MARKING SCHEME CHEMISTRY PAPER 233/1

1. (a) The solution turns from colourless to brown then a black solid is seen✓1

(b) $Cl_2(g) + 2I^-aq \longrightarrow 2Cl^-aq + I_2(s)$ ✓1

2.

	C	H	O
	$\frac{64.86}{12}$	$\frac{13.51}{1}$	$\frac{21.63}{16}$✓1
Moles:	$\frac{5.405}{1.3518}$	$\frac{13.51}{1.3518}$	$\frac{1.3518}{1.3518}$
	4	10	1✓1

E.F = $C_4H_{10}O$✓1

3. (a) molar heat of fusion/latent heat of fusion✓1

(b) negative/-ve, the process is exothermic/heat is given out when steam condenses to water✓1

4. $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$✓1

$\frac{250 \times 750}{300} = \frac{V_2 \times 750}{315}$✓1

$V_2 = 262.5cm^3$✓1

5.	Number of		
Particle	Protons	Neutrons	Electrons
$^{34}_{16}X^{-2}$	16	18	18
$^{56}_{26}Y^{+3}$	26	30	23

6. (a) Moles of acid ✓ 1

1000

Moles of MCO_3 ✓ 1

(b) 0.1 moles = 12.5g✓ 1
1 mole = ?

0.1

7.(a) scum✓1

(b) contains calcium ions which helps to strengthen the teeth

8.(i) black specks✓1 and white powder✓1

(ii) $C0_2(g) + 2Mg(s) \longrightarrow 2MgO(s) + C(s)$ ✓1

9.(a) solution E✓1

(b)Solution H✓1

(c) Solution F✓1

10. $\frac{Rate\ of\ diffusion\ of\ N_2}{Rate\ of\ diffusion\ of\ CO_2} = \frac{\sqrt{MMCO_2}}{\sqrt{MMN_2}}$ ✓1

$$\frac{3}{R_{CO_3}} = \sqrt{\frac{44}{28}}$$

$$\frac{3}{R_{CO_2}} = 1.2536$$

$$R_{CO_2} = \frac{1.2536}{3}$$

$=0.41786 cm^3/s$✓1

Rate $= \frac{volume}{time}$

$0.411785 = \frac{240}{time}$

Time =582.8251✓1

11. $\frac{(62.93 \times 69.09) + (64.93 \times 30.91)}{100}$ ✓1

Evaluation ✓1

=63.548✓1

12.(a)alkali metals✓1

(b)C✓1

(c) darts on the surface and melts into asilvery ball

13. (a)(i)Cu^{2+}, ✓ ½ and Zn^{2+} ✓ ½

(ii) $S0_4^{2}$ ✓1

(b) $Zn(OH)_{2(s)} + 4NH_{3(aq)} \longrightarrow [Zn(NH_3)_4^{2+}{}_{(aq)} + 2OH_{(aq)}$

(c) Neutralization ✓1

14.(a) sodium and magnesium are metals with delocalized electrons, While phosphorous lacks delocalised electrons since it is anon metal

(b) it exists in allotropic form/it has two allotropes

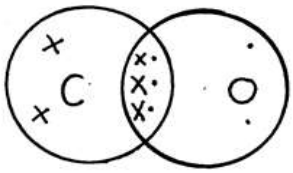
(c).due to increase in the strength of nuclear charge due to increase in the proton number,outermost energy level strongly attracted to the nucleus.

15.(i) sample 3

(ii) boiling precipitates calcium or magnesium ions hence removing hardness

16. -add distilled water to potasiumsulphate to make a solution✓½
- Dissolve lead carbonate in dilute nitric acid to form lead nitrate✓½
- React lead nitrate with potasiumsulphate solution to precipitate leadsulphate✓1
- Filter out lead sulphate✓½ and dry it between filter papers✓½

17.



18. .- Heat change = $MC\Delta T$

$= [0.4 \times 4.2 \times (85-20)]kJ$ ✓ ½

= 109.2kJ ✓ ½

Moles of ethanol = $\frac{10}{46}$ = 0.2174 mol ✓ ½

If 0.2714 moles give 109.2kJ

then 1mole gives 1 x 109.2 ✓ ½

$$= \frac{0.2174}{} = 501.4\text{kJ}$$ ✓ ½

∴ Molar enthalpy of combustion of ethanol = -501.4 kJ mol^{-1} ✓ ½

19. sample (ii),since it does not form scum with hard water

20.(a)propane

(b)2-methylpropane

21. (a).C.A,B ✓1

(b).C✓1

(c).$AgNO_3$, $Hg(NO_3)_2$✓1

22. they have the same molecular mass✓1

23. I. minimize on wastage✓1

II. it ia magnetic✓1

III. during extraction a lot of electricity is used to melt the ore and maintain it in molten state✓1

24.P-making lubricants,making brushes for dynamos

Q-making drilling bits,jewellery

25(i). NH_4NO_3 - $\frac{28}{80} \times 100$

= 35%✓1

$(NH_4)_2HPO_4$ $\frac{28}{132} \times 100$

=21%✓1

(ii) they support rapid growth of acquatic plants which compete for oxygen with animals causing death hence pollution of water✓1

26. .(a) $CH_3\ CH_2CH_2OH$✓1

(b) (i) propanoic acid✓1

(ii) Dehydration✓1

27. (a) When the air-hole is open ✓1

(b)- It is hotter than the luminous flame

- It does not produce soot (Any 1 x 1mk

28. .(i) Fractional distillation✓1

(ii) N-addition of water to magnesium nitride✓1

P- Addition of hydrogen in presence of finely divided iron

29. mass of solid =30.4-26.2=4.2g
Mass of solution =42.4-26.2=16.2g
Mass of solvent =16.2-4.2=12g
12g contains 4.2g of solute
100g contains?
=35g/100gH_2O