

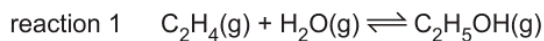
13. An introduction to AS Level organic chemistry

13.2 Characteristic organic reactions

Paper 2

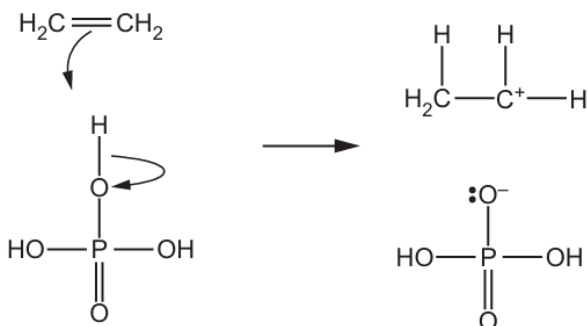
Question Paper

- 1 In industry, ethanol is made by reacting ethene with steam in the presence of H_3PO_4 .



- (c) The mechanism for reaction 1 can be described in three steps. Steps 1 and 2 for reaction 1 are shown in Fig. 4.1.

step 1



step 2

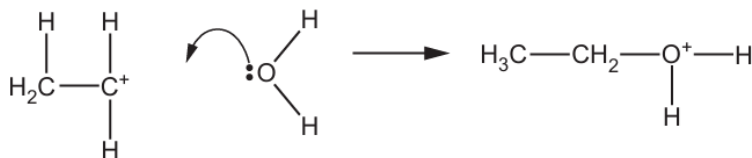


Fig. 4.1

- (i) Describe the behaviour of H_3PO_4 in step 1 in Fig. 4.1. Explain your answer.

.....
 [1]

- (ii) Identify the species that behaves as an electrophile in step 2 in Fig. 4.1. Explain your answer.

.....
 [1]

- (iii) Complete Fig. 4.2 to show the mechanism for step 3 of reaction 1. Include charges, dipoles, lone pairs of electrons and curly arrows, as appropriate.

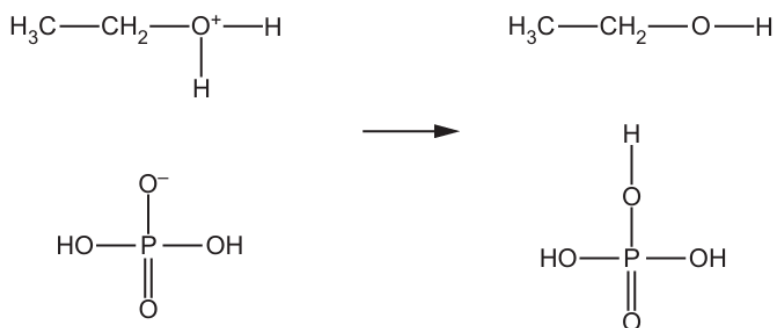


Fig. 4.2

[2]

- 2 (b) $Cl(g)$ can be made from $Cl_2(g)$.

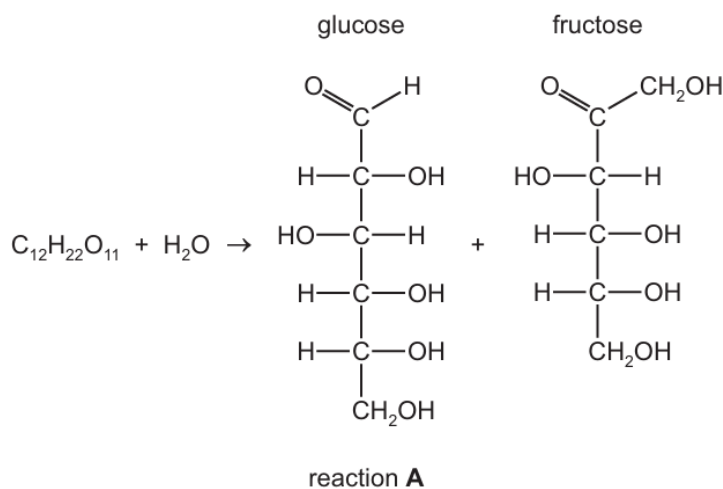
- (i) Describe the conditions required for this process.

..... [1]

- (ii) Name this process.

..... [1]

- 3 Sucrose, $C_{12}H_{22}O_{11}$, reacts with water to form glucose and fructose in reaction A.



- (a) Suggest a name for this type of reaction.

..... [1]

- 4 There are many different types of aliphatic and aromatic hydrocarbons.

- (d) The table compares the reactivity of alkanes and alkenes with chlorine.

	alkanes	alkenes
name of the type of reaction with chlorine	substitution	addition and substitution
name of the type of reacting species	free radical	electrophile and free radical

- (i) During the first stage in the substitution reaction chlorine forms chlorine free radicals.

Explain what is meant by the term *free radical*.

..... [1]

- (ii) Name and explain the type of bond breaking which occurs to form chlorine free radicals.

.....

..... [2]