MARKING SCHEME
SAMPLE PAPER 4
233/1

1. (i) C✓ ½

   (ii) A✓ ½ Acetic acid is a weak acid since it is organic in nature✓ ½

   (iii) E ✓ ½

2. $C_{(s)} + O_{2\,(g)} \longrightarrow CO_{2\,(g)}$ – 393 kj mol – 1

   $H_{2\,(g)} + \frac{1}{2} O_{(g)}$ - $\longrightarrow H_2O_{(t)}$ 285 kj mol y

   $CH_{4\,(g)} + 20_{2\,(g)} \longrightarrow CO_{2\,(g)} + 2\,H_2O$ - 88 Kj mol

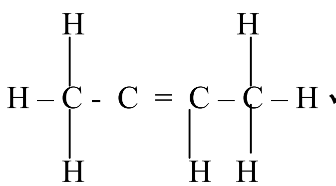
   $C_{(s)} + 0/2_{(g)} \longrightarrow C/o_{2\,(g)}$ 393 kj

   $2\,H_{2\,(g)}\ 0/2_{(g)} \longrightarrow 2\,H_2O$ – 285 x 2 kj

   $CH_{4\,(g)} + O_2 \longrightarrow$ -$C\,O_{2\,(g)} + 20/_2$ + 887 Kj

   $C_{(s)} + 2\,H_{2\,(g)} \longrightarrow CH_{4\,(g)}$ - 393 + 2x - 285 + 887

   $C_{(s)} + 2\,H_{2\,(s)} \longrightarrow CH_{4\,(s)})$ – 76 kj mole -1

3. a)  ✓ 1

   b) Alkenes✓ ½

   c) 2,3 – difluorobutane ✓1

4. The bulb lights in ✓ ½ set – up I and does not✓ ½ light in set-up II

   Magnesium has delocalized ✓ 1 electrons and diamond does not have delocalized electrons✓

1

   hence is a non conductor of electricity

5. Pb^{2+} + 2e $\longrightarrow$ Pb (s) ✓ ½

   Q = (0.2 x 25 x 60)

   = 300 C ✓ 1

   (2 x 96500) C $\longrightarrow$ 207 g of lead

   300 C $\longrightarrow \dfrac{(300 \times 207)}{(2 \times 96500)}$ ✓ ½

= 0.3218 g of lead ✓ 1

6. Let the oxidation state for Mn be x

   x + 3 (-2) = 0 ✓ 1

   x = +6 ✓ 1 (the sign must be shown)

   Systematic name of Mn O_3 is manganese (vi) Oxide ✓ 1

7. a) $Ag+ \; e- \longrightarrow Ag \; (s)$

   b) Oxygen // O_2

8. - Magnesium continues to burn
   - White solid
   - Yellow specks

   any two correct award ½ mones magnesium oxidized to magnesium oxide ✓ 1

$Ag_{(aq)} + e \longrightarrow Ag_{(s)}$

IF $\longrightarrow$ 108 (g) of Ag

Therefore 0. 075 F $\longrightarrow \dfrac{0.075 \times 108}{1}$ ✓ ½

= 8.1 g of Ag ✓ ½

9. 800 g $\xrightarrow{t\,½}$ 400 (g) $\xrightarrow{t\,½}$ 200 $\xrightarrow{t\,½}$ 100 $\xrightarrow{t\,½}$ 50g

4 t ½ = 100 days ✓ ½

therefore t ½ = $\dfrac{100}{4}$

= 25 days

11. a) Increase surface area for dissolution of hydrogen chloride gas
    - prevents suck back ✓ ½

    b) A White precipitate is formed due to formation insoluble silver chloride//
    $Ag+ \; (aq) + CI \; (aq) \longrightarrow Agcl \; (s)$

    The precipitate dissolved in excess aqueous ammonia to form a colourless solution due to formation of a soluble complex silver ions//

    $Agcl \; (s) + 2 \; NH_{3\,aq} \longrightarrow [Ag \; (NH_3)2]^{+}{}_{aq} + + Cl^{-}{}_{aq}$

12. (i) 3 Mg (s) + N2 (g) $\longrightarrow$ Mg_3 $N_{2\,(s)}$ ✓ ½ ✓ ½ state symbol

(ii) When water✓ ½ is added to magnesium nitride, ammonia gas which turns red litmus paper blue✓ ½ .
Ammonia is not produced when water is ✓ ½ is added to oxide

13 a) (i) Water / H_2 O (i)
(ii) - Use anhydrous copper (ii) sulphate ✓ ½ change from white to blue//
- Use dry cobalt (ii) chloride paper change from blue to pink ✓ ½

b) The reddish ✓ ½ brown hot lead (ii) oxide turns grey ✓ ½

c) $H2_{(g)}$ + $PbO_{(s)}$ $\longrightarrow$ $H2O_{(l)}$ + $Pb_{(s)}$

14 . (a) Nitrogen (I) Oxide ✓ 1 - Reject dinitrogen oxide/ nitrous oxide
(b) has sweet smell and relights a ✓ 1 glowing splint
(c) Was formerly used as an anaesthetic ✓ 1 during dental surgery

15. Deflagrating spoon ✓ 1
Use: to Burn solid substance ✓ 1

16. a)

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              O                     O
              ll                    ll
(i)  H O -    C  - ( CH 2 ) 4  -    C  - OH ✓ 1

              H                     H
              l                     l
(i)  H   -    N  - ( CH 2 ) 6  -    N  - H ✓ 1
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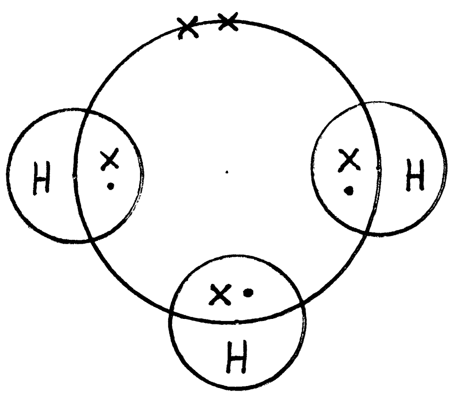
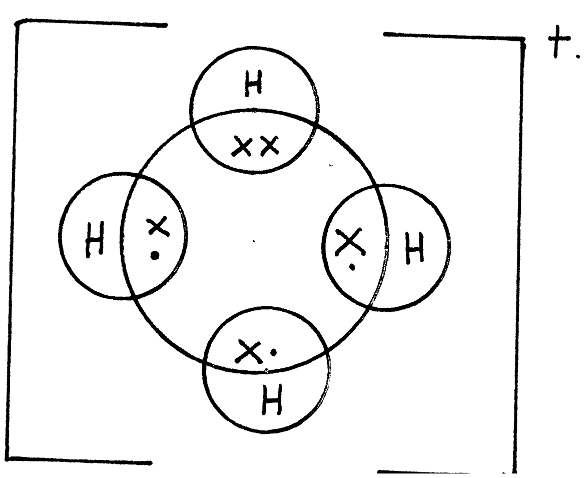
b) A substitute of glass since its transparent



17. (a) (i)

✓ 1



(ii)

✓ 1

b) because of the Ione pair of electrons ✓ 1

18.

a) Copper (II) oxide // Cuo $_{(s)}$ ✓ 1

b) CU (OH) 2 $\xrightarrow{\text{Heat}}$ CUO $_{(s)}$ + $H_2O_{(l)}$

19. - Distilled water is added to the mixture, potassium Chloride dissolves ✓ 1 and lead (ii) chloride does not✓ 1

- Filter to obtain potassium chloride as a filtrate and lead (ii) chloride as a residue✓ ½
- Dry the residue to obtain dry ✓ 1 lead (ii) Chloride
- Evaporate the filtrate using an evaporation dish to obtain solid potassium chloride✓ 1

20. (i)

Element	C		H
%	92.31		7.69
R.A.M.	12		1
Moles	$\frac{92.31}{12}$		$\frac{7.69}{1}$ ✓ 1
RATIO	7.6 g	:	7.6 g✓ 1

E.F. CH ✓ ½

(CH) = 78

13 n = 78✓ ½

n = 6

MF = $(CH)_6$

= C_6H_6 ✓ ½

(ii) $H - C = C - CH_2 - CH_2 - CH_2 - CH_3$✓ ½

21 $PCl_{5\,(s)}$Hydrolyses✓ 1 in air to form hydrogen chloride fumes✓ 1

$PCl_{5\,(s)} + 4\,H_2O_{(i)} \longrightarrow H_3PO_4\,(aq) + 5\,Hcl_{(g)}$

22. a) By thermal decomposition of calcium carbonate//

$Ca\,Co3_{(s)} \xrightarrow{Heat} CaO_{(s)} + CO2_{(g)}$

Or burning Coke/carbon in excess air or oxygen// $C_{(s)} + O_{2(g)}\ \ CO_{2\,(g)}$

b) By electrolysis ✓ 1 of fused or anhydrous saturated / molten calcium chloride, so that calcium is deposited at the cathode

$Ca^{2+} + 2\,e \longrightarrow Ca_{(s)}$ ✓ 1

23. $HCl_{(aq)} + NaOH_{(aq} \longrightarrow + Nacl_{(aq)} + H_2O_{(l)}$

$100\,cm^3 \longrightarrow 0.5$ moles HCl

$30\,cm^3 \quad \frac{30 \times 0.5}{1000}$

$= 0.015$ moles Hcl✓ 1

Mole Ratio 1:1

No. of moles of NaoH reaching = 0.015✓ 1

$25\,cm^3 \longrightarrow 0.015$ moles NaOH

$1000cm^3 \longrightarrow \frac{1000 \times 0.015}{25}$✓ 1

$= 0.6m$

R.F.M. of NaoH = 40

Mass in Il = 0.6

40 = 0.6✓ 1

concentration = 24 g/l✓ 1

(correct units included

24. (a) Q^{3+} 2.8 ✓ ½

S^{-} 2.88✓ ½

(b) P has a higher M.P. than u ✓ ½

P has stronger metallic bonds than u ✓ ½

P has stronger nuclear charge than U

(c) Element O ✓

Has the smallest atomic radius// most electronegative

25 a) The rate of diffusion of a fixed mass of gas is inversely proportional to the square root of its density, at the same conditions of temperature and pressure ✓ 1

b) $\frac{Rx}{Ry} = \sqrt{\frac{My}{Mx}}$

$\frac{2}{1} = \sqrt{\frac{16}{Mx}}$

$4 = \frac{16}{Mx}$

$Mx = 4$

26. a) A $2CO_{(g)} + O_{2(g)} \longrightarrow 2CO_{2(g)}$ ✓ ½

B $CO_{2(g)} + C_{(s)} \longrightarrow 2CO_{(g)}$ ✓ ½

26. Poisonous carbon (ii) oxide✓ 1 is produced in absence of enough air

27. The mixture turns orange✓ 1

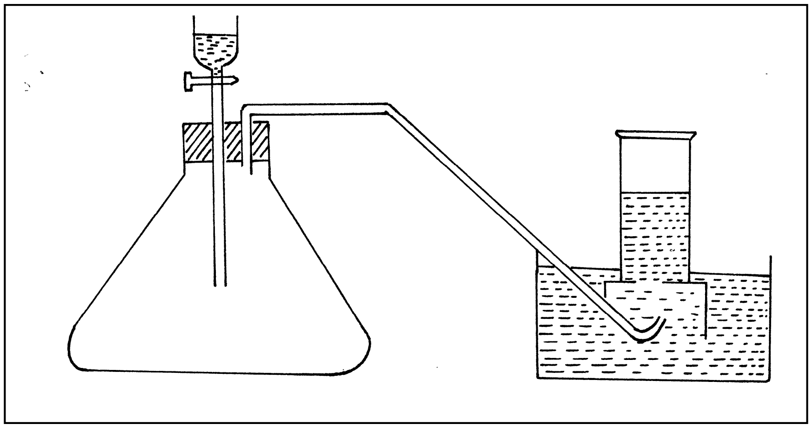
The hydroxide ions from NaoH aq✓ 1

React with the H+ ions, thereby ✓ 1

Reducing the concentration of H+ ions✓ 1

Hence the equilibrium shifts to the left

28.



b) Sodium Peroxide // Na2 O2✓ 1

29. has white hot glowing carbon particles✓ 1