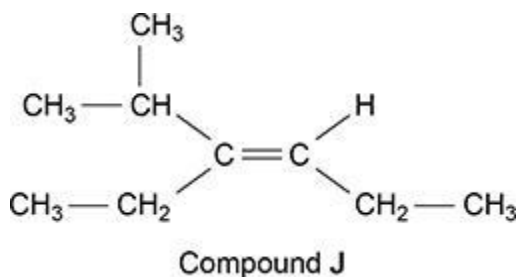


Max. Marks : 25 Marks

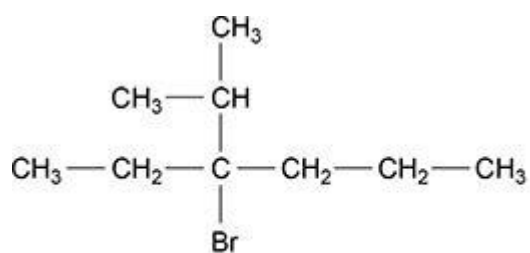
Time : 25 Minutes

(a) Compound **J** is one of a pair of stereoisomers.

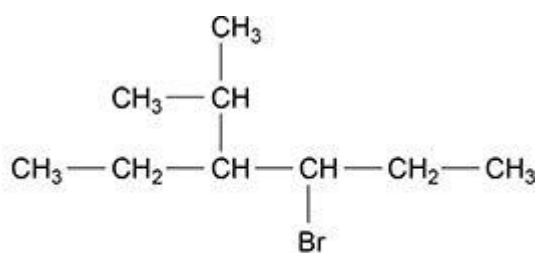
This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

(6)

- (b) Compound **J** reacts with hydrogen bromide to form compounds **K** and **L**.



Compound **K**



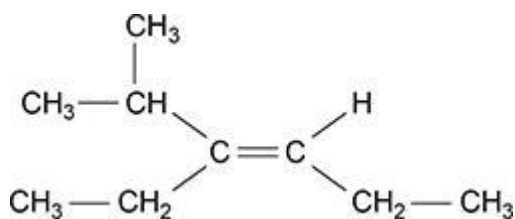
Compound **L**

K is the major product.

Name and outline the mechanism for the formation of **K**.

Name of mechanism _____

Outline of mechanism



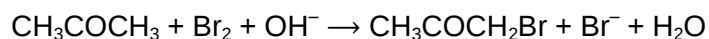
(5)

- (c) Explain why compound **K** is the major product in the reaction in part (b).

(3)
(Total 14 marks)

Q2.

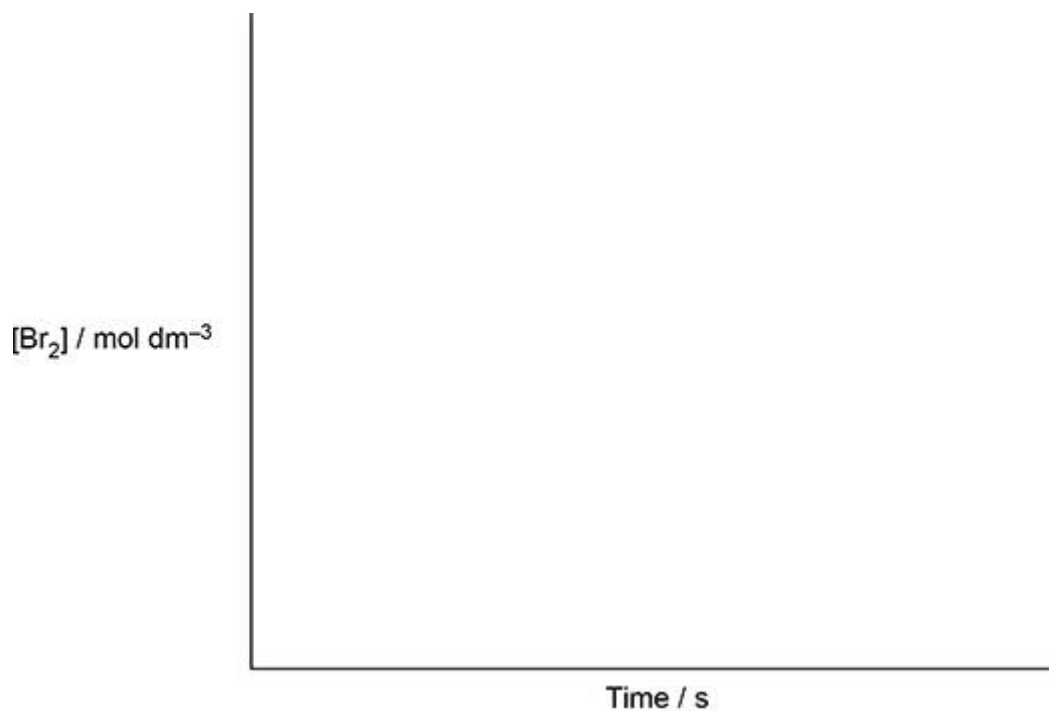
Propanone reacts with bromine in alkaline conditions.



The rate equation for this reaction is

$$\text{Rate} = k [\text{CH}_3\text{COCH}_3] [\text{OH}^-]$$

- (a) Sketch a graph on the axes provided to show how, at constant temperature, the concentration of bromine changes during this reaction.



(1)

- (b) The table shows the initial rate of this reaction for experiments using different mixtures containing propanone, bromine and hydroxide ions.

Experiment	$[\text{CH}_3\text{COCH}_3]$ $/ \text{mol dm}^{-3}$	$[\text{Br}_2]$ $/ \text{mol dm}^{-3}$	$[\text{OH}^-]$ $/ \text{mol dm}^{-3}$	Initial rate $/ \text{mol dm}^{-3} \text{s}^{-1}$
1	1.50×10^{-2}	2.50×10^{-2}	2.50×10^{-2}	2.75×10^{-11}
2	1.50×10^{-2}	2.50×10^{-2}		8.25×10^{-11}
3	3.75×10^{-3}	5.00×10^{-2}	1.00×10^{-1}	

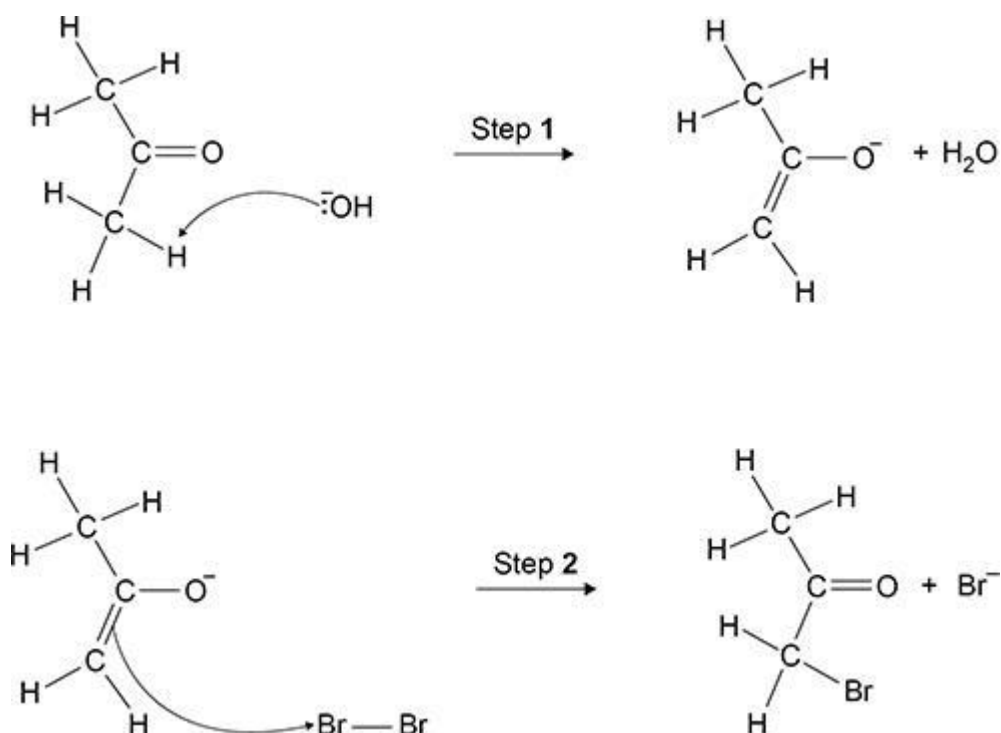
Complete the table above.

Use the data from experiment 1 to calculate the rate constant k for this reaction.

Give the units for the rate constant.

(5)

(c) The figure below shows an incomplete mechanism for this reaction.



Complete the mechanism in the figure by adding four curly arrows and any relevant lone pair(s) of electrons.

(4)

(d) Use evidence from the rate equation to explain why Step 1 is the rate determining step.

(1)

(Total 11 marks)