

Paper 1 (MCQ)

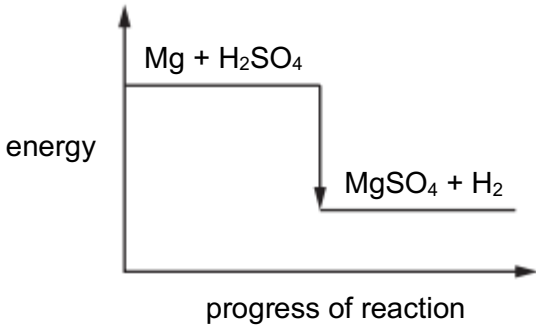
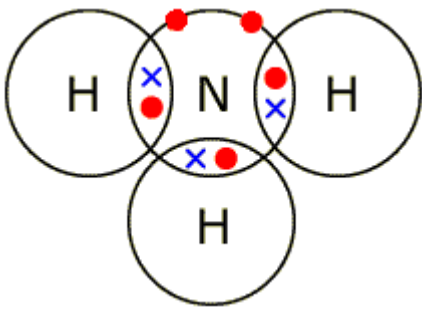
- 1. C**
- 2. A**
- 3. A**
- 4. C**
- 5. B**

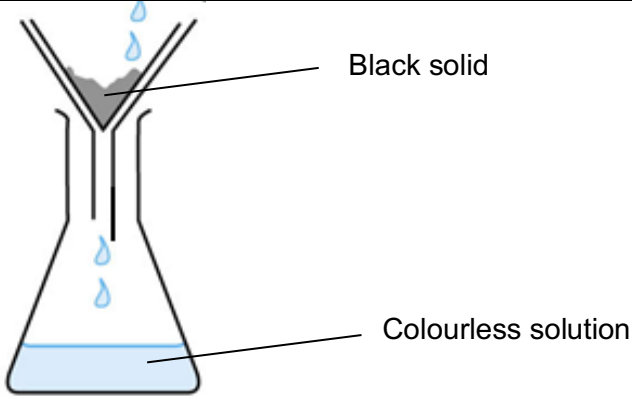
- 6. B**
- 7. D**
- 8. B**
- 9. A**
- 10. D**

- 11. D**
- 12. C**
- 13. B**
- 14. C**
- 15. B**

- 16. C**
- 17. B**
- 18. D**
- 19. A**
- 20. D**

Paper 3 - Section A – 55m

Q/No.	Answer	Comments/Instructions/ Suggestions to Markers	M
1a	Carbon dioxide;		[1]
1b	acidified potassium manganate(VII);		[1]
1c	silver chloride;		[1]
1d	Methane;		[1]
2ai			[1]
2aii	Energy of the reactants is higher than the products showing that energy is transferred /released into the surroundings;		[1]
2bi	Magnesium oxide and hydrogen gas;		[1]
2bii	Silver, chromium, beryllium, magnesium;		[1]
3ai	covalent		[1]
3aii		-number of atoms -number of bonding electrons -number of non bonding electrons 3pt = 2m 1 to 2 pt = 1m	[2]
3bi	there are <u>strong electrostatic forces of attraction</u> between the ions; large amount of energy is needed to <u>overcome</u> the forces;		[2]
3bii	<u>mobile ions/ free moving ions</u> present in molten state only;		[1]
4a	78;		[1]

Q/No.	Answer	Comments/Instructions/ Suggestions to Markers	M
4b	<u>nitrogen and oxygen under high temperatures</u> in the car engines <u>react</u> to form nitrogen monoxide;		[1]
4c	in <u>large quantities</u> cause <u>death</u> / <u>prevents blood</u> from <u>transporting oxygen</u> /		[1]
4d	Carbon dioxide is released through combustion of (carbon containing) fuels / respiration / decomposition / decay; Carbon dioxide is taken in through photosynthesis / ocean uptake; If carbon dioxide released is more than carbon dioxide taken in, there will be a net increase in carbon dioxide in the atmosphere / Carbon dioxide released will be balanced by or is equal to the carbon dioxide taken in.;		[3]
5(a)	G;		[1]
5(b)	E;		[1]
5(c)	D;		[1]
5(d)	F & G;		[1]
5(e)	H;		[1]
6a		Drawing – 1m Label – 1m	[2]
6b	M – CO ₂ / carbon dioxide N – BaSO ₄ / barium sulfate O – CuCl ₂ / copper(II) chloride P – Cu(OH) ₂ / copper(II) hydroxide Q – AgCl / silver chloride		[5]
6c	$\text{Ba}(\text{NO}_3)_2 (\text{aq}) + \text{SO}_4^{2-} (\text{aq}) \rightarrow \text{BaSO}_4 (\text{s}) + 2\text{NO}_3^- (\text{aq})$ $\text{Ba}^{2+} (\text{aq}) + \text{SO}_4^{2-} (\text{aq}) \rightarrow \text{BaSO}_4 (\text{s})$ $2\text{HNO}_3 (\text{aq}) + \text{CO}_3^{2-} (\text{aq}) \rightarrow 2\text{NO}_3^- (\text{aq}) + \text{H}_2\text{O} (\text{l}) + \text{CO}_2 (\text{g})$ $2\text{H}^+ (\text{aq}) + \text{CO}_3^{2-} (\text{aq}) \rightarrow \text{H}_2\text{O} (\text{l}) + \text{CO}_2 (\text{g})$ $\text{CuCl}_2 (\text{aq}) + 2\text{AgNO}_3 (\text{aq}) \rightarrow 2\text{AgCl} (\text{s}) + \text{Cu}(\text{NO}_3)_2 (\text{aq})$ $\text{Ag}^+ (\text{aq}) + \text{Cl}^- (\text{aq}) \rightarrow \text{AgCl} (\text{s})$	formula [1] balanced equation [1] state symbols [1]	[3]

Q/No.	Answer	Comments/Instructions/ Suggestions to Markers	M
	$\text{CuCl}_2 (\text{aq}) + 2\text{NaOH} (\text{aq}) \rightarrow 2\text{NaCl} (\text{aq}) + \text{Cu}(\text{OH})_2 (\text{s})$ $\text{Cu}^{2+} (\text{aq}) + 2\text{OH}^- (\text{aq}) \rightarrow \text{Cu}(\text{OH})_2 (\text{s})$		
7ai	$\text{C}_n\text{H}_{2n+1}\text{COOH}$		[1]
7aii	same general formula / similar chemical properties / shows a gradation in physical property	1pt = 1m, max 2m	[2]
7b	produce <u>hydrogen ions</u> / H^+ in <u>aqueous</u> solution / <u>water</u>		[1]
7c	• arrangement: from quite closely packed, disorderly manner • to far apart, disorderly manner or randomly arranged • movement: from sliding over each other • to move randomly at high speed or quickly	4 pt = 3m 2 to 3 pt = 2m 1 pt = 1m	[3]
7di	Mr of propanoic acid = $12 \times 3 + 1 \times 6 + 2 \times 16 = 74$		[1]
7dii	Concentration = $125 / 74 = 1.69$		[1]
7diii	Concentration = $1 / 2 = 0.500$		[1]
8a	Powdered marble is of smaller particle size; When particle size decreases, exposed surface area increases / surface area: volume ratio increases; Frequency of effective collisions increases; Speed of reaction will increase and affect the results;	2 pt = 1m	[2]
8bi	At a lower temperature • reacting particles have lesser kinetic energy / less particles have energy greater than or equal to activation energy • <u>lower frequency of effective collision</u> • reaction is <u>slower</u> / graph or gradient is <u>less steep</u>	3pt = 2m 1 or 2 pt = 1m	[2]
8bii	At a lower concentration • the <u>same volume</u> of acid used will produce <u>lesser volume of gas</u> • lesser reacting particles per unit volume • <u>lower frequency of effective collision</u> • reaction is <u>slower</u> / graph or gradient is <u>less steep</u>	4 pt = 3m 2 or 3 pt = 2m 1pt = 1m	[3]
8ci	Mole of $\text{CO}_2 = 100 / 24000 = 1/240$; Mr of $\text{CaCO}_3 = 40 + 12 + 16 \times 3 = 100$ Mass of $\text{CaCO}_3 = 1/240 \times 100 = 0.417 \text{ g}$;		[2]
8cii	Mass of $\text{CaCO}_3 = 0.417 \times 2 = 0.834 \text{ g}$;		[1]

Paper 3 - Section B – 10m (2 choose 1 question)

Q/No.	Answer	Comments/Instructions/ Suggestions to Markers	M
9(a)	Ca: 2,8,8,2; 2 valence electrons hence in Group 2; 4 electron shells hence in Period 4;	3pt = 2m 1 or 2 pt = 1m	[2]
9(bi)	Hydrogen		[1]
9(bii)	OH ⁻		[1]
9(biii)	Add <u>Universal Indicator</u> into the solution; <u>Compare</u> the resulting <u>colour</u> with a <u>pH chart</u> to determine the pH;		[2]
9(c)	Bubbles of gas observed; <u>Violent</u> reaction with <u>potassium</u> and <u>calcium reacts readily</u> ; <u>Potassium floats</u> on water and <u>calcium sinks</u> ;	A: K – lilac flame seen / catches fire	[3]
9(d)	Argon has <u>completely filled valence shell</u> and is <u>unreactive</u>		[1]
10(ai)	Cracking naphtha is essential to <u>match the demand for fractions</u> ; containing <u>smaller molecules</u> from the refinery process;		[2]
10(aii)	Hydrocarbon X $ \begin{array}{ccccccc} & \text{H} & & \text{H} & & \text{H} & & \text{H} & & \text{H} \\ & & & & & & & & & \\ \text{H} & - \text{C} & - & \text{C} & - & \text{C} & - & \text{C} & - & \text{C} & - \text{H} \\ & & & & & & & & & \\ & \text{H} & & \text{H} & & \text{H} & & \text{H} & & \text{H} \end{array} $ Hydrocarbon Y $ \begin{array}{ccc} \text{H} & & \text{H} \\ & \diagdown & / \\ & \text{C} = \text{C} \\ & / & \diagdown \\ \text{H} & & \text{H} \end{array} $	1m each	[2]
10(aiii)	Bromine water / aqueous bromine / bromine solution; X – remains reddish brown; Y – turns colourless;	3pt = 2m 1 or 2 pt = 1m	[2]
10(aiv)	$ \begin{array}{cccc} \overline{\text{C}}\text{O}\text{I}\overline{\text{C}}\text{E}\overline{\text{F}}\overline{\text{F}}\overline{\text{E}}\text{I} & \overline{\text{C}}\text{O}\text{I}\overline{\text{C}}\overline{\text{F}}\overline{\text{F}}\overline{\text{E}}\text{I} \\ \text{K}\overline{\text{E}}\text{B}\overline{\text{E}}\text{A}\overline{\text{T}} & \text{I}\text{U}\text{I} & \text{K}\overline{\text{E}}\text{B}\overline{\text{E}}\text{A}\overline{\text{T}} & \text{I}\text{U}\text{I} \\ \\ \text{H} & \text{H} & \text{H} & \text{H} \\ & & & \end{array} $	correct partial drawing with at least 2 carbon [1] two repeating units [1]	[2]
10(bi)	Polyunsaturated contain hydrocarbon chains with <u>two or more carbon-carbon double bonds</u> in each chain		[1]
10(bii)	The <u>carbon-carbon double bond</u> gets <u>broken</u> / become <u>single bond</u> / <u>hydrogen</u> are added <u>across the double bond</u>		[1]

Submitted on: 20 June 2024