Oxford Cambridge and RSA

# A level Chemistry A

**H432/01** Periodic table, elements and physical chemistry

## Question Set 4

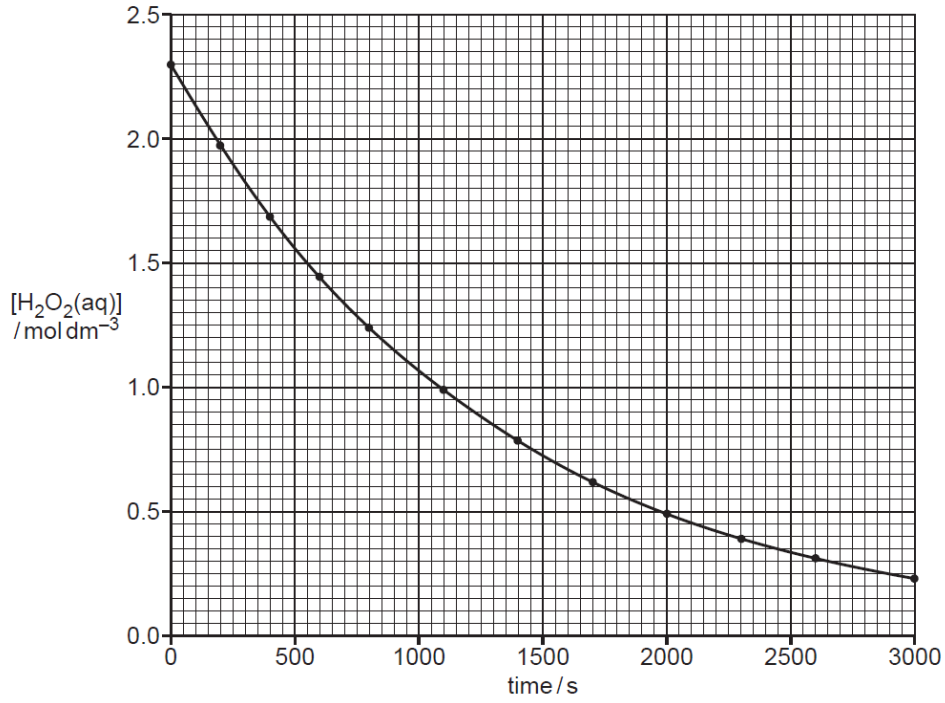
**4. (a)** Aqueous solutions of hydrogen peroxide, $H_2O_2(aq)$, decompose as in the equation below.

$2H_2O_2(aq) \longrightarrow 2H_2O(l) + O_2(g)$

A student investigates the decomposition of $H_2O_2(aq)$ by measuring the volume of oxygen gasproduced over time. All gas volumes are measured at room temperature and pressure.

The student uses 25.0 $cm^3$ of 2.30 mol $dm^{-3}$ $H_2O_2$.

From the results, the student determines the concentration of $H_2O_2(aq)$ at each time. The studentthen plots a concentration–time graph.




Determine the total volume of oxygen, measured at room temperature and pressure, that thestudent should be prepared to collect in this investigation.

Suggest apparatus that would allow this gas volume to be collected, indicating clearly thescale of working.

**[3]**

**(b)** Suggest a different experimental method that would allow the rate of this reaction to befollowed over time.

**[1]**

**(c)*** Determine the initial rate of reaction, the order with respect to $H_2O_2$, and the rate constant.

Your answer must show full working on the graph and on the lines below. **[6]**

## Total Marks for Question Set 4: 10