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Biochemistry

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Question number 1

Primary alcohols

In a primary (1°) alcohol, the carbon atom that carries the -OH group is only attached to one alkyl group. Some examples of primary alcohols are shown below:

I ethanol

II propan-1-ol etc

Notice that the complexity of the attached alkyl group is irrelevant. In each case there is only one linkage to an alkyl group from the CH2 group holding the -OH group. There is an exception to this. Methanol, CH3OH, is counted as a primary alcohol even though there are no alkyl groups attached to the the -OH carbon atom.

Secondary alcohols

In a secondary (2°) alcohol, the carbon atom with the -OH group attached is joined directly to two alkyl groups, which may be the same or different. Examples include the following:

I propan-2-ol

II butan-2-ol

III Pent-2-ol etc

Tertiary alcohols

In a tertiary (3°) alcohol, the carbon atom holding the -OH group is attached directly to three alkyl groups, which may be any combination of the same or different groups. Examples of tertiary alcohols are given below:

I 2-methylpropan-2-ol

II 2-methylbutan-2-ol

Question 2

Discuss the solubility of alcohol is water.

This is due to the combined strength of so many hydrogen bonds forming between oxygen atoms of one alcohol molecule and the hydroxy H atoms of another. The longer the carbon chain in an alcohol is, the lower the solubility in polar solvents and the higher the solubility in nonpolar solvents.

Question 3

Show the three steps in the industrial manufacture of ethanol. Equations of reaction are mandatory.

Ethanol is manufactured by reacting ethene with steam. The catalyst used is solid silicon dioxide coated with phosphoric(V) acid. The reaction is reversible.



Only 5% of the ethene is converted into ethanol at each pass through the reactor. By removing the ethanol from the equilibrium mixture and recycling the ethene, it is possible to achieve an overall 95% conversion.

Question 4

Show the reaction between 2-methylpropanal and butylmagnesiumchloride Hint: Grignard synthesis.