

# QB365 Question Bank Software

12th Chemistry CBSE Case Study Questions Alcohols , Phenols and Ethers For - 2024

12th Standard

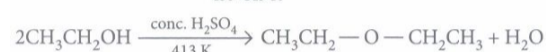
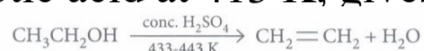
Chemistry

## SECTION -A

2 x 4 = 8

1) Read the passage given below and answer the following questions:

Dehydration of alcohols can lead to the formation of either alkenes or ethers. This dehydration can be carried out either with protonic acids such as cone.  $\text{H}_2\text{SO}_4$ ,  $\text{H}_3\text{PO}_4$  or catalysts such as anhydrous  $\text{ZnCl}_2$  or  $\text{Al}_2\text{O}_3$ . When primary alcohols are heated with cone.  $\text{H}_2\text{SO}_4$  at 433-443 K, they undergo intramolecular dehydration to form alkenes. Secondary and tertiary alcohols undergo dehydration under milder conditions. The ease of dehydration of alcohols follows the order:  $3^\circ > 2^\circ > 1^\circ$ . The dehydration of alcohols always occurs in accordance with the Saytzeffs rule. Primary alcohols when heated with protic acid at 413 K, gives dialkyl ether.



The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Which one of the following alcohols undergoes acid-catalysed dehydration to alkenes most readily?

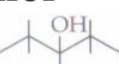
- (a)  $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$  (b)  $(\text{CH}_3)_3\text{COH}$  (c)  $\text{CH}_3\text{CHOHCH}_3$  (d)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

(ii) Dehydration of alcohol is an example of which type of reaction?



- (a) Substitution (b) Elimination (c) Addition (d) Rearrangement

(iii) The alcohol which does not give a stable compound on dehydration is

- (a) ethyl alcohol (b) methyl alcohol (c) n-propyl alcohol (d) n-butyl alcohol

(iv)   $\xrightarrow{\text{conc. H}_2\text{SO}_4}$  products.

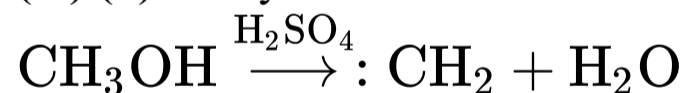
The most stable product(s) is/are

- (a)  (b)  (c) both (a) and (b) (d) none of these.

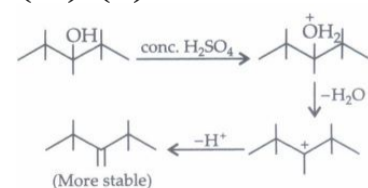
**Answer : (i) (b):** The order of dehydration of alcohols is  $3^\circ > 2^\circ > 1^\circ$ .

**(ii) (b):** The dehydration of alcohol is an example of elimination reaction.

**(iii) (b):** Dehydration of  $\text{CH}_3\text{OH}$  will give methylene (a carbene) which is unstable.



**(iv) (a):**



2) Observe the following table showing boiling points of alcohol, molar mass. Study the table and answer the questions based on table and related studied concept.

Alcohol	Boiling Point	Molar Mass
$\text{CH}_3\text{OH}$	$64^\circ\text{C}$	$32 \text{ g mol}^{-1}$
$\text{C}_2\text{H}_5\text{OH}$	$78^\circ\text{C}$	$46 \text{ g mol}^{-1}$
$\text{C}_3\text{H}_7\text{OH}$ (n-propyl alcohol)	$97^\circ\text{C}$	$60 \text{ g mol}^{-1}$
Isopropyl alcohol	$82.5^\circ\text{C}$	$60 \text{ g mol}^{-1}$
n-butanol	$118^\circ\text{C}$	$74 \text{ g mol}^{-1}$
Isobutyl alcohol	$108^\circ\text{C}$	$74 \text{ g mol}^{-1}$

Butan-2-ol	100°C	74 g mol <sup>-1</sup>
Tert. butyl alcohol	83°C	74 g mol <sup>-1</sup>

- (a) Why do alcohols have higher boiling points than haloalkanes, ethers, aldehydes and ketones?  
 (b) Why does tertiary butyl alcohol have lower boiling point than n-butyl alcohol?  
 (c) How does boiling point vary with increase in carbon chain?  
 (d) How is solubility of alcohol vary with increase in molar mass?  
 (e) Which alcohol is most acidic and why?

**Answer :** (a) It is due to inter molecular H-bonding.

(b) It is because it has spherical shape, least surface area, less van der Waals' forces of attraction, hence lower boiling point than n-butyl alcohol.

(c) Boiling point increases with increase in carbon chain

(d) Solubility of alcohol decreases with increase in molar mass.

(e) CH<sub>3</sub>OH is most acidic because CH<sub>3</sub>O<sup>⊖</sup> is most stable among RO<sup>⊖</sup>.