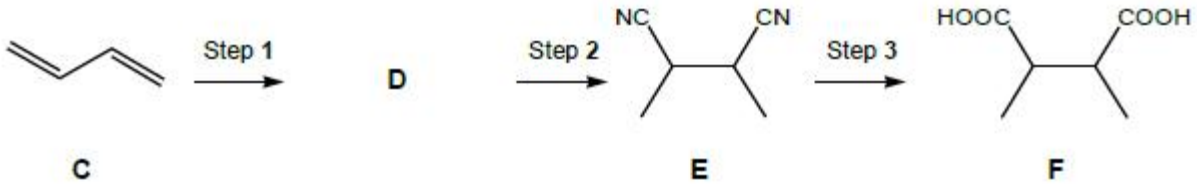
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

Chemists design synthetic routes to convert one organic compound into another.

Buta-1,3-diene, **C**, is converted into compound **F** as shown in the diagram below.



(a) State the IUPAC name of compound **F**.

_____

(1)

(b) Deduce the structure of compound **D**.

For each of the conversions in steps **1** and **2**, suggest a reagent for the conversion and name the mechanism.

Suggest the type of reaction occurring in step **3**.

Structure of **D**

Step **1** _____

_____

_____

_____

_____

Step **2** _____

_____

_____

_____

_____

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Type of reaction in Step **3** _____

_____

(6)

(c) Compound **F** can also be made from compound **G**.



F **G**

State a reagent (or combination of reagents) that can be used in a test-tube reaction to distinguish between F and G.

Describe what you would observe when the reagent is added to each compound and the test tube is shaken.

Reagent(s) _____

_____

Observation with **F** _____

_____

_____

Observation with **G** _____

_____

_____

(3)

(d) Compounds **F** and **G** react to form a polymer.

Draw the repeating unit of the polymer.

(2)

(e) In an experiment, 0.930 kg of purified **F** were obtained from 1.11 dm^3 of **G** (density 1.04 g cm^{-3}).

Calculate the percentage yield.

Give your answer to the appropriate number of significant figures.

Percentage yield _____ %

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(4)

(f) One reason for a yield of less than 100% in part **(e)** is that **G** reacts to form a number of other compounds.

The other compounds are all liquids at room temperature.

Name the technique that should be used to separate and collect each of these other compounds from the reaction mixture.

Include in your answer a description of the apparatus.

Your description of the apparatus can be either a description in words or a labelled sketch.

Name of technique _____

Apparatus

(4)
(Total 20 marks)

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