
Question 1

1.1 Bauxite

1.2 dehydration

1.3 activated complex

1.4 Temperature

Question 2

2.1 C√√

2.2 D

2.3 C

Question 3

3.1 $Cr_2(SO_4)_3$✓ (1)

3.2 If different salts are used, they may react with electrodes. ✓✓ (2)

3.3 Cr✓✓ (2)

3.4 $Cr \rightarrow Cr^{3+} + 3e^-$✓✓ (2)

3.5 $Cu^{+2} + 2e^- \rightarrow Cu$ ✓✓ (2)

3.6 $2Cr + 3Cu^{2+}$ ✓ $\rightarrow 2Cr^{3+} + 3Cu$ ✓ (2)

3.7 $E^o_{cell} = E^o_{cathode} - E^o_{anode}$ ✓
$E^o_{cell} = 0,34$ ✓ $- (- 0,74)$ ✓
$E^o_{cell} = 1,08V$ ✓ (4)

3.8.1

- Maintain electrical neutrality✓
- Complete the circuit✓ (2)

Question 4

4.1 E and H√ (1)

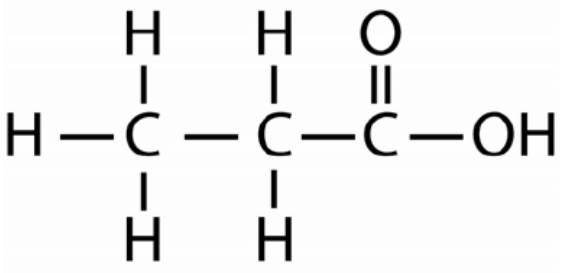
4.2 Propyl pentanoate√ and water√ (2)

4.3 Ketones √ √ propanone (2)

4.4.1 Methyl ethanoate√√ (2)

4.4.2 methanol√ and ethanoic acid √ (2)

4.4.3 Propanoic acid √ (2)

√ 

4.4.4 Concentrated sulphuric acid √ (1)

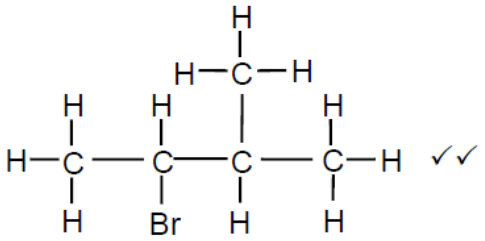
[12]

QUESTION 5/*VRAAG 5*

5.1

5.1.1 Haloalkanes /*Haloalkane* ✓ (1)

5.1.2



✓✓ (2)

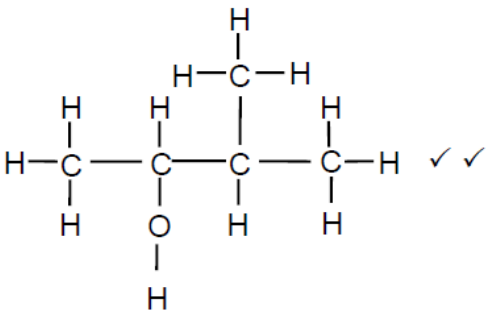
5.2

5.2.1 Substitution/*Substitusie* ✓

OR/*OF*

Hydrolysis/*Hidrolise* ✓ (1)

5.2.2



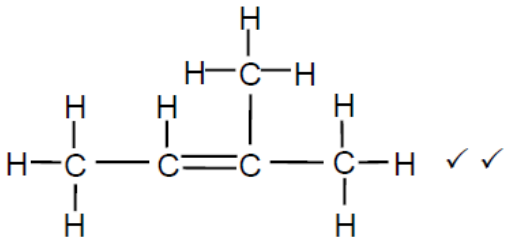
✓ ✓ (2)

5.3

5.3.1 Heat (strongly) ✓
Verhit sterk (1)

5.3.2 Elimination/dehydrohalogenation/dehydrobromination ✓
Eliminasie/dehidrohalogenering/dehidrobrominering ✓ (1)

5.3.3



✓ ✓ (2)

5.4 2-methylbut-2-ene ✓✓
2-metielbut-2-een (2)

[12]

Question 6

6.1
- Wear gloves✓
- Wear goggles✓
- Perform experiment in a well ventilated room or fume cupboard

(accept any two answers) (2)

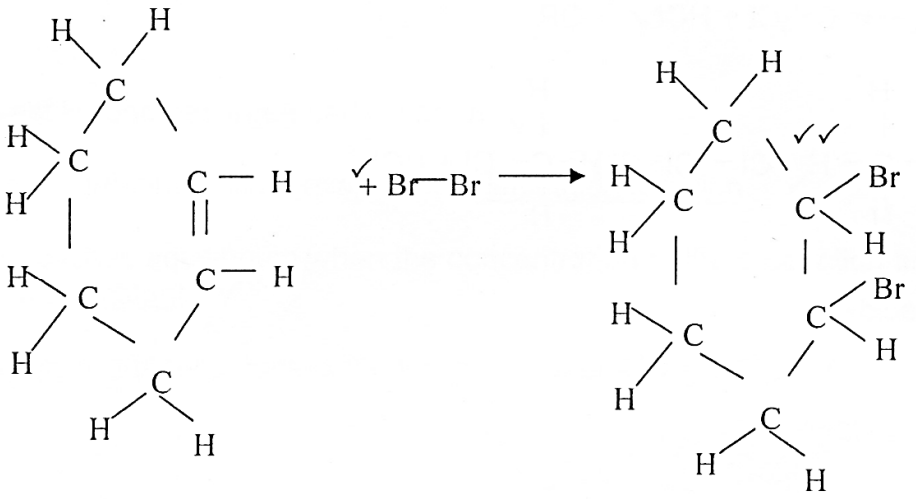
6.2

Compound	Action of liquid bromine in the dark room	Action of liquid bromine in sunlight
Cyclohexane	No visible reaction✓	Liquids mix and decolourise✓
Cyclohexene	Bromine decolourises slowly✓	Liquids mix and decolourise rapidly✓

(4)

6.3 Alkenes react more readily in bromine than alkanes.✓✓ (2)

6.4



(3)

6.5 Halogenation✓✓ (2)

(13)

Question 7

7.1 Exothermic √ ΔH = -197 kJ.mol^{-1}√ (2)

7.2 1580 kJ.mol^{-1}√ (1)

7.3 1580 + 197 = 1777 kJ.mol^{-1}√√ (2)

7.4 1340 + 197 = 1537 kJ.mol^{-1}√√ (2)

7.5.1 No effect √ (1)

Question 8

8.1 The change in concentration of reactants/products per unit time ✓✓
Die verandering in konsentrasie van reaktanse/produkte per eenheid tyd

Only/*Slegs* $^{2}/_{2}$ or/*of* $^{0}/_{2}$

OR/*OF*
The rate of change of concentration of reactants/products
Die tempo van verandering in konsentrasie van reaktanse/produkte

OR/*OF*
The change in amount of reactants/products per unit time
Die verandering in hoeveelheid reaktanse/produkte per eenheid tyd [12.2.1] (2)

8.2 What is the relationship between reaction rate and surface area (of an antacid tablet)? ✓✓
Wat is die verwantskap tussen reaksietempo en oppervlakte (van 'n teensuurtablet)?

OR/*OF*
What is the relationship between the volume of $CO_2(g)$ formed per unit time and surface area (of an antacid tablet)?
Wat is die verwantskap tussen die volume $CO_2(g)$ gevorm per eenheid tyd en die oppervlakte (van 'n teensuurtablet)?

Criteria for investigative question/*Kriteria vir ondersoekende vraag*	**Mark/*Punt***
Refers to relationship between dependent and independent variables *Verwys na verwantskap tussen afhanklike en onafhanklike veranderlikes*	✓
Is a question – not stated as an aim *Is 'n vraag – nie 'n doelstelling nie*	✓

[12.1.1] (2)

8.3 Concentration of acid/*Konsentrasie van suur* ✓
Mass of antacid/*Massa van teensuurmiddel* ✓
Temperature of acid/*Temperatuur van suur* ✓ [12.1.1] (3)

8.4 Any one pieces of apparatus with purpose/*Enige twee apparaatstukke met doel*:

- Thermometer/*Termometer* ✓
  Measure temperature ✓

or

- Pestle and mortar/any apparatus that can be used for grinding tablet✓

or

Grind antacid tablet to a powder/*Maal teensuurtablet tot poeier* ✓

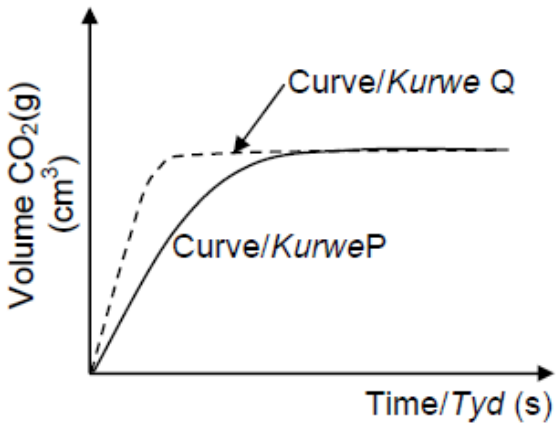
- Triple beam/mass meter/*massameter*
  Measure the mass of the antacid/*Meet massa van die teensuurtablet*

[12.1.1] (2)

8.5 (Gas) syringe ✓
(Gas-) spuit

[12.1.1] (1)

8.6



Criteria for sketch graph/*Kriteria vir sketsgrafiek*	**Mark/*Punt***
Curve Q has a steeper slope than Curve P *Kurwe Q het 'n steiler helling as Kurwe P*	✓
Curve Q shows a constant volume in a shorter time than Curve P *Kurwe Q toon 'n konstante volume in 'n korter tyd as Kurwe P*	✓
Maximum volume the same for both graphs *Maksimum volume dieselfde vir beide grafieke*	✓

[12.1.2] (3)

8.7 Chewing tablet <u>increases its surface area</u> ✓ that results in a <u>faster rate of reaction</u> ✓
Kou van tablet <u>vergroot die oppervlakarea</u> wat tot 'n <u>vinniger reaksietempo</u> lei

[12.2.3] (2)

[17]

Question 9

9.1 Reversible: Reaction takes place in both directions✓
Equilibrium: Rates of the forward and reverse reactions are the same. ✓ (2)

9.2 Reaction continues in both directions although the concentrations remain constant. ✓✓ (2)

9.3 If a chemical system at equilibrium (is disturbed) experiences a change in concentration, temperature or total pressure the equilibrium position will shift in order to minimise that change. ✓✓ (2)

9.4 Increase the temperature✓ (1)

9.5 If temperature increases, the equilibrium is disturbed. According to le Chatelier's principle the reaction that will restore the equilibrium is favoured. ✓That means the excess heat must be removed so the endothermic (forward) reaction is favoured. ✓ The concentration of the CO and $C\ell_2$ increases and the $COC\ell_2$ concentration decreases. ✓ (3)

9.6 When the CO concentration decreases the equilibrium is disturbed. According to le Chatelier's principle the reaction that will restore the equilibrium is favoured. That means the CO must be replaced. The forward reaction is favoured. That means the $COC\ell_2$ concentration will start decreasing and the concentration of the CO and $C\ell_2$ will start increasing till a new equilibrium is formed. (3)

9.7 A decrease in pressure. ✓ (1)

[14]