

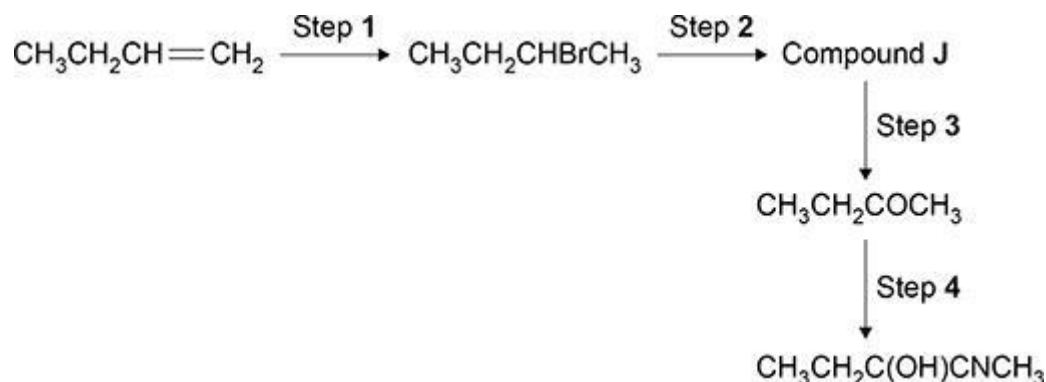
Name of the Student: _____

Max. Marks : 27 Marks

Time : 27 Minutes

Q1.

This question is about an organic synthesis.



(a) Name the mechanism in Step 1.

State the reagent(s) used for Step 1.

Name of mechanism _____

Reagent(s) _____

(2)

(b) Identify compound J.

State the reagent(s) and conditions needed for Step 2.

Compound J _____

Reagent(s) and conditions _____

(2)

(c) State the reagent(s) used for Step 4.

Outline the mechanism for Step 4.

Reagent(s) _____

Mechanism

(5)

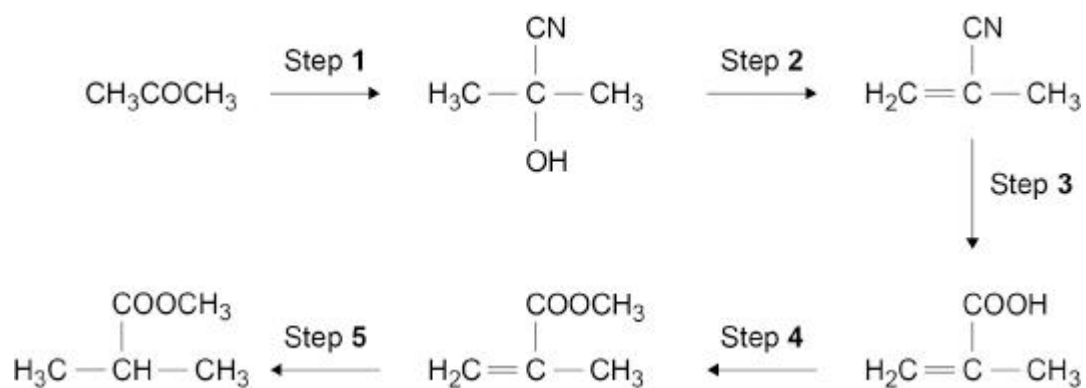
(d) Explain why Step 4 produces a racemic mixture.

(3)

(Total 12 marks)

Q2.

Consider this reaction scheme.



Which step is shown with a correct reagent and a correct condition?

- A** Step 1 HCN dissolved in water
- B** Step 2 KOH dissolved in warm water
- C** Step 4 CH_3OH with an alkaline catalyst
- D** Step 5 H_2 with a nickel catalyst

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(Total 1 mark)

Q3.

Compound **X** can be converted into an alcohol in a two-stage process.



What is the name of compound **X**?

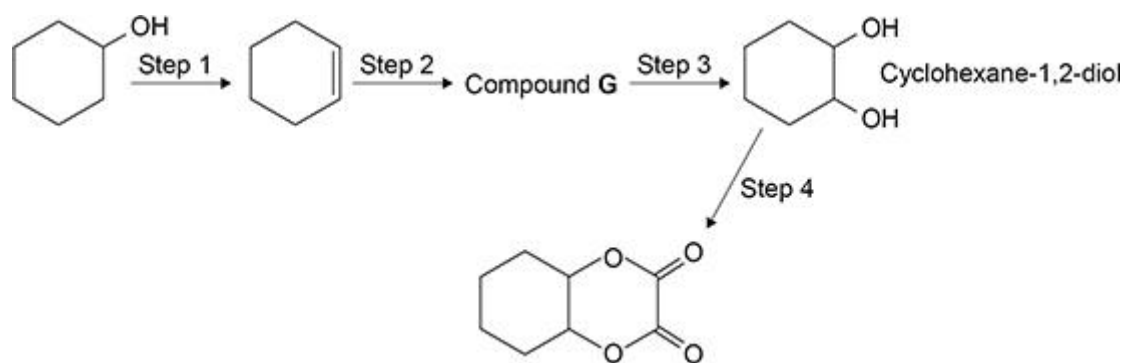
- A propene
- B propanal
- C methylbenzene
- D ethanamide

☐☐☐☐

(Total 1 mark)

Q4.

This question is about making a diester from cyclohexanol.



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

Give the name of the reagent needed for step 1.

Type of reaction _____

Reagent _____

(2)

- (b) State the reagents needed and give equations for step 2 and step 3.

Show the structure of Compound **G** in your equations.

Step 2 reagent _____

Step 2 equation

Step 3 reagent _____

Step 3 equation

(4)

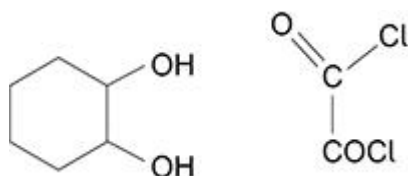
- (c) Cyclohexane-1,2-diol reacts with ethanedioyl dichloride.

Give the name of the mechanism for this reaction.

Complete the mechanism to show the formation of **one** ester link in the first step of this reaction.

Mechanism name _____

Mechanism



- (d) Suggest why chemists usually aim to design production methods
- with fewer steps
 - with a high percentage atom economy.

Fewer steps _____

High percentage atom economy _____

(2)

(Total 13 marks)