

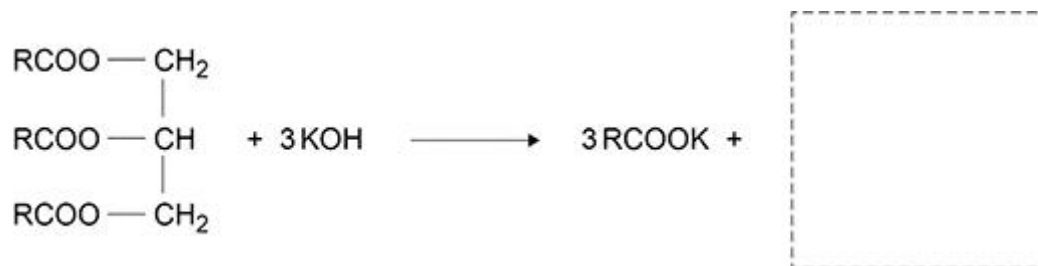
Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Q1.

Coconut oil contains a triester with three identical R groups.
 This triester reacts with potassium hydroxide.



- (a) Complete the equation by drawing the structure of the other product of this reaction in the box.

Name the type of compound shown by the formula RCOOK

Give **one** use for this type of compound.

Type of compound _____

Use _____

(3)

- (b) The triester in coconut oil has a relative molecular mass, $M_r = 638.0$
 In the equation shown at the start of this question, R represents an alkyl group that can be written as $\text{CH}_3(\text{CH}_2)_n$

Deduce the value of n in $\text{CH}_3(\text{CH}_2)_n$
 Show your working.

n _____

(3)

- (c) A 1.450 g sample of coconut oil is heated with 0.421 g of KOH in aqueous ethanol until all of the triester is hydrolysed.
The mixture is cooled.
The remaining KOH is neutralised by exactly 15.65 cm³ of 0.100 mol dm⁻³ HCl

Calculate the percentage by mass of the triester ($M_r = 638.0$) in the coconut oil.

Percentage by mass _____

(6)

- (d) Suggest why aqueous ethanol is a suitable solvent when heating the coconut oil with KOH.

Give a safety precaution used when heating the mixture.
Justify your choice.

Reason _____

Safety precaution _____

Justification _____

(3)

(Total 15 marks)

Q2.

A student does an experiment to determine the percentage by mass of sodium chlorate(I), NaClO, in a sample of bleach solution.

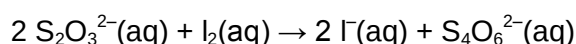
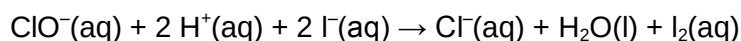
Method:

- Dilute a 10.0 cm^3 sample of bleach solution to 100 cm^3 with distilled water.
- Transfer 25.0 cm^3 of the diluted bleach solution to a conical flask and acidify using sulfuric acid.
- Add excess potassium iodide to the conical flask to form a brown solution containing $\text{I}_2(\text{aq})$.
- Add $0.100 \text{ mol dm}^{-3}$ sodium thiosulfate solution ($\text{Na}_2\text{S}_2\text{O}_3$) to the conical flask from a burette until the brown solution containing $\text{I}_2(\text{aq})$ becomes a colourless solution containing $\text{I}^-(\text{aq})$.

The student uses 33.50 cm^3 of sodium thiosulfate solution.

The density of the original bleach solution is 1.20 g cm^{-3}

The equations for the reactions in this experiment are



- (a) Use all the information given to calculate the percentage by mass of NaClO in the original bleach solution.

Give your answer to 3 significant figures.

Percentage by mass _____

(7)

- (b) The total uncertainty from two readings and an end point error in using a burette is $\pm 0.15 \text{ cm}^3$

What is the total percentage uncertainty in using the burette in this experiment?

Tick (✓) **one** box.

0.45%

☐

0.90%

☐

1.34%



(1)
(Total 8 marks)