OCR (B) Chemistry A-Level

PAG 09: Rates of Reaction, Continuous Monitoring Method

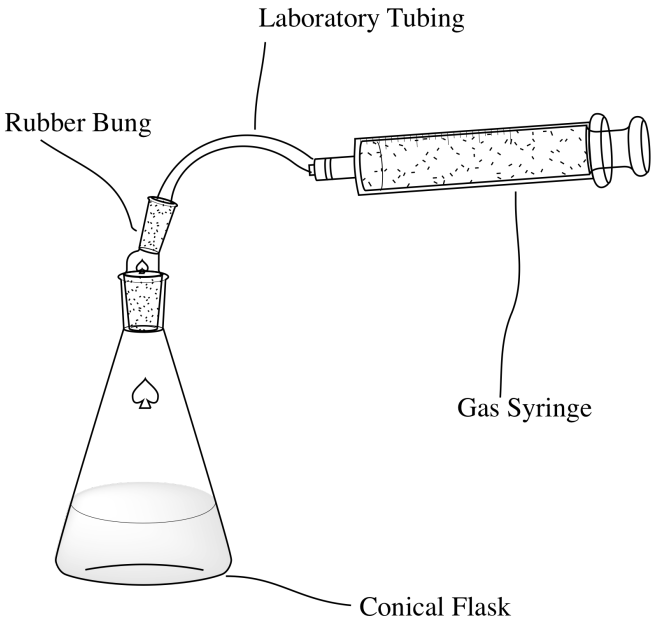
9.1 Rate of decomposition of hydrogen peroxide

Equipment

- Laboratory tubing
- Rubber bung with a hole through it
- Conical flask
- Gas syringe
- Spreadsheet software such as google sheets or excel
- Timer/Stopwatch

Method

1. Set up the equipment as shown in the diagram, with the syringe all the way in and the bung disconnected from the flask.



2. Add 0.05 g of MnO_2 and 20 cm^3 of H_2O_2 to the conical flask, then put the bung quickly in the flask and start the timer.
3. Record the volume of gas collected in the syringe every 20 seconds for 5 minutes.

Calculations

- Use the spreadsheet software to set up a table like the one below.

Time /s	V (O_2) collected /cm^3	[H_2O_2] /mol dm^{-3}

- Use [H_2O_2] = $\frac{(40-V)}{240}$ to work out the fourth column.
- Use the spreadsheet software to plot the graph of [H_2O_2] against time.
- Use the graph to find two values for the half life.

Errors

- Some gas may have escaped before putting the bung on.
  Place the MnO_2 upright in a sample tube in the conical flask, put the bung on, then shake the flask with the tube to mix the reactants.
- Not all MnO_2 transferred to conical flask
  Use the weighing by difference technique.

Risk Assessment

Hazard	**Risk**	**Control**
Manganese(IV) Oxide	Harmful if swallowed or inhaled.	Wear gloves and eye protection during the experiment.