WATER AND HYDROGEN MARKING SCHEME

1. 1990 Q25 P1

(i) If ignited immediately explosion would occur because it would still be mixed with air (explosion and air tied)

2. 1991 Q3 P1

Colourless droplets/droplets of water on cooler parts of the tube solid melts to orange /a grey residue/silvery beads or bells are formed

3. 1991 Q11 P1

HCL in water dissolves H^+ ions in solution reacts with zinc to evolve H_2.No ions are formed when HCL is in menthyl/benzene/HCL remains in molecular form

4. 1995 Q18 P1

a) $2HCl\ (aq) + Zncl_2 \square\ (aq) + H_2\ (g)$ ($^{-1}/_2$) states)

b) $2H_2\ (g) + O_2\ (g \longrightarrow 2H_2O\ (g)$ (Not L) ($^{-1}/_2$ state)

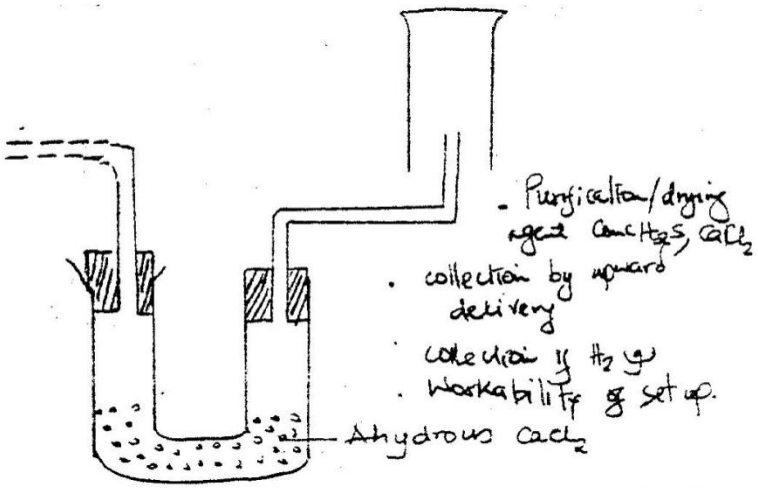
5. 2002 Q22 P1

a) Manganese (IV) oxide (1)

b) -Welding (l)
- Fuel in rockets
- Breathing aid / hospitals
- Steel making (3 marks)

6. 2003 Q6 P2

a)



b) $2H_2\ (g) + O_2\ (g) \longrightarrow 2H_2O(g)$

(c) (i) $Zn(s) + H_2SO_4(aq) \longrightarrow ZnsO_4(aq) + H_2(g)$

$\frac{1.2}{24} = 0.05$

Moles of Zn = 0.05

0.05 moles of zn = 0.05 moles

R.A. M $\frac{3.27}{0.05}$ = 65.4 (N0 units)

d) - Manufacture of ammonia
- Extraction of tungstein
- Synthesis of HCL (acid) or HCL (gas)
- Filling weather balloons
- Making oxy-hydrogen flame for welding
- Hardening of oil/manufacture of margarine.

7. 2005 Q3 P1

(a) Carbon dioxide gas

(b) Temporary hard water dissolves hydrogen carbon salts which decomposes on heating to produce carbon dioxide

$$Ca(HCO_3)_2\ (aq) \xrightarrow{Heat} CaCO_3(s) + H_2O(l) + CO_2(g)$$

8. 2006 Q19 P1

a) To MgO and excess HCl or H_2SO_4. Add NaOH or KOH to the mixture. Filter and dry the residue. (2 marks)

b) Anti-acid (treatment of acid indigestion) (1 mark)

9. 2007 Q25a P1

(a) No change in volume since the number of moles of acid is equal in both cases.

10. 2009 5c P2

(i) Hydrogen burns to produce steam which is a non pollutant/ does not cause pollution to the environment

- Hydrogen has a high energy content hence very small amount produce a lot of heat energy

- Hydrogen is renewable hence cannot be exhausted/ used completed.

(ii) It can easily explore when burning/ highly flammable unlike fossils fuels expensive.

11. 2011 Q9 P1

- It is expensive
- It is explosive (deny not dangerous/ harmful/ not easily available.
- It is difficult to store

12. 2011 Q12 P1

- Small piece of sodium metal (pea size) with a lot of water
- perform the experiment wearing goggles
- Electrolysis
- Manufacture of papers (soften)
- Manufacture of soaps and detergents
- Fractional distillation of liquid air
- Extraction of Aluminium metal
- Manufacture of bleaching agents e.g NaOCl

- Making herbicides on weed killers
- It is boiled with textile industry to soften

13. 2012 Q3, 19 P1

- Grey solid is deposited PbO has been reduced to lead metal
- A vapour condenses on the cooler sides of the tube – the hydrogen has been oxidised to water

  Or

  $H_{2\ (g)} + PbO_{(s)} \longrightarrow Pb_{(s)} + H_2O_{(l)}$

14. 2012 Q19 P1

Level of water glass tube goes down / bubbles in the beaker

$H_{2(g)}$ gas <u>being less dense</u> than air d<u>iffusing</u> than air into the porous pot