

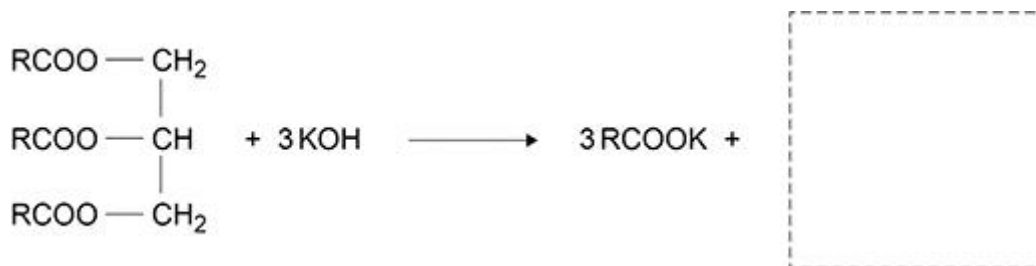
Name of the Student: \_\_\_\_\_

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 cm<sup>3</sup> of 0.100 mol dm<sup>-3</sup> 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.

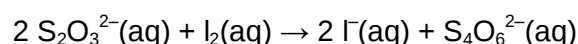
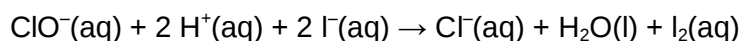
Method:

- Dilute a  $10.0 \text{ cm}^3$  sample of bleach solution to  $100 \text{ cm}^3$  with distilled water.
- Transfer  $25.0 \text{ cm}^3$  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  $33.50 \text{ cm}^3$  of sodium thiosulfate solution.

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

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)