CHEMISTRY PAPER 1

Marking Scheme

1(a) When air hole is completely/fully closed. — 1Mrk

If filly/completely mentioned If not mentioned penalize fully

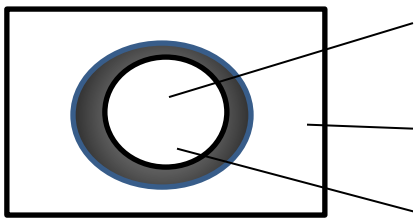
(b) $C_4H_{10\,(g)} + 4O_{2\,(g)} \longrightarrow C_{(s)} + 3CO(g) + 5H_2O_{(l)}/_{(g)}$ — 1Mrk

Or

$C_4H_{10\,(g)} + 3O_{2(g)} \longrightarrow C_{(s)} + CO_{2(g)} + 5H_2O_{(l)/\,(g)}$

No state penalize ½
Not balanced penalize fully
Water can be liquid or gas.

(c)



1mrk

A diagram must be well labeled
Mention burnt and not burnt region

Or

Slip a piece of paper across the middle point of the flame. Several times. Remove and observe ½
The central part remains unburnt while other part burns. ½ Accept wooden splint

2(a) Metallic bond — 1mrk

(b) Group I (1mrk) Each action contains one electron in the outermost energy level (1mrk) — 2mkrs

3 (a) (i) Alpha (a) — 1mrk

(b) Betta (-Ie) — 1mrk

(b) Cancer treatment
- Detecting cracks in metals

} Any 1mrk

- Carbon dating of plants and animals — 1mrk

4(a) Black Precipitate — 1mrk

(b) $Pb^{2+}_{(aq)} + S^{2-}_{(aq)} \longrightarrow Pbs_{(s)}$ — 1mrk

Penalize ½ if no symbol or if they are wrong
If not balanced penalize fully

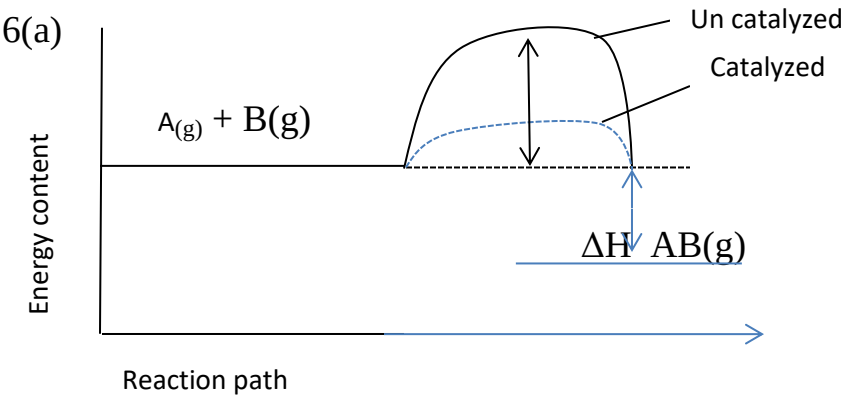
5 (a) Anhydrous calcium chloride — 1mrk

(b) Black CuO changes to brown solid — 1mrk

(c) Hydrogen reduces CuO to copper metal which is brown
Colorless liquid forms on the cooler parts of the combustion tube. — Any 1mrk

(b) If initial and final colour is not mentioned penalize fully

6(a)



1mrk

Catalyzed must be below that of un catalyzed

(b) $N_2H_4 + O_2$ (g) $\longrightarrow N_{2(g)} + 2H_2O$(l) — 3mrks

Bond Breaking	Bond Formation
4x 388 = 1552	1x944= 944
1x163	4x464= 1856
1x 496=496	
+2211 kJ	-2800 kJ

ΔH = -589kJ

7(a) A - chlorine — ½
B – Hydrogen — ½

(b) $H_{2(g)} + Cl_2(g) \longrightarrow 2HCl_{(g)}$ — 1mrk

(c) To increase surface area for dissolution of hydrogen — 1mrk

Chloride gas in water. No present sucking back. 2mrk

8(a) S, Hydrogen, V, T

(b) $T_{(s)} + V^{2+}_{(aq)} \longrightarrow V_{(s)} + T^{2+}_{(aq)}$ 1mrk

9 Crush the tablet with mortex and pistle ½, add water stir To dissolve ½, add the universal indicator ½ , match the Color with that of *PH* chart ½, determine the *PH* 1mrk. 3mrks

Mark consequentially.

10 (a) $Ca^{2+}_{(aq)} + 2e^{-} \longrightarrow Cu(s)$ 1mrk

(b) 63.5g of Cu $\longrightarrow$ (96500x2)C

Thus 1.184g Cu = 1.184g x $\frac{193000}{63.5}$ 1mrk

= 3598.66

Quantity = It $\longrightarrow$ 3598.66

2t = $\frac{3598.6}{2}$ = 1799. 3 Sec

=30 sec 1mrk

11(a) $C_{(s)} + H_2O_{(g)} \longrightarrow CO_{(g)} + H_{2(g)}$ 1mrk

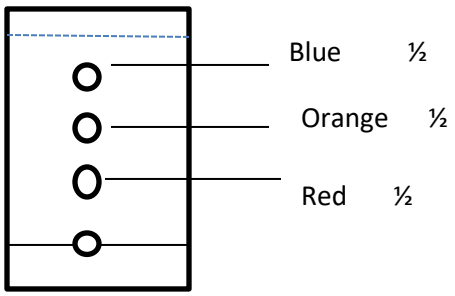
Equation must be balanced if not penalize fully

(b) Reducing agent 2mrks

Together with oxygen is used as fuel

Award ½ if state is not given/ missing

12(a)



1½

1mrk

(b) Wash the blue spot in the chromatogram with plenty of water ½
Evaporate the water to obtain the dye ½

(c) Ethanol/ Propanol — 1mrk

13(a) Source of heat — 2mrks

(b) The solid Pb Br_2 melts to form Pb^{2+} and Br^{-} ½
These mobile ions ½ conducts electric current ½ Then Bulb lights ½ — ½ ½ ½ — 2

14 Mass of $KClo_3$ = 16.86 – 15.86 = 1g ½
Mass of water = 26.86 – 16.86 = 10g ½
1g of $KClO_3$ saturates 10g of water at 30^oC ½

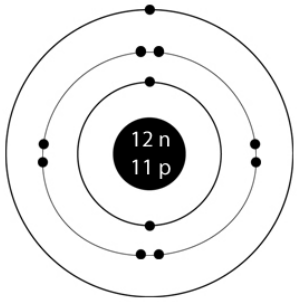
$X_{(g)}$ of K ClO_3 saturates 60g of water at $30^0C = \frac{60x1}{10}$ = 6g ½

Mas of saturated solution = 6+ 60
= 66g — 1mrk

15(a) (i) 2, 2 – dimethyl propane — 1mrk
(ii) Pent – 2 – yne — 1mrk

(b) Add acidified $KMnO_4$ solution to both separately
$CH_3C = CCH_2$ CH_3 will change purple acidified $KMnO_4$ Colourless. — 1mrk
$CH_3 (CH2)_2$ CH_3 doesn't ½ — 1mrk

16 (a)

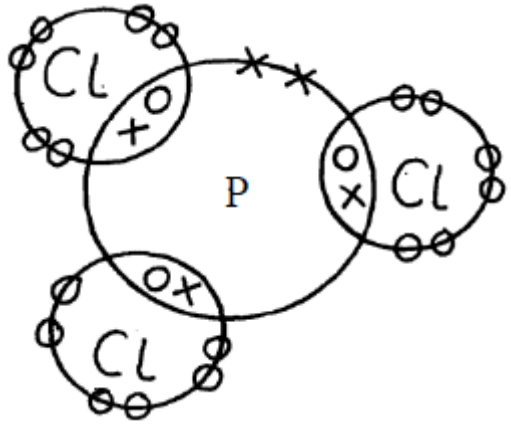


2Mrks

11P ½

12N ½ 3 energy levels ½
11 electrons ½

(b)



17 (a) When gases react they do so in volumes which bears Simple whole number ratio to one another and to the Volume of products if gaseous when temperature and pleasure remains constant 1mrk

(b) $C_x H_y + O_{2(g)} \longrightarrow CO_{(g)} + H_2 O_{(g)}$

15/15	45/15	30/15	30/15
1	3	2	2

$C H_y + 3O_2 \longrightarrow 2CO_{2(g)} + 2H_2 O(g)$

Cx Hy = $C_2 H_4$ ½

18 (a) $\frac{-92.4}{2} = -46.2 kJmol^{-1}$ *penalize ½ for missing sign or wrong units* 1mrk

(b(i) Lowers the yield ½ forward reaction is exothermic/ Backward reaction is endothermic ½ 2mrks

Penalize for backward reaction is favoured

(ii) No effect ½ catalysts have no effect on the position of Equilibrium. ½ 1mrk

19(i) $4Fe_{(s)} + 3O_{2(g)} + NH_2 O \longrightarrow 2Fe_2 O_3.NH_2 O$

1mrks

(ii) 6th day ½, volume of air remains constant ½ 1mrks

(iii) % of oxygen gas = $\frac{2000 - 1600}{2000} \times 100$ ½

=20% ½

1mrk

20 (i) 2. 8. 3 1mrk

2. 8. 6

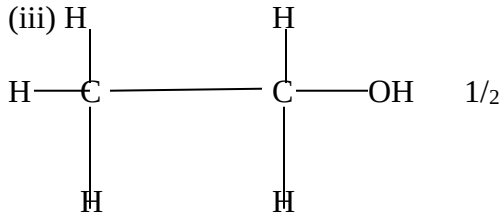
1mrk

(ii) P_2Q_3

21 (i) Ethyl propanoate 1mrk

(ii) Ester/ Alky/alkanoate 1mrk

(iii)



1mrk

Ethanol ½

22 Gas m is lighter than air hence creating low pressure, water will rise to occupy space left as gas m escapes to the atmosphere. Gas N is denser than air so air enter the porus pot hence increasing the pressure hence pushing water down.1mrk 2mrk

23 (a) Nitric acid is a strong oxidizing agent and attacks rubber corks and rubber tubes. 1mrk

(b) Contain dissolved nitrogen (IV) oxide which reacts from decomposition of nitric (V) acid 2mks

24 Heat copper metal in air to form copper (II) oxide, 1mrk, React excess copper (II) oxide with dilute $H_2SO_{4(aq)}$ to obtain copper (II) sulphate solution. 1mrk Heat the solution to Saturation ½ and allow it to cool to form copper (II) sulphate Crystals ½ 3mrks

25 (a) Malleable material that can be hammered into sheets while ductile is the material that can be drawn into wires

2mrks

(b) (i) Used in making of cooking utensils.

2mrks

(ii) Used to make overhead cables

26 $SO_{2(g)} + NO_{2(g)} \longrightarrow SO_{3(g)} + NO_{(g)}$

+4 +4 +6 +2

1mrk

Oxidation number of sulphuric increases from +4 to +6 1mrk
Oxidation of number of nitrogen decreases 1mrk

1mrk

(ii) Sulphur – dioxide/ SO_2