1.

```
      H     H     H     H     H                              H
      |     |     |     |     |                              |
      |     |     |     |     |                 H     HH - C – H
                                                |     |     |         H
                                                |     |     |         |
H —— C —— C —— C —— C —— C —— H          H — C —— C —— C —— C — H
      |     |     |     |     |                 |     |     |     |
      H     H     H     H     H                 H     H     H     H

            Pentane                                 2-methybutane
```

```
                  H
                  |
      H     H —— C —— H
      |           |
H —— C ————————— C —— C —— H
      |           |     |
      H     H —— C—H  H
                  |
                  H
```
2, 2 dimethyl propane

2. a) Atoms of the same element with different mass numbers.

b)
$$RAM = \left(\frac{20\times90.9}{100}\right) + \left(\frac{21\times0.3}{100}\right) + \left(\frac{22\times8.8}{100}\right)$$

= 18.18 + 0.063 + 1.93
= 20.173

3. a) Amphoterism
b) Lead(II) hydroxide and zinc hydroxide (reject aluminium hydroxide)
    -Melts into a silvery ball because of the heat produced during the reaction.
4. i) - Hissing sound produced due to the production of hydrogen gas.
    - Darts on the surface of water because hydrogen produced propels it.
    - Melts into a silvery ball because of the heat produced during the reaction.
    - Floats on the water because its less denser than water (mark any two correct)
ii) $2Na_{(s)} + 2H_2O_{(l)} \rightarrow 2NaOH_{(aq)} + H_{2(g)}$
5. - Contains mineral salts that strengthen body bones.
    - Gives water a taste.

6.
$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$\frac{1.0\times10^3\times0.4}{293} = \frac{1.0\times10^3\times0.1}{T_2}$$

$T_2 = \dfrac{1.0 \times 10^3 \times 0.1 \times 293}{1.0 \times 10^3 \times 0.4}$

= 73.25k

7i)
$$CO_2 \quad H_2O$$

CO_2	H_2O
0.88	0.36
44	18
0.02	0.02
0.02	0.02
0.02	0.02
1	1

Mole ratio $CO_2 : H_2O = 1:1$

E.F = CH_2

$(CH_2)_n = 70$

$14n = 70$

$N = \dfrac{70}{14} = 5$

M.F = $(CH_2)_5 = C_5H_{10}$.

ii)

or
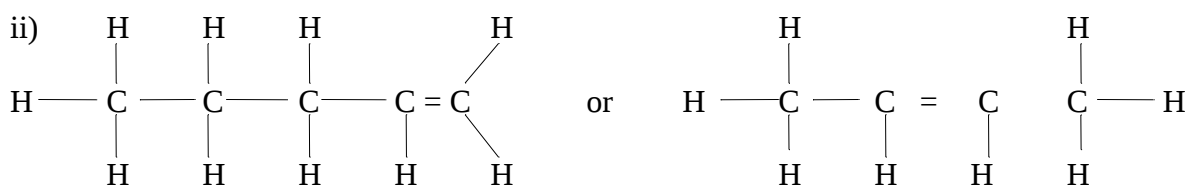
Or
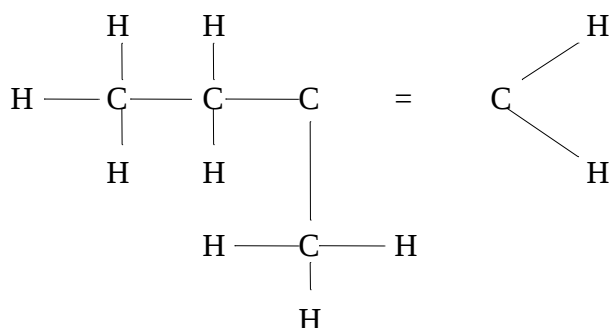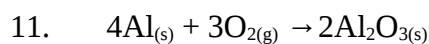

8.i)   (I)   Zinc ions
        (II)   Copper (II) ions

ii) $Cu(NH_3)_4^{2+}$
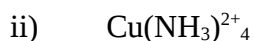
9. i)   Patinum
        Vanadium (v) oxide

ii)   I   Lower yield because equilibrium shift to the left.

       II   More yield because forward reaction is exothermic thus equilibrium shifts to the right.

10. i)   Sodium chlorate (v)
ii)   - Antiseptic for throat and mouth, making weed killers
        - Making heads of safety matches

11. $4Al_{(s)} + 3O_{2(g)} \rightarrow 2Al_2O_{3(s)}$
        Mole ratio 4:3
        No. of moles of Al $= \dfrac{0.28}{27}$

                              $= 0.01$ moles

No. of moles of Al $= \dfrac{0.28}{27}$

$\qquad\qquad\qquad = 0.01$ moles

No. of oxygen $= \dfrac{0.01 \times 3}{4}$

$\qquad\qquad = 0.0075$ moles

Volume of oxygen gas $= 0.0075 \times 24000$

$\qquad\qquad\qquad = 180 cm^3$

12.   - Add excess zinc oxide to dil $HCl/ H_2SO_4/HNO_3$ acid
- Filter the mixture
- Add soluble carbonate (Na_2CO_3, K_2CO_3) to the filterate to precipitate zinc carbonate
- Filter the zinc carbonate and wash it with distilled water.
- Dry the residue between filter papers

13.   E is a stronger acid than D. Thus E has more hydrogen ions that react with magnesium liberating more hydrogen gas.

14.   Molar heat of vaporation $= -133 + 188$ kJ/mol

$\qquad\qquad\qquad\qquad = +55$ kJ/mol

15.   I – hydrogen gas.

II $4OH^-_{(aq)} \rightarrow 2H_2O_{(L)} + O_{2(g)} + 4e^-$

III Concentration of the magnesium sulphate increases because more water is used to produce hydrogen and oxygen gas than the water formed at the anode.

16.i)   Time taken by the given mass of radioactive miclide to be reduced to half the original mass.

ii)   No. of $t^{1/2} = \dfrac{15.6}{5.2}$

$\qquad\qquad = 3$

$\qquad\qquad t^{1/2} \qquad t^{1/2} \qquad t^{1/2}$

$100g \;\rightarrow\; 50g \rightarrow 25g \rightarrow 12.5g$

$X = 100g$

17.a)   R – covalent bonds

S – vander waals forces

b) i

ii)
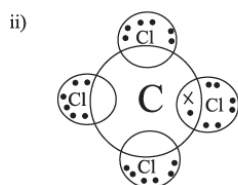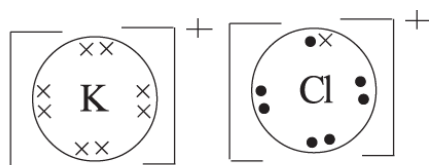
18.i)   Mass of solute $= 28.4 - 24.2$

$\qquad\qquad\qquad = 4.2$

Mass of water $\qquad = 40.4 - 28.4$

$\qquad\qquad\qquad = 12$

Solubility $\qquad\quad = \dfrac{4.2 \times 100}{12}$

$\qquad\qquad\qquad = 35g/100gm$

ii)   Ensure that no solid is lost during evaporation

19. i) Acids, salts, high temperatures.
ii) Electroplating
   -Oiling/ greasing
   - Painting
   - Sacryicial protection
20. i) Sacrificial protection/ cracking
   Catalytic cracking
ii) Silicon (IV) oxide or Aluminium oxide
iii) Decolourises bromine water
   Decolourises acidified potassium manganate (VII) solution
                      Or
   Burns with a soofy flame
21. Yellow colour intensifies
   Conc. H_2SO_4 is a dehydrating agent hence removes water from the sytem making the equilibrium to shift to the left.
22. i) L and M both solutions contains hydrogen ions which react with calcium metal
ii) M.
23. i) Lower the m.p of aluminium oxide
             Or
Improves the conductivity of aluminium oxide
ii) Good conductor of electricity
   - Doesn't corrode easily
   - Light/ low density
   - Ductile
24. i) R has the highest negative electrode potential
ii) $R^{2+}_{(aq)} + 2e \rightarrow R_{(s)}$
   $S^{2+}_{(aq)} + 2e \rightarrow S_{(s)}$
   Both half cells must be mentioned to score.
iii) $E\theta$ = E reduced – E oxidized
   = + 0.80 - -2.37
   = 3.17 volts
25. - Storage of semen for A.I
   - Used in light bulbs
26. - Temperature increases
   - Light green solution formed
   - Brown solid formed.
27. i) Changes anhydrous cobalt (II) chloride from blue to pink or changes anhydrous copper (II) sulphate from white to blue.
ii) Boils at 100^0C at 1 atmosphere or sea level.
28. a)i) W and U
ii) Y X and U
29. a) Ink 1 is more soluble or less (b) halogens absorbed
   b) Solubility
   Adsorption
   Halogens absorbed
c)