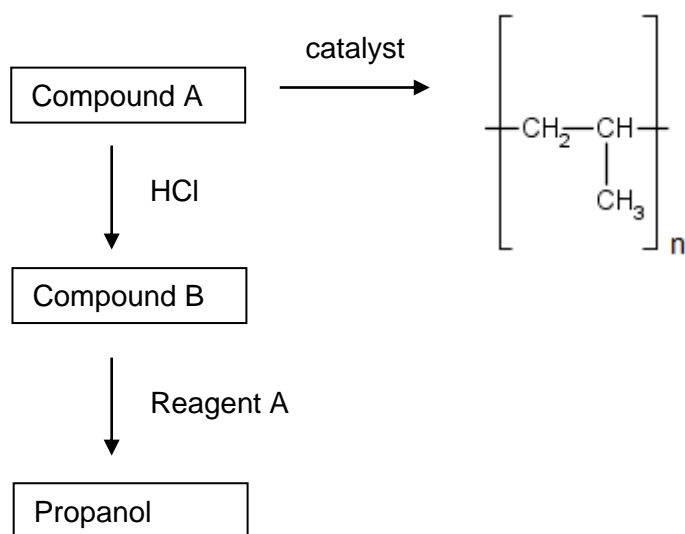


ORGANIC REACTION PATHWAYS – TEST 1

Use the following diagram to answer Questions 1 to 4:



QUESTION 1

Compound A is

- A Ethene
- B Ethane
- C Propene
- D Propane

QUESTION 2

Compound B is

- A Chloroethene
- B Chloroethane
- C 1-chloropropene
- D 1-chloropropane

QUESTION 3

Reagent A is

- A Water/ H_3PO_4
- B HCl
- C NaOH
- D $\text{MnO}_4^-/\text{H}^+$

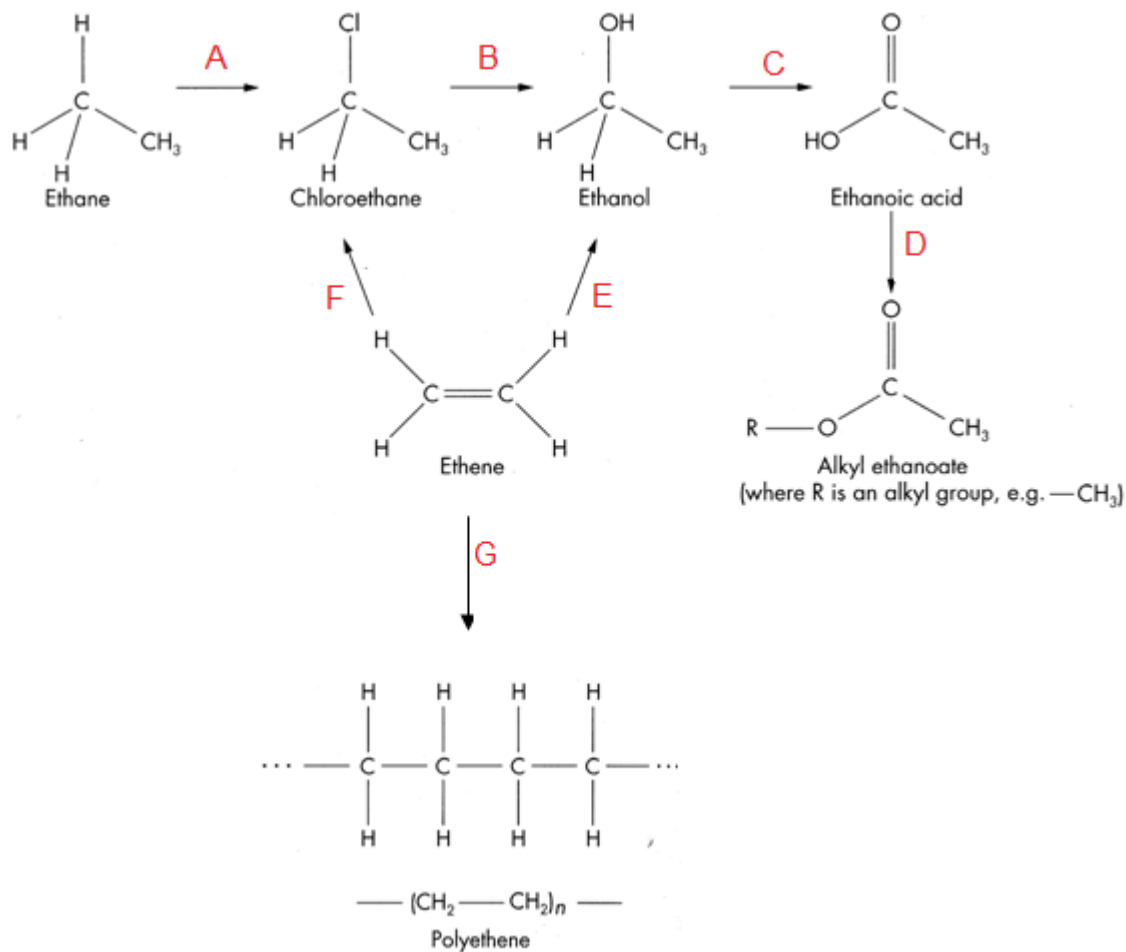
QUESTION 4

Which of the following reaction types is not shown in the flow chart?

- A Addition polymerisation
- B Oxidation
- C Addition
- D Substitution

QUESTION 5

Identify the reagents needed at A→G



QUESTION 6

A substance V with molecular formula C_3H_8O is dehydrated by treating it with concentrated sulfuric acid to form substance W , C_3H_6 . Substance V is also oxidised to X , $C_3H_6O_2$, using acidified potassium dichromate.

Oxidation of compound W with acidified potassium dichromate solution produces compound Y , $C_2H_4O_2$.

Substances V and Y react in the presence of a concentrated sulfuric acid to produce a sweet smelling compound, Z .

(a) Use this information to identify the substances V , W , X , Y and Z .

$V =$ _____

$W =$ _____

$X =$ _____

$Y =$ _____

$Z =$ _____

(b) Write structural equations for the following reactions.

(i) The dehydration of substance V .

(ii) The reaction between V and Y .

QUESTION 7

An organic compound, X, is very slightly acidic and contains two carbons. Some of it was reacted and produced a product that was significantly more acidic (compound A). Another sample of compound X was reacted with ammonia to form a molecule with basic properties (compound B).

- (a) Write equations showing the identity of compound X and the formation of compound A and B.
- (b) Write an equation for the reaction of compound X with sodium hydroxide.
- (c) Write an equation for the reaction of compound X with concentrated sulfuric acid to form compound C.
- (d) Write a combustion reaction for compound C.
- (e) Write an equation for the reaction of compound A with magnesium.

QUESTION 8

Show how chloroethane can be synthesised from ethane or ethene.

SOLUTIONS

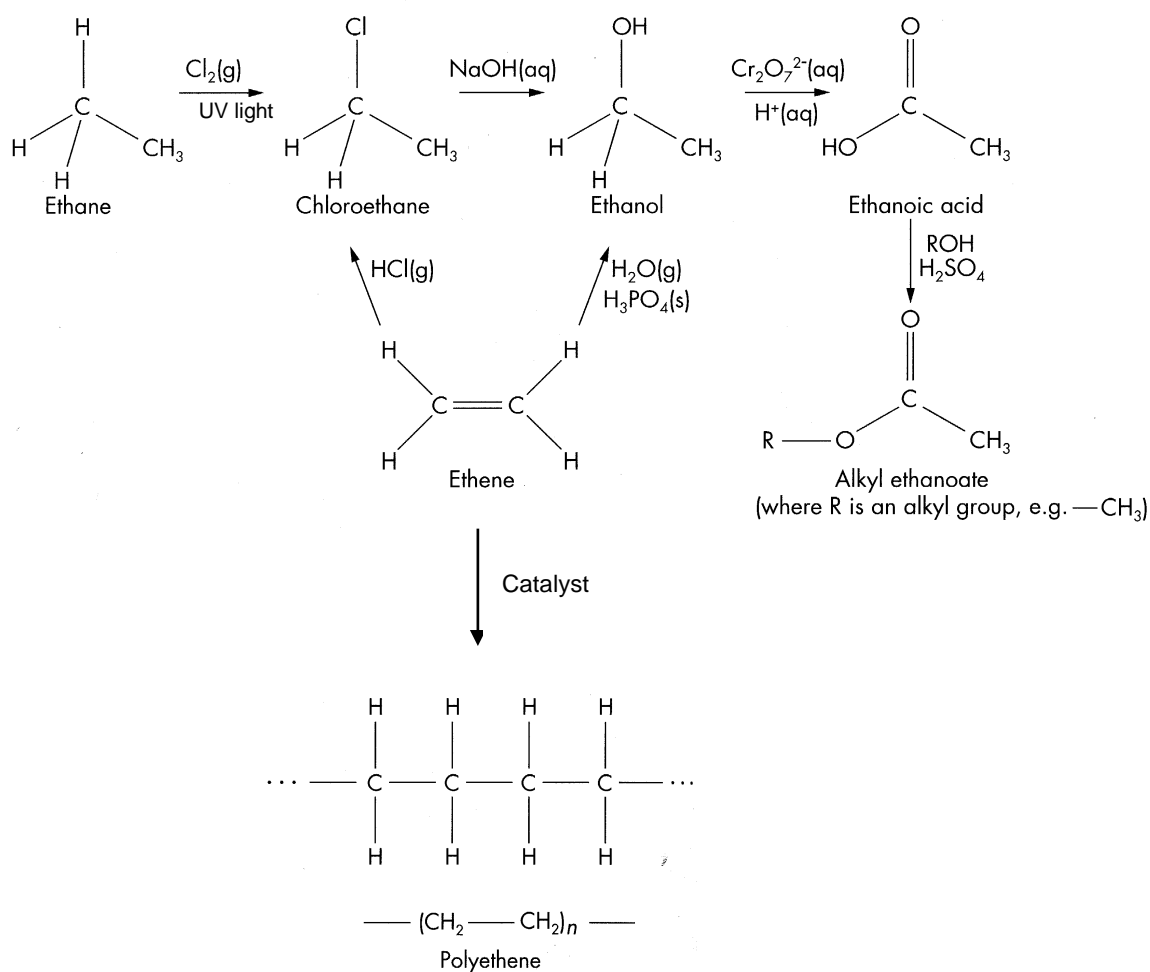
QUESTION 1 Answer is C

QUESTION 2 Answer is D

QUESTION 3 Answer is C

QUESTION 4 Answer is B

QUESTION 5



QUESTION 6

- (a) The molecular formula of substance V suggests that the molecule is an alcohol.

The molecular formulae of substance X and Y suggest that the molecules are either an ester or carboxylic acid.

The fact that V is oxidised to X suggests that V is an alcohol and that X is a carboxylic acid.

The dehydration reaction suggests that V is an alkanol. Hence its systematic name is 1-propanol.

X is 1-propanoic acid.

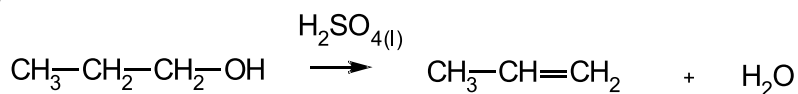
Alkanols are oxidised by strong oxidants such as acidified potassium dichromate to produce carboxylic acids. Therefore, Y must be ethanoic acid.

Compound Z is the ester propyl ethanoate.

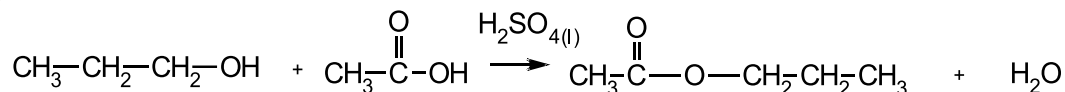
Using the given molecular formula, the product, W, formed during the dehydration of V can be identified as prop-1-ene.

(1 mark for each molecule correctly identified).

- (b) (i)

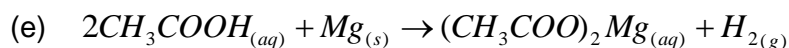
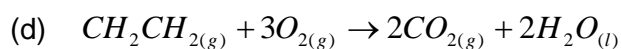
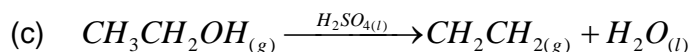
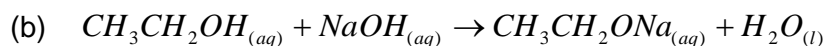
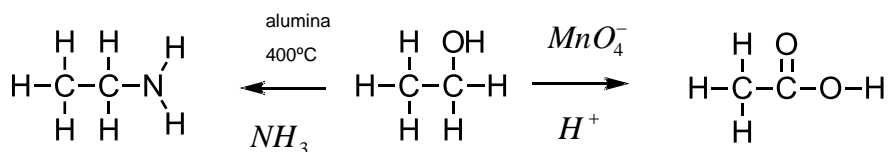


- (ii)



QUESTION 7

- (a)



QUESTION 8

