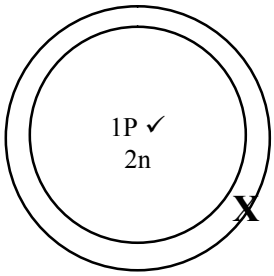
MARKING SCHEME
SAMPLE PAPER 5
233/1

1.



Nuclear composition = ✓ (2 mks)

One Electron = ✓ (2 mks)

2. (a) The purer sample will have sharp / constant melting and boiling point.✓ (1mks)

(b) Melting point will be lowered. .✓ (1mks)

3. (a) Heat.✓

(b) $Cu_{(s)} + N_2O \longrightarrow CuO_{(S)} + N_{2\,(g)}$.✓ (1mk)

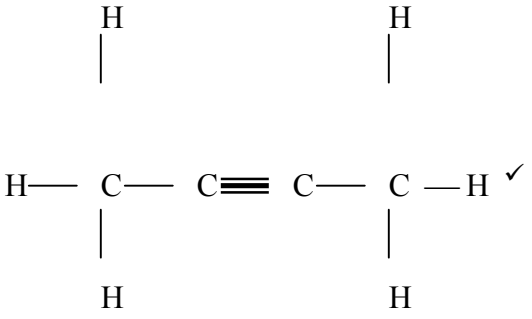
(c) – Manufacture of ammonia.✓
- Manufacture of light bulbs
- As a refrigerant (1mk)

4. Mass of carbon in graphite=2.9053-2.804
=0.1013g.✓
12g of carbon =6.0×10^{23} atoms
0.1013_g of carbon = $\frac{6.0\times10^{23} \times 0.1013}{12}$.✓
=5.065×10^{25} atoms.✓ (3mks)

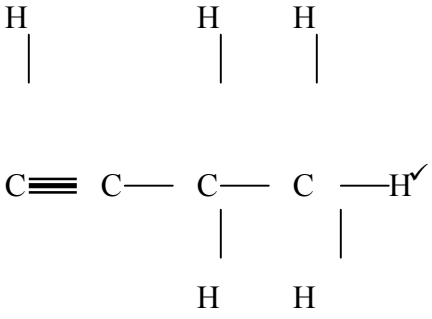
5. (a) Alkyne .✓

(b) (1mk)

(2 mks)



but – 2 – yne ✓



but – 1 – yne ✓

(1mk)

6. (a) Na_2SO_3 .✓ 1mk)
   (b) Reducing.✓ (1mk)
   (c) Sodium chloride /Nacl .✓

7. (a) Fractional distillation of liquid air .✓
   (1mk)
   (b) (i) lead (II) oxide / copper (II) oxide .✓

(1m
k

(ii) $Mg_3N_{2(s)} + 6H_2O_{(l)} \longrightarrow 3Mg(OH)_{2(aq)} + 2NH_{3(g)}$
(1mk)

8. Solubility at 30^0 c = 24g/100g of water
   Solubility at 70^0 c = 19g/100g of water
   Therefore mass of crystals = 24-19 ✓
   (2mks)
   =5g✓
This is because at 70^0c 19g of solute✓ saturates the solution while at 30^0c the solution✓ is saturated with 24g of solute.

9. Blue litmus paper turn to Red ✓ then it is bleached red colour is due to hydrochloric✓ acid while bleaching in due to hypochloric (I) acid ✓
(2mk)

10. (a) $2HCl_{(aq)} + Zn_{(s)} \longrightarrow ZnCl_{(aq)} + H_{2(g)}$ ✓
    $Zn_{(s)} + CuSo_{4(aq)} \longrightarrow ZnSo_{4(aq)} + Cu_{(s)}$

(1m
k)
   (b) Black✓ copper (II) oxide (solid) turns to red ✓–brown deposit of copper. Hydrogen reduces✓
   copper (II) oxide to copper✓

(2
mks)
11. (a) Bulb light in setup I and not in set up II Aluminium has delocalized electrons which conduct electricity while diamond does not

(2
mks)
   (b) - Making of drill- bits.
   - In jewellery
12.(a) A state when the backward and forward reactions are going on at the same rate

(1
mk)
   (b) Magnesium reacts with steam producing magnesium oxide ✓ which cannot react with hydrogen Equilibrium shifts to the left as backward✓ Reaction is favoured
(2mks)

13. (a) Burning wooden sprint burns with a pop- sound✓

(b) Hydrogen is less dense than air✓ (2mks)

14. Mole of acid $= \frac{25x0.1}{1000} = 0.0025$ mols ✓

Moles of $H_2 S O_4 : Na_2 CO_3 = 1:1$ ✓

Therefore Mole of $Na_2 CO_3$ used = 0.0025mols ✓

Mole of $Na_2 CO_3$ in $1000cm^3 = \frac{1.06x1000}{250} = 4.24g$ ✓

Molarity $Na_2 CO_3 = \frac{4.24}{106} = 0.04m$ ✓

Volume of $Na_2 CO_3$ used = $M_a V_a = M_b V_b$

$Vb = \frac{M_a V_a}{M_b}$

$= \frac{0.1x25}{0.04}$ ✓

$= 62.5cm^3$ ✓

15. Carbon (II) oxide is toxic/ poisonous hence can cause death when inhaled. ✓
Carbon (IV) oxide is a green house gas which can lead to global warning✓ (2mk)

16. (a) $2A_{(s)} + 2H_2 O_{(l)} \longrightarrow 2 AOH_{(aq)} + H_{2(g)}$ ✓ (1mk)

(b) Add water✓ to the mixture E sulphate dissolves while lead (II) sulphate does not. Filter✓ to remove lead (II) sulphate and sulphate of E as Filtrate Dry✓ lead (II) sulphate in the sun /between filter paper / by heating. Heat the filtrate to saturation point and cool for the crystals to form. (2mk)

17. (a) Water dissolves✓ the hydrogen carbonate H^+ ✓ions produced decompose✓ the hydrogen carbonate releasing carbon (IV) oxide✓ which raises the dough (2mk)

(b) $HX_{(aq)} + BHCO_{3(aq)} \longrightarrow BX_{(aq)} + H_2O_{(L)} + CO_{2(g)}$ (1mk)

18. Digest the powdered ore with dilute HNO_3 (aq). Filter. Add $NaOH_{(aq)}$ to the filtrate. A red – brown ppt confirms presence of from iron / OR
Digest the powdered ore with dilute hydrochloric acid or sulphuric acid; ✓ filter; add $NaOH_{(aq)}$ to the filtrate. Dirty green precipitate confirms the presence of iron (2mks)

19. (a) Sketch is below ✓;starts at origin✓ and levels off at the maximum ✓level. (2mks)

(b)- Catalysts lower activation energy✓ OR (2mks)

- Provide surface area which reactants reacts✓ as they form intermediate products the catalyst is released to be reused.

20. (a)- Simple covalent ✓
- Vander Waal's forces ✓ (1mk)

(b) It has weak Vander Waals forces holding the molecules together the forces require less energy to be broken ✓ (1mk)

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21. Ratio of trona: sodium carbonate=2:3

Mass of trona: carbonate

$Na_2CO_3.NaHCO_3.2H_2O : Na_2CO_3$

=226X2:106X3

=452:318

(2mks)

Therefore 3tonnes of $N_{a2}CO_3$ will produced by

$$\frac{452}{318} \times 3 = 4.264 \text{ tonnes}$$

(1mk)

22(a) (i) I $\quad {}^{4}_{2}He$ / alpha particle✓

(1mk)

(ii) $II^{0}_{-1}e$ / beta particle ✓

(1mk)

(b) ${}^{210}_{84}P_0 \longrightarrow {}^{206}_{82}Pb + {}^{4}_{2}He$ ✓

(1mk)

(c) - Genetic mutation in living tissues causing cancers
- Heat generated can cause fire leading to mass destruction

(1mk)

23.

Bond broken	bond formed
C – H = +413	C- CL =-326
CL- CL =+243	H – CL = -431
+656KJ	-757

Overall energy = +656 - 757✓

=-101kj/mol✓

(3mks)

24. (a) $2NaNO_3 \longrightarrow 2NaNO_{2(S)} + O_{2(g)}$ ✓

(1mk)

(b) It is insoluble in water: it does not react with water

(1mk)

(c) No effect on the litmus ✓paper because the gas produced is neutral

(1mk)

25. (i) and (ii) ✓

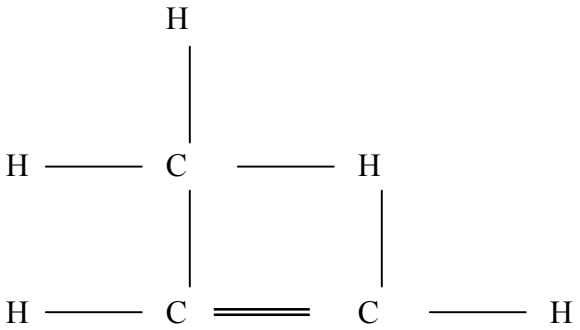
LO is reduced by CO to L as CO is oxidized to CO_2
Li is oxidized to Li^+ as F is reduced to F^-
(3mks)

26. (a) $C_2H_{4(g)} + 3O_{2(g)} \longrightarrow 2O_{2(g)} + 2H_2O_{(g)}$
(1mk)

(b) 1 volume of C_2H_4 used 3 vol of oxygen
Therefore $15cm^3$ require $15x2cm^3 = 45cm^3$ of O_2
$15Cm_3$ of C_2H_4 produce $15X2 = 30CM^3$ of CO_2 (g) ✓
$15Cm^3$ of C_2H_4 produce $15X2 = 30CM^3$ of H_2O(g) ✓
The gaseous mixture contains
$5cm^3$ of oxygen✓
$30cm^3$ of co_2
$30cm^3$ of H_2O(g)
$65cm^3$✓
(2mks)

27. (a) SO^{2-}_4✓
Cl^-✓ (3 mks)
(b) Brewery ✓
(c) Soapy detergent has carboxylate lead (-coo-)✓
While soapless detergent has sulphonate($-SO_3^{2-}$)✓

28.

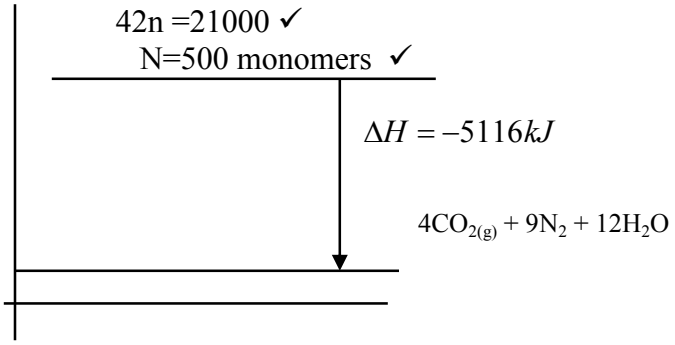


(2 mks)

b) RMM of monomer $CH_3-CH=CH_2$

$\left(CH_3-CH=CH_2\right)_n$ $=12X3 + 1 x6 = 42$ ✓

29.



30. n + -2 x 2 =0✓

n - 4 =0 n=+4

Oxidation of Pb =+4 ✓

Cation present = Pb^{4+}✓