POST MOCK TERM 32019

Kenya Certificate of Secondary Education (KCSE)

233/1 CHEMISTRY (THEORY)

PAPER 1

MARKING SCHEME

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1) A thistle funnel does not have a tap while a dropping funnel has.√1// A dropping funnel delivers controlled amounts of liquid substances while a thistle funnel does not.

2) a) A substance that dissociates in water to give hydrogen ions as the only positively charged ions..√1
b) Sodium hydroxide solution causes a greater deflection on the ammeter than ammonia solution. .√1Sodium hydroxide completely ionizes.√ ½ to form sodium and hydroxide ions while ammonia solution partially ionizes.√ ½ to form ammonium and hydroxide ions.

3)a) fermentation.√1
b)Ethanol forms hydrogen bonds .√ ½ with water while ethane does not//.√ ½ remains molecular/has only weak vanderwaals forces(intermolecular force)//.Ethane is non polar while ethanol is polar.

4) a) $^{234}U \rightarrow {}^{230}Th + {}^{4}He$.√1
(b) Gamma rays will penetrate through the walls of the container and cause damage.

5)a) I..√1
II More Oxygen is used to form CO_2.√1
b) (i) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$
IV 2V 1V 2V.√ ½
80 cm^3 150 cm^3 75 cm^3 150 cm^3
Volume of carbon (IV) oxide = 75 x 1 = 75cm^3 .√ ½
(ii) Volume of water = 2 x 75 = 150cm^3
Residual air = 5cm^3 + 75cm^3 + 150cm^3.√ ½ = 230cm^3 .√ ½

6)a) X. .√ ½ It is stable; it neither loses nor gains electrons.√ ½

b) W and Y.√ 1

c) YW.√ ½1

7) . a) Thermometer should not be dipped in the mixture, .√ 1 it should be at the outlet point to the condenser.
The direction of water flow is wrong/ condenser wrongly fixed.√ any 1

No water bath is used
(b)Boiling point/ Freezing point/Density / refractive index

8).a) $2Pb(NO_3)_{2(s)} \dashrightarrow 2PbO+4NO_2(g) +O_{2(g)}$.√ 1

b) Moles of NO_2 gas= $\frac{0.29}{24} = 0.01208$.√ ½

moles of $Pb(NO_3)_2$= $\frac{1}{2} x 0.01208 = 0.006$.√ ½

mass of $Pb(NO_3)_2$=0.006x331.√ ½ =1.986g.√ ½

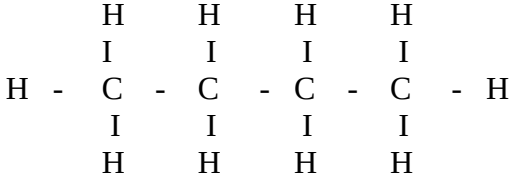
9) a) Neutralization.√ 1
b) (i)Calcium hydrogen carbonate.√ 1
(ii) Drying agent. .√ 1 Extraction of sodium from Downs's process..√ ½
10.Kerosene floats on water therefore it continues to burn
carbon (iv) oxide blanket covers the flame.√ 1// cuts off the supply of oxygen therefore burning stops .√ ½

11) a) ΔH_1 – Bond breaking.√ ½ / activation Energy
ΔH_3 – Energy evolved during reaction
(b) $\Delta H_3 = \Delta H_1 + \Delta H_2$.√ 1

12.Add excess zinc oxide.√ ½ to dilute HCl(aq).√ ½
/ HNO_3(aq) / H_2SO_4(aq).Filter. .√ ½
To the filtrate add aqueous K_2CO_3(aq) / Na_2CO_3(aq) / $(NH_4)_2 CO_3$(aq) to precipitate $ZnCO_3$(S).
√ ½
Filter.√ ½ to obtain $ZnCO_3$(S) as the residue. .√ ½

Q13. i) T = (32 x60) + 10 = 1930s .√ ½
I = 0.5
Q = It = 0.5 x 1930 = 765 C .√ ½
0.44g deposited by 765C
88g ?
$\frac{88}{0.44} x 765 = 153000$.√ ½
$\frac{153000}{96500} = 1.586 \cong 2$.√ ½
Charge of X = 2
ii) $X(OH)_2$.√ 1

Q14. Butane.√ 1



Q15(a)Barium Sulphate ($BaSO_3$).√ 1

(b)$BaSO_{3(s)} + 2HCI\ (aq) \rightarrow BaCI_{2(aq)} + SO_{2(aq)}$.√ 1
(c)Changes from orange to green.√ 1

Q16

Element	C	H	O
% Composition	57.15	4.76	38.09 √ 1
R.A.M	12	1	16
$\frac{\%}{R.A.M}$	4.7625	4.76	2.380625√ 1
Moles ratio	$\frac{4.7625}{2.380625}$ =2.004 =2	$\frac{4.76}{2.380625}$ =2.00	$\frac{2.380625}{2.380625}$ =1 √ ½

Empirical formula= C_2H_2O√ ½
$n = \frac{126}{42}$ = 3 √ ½
Molecular formula = $(C_2H_2O)_3 = C_6H_6O_3$√ ½

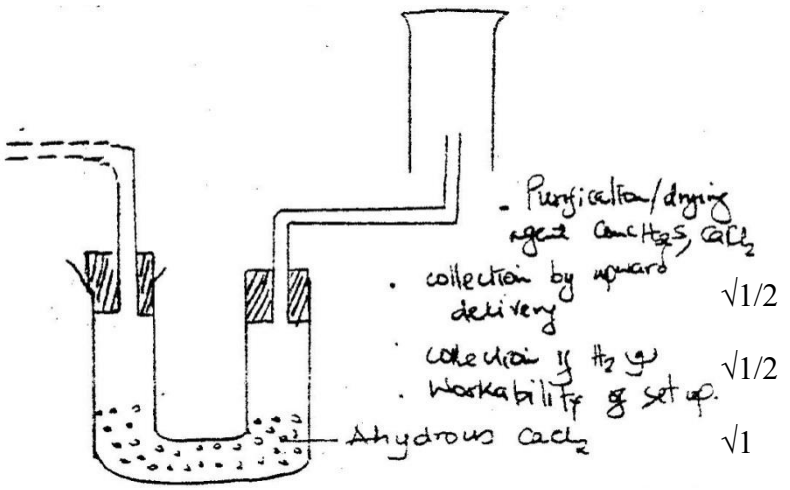
Q17 a) Ammonia gas√ 1
b) Filtration/precipitation/Crystallization√ 1
c) $2NaHCO_3\ (s) \rightarrow Na_2CO_{3(s)} + CO_{2\ (g)} + H_2O_{\ (g)}$√ 1

Q18. -Iron wool turns or rusts√ ½ due to formation of hydrated iron (III) oxide√ ½
-Level of water inside the tube rises√ ½ to occupy the space left by oxygen√ ½
// Level of water in the beaker will fall

Q19.a) The water contained impurities √ 1 (1mk) //presence of impurities elevate the Boiling point. // water contained dissolved ions//Hard.
b) (i) Copper(II) sulphate;√ 1 at 40^0C ONLY 28gm is soluble leaving the rest undissolved. √ 1
At 40^0C, all lead nitrate dissolves.
(ii) 35-28=7g√ ½

Q20. Equilibrium shift to the right (1mark)
- Shift to the right √ ½
- Shifts to the left (equivalent to increase in pressure) (1mark)

Q21.a)



√1
√1/2
√1/2
√1

b) $2H_2(g) + O_2(g) \longrightarrow 2H_2O(g)$√ 1

Q22. a) $1000cm^3 = 0.1mol$
$25\ cm^3$?

$\frac{25}{1000} x0.1 = 0.0025mol$ √ 1

b) $H_2X\ (aq) + 2\ NaOH\ (aq) \rightarrow Na_2X(aq) + H_2O(l)$
Mole ratio 1 : 2√ 1
Moles of acid = 0.0025x2= 0.00125mol.√ ½
Molarity = $\frac{1000}{18.7} x0..00125 = 0.0668M$√ ½

√Q23. $NH_4NO_3(s) \rightarrow N_2O(g) + 2H_2O(g)$
b) Over warm water.√ ½ Downward displacement of warm water because it is fairly soluble in cold water.√ ½
c) Both red and blue litmus will not change colour√ 1

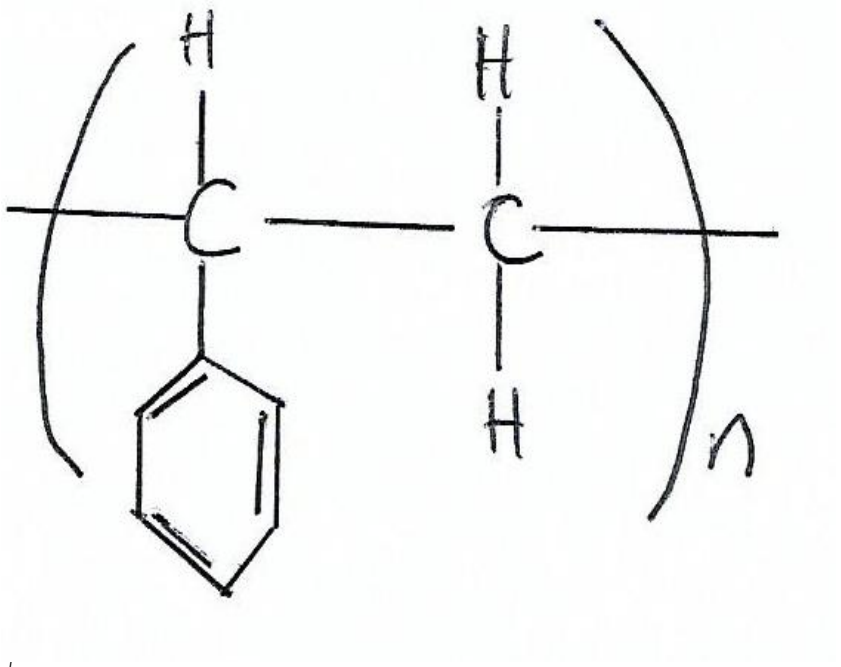
Q24. a)At room temperature √ 1cold and dilute sodium hydroxide
b)Used in sterilizing of water / treatment of water / killing germs
Used as a bleaching agent√ 1 any
Antiseptic for mouth wash
Fungicide

Q25. Q22. a) 2cr + -2 x 7 = -2 √ ½
2cr - 14 = -2
2cr = +12
Cr = +6√ ½
(b) Oxidation - Fe^{2+}√ 1 (Iron (II) ions) to Fe^{3+}(increase of oxidation number/ loss of electron)
Reduction – Chlorine to Cl^{-1}(decrease in oxidation number/ gain of electron)√ 1

Q26. a)Bromine
At room temp (25°c) Bromine is liquid since its M.P is -7°c
and B.P 59°c/58.8°c.Room temp is between its M.P and B.P√ 1
b) Atomic mass / molecular mass / molecule of iodine is higher than that of Cl_2.
Van der waals forces are stronger in I_2 than Cl_2 hence iodinesb.p is highest than that of Cl_2

Q27. a) N √1
b) Eø =0.80 +0.76√ ½
= 1.56 volts √ ½

Q28. a) Polystyrene or polyphenylethene√ ½



b)√ 1
c) non biodegradable√ 1

Q29. P_1+ P_2
Volume is constant

$$\frac{760}{273} = \frac{P_2}{373} \qquad P_2 = \frac{760 \times 373}{273}$$ √ 1 = 1038 mmHg√ 1