

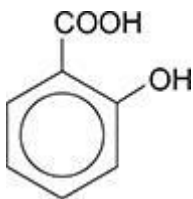
Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

The structure of 2-hydroxybenzenecarboxylic acid is shown.



- (a) Give the equation for the reaction of 2-hydroxybenzenecarboxylic acid with methanol.

In your equation, include the **skeletal** formula of the organic product.

(2)

Aspirin is produced from 2-hydroxybenzenecarboxylic acid by reaction with ethanoic anhydride in the presence of concentrated phosphoric acid.

Method

1. Add 2-hydroxybenzenecarboxylic acid to a conical flask.
2. Add excess ethanoic anhydride.
3. Add a few drops of concentrated phosphoric acid.
4. Heat the flask to 85 °C for 10 minutes.
5. Cool the flask and pour the contents into 150 cm³ of cold water.
6. Filter and wash the impure solid aspirin.
7. Recrystallise the aspirin using a 50:50 mixture of water and ethanol.
8. Check the purity of the aspirin.

- (b) Aspirin can also be produced by reacting 2-hydroxybenzenecarboxylic acid with ethanoyl chloride.

State why ethanoic anhydride is preferred to ethanoyl chloride for this preparation.

(1)

- (c) Give the name of the mechanism for the reaction of 2-hydroxybenzenecarboxylic acid with ethanoic anhydride.

(1)

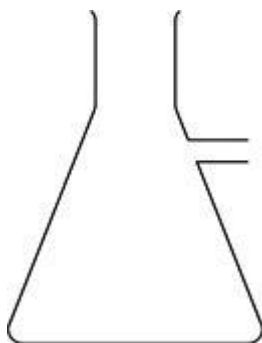
- (d) Suggest the role of the concentrated phosphoric acid.

(1)

- (e) Suggest why reflux is **not** essential when the flask is heated to 85 °C for 10 minutes.

(1)

- (f) Complete and label the diagram below to show how the impure solid is filtered.



(2)

- (g) Suggest the identity of **two** impurities present in the filtered solid aspirin before it is washed in Step 6 of the method.

Impurity 1 _____

Impurity 2 _____

(2)

- (h) Describe the recrystallisation process used to purify the aspirin.

Include the method and apparatus used.

(6)

- (3)**

Downloaded from www.merit-minds.com