Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

(a) Any **two** from:

Weigh by difference or rinse weighing bottle and add to beaker

Rinse beaker and add washings to graduated flask

Invert flask several times to ensure uniform solution

Use a funnel to transfer to the flask and rinse the funnel

Use a stirrer to prepare the solution and rinse the stirrer

If more than two answers apply the list rule.

Max 2

(b) $K_a = [H^+]^2 / [HA]$

Allow any correct expression relating K_a, $[H^+]$ and [HA]

1

$[HA] = (10^{-2.50})^2 / 1.07 \times 10^{-3}$

M2 also scores M1

1

$= 9.35 \times 10^{-3}$ (mol dm^{-3})

Do not allow 9.4 (answer is 9.346).
Correct answer only scores 1 mark.
Do not penalise precision but must be to at least two significant figures.

1

(c) (b) × 138.0 / 4

1

= 0.322

Using 8.50×10^{-3} gives 0.293
Correct answer scores M1 and M2.
Do not penalise precision but must be to at least two significant figures.

1

(d) (c) × 100 / 0.500 = 64.5%

Using 0.293 from (c) gives 58.7%
Using 0.347 gives 69.4%
Do not penalise precision.

1

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[8]

Q2.

(a) $CH_3(CH_2)_{14}COOH$

Allow molecular formulae.

1

$CH_2OHCHOHCH_2OH$

Allow one mark only if formulae are swapped in position.

1

(b) Keeping the foodstuff dry

Allow an answer which refers to removal of water from the environment.

Do not allow dehydration / removal of water from the fat.

1

(c) They (antioxidants) react with free radicals

1

And they are used up in the reaction / do not remain behind after reaction

Lose one mark for any reference to 'catalysts can't slow down a reaction'.

1

(d) Mol of fat = (2.78 / 806 =) 3.45×10^{-3}

Mol of NaOH = 3.68×10^{-3} = mol of fatty acid

1

Mol of NaOH = 3.68×10^{-3}

Mol of fat hydrolysed = 1.23×10^{-3}

1

Mol of fat hydrolysed = (3.68×10^{-3} / 3 =) 1.23×10^{-3}

Mass of fat hydrolysed = 0.987 g

1

Percentage hydrolysed = 35.5 – 35.7

Percentage hydrolysed = 35.5 – 35.7

Do not penalise precision at any point.

Since there are a variety of approaches to this calculation, award four marks for a correct answer but it must be clear that there is some relevant working.

The answer alone gets M4 only.

Any incorrect use of the 3:1 ratio is CE – lose M3 and M4.

1

[9]

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