

Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Mark Schemes

Q1.

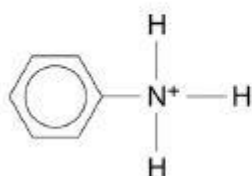
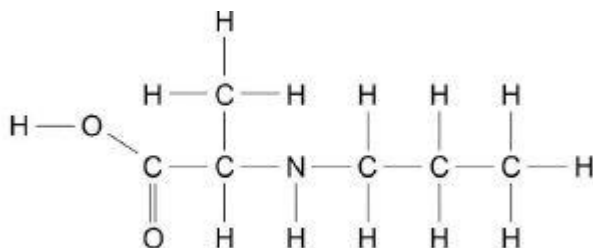
- (a) One circled C atom only – The C attached to
- $\text{CH}_3/\text{C}=\text{O}/\text{H}$
- and
- NH

1

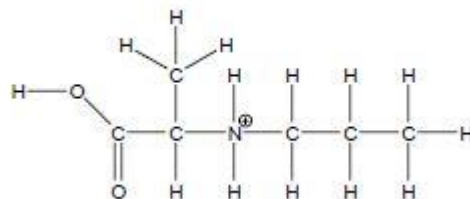
- (b) Two ticks only for amine and amide

1

- (c)

**M1** for choosing the correct bond to hydrolyse**M2** and **M3** for the correct structures of the products

Allow protonated amino acid for M2

Allow $\text{C}_6\text{H}_5\text{NH}_3^+$ or + outside a square bracket

3

- (d)
- M1**
- Enzyme has an
- active site

1

M2

The G-Enantiomer / Enzyme has the correct stereo chemistry / stereospecific

Or

The G-Enantiomer / Enzyme has the complementary shape

For M2 allow opposite argument for F-Enantiomer

1

[7]

Q2.

- (a) **M1** (Re)weigh the empty boat 1
- M2** In order to calculate the (exact) mass of salicylic acid added to the reaction mixture 1
- (b) 10 cm³ measuring cylinder (if volume given – allow between 10 to 50 cm³)
Or a 10 cm³ pipette
Or burette / graduated pipette
Or 10 cm³ syringe 1
- (c) Corrosive
Allow skin burn / permanent eye damage
Ignore irritant / toxic 1
- (d) LHS + (CH₃CO)₂O RHS + CH₃COOH 1
- (e) **M1** Amount salicylic acid = $\frac{6.01}{138} = 4.36 \times 10^{-2} \text{ mol}$
Allow conseq from wrong mole ratio in (d)
Must show and state that ethanoic anhydride is in excess 1
- M2** Mass (CH₃CO)₂O = 10.5 × 1.08 = 11.34 g 1
- M3** Amount (CH₃CO)₂O = $\frac{11.34}{102} = 1.11 \times 10^{-1} \text{ mol}$
For M4/M5 ecf from M1/M3 1
- M4** (CH₃CO)₂O is in excess 1
- M5** Mass aspirin = M1 × 0.841 × 180 = 6.59 g
Allow 2 sf or more. 1
- (f) **M1** Value lower 1
- M2** Range of values
For M2 allow mpt not sharp or a larger range of melting points 1
- (g) **M1** (Ethanol is flammable so) use a water bath to heat / do not use a Bunsen burner
Must give practical step, not just state hazard 1
- M2** Heat to temp below bp (so ethanol does not boil away)
Allow use min vol solvent 1
- (h) To remove any soluble impurities
Allow To avoid aspirin dissolving (small amount cold solvent used)
Allow To remove/(wash away) any ethanolic solution on the product.

- (i) Pure product will have (larger) crystals / needle-like crystals / lighter in colour
Allow whiter, less grey, more crystalline, less powdery, shinier, single colour
Must be tied to pure product
Allow opposite points tied to the crude product