

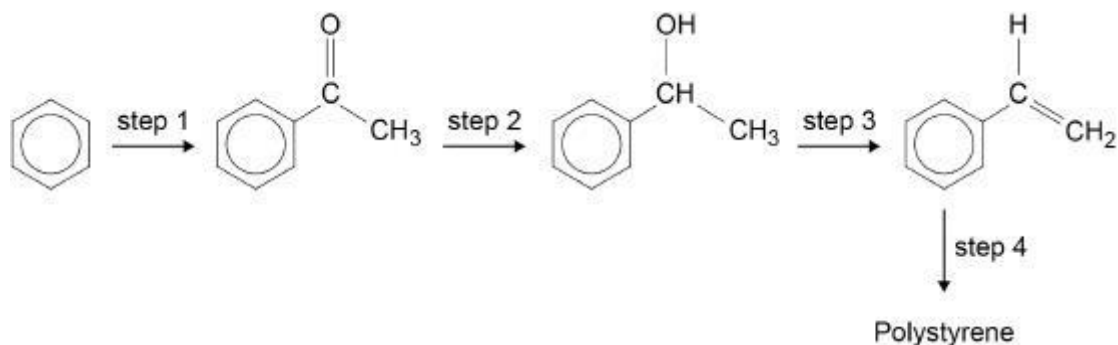
Name of the Student: _____

Max. Marks : 22 Marks

Time : 22 Minutes

Q1.

Polystyrene can be made from benzene in the series of steps shown.



- (a) State the type of reaction in step 1.

Identify the reagent(s) and conditions needed for step 1.

Type of reaction _____

Reagent(s) _____

Conditions _____

(3)

- (b) State the name of the mechanism for the reaction in step 2.

Identify the inorganic reagent needed for step 2.

Name the organic product of step 2.

Name of mechanism _____

Inorganic reagent _____

Name of organic product _____

(3)

- (c) The organic product of step 2 is reacted with concentrated sulfuric acid in step 3.

Outline the mechanism for step 3.

(d) Draw the repeating unit of polystyrene.

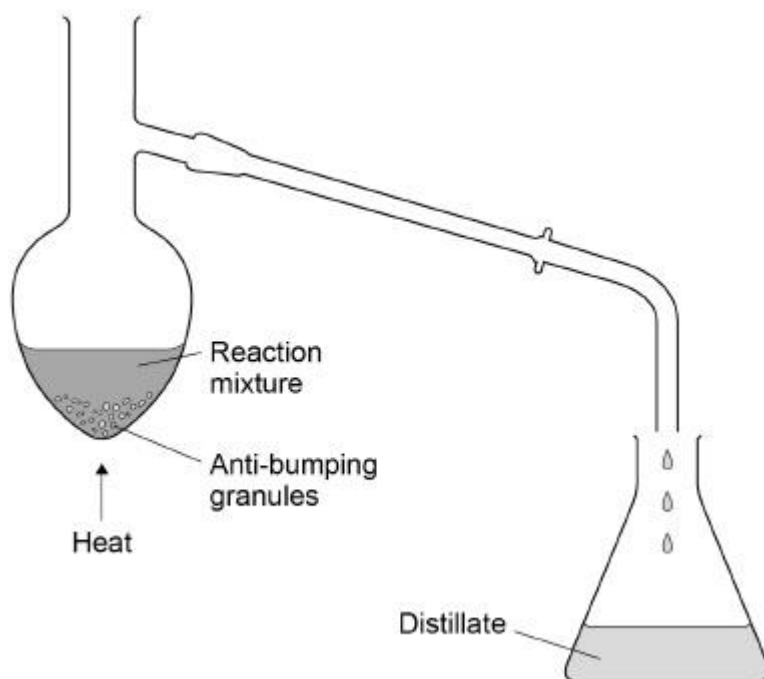
(1)

(Total 10 marks)

Q2.

A student prepared cyclohexene by heating cyclohexanol with concentrated phosphoric acid. The cyclohexene produced was distilled off from the reaction mixture.

- (a) Complete the diagram of the apparatus used to distil the cyclohexene from the reaction mixture at 83 °C.



(2)

- (b) The distillate was shaken with saturated sodium chloride solution. The cyclohexene was separated from the aqueous solution using a separating funnel.

State why cyclohexene can be separated from the aqueous solution using the separating funnel.

(1)

- (c) The cyclohexene separated in part (b) was obtained as a cloudy liquid. The student dried this cyclohexene by adding a few lumps of anhydrous calcium chloride and allowing the mixture to stand.

Give **one** observation that the student made to confirm that the cyclohexene was dry.

(1)

- (d) In this preparation, the student added an excess of concentrated phosphoric acid to 14.4 g of cyclohexanol ($M_r = 100.0$).
The student obtained 4.15 cm³ of cyclohexene ($M_r = 82.0$).
Density of cyclohexene = 0.810 g cm⁻³

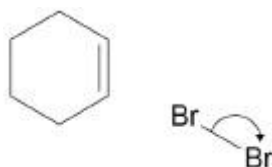
Calculate the percentage yield of cyclohexene obtained.
Give your answer to the appropriate number of significant figures.

% yield _____

(5)

- (e) Cyclohexene reacts with bromine.

Complete the mechanism for this reaction.



(3)

(Total 12 marks)