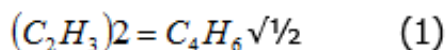


$27n = 54$

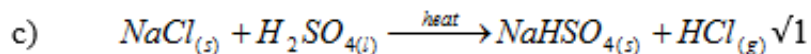
$n = \frac{54}{27}$

$n = 2 \checkmark 1/2$

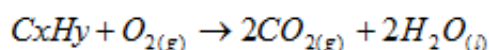


10. a) Sodium chloride/NaCl/KCl ✓1 (1) accept any chloride.

b) Bubbling HCl gas through a delivery tube to the water as water will suck backs/lack of a funnel to prevent suck back. ✓1(1) or Use of a conical flask that doesn't require heat/ did not use round bottomed flask to spread heat.



11. a) Gay Lussac's Law states that when gases react they do so in volumes that bear a simple whole number ratio to one another and to the products if gaseous. ✓1



$$10cm^3 : 30cm^3 : 20cm^3$$

Simplest ratio 1 : 3 : 2 ✓1

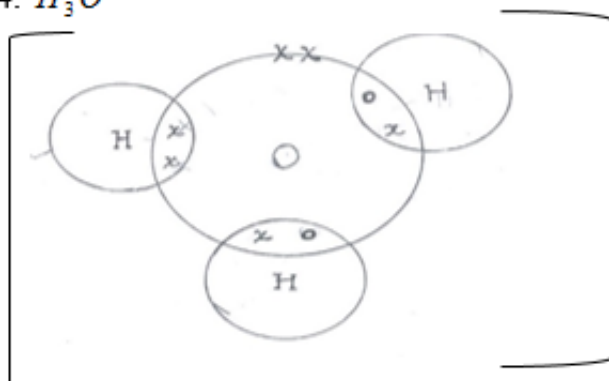
2 moles  $CO_2$  contain 2 moles carbon

$$Cx = C, / x = 2 \checkmark 1$$

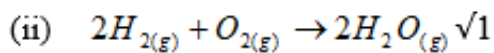
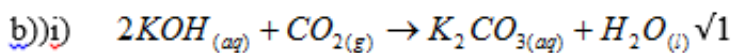
13. a) 8 ✓1

b) Group VI ✓1 Period 2 ✓

14. 4.  $H_3O^+$



15. a) No white precipitate. ✓1

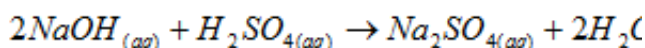


- 16.

$$NaOH = 23 + 16 + 1 = 40$$

$$\text{Molarity } NaOH = \frac{4}{40} = 0.1M \checkmark \frac{1}{2}$$

$$\text{Moles } NaOH = 0.1 \times \frac{20}{1000} = 0.002 \text{ moles } \checkmark \frac{1}{2}$$



$$\text{Moles } H_2SO_4 = 0.002 \times \frac{1}{2} = 0.001 \text{ moles}$$

$$\begin{aligned} \text{Molarity } H_2SO_4 &= \frac{0.001}{8} \times 1000 \checkmark \frac{1}{2} \\ &= 0.125M \checkmark \frac{1}{2} \end{aligned}$$

17. a) Concentrated nitric acid.  $\checkmark 1$

b) Prepare the gas in open air/fume.  $\checkmark 1$  chamber because the gas has a pungent choking smell and is poisonous (  $\frac{1}{2}$  mark).

18. . a) Coke as an alternative source of Carbon (IV) Oxide.  $\checkmark 1$

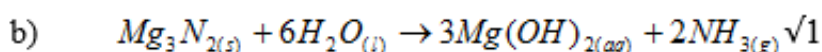
b) To cool the machines  $\checkmark 1$ /slaking CaO to Ca(OH)<sub>2</sub>

c) To react and produce ammoniacal brine.  $\checkmark 1$

19. . a) Purple acidified  $KMnO_4$  remains purple with  $C_2H_6$   $\checkmark 1$ . Purple acidified  $KMnO_4$  decolourised by

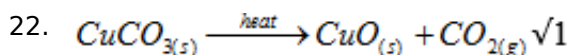
$C_2H_4$  / turns to colourless.  $\checkmark 1$

20. . a)  $Mg_3N_2$   $\checkmark 1$  magnesium nitride.  $\checkmark 1$



21. . a) Is the energy required to remove one electron from the outermost energy level of an atom in gaseous state.  $\checkmark 1$

b) S,  $\checkmark 1$  has the smallest atomic size, highest nuclear attraction to outermost electrons and does not easily lose an electron as it requires more energy.  $\checkmark 1$



$$CuCO_3 = 64 + 12 + (16 \times 3) = 124$$

$$\text{Moles } CO_2 = \frac{300}{22400} = 0.0134 \text{ moles } \checkmark \frac{1}{2}$$

$$\text{Moles } CuCO_3 = 0.0134 \times \frac{1}{1} = 0.0134 \text{ moles}$$

$$83\% = 0.0134 \text{ moles}$$

$$\therefore 100\% = \frac{100 \times 0.0134}{83} \sqrt{1/2}$$

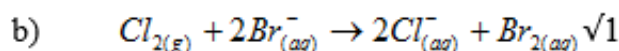
$$= 0.0161 \text{ moles}$$

$$1 \text{ mole } \text{CuCO}_3 = 124 \text{ g}$$

$$0.0161 \text{ moles } \text{CuCO}_3 = \frac{0.0161 \times 124}{1}$$

$$= 1.9964 \text{ g } \text{CuCO}_3 \sqrt{1/2}$$

23. a) Solution turns from colourless to brown.√1 because chlorine displaces bromide from solution forming bromine.√1 Reject displace bromine.



24. a) Manganese (IV) Oxide.√1/2 speeds up the decomposition of Hydrogen peroxide to produce oxygen √1/2. Reject catalyst

b) First bubbles are mixed with air/impure.√1

c) It is slightly soluble in water.√1

25. a)  $2\text{H}_2\text{S}_{(\text{g})} + \text{SO}_{2(\text{g})} \rightarrow 2\text{H}_2\text{O}_{(\text{l})} + 3\text{S}_{(\text{s})} \sqrt{1}$

b)  $\text{SO}_2$  √1 because the oxidation number of Sulphur in  $\text{SO}_2$  has reduced from +4 to 0.√1 (3)

26. 2 electrons.√1

27. A suspension is a mixture formed when an insoluble solid is mixed with a liquid.√1 A precipitate is a solid substance formed when two fluids are mixed.√1

$$28. \quad 39.5 \left( \frac{38 \times 0.01}{100} \right) + \left( \frac{39 \times (99.99 - x)}{100} \right) + \left( \frac{40 \times x}{100} \right)$$

$$39.5 = \frac{0.38}{100} + \left( \frac{3899.61 - 39x}{100} \right) + \frac{40x}{100}$$

$$39.5 = \frac{3899.99 - 39x + 40x}{100}$$

$$39.5 \times 100 = 3899.99 - x$$

$$3950 = 3899.99 - x$$

$$3950 - 3899.99 = -x$$

$$-x = -50.01$$

$$x = 50.01\% \sqrt{1}$$

$$V - 40 = 50.01$$

$$V - 39 = 49.98 \sqrt{1}$$

29. a) Inflammable/catches fire easily.√1  
b) Toxic/poisonous/fatal.√1
30. a) Solid √½, melting point above room temperature(250C/298K)√½ (1)  
b) Has an impurity.√1