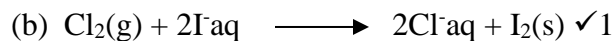


MARKING SCHEME CHEMISTRY PAPER 233/1

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



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. $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$ ✓ 1

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

$V_2 = 262.5 \text{ cm}^3$ ✓ 1

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

6. (a) Moles of acid ✓ 1

Moles of MCO_3 ✓ 1

2

(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) $\text{CO}_2(\text{g}) + 2\text{Mg}(\text{s}) \longrightarrow 2\text{MgO}(\text{s}) + \text{C}(\text{s})$ ✓ 1

9.(a) solution E ✓ 1

(b) Solution H ✓ 1

(c) Solution F ✓ 1

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

$$\frac{3}{R_{CO_2}} = \sqrt{\frac{44}{28}}$$

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

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

$$= 0.41786 \text{ cm}^3/\text{s} \checkmark 1$$

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

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

$$\text{Time} = 582.8251 \checkmark 1$$

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

100

Evaluation ✓ 1

=63.548 ✓ 1

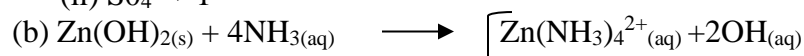
12.(a)alkali metals ✓ 1

(b)C ✓ 1

(c) darts on the surface and melts into a silvery ball

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

(ii) SO_4^{2-} ✓ 1



(c) Neutralization ✓ 1

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

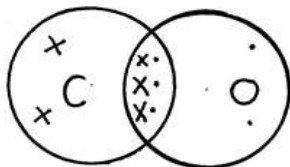
16. -add distilled water to potassium sulphate to make a solution ✓ ½

- Dissolve lead carbonate in dilute nitric acid to form lead nitrate ✓ ½

- React lead nitrate with potassium sulphate solution to precipitate lead sulphate ✓ 1

- Filter out lead sulphate ✓ ½ and dry it between filter papers ✓ ½

17.



18. .-

$$\text{Heat change} = MC \Delta T$$

$$= [0.4 \times 4.2 \times (85 - 20)] \text{kJ} \quad \checkmark \quad \frac{1}{2}$$

$$= 109.2 \text{kJ} \quad \checkmark \quad \frac{1}{2}$$

$$\text{Moles of ethanol} = \frac{10}{46} = 0.2174 \text{ mol} \quad \checkmark \quad \frac{1}{2}$$

If 0.2714 moles give 109.2kJ
 then 1mole gives $\frac{1 \times 109.2}{0.2714}$ ✓ ½
 = 501.4kJ ✓ 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).AgNO₃, Hg(NO₃)₂ ✓ 1

22. they have the same molecular mass ✓ 1

23. I. minimize on wastage ✓ 1

II. it is 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). NH₄NO₃ - $\frac{28}{80} \times 100$
 = 35% ✓ 1

(NH₄)₂HPO₄ $\frac{28}{132} \times 100$
 =21% ✓ 1

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

26. (a) CH₃ CH₂CH₂OH ✓ 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 = $30.4 - 26.2 = 4.2\text{g}$

Mass of solution = $42.4 - 26.2 = 16.2\text{g}$

Mass of solvent = $16.2 - 4.2 = 12\text{g}$

12g contains 4.2g of solute

100g contains?

= $35\text{g}/100\text{gH}_2\text{O}$