



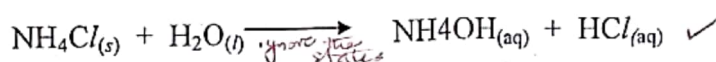
KISITU ATTENDED

1. (a) (i) Components in steel are physically combined while those in Magnesium oxide are chemically combined.
- Components in steel can be separated by physical means while ^{Components} ~~elements~~ in Magnesium oxide can be separated by chemical means.
 - Properties of steel are average of those of its components while in Magnesium oxide its properties are different from its components.
 - No energy is released/absorbed in formation of steel while energy is absorbed in formation of Magnesium oxide.
 - Steel has variable composition while that of Magnesium oxide is not variable.

Any 2 correct
(2marks)

- (ii) Using a magnet/Magnetic separation. ^{rej magnetism} ~~magnetisation~~

- (b) (i) The indicator turns from orange to red, ^{pink} ~~pink~~
- Ammonium chloride dissolves in water according to the equation.



The Hydrochloric acid formed is stronger [✓] than the ammonium hydroxide and therefore the resultant solution is acidic. [✓]

NH_4Cl hydrolyses to form H^+

(2marks)

05

2. (a) (i) $(31 - 15) = 16$ neutrons. [✓]
- (ii) $2 : 8 : 8$ ^{2, 8, 8 or 2) 8) 8}
- (b) Group V ^{group five ✓} ^{rej. 5. rej. V}
- (c) Z_2O_3 , covalent bond ^{rej. O_3Z_2}
- (d) Isotopy ^{reject isotopes}

(1mark)

(1mark)

(1/2mark)

(1 1/2mark)

(1mark)

05

3. (a) (i) Hydrogen [✓] ^{accept formula H_2}
- (ii) $\text{Zn}_{(s)} + 2\text{HCl}_{(aq)} \longrightarrow \text{ZnCl}_{2(aq)} + \text{H}_{2(g)}$ [✓] ^{accept ionic equation}
- (iii) To speed up the reaction rate ^{reject catalyst} ^{Or Increase the rate of reaction [✓]}

(1/2mark)

(1 1/2mark)

(1/2mark)

- (b) Nitric acid is a strong oxidizing agent [✓] (1mark)

- (c) Using anhydrous Copper (II) sulphate. When the product is added to ^{white} ~~white~~ anhydrous copper (II) sulphate it turns to ^{blue} ~~blue~~. [✓] (1 1/2mark)

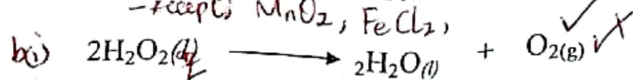
Accept: anhydrous cobalt (II) chloride paper from ^{blue} ~~blue~~ to ^{pink} ~~pink~~.

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accept CuSO_4 ^{white} ~~white~~ ^{WAKISSHA Joint Mock Examinations 2023}

^{white} ~~white~~ Copper (II) Sulphate turns ^{blue} ~~blue~~

- accept speed at which reactants are converted into products
 accept amount of reactants consumed per unit time
4. (a) Amount of products formed per unit time OR Equivalent. ✓
 (b) (i) - Presence of a catalyst ✓
 - Concentration of reactants. ✓
 - Temperature of reactants. ✓
 - accept MnO_2 , $FeCl_3$, MnO_2



- (c) Sodium Peroxide ✓ potassium chlorate, reject! Chemical formula ✓

5. (a) (i) % of oxygen = $100 - (43.40 + 11.32) = 45.28$ ✓

Elements	Na	C	O
Moles	$\frac{43.40}{23}$	$\frac{11.32}{12}$	$\frac{45.28}{16}$
	1.89	0.94	2.83 ✓
Divide by smallest	$\frac{1.89}{0.94}$	$\frac{0.94}{0.94}$	$\frac{2.83}{0.94}$ ✓
	2	1	3 ✓

Ratio 2 : 1 : 3 ✓

Empirical formula is Na_2CO_3

$$(Na_2CO_3)_n = 106$$

$$46n + 12n + 48n = 106$$

$$106n = 106$$

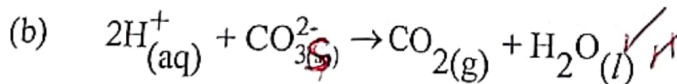
$$n = 1 \quad \checkmark$$

Molecular formula is Na_2CO_3 ✓

- (b) (i) ~~Blue~~ precipitate ✓ $Na_2CO_3 + H_2O \rightarrow 2NaOH + H_2CO_3$ reject PPT
 (ii) $Cu^{2+}_{(aq)} + CO_3^{2-}_{(aq)} \rightarrow CuCO_{3(s)}$ ✓



6. (a) (i) Sulphur dioxide gas, accept SO_2 reject sulphur dioxide ✓
 (ii) Carbon dioxide gas accept CO_2 ✓



- (c) Rfm of $CaCO_3$

$$40 + 12 + 16 \times 3 = 100 \quad \checkmark$$

If $22.4dm^3$ of CO_2 at Stp is evolved from 100g. ✓

$0.224dm^3$ of CO_2

$$\left(\frac{100}{22.4} \times 0.224 \right) = 1g \quad \checkmark$$

= 1g of $CaCO_3$ ✓

0.1g of $CaCO_3$ ✓

(1mark)

(2marks)
(1½mark)

(½mark)

05

(2marks)

0.3 marks

(½mark)

(1½mark)

(1½mark)

05½

(1mark)

(1mark)

(1½mark)

(½mark)

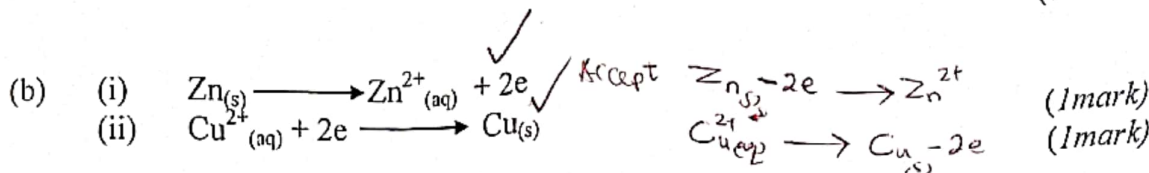
(½mark)

(½mark)

05

14, main
13, 1st

7. (a) (i) Zinc ✓
(ii) Copper ✓ (1/2 mark)
(1/2 mark)



- (c) Copper electrode. ✓
Reason; It undergoes reduction ✓ (2 marks)

Accept: Cu is less reactive than zinc or Cu is less reactive

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8. (a) This is the heat change when 1 mole of a substance is completely burnt in excess oxygen under standard conditions. ✓ (1 mark)
Accept: If a learner doesn't put standard conditions

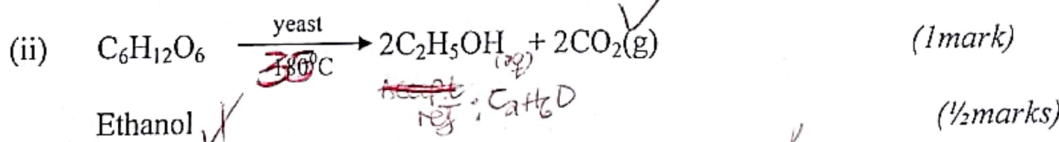
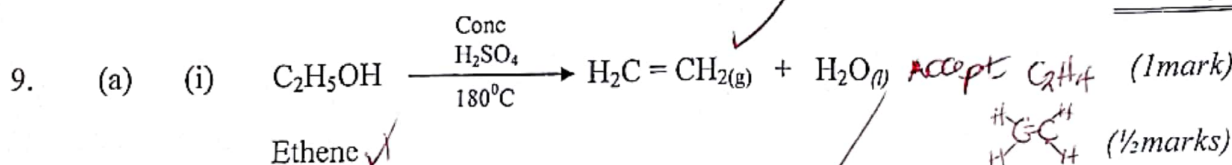
- (b) (i) Rfm. of CH_4 is $(12 + 4) = 16$ ✓ (1/2 mark)
890 kJ are produced by 16 g of CH_4 (1/2 mark)

5050 kJ are produced by $\left(\frac{16}{890} \times 5050\right)$ ✓ (1/2 marks)

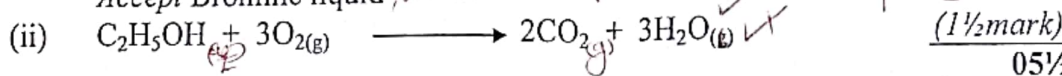
Mass of CH_4 90.7865 g ✓ Accept 91, 90.8, 90.79 (1 mark)
90.78, 90.787

- (ii) Ethane ✓
Has more Carbon atoms ✓ (1/2 mark)
(1 marks)

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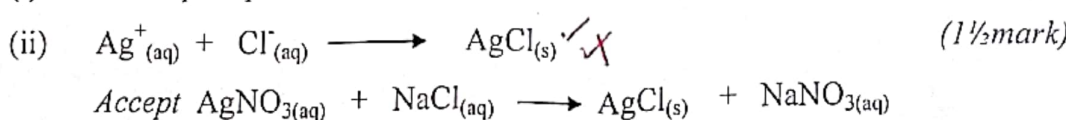


- (b) (i) Acidified potassium permanganate, turns colourless. ✓
Accept Bromine liquid, water accept alkaline potassium permanganate. (1 mark)



10. (a) Neutralization ✓ (1 mark)

- (b) (i) White precipitate insoluble in the acid ✓ (1 mark)



- (c) Fractional crystallization. (1/2 marks)

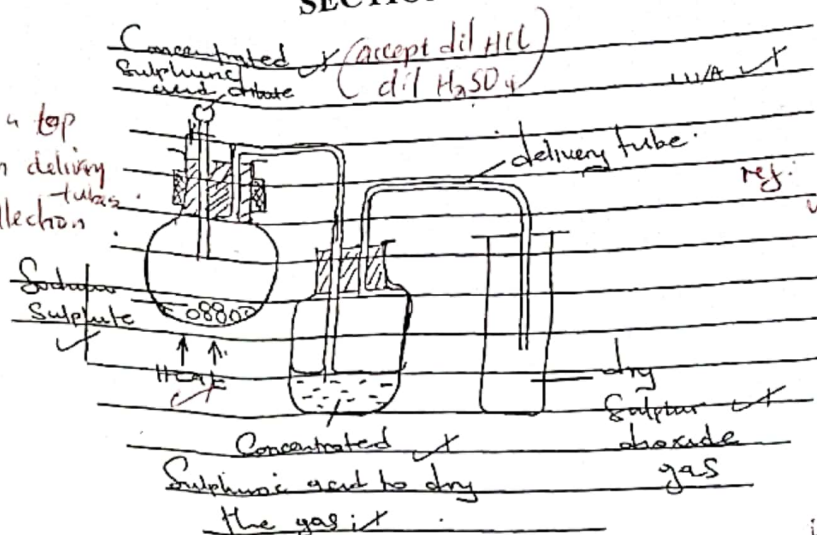
rej Fraction Crystallisation
Accept Fractional Crystallisation

04

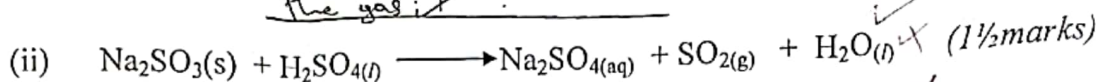
SECTION B

11. (a) (i)

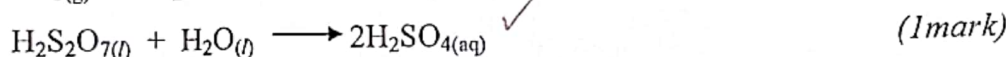
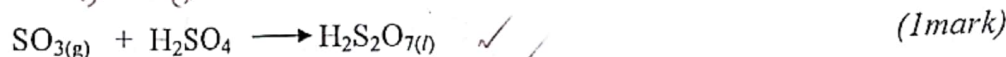
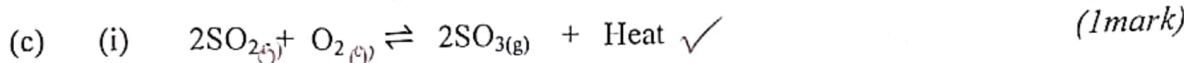
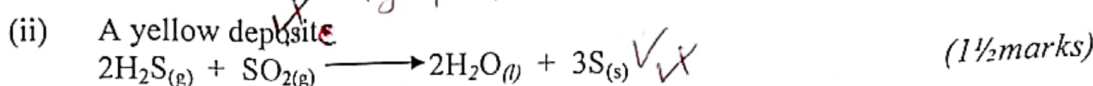
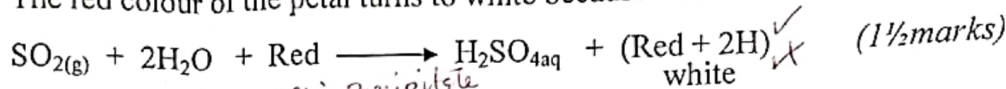
Thistle funnel with a top
No sharp corners on delivery tubes
state method of collection.



(3marks)



(b) (i) The red colour of the petal turns to white because it is bleached. (1mark)



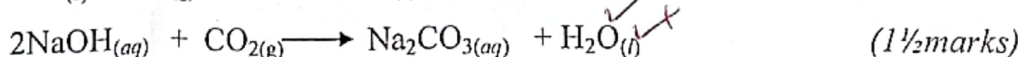
Sulphur dioxide gas is reacted with pure oxygen in the presence of Vanadium (V) oxide catalyst at a temperature of about 400 - 500°C, at high pressure to form sulphur trioxide.

The sulphur-trioxide is reacted with concentrated Sulphuric acid to form Oleum. Oleum is then diluted with a correct amount of water to form ordinarily concentrated sulphuric acid.

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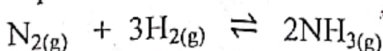
12. (a) (i) To remove Oxygen gas (1mark)

(ii) To remove Carbon dioxide gas (1mark)



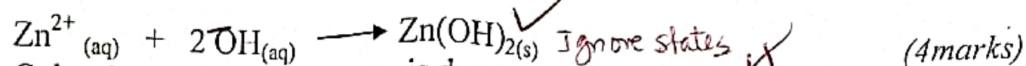
(b) Nitrogen from air and hydrogen from natural gases are mixed in a ratio of 1 : 3 and then passed over finely divided Iron catalyst at 500°C and 200 atm (high pressure) (4½marks)

Equation

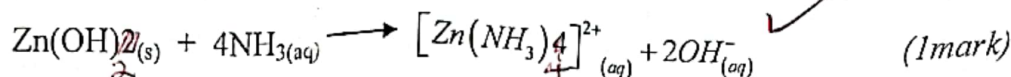


Ammonia formed is either dissolved in water or liquidified.

- (c) (i) White precipitate soluble in excess to form a colourless solution (1½ marks)
 (ii) White precipitate is due to formation of Zinc hydroxide which is insoluble in water.



Colourless solution in excess is due to formation of a complex of tetra ammine Zinc (II) ions which is soluble. (1 mark)
 i.e.

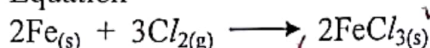


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13. (a) Chlorine is produced by action of Potassium permanganate on concentrated hydrochloric acid. The gas is passed through CaO to dry and its then passed over heated Iron filings in a combustion tube.

The Iron filings glow red hot and black crystals of Iron (III) chloride will be deposited in the small bottle which acts as a condenser. (3 marks)

Equation

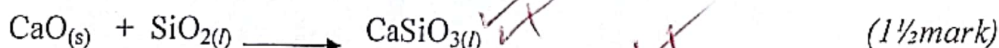


- (b) (i) A brown precipitate insoluble in excess accept redish brown precipitate (1 mark)
 (ii) A white precipitate dissolves on warming and precipitates/reforms on cooling. (1½ mark)

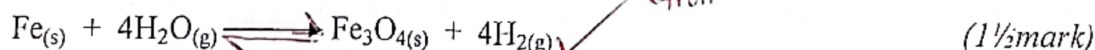
- (c) (i) $\text{C}_{(\text{s})} + \text{O}_{2(\text{g})} \rightarrow \text{CO}_{2(\text{g})}$ (1 mark)
 $\text{CO}_{2(\text{g})} + \text{C}_{(\text{s})} \rightarrow 2\text{CO}_{(\text{g})}$ (1½ mark)

- (ii) $\text{Fe}_2\text{O}_{3(\text{s})} + 3\text{CO}_{(\text{g})} \rightarrow 2\text{Fe}_{(\text{s})} + 3\text{CO}_{2(\text{g})}$ accept: a full arrow (1½ mark)

- (iii) $\text{CaCO}_{3(\text{s})} \rightarrow \text{CaO}_{(\text{s})} + \text{CO}_{2(\text{g})}$ (1 mark)

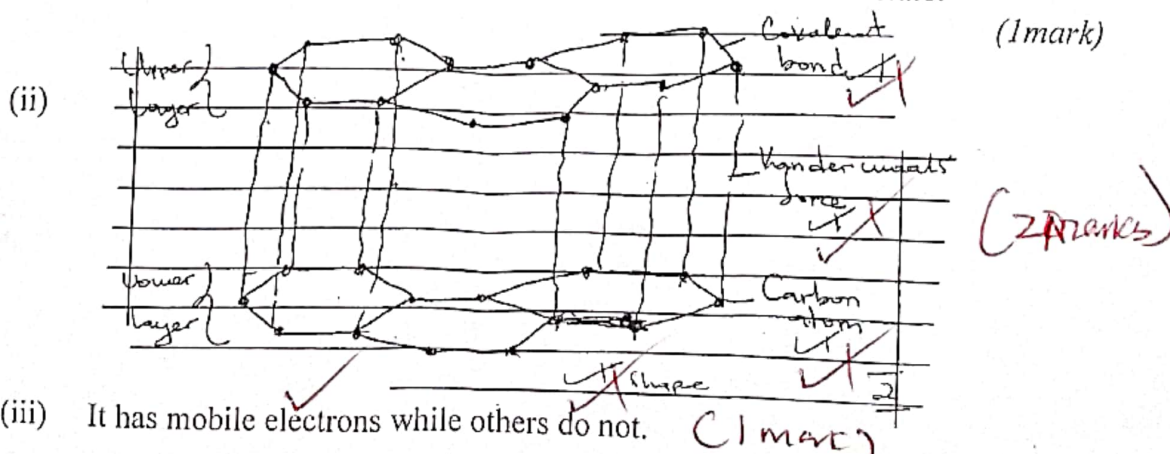


- (d) Iron reacts with dilute hydrochloric acid forming Iron (II) Chloride. Solution (1½ mark)
 $\text{Fe}_{(\text{s})} + 2\text{HCl}_{(\text{aq})} \rightarrow \text{FeCl}_{2(\text{aq})} + \text{H}_{2(\text{g})}$
 Iron reacts with steam to form mixed oxide of tri Iron tetra oxide

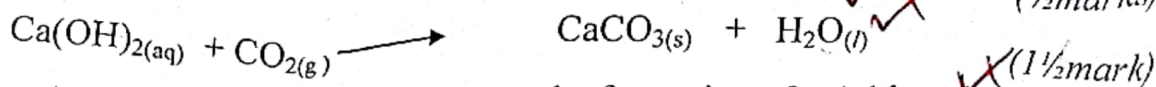


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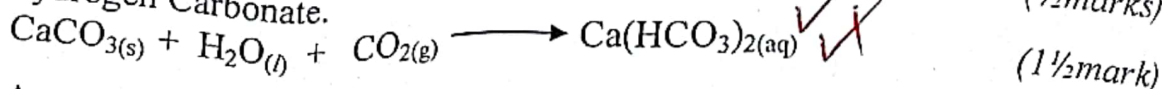
14. (a) (i) The different forms in which an element exists in the same state. (1 mark)



- (b) (i) White precipitate is due to formation of insoluble Calcium Carbonate. (1/2 marks)

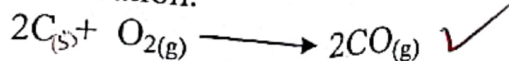


+ and the colourless solution is due to the formation of soluble calcium hydrogen Carbonate. (1/2 marks)

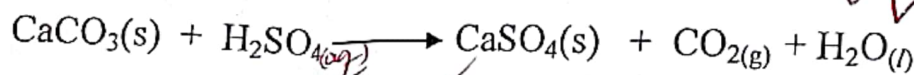


Acc. combined equation

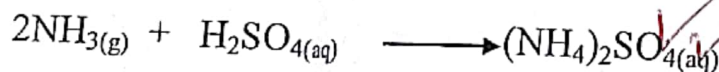
(ii) $\text{Ca(OH)}_{2(aq)} + 2\text{CO}_{2(g)} \longrightarrow \text{Ca(HCO}_3)_2(aq)$
Carbon under limited Oxygen supply undergoes incomplete combustion to form carbon monoxide which competes for the available oxygen and hence suffocation. (2 1/2 marks)



- (iii) Calcium Carbonate reacts with sulphuric acid to form an insoluble calcium sulphate that forms a protective coating around the Calcium carbonate and stops further reaction. (3 marks)



- (iv) Ammonia gas being alkaline reacts with Sulphuric acid to form ammonium Sulphate. (3 marks)



END