SULPHUR AND ITS COMPOUNDS

MARKING SCHEME

1. Barium carbonate reacts with dilute sulphuric (VI) acid to form the insoluble Barium sulphate ($BaSO_4$) which covers the reactant Barium carbonate preventing any contact between the acid and the carbonate salt. ✓ 1
Hence, the reaction is slow and stops after a very short time.

$$BaCO_{3(s)} + H_2SO_{4(aq)} \longrightarrow BaSO_{4(s)} + CO_{2(g)} + H_2O_{(l)}$$

Insoluble

2. The dye is oxidized to a new product with chlorine (1mk) but oxygen is removed to form an unstable product which gradually gets re-oxidized by atmospheric oxygen on exposure for sometime to air (1mk) in the case of Sulphur (IV) oxide.

3. (a) Dehydrating agent (1mk)

(b) Oxidizing agent (1mk)

4. 1 – Compressed hot air, in

2 – Molten froth of Sulphur water mixture, out

3 – Superheated water – in

5. a) i) Dehydration (½)

ii) Oxidation (½)

b) $Cu_{(s)} + 2H_2SO_{4(l)} \longrightarrow CuSo_{4(aq)} + SO_{2(g)} + 2H_2O_{(l)}$ (1)

6. (a) Mass of acid = $\frac{75}{100} \times 1.84 \times 1000$ = 1380g in $1000cm^3$

Morality = $\frac{1380}{98}$ = 14 .08m ✔ ½

(b)Moles of dilute acid = 0.25 x 1 = 0.25x 1 ✔ ½ = 0.25 moles.
✔ ½

Volume = $\frac{0.25}{14.08} \times 1000$ ½ = 17. 756cm^3 ½

Penalize ½ for wrong units

7. It reacts with ammonia ✔ ½ gas to form ammonium sulphate. ✔ ½

(b) Quick time / Ca O ✔

8. (a) To avoid poisoning the catalyst ✔ 1

(b) $SO_3(g) + H_2SO_4(l) \longrightarrow H_2S_2O_7(l)$ ✔1

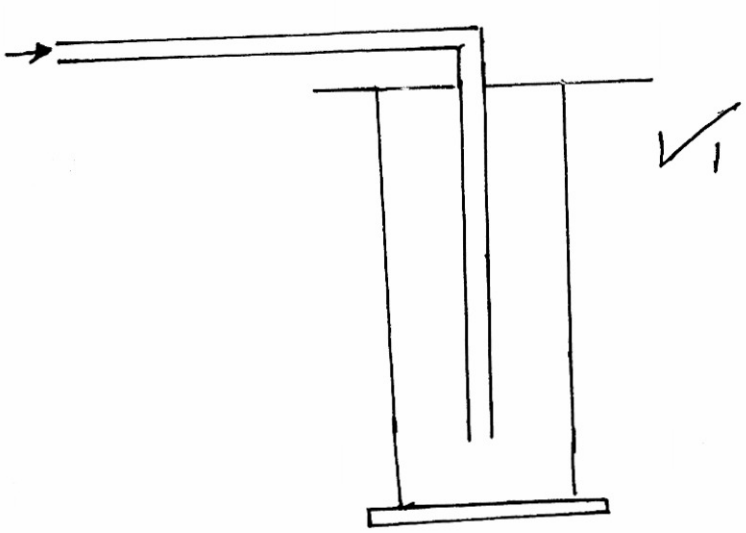
(c) Vanadium (v) Oxide V_2O_5 ✔1

9.	a) $3H_2S_{(g)} + H_2SO_{4(l)} \quad 4H_2O_{(l)} + 4S_{(s)}$ ✓ b) H_2S ✓ ½reducing agent ; Sulphur in H_2S oxidized from -2 to 0 (zero c) $Pb(C_2H_3O_2)_{2(aq)} + H^2S_{(g)} \longrightarrow PbS_{(s)} + 2C^2H_4O_{2(aq)}$

9. a) Hydrogen chloride✓1

Sulphur (IV) oxide✓1

b)



25. a) Frasch process✓1

b) Hot compressed air✓1

c) Monoclinic / prismatic sulphur / beta sulphur✓½

Rhombic / octahedral sulphur / alpha sulphur✓½