is the minimum mass, in mg, of zinc (A_r = 65.4) needed to react with 50.0 cm^3 of 1.68 mol dm^{-3} hydrochloric acid?

A 2.75 ⬭

B 5.49 ⬭

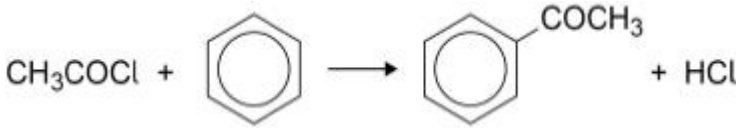
C 2.75×10^3 ⬭

D 5.49×10^3 ⬭

(Total 1 mark)

Q32.

Phenylethanone can be prepared by the reaction between ethanoyl chloride and benzene.



In a preparation, with an excess of benzene, the mass of ethanoyl chloride (M_r = 78.5) used was 5.7×10^{-2} kg.

The percentage yield of phenylethanone was 62%.

What mass, in grams, of phenylethanone was produced?

A 35 g ⬭

B 54 g ⬭

C 87 g ⬭

D 102 g ⬭

(Total 1 mark)

Q33.

A measuring cylinder has an uncertainty of ±5 cm^3.

What is the minimum volume of liquid that can be measured if the percentage error in the volume is to be less than 0.20%?

A 0.025 dm^3 ⬭

B 0.25 dm^3 ○

C 2.5 dm^3 ○

D 25 dm^3 ○

(Total 1 mark)

Q34.

What is the volume of 0.200 mol dm^{-3} $Ba(OH)_2$ (aq) required to neutralise exactly 30.0 cm^3 of 0.100 mol dm^{-3} HCl(aq)?

A 150.0 cm^3 ○

B 75.0 cm^3 ○

C 15.0 cm^3 ○

D 7.50 cm^3 ○

(Total 1 mark)

Q35.

Which reaction has the largest atom economy for the production of hydrogen?

A $C + H_2O \longrightarrow CO + H_2$ ○

B $Zn + 2HCl \longrightarrow ZnCl_2 + H_2$ ○

C $CH_4 + H_2O \longrightarrow CO + 3H_2$ ○

D $CO + H_2O \longrightarrow CO_2 + H_2$ ○

(Total 1 mark)

Q36.

After reaction of some zinc metal with excess sulfuric acid, a student collected 40.8 g of $ZnSO_4.7H_2O$ crystals. The yield of crystals was 70.0%.

What was the original mass of zinc used?

A 9.28 g ○

B 13.3 g ○

C 23.6 g ○

D 58.3 g ○

(Total 1 mark)

Q37.

The equation for the hydrogenation of ethyne is

$$C_2H_2 + 2H_2 \longrightarrow C_2H_6$$

The experimental yield is 65.0%.

What is the mass in grams of ethane that can be produced from 16.20 g of hydrogen?

A 42.53 g ⬭

B 78.98 g ⬭

C 121.5 g ⬭

D 527.7 g ⬭

(Total 1 mark)

Q38.

Which of these pieces of apparatus has the lowest percentage uncertainty in the measurement shown?

A Volume of 25 cm^3 measured with a burette with an uncertainty of ±0.1 cm^3. ⬭

B Volume of 25 cm^3 measured with a measuring cylinder with an uncertainty of ±0.5 cm^3. ⬭

C Mass of 0.150 g measured with a balance with an uncertainty of ±0.001 g. ⬭

D Temperature change of 23.2 °C measured with a thermometer with an uncertainty of ±0.1 °C. ⬭

(Total 1 mark)

Q39.

What is the total volume of gas remaining after 20 cm^3 ethane are burned completely in 100 cm^3 oxygen? All volumes are measured at the same pressure and the same temperature, which is above 100 °C.

$$C_2H_6 + 3\tfrac{1}{2}O_2 \longrightarrow 2CO_2 + 3H_2O$$

A 40 cm^3 ⬭

B 100 cm^3 ⬭

C 120 cm^3 ⬭

D 130 cm^3 ⬭

(Total 1 mark)

Q40.

An ester is hydrolysed as shown by the following equation.

$$RCOOR^{/} + H_2O \longrightarrow RCOOH + R^{/}OH$$

What is the percentage yield of RCOOH when 0.50 g of RCOOH (M_r = 100) is obtained from 1.0 g of $RCOOR^{/}$ (M_r = 150)?

A 33% ⬭

B 50% ⬭

C 67% ⬭

D 75% ⬭

(Total 1 mark)

Q41.

A saturated aqueous solution of magnesium hydroxide contains 1.17×10^{-3} g of $Mg(OH)_2$ in 100 cm^3 of solution. In this solution, the magnesium hydroxide is fully dissociated into ions.

What is the concentration of $Mg^{2+}(aq)$ ions in this solution?

A 2.82×10^{-2} mol dm^{-3} ⬭

B 2.01×10^{-3} mol dm^{-3} ⬭

C 2.82×10^{-3} mol dm^{-3} ⬭

D 2.01×10^{-4} mol dm^{-3} ⬭

(Total 1 mark)

Q42.

Magnesium reacts with hydrochloric acid according to the following equation.

$$Mg + 2HCl \longrightarrow MgCl_2 + H_2$$

A student calculated the minimum volume of 2.56 mol dm^{-3} hydrochloric acid required to react with an excess of magnesium to form 5.46 g of magnesium chloride (M_r = 95.3).

Which of the following uses the correct standard form and the appropriate number of significant figures to give the correct result of the calculation?

A 4.476×10^{-2} dm^3 ⬭

B 4.48×10^{-2} dm^3 ⬭

C 4.50×10^{-2} dm^3 ⬭

D 44.8×10^{-3} dm^3 ⬭

(Total 1 mark)

Q43.

The following equation represents the oxidation of vanadium(IV) ions by manganate(VII) ions in acid solution.

$$5V^{4+} + MnO_4^- + 8H^+ \longrightarrow 5V^{5+} + Mn^{2+} + 4H_2O$$

What volume of 0.020 mol dm^{-3} $KMnO_4$ solution is required to oxidise completely a solution containing 0.010 mol of vanadium(IV) ions?

A 10 cm^3 ⬭

B 25 cm^3 ⬭

C 50 cm^3 ⬭

D 100 cm^3 ⬭

(Total 1 mark)

Q44.

Refer to the unbalanced equation below when answering this question.

$$K_2Cr_2O7 + 3H_2C_2O_4 + \_H_2SO_4 \longrightarrow Cr_2(SO_4)_3 + \_H_2O + 6CO_2 + K_2SO_4$$

In the balanced equation the mole ratio for sulfuric acid to water is

A 1 : 4 ⬭

B 1 : 2 ⬭

C 4 : 7 ⬭

D 4 : 9 ⬭

(Total 1 mark)

Q45.

In a molecule of a hydrocarbon, the fraction by mass of carbon is $\frac{9}{11}$

What is the empirical formula of the hydrocarbon?

A CH ⬭

B CH_3 ⬭

C C_3H_8 ⬭

D C_5H_{12} ⬭

(Total 1 mark)

Q46.

30 cm^3 of xenon are mixed with 20 cm^3 of fluorine. The gases react according to the following equation. Assume that the temperature and pressure remain constant.

$$Xe(g) + F_2(g) \rightarrow XeF_2(g)$$

What is the final volume of gas after the reaction is complete?

A 50 cm^3 ⬭

B 40 cm^3 ⬭

C 30 cm^3 ⬭

D 20 cm^3 ⬭

(Total 1 mark)

Q47.

Which of the following solutions would react exactly with a solution containing 0.0500 mol sulfuric acid?

A 50.0 cm^3 of 1.00 mol dm^{-3} KOH ⬭

B 100.0 cm^3 of 2.00 mol dm^{-3} KOH ⬭

C 100.0 cm^3 of 2.00 mol dm^{-3} $Ba(OH)_2$ ⬭

D 50.0 cm^3 of 1.00 mol dm^{-3} $Ba(OH)_2$ ⬭

(Total 1 mark)

Q48.

In a car airbag, sodium azide (NaN_3) decomposes to form sodium metal and nitrogen gas.

$$2NaN_3(s) \longrightarrow 2Na(s) + 3N_2(g)$$

The sodium metal then reacts with potassium nitrate to produce more nitrogen gas.

$$10Na(s) + 2KNO_3(s) \longrightarrow N_2(g) + 5Na_2O(s) + K_2O(s)$$

If 2.00 mol of sodium azide react in this way, how many molecules of N_2 will be formed? (The Avogadro constant L = 6.022×10^{23} mol^{-1})

A 2.41×10^{24} ⬭

B 1.93×10^{24} ⬭

C 1.81×10^{24} ⬭

D 9.63×10^{23} ⬭

(Total 1 mark)

Q49.

Propene can be made by the dehydration of propan-2-ol.

What is the percentage yield when 30 g of propene (M_r = 42.0) are formed from 50 g of propan-2-ol (M_r = 60.0)?

A 60% ⬭

B 67% ⬭

C 81% ⬭

D 86% ⬭

(Total 1 mark)

Q50.

The removal of silicon dioxide with limestone in the Blast Furnace can be represented by the following equation.

$$CaCO_3(s) + SiO_2(s) \rightarrow CaSiO_3(l) + CO_2(g)$$

The minimum mass of calcium carbonate needed to remove 1.00 tonne (1000 kg) of silicon dioxide is

A 0.46 tonne

B 0.60 tonne

C 1.67 tonne

D 2.18 tonne

(Total 1 mark)

Q51.

The removal of silicon dioxide with limestone in the Blast Furnace can be represented by the following equation.

$$CaCO_3(s) + SiO_2(s) \rightarrow CaSiO_3(l) + CO_2(g)$$

The volume of carbon dioxide, measured at 298 K and 1.01×10^5 Pa, formed in this reaction during the removal of 1.00 tonne (1000 kg) of silicon dioxide is

A 24.5 dm^3

B 408 dm^3

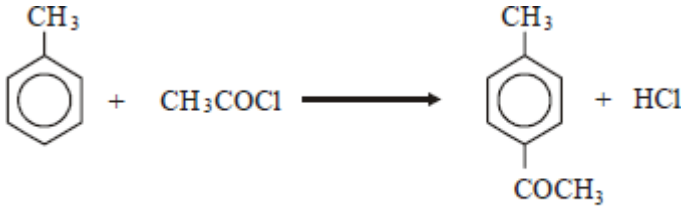
C 24.5 m^3

D 408 m^3

(Total 1 mark)

Q52.

Ethanoyl chloride reacts with methylbenzene forming compound **X** according to the equation below.



X

If the experimental yield is 40.0%, the mass in grams of **X** (M_r = 134.0) formed from 18.4 g of methylbenzene (M_r = 92.0) is

A 26.8

B 16.1

C 10.7

D 7.4

(Total 1 mark)

Q53.

25.0 cm^3 of ethanedioic acid required 22.5 cm^3 of 0.100 mol dm^{-3} potassium hydroxide solution for complete neutralisation.

The concentration of ethanedioic acid is

A 0.0225 mol dm^{-3}

B 0.0450 mol dm^{-3}

C 0.0560 mol dm^{-3}

D 0.0900 mol dm^{-3}

(Total 1 mark)

Q54.

Silver oxide, Ag_2O, can be reduced by passing hydrogen gas over the heated oxide. The maximum mass of silver that could be obtained from 2.32 g of silver oxide is

A 2.02 g

B 2.06 g

C 2.12 g

D 2.16 g

(Total 1 mark)

Q55.

In a reaction which gave a 27.0% yield, 5.00 g of methylbenzene were converted into the explosive 2,4,6-trinitromethylbenzene (TNT) (M_r = 227.0). The mass of TNT formed was

A 1.35 g

B 3.33 g

C 3.65 g

D 12.34 g

(Total 1 mark)

Q56.

A 0.0720 g sample of reducing agent **R** was dissolved in water and acidified with an excess of dilute H_2SO_4. The resulting solution was found to react with exactly 18.0 cm^3 of a 0.0200 mol dm^{-3} solution of $KMnO_4$.

In this reaction, 5 mol of **R** react with 3 mol of $KMnO_4$. The M_r of **R** is

A 120

B 167

C 240

D 333

(Total 1 mark)

Q57.

The percentage by mass of carbon is 83.3% in

A propane.

B butane.

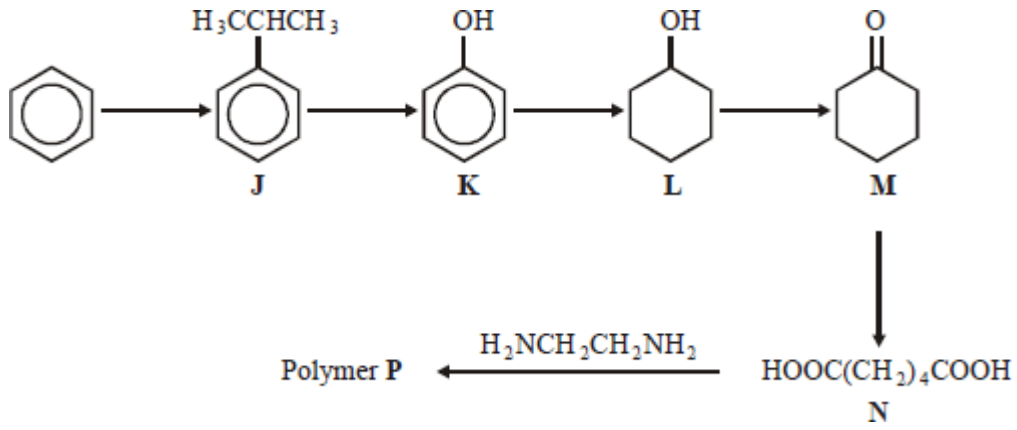
C pentane.

D hexane.

(Total 1 mark)

Q58.

This question is about the following reaction scheme which shows the preparation of polymer **P**.



If 1.0 kg of benzene gave 0.98 kg of **J**, the percentage yield of **J** was

A 64

B 66

C 68

D 70

(Total 1 mark)

Q59.

A particular sample of iron ore contains 85% by mass of Fe_2O_3 (M_r= 159.6) and no other iron compound. The maximum mass of iron that could be extracted from 1.0 tonne of this ore is

A 0.59 tonne

B 0.66 tonne

C 0.75 tonne

C 0.85 tonne

(Total 1 mark)

Mark schemes

Q1.

C

HOOCCOOH

[1]

Q2.

B

[1]

Q3.

C

[1]

Q4.

C

[1]

Q5.

B

[1]

Q6.

C

51.1%

[1]

Q7.

B

ethanol

[1]

Q8.

C

1.47

[1]

Q9.

B

14.8 cm^3

[1]

Q10.
C

[1]

Q11.
D

[1]

Q12.
C

[1]

Q13.
A

[1]

Q14.
C

[1]

Q15.
A

[1]

Q16.
D

[1]

Q17.
A

[1]

Q18.
C

[1]

Q19.
A

[1]

Q20.
B

[1]

Q21.
B

[1]

Q22.
B

[1]

Q23.
B

[1]

Q24.
B

[1]

Q25.
B

[1]

Q26.
B

[1]

Q27.
B

[1]

Q28.
C

[1]

Q29.
B

[1]

Q30.
C

[1]

Q31.
C

[1]

Q32.
B

[1]

Q33.
C

[1]

Q34.
D

[1]

Q35.
C

[1]

Q36.
B

[1]

Q37.
B

[1]

Q38.
A

[1]

Q39.
D

[1]

Q40.
D

[1]

Q41.
D

[1]

Q42.
B

[1]

Q43.
D

[1]

Q44.
C

[1]

Q45.
C

[1]

Q46.
C

[1]

Q47.
D

[1]

Q48.
B

[1]

Q49.
D

[1]

Q50.
C

[1]

Q51.
D

[1]

Q52.

C

[1]

Q53.

B

[1]

Q54.

D

[1]

Q55.

B

[1]

Q56.

A

[1]

Q57.

C

[1]

Q58.

A

[1]

Q59.

A