

Value based questions

1. Gasoline is being used worldwide for running automobile, aeroplane etc. Due to the presence of nitrogen and sulphuric compounds in gasoline, the exhaust gases contain oxides of nitrogen and sulphur which are major pollutants in the environment. In contrast, ethanol is a much cleaner fuel because it produces only CO_2 and H_2O

Now answer the following questions:

- a. Besides being a cleaner fuel, what are the other advantages of using ethanol as a fuel in automobile?
- b. What are the disadvantages of using ethanol as a fuel?

Ans. a. the main advantages are

- I. It is made from renewable energy sources i.e. sugarcane and corn which are grown in the field
- II. It has higher octane rating
- III. Due to the presence of oxygen in ethanol, poisonous gases like CO and unburnt hydrocarbon are emitted to a lesser extent
- IV. Less dependence on imported oils thereby promoting the economy of our country

b the main disadvantages are

- i. one third the energy content than the gasoline. Thus drivers will need more ethanol than gasoline to drive the same distance
- ii. Ethanol can water and dust more easily and hence corrodes engine made up of Al
- iii. It produces cancer causing emissions such as acetaldehyde and formaldehyde forty times more than gasoline

2. Miss Usha was asked to synthesize alcohol by acidic hydration of 1-butene. She was unaware of the fact that the vessel she used had some coating of a metal, and in addition to alcohol, compound X was isolated. X forms bisulphate compound as well

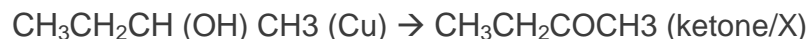
as 2,4-dinitrophenylhydrazones. Separation of alcohol could be made by physical as well as by chemical methods.

Answer the following Qs.

- a. How are alcohol acid X formed?
- b. Can alcohol acid X give iodoform test?
- c. Give different methods of separation.

Ans. a. $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 \xrightarrow{\text{H}^+} \text{CH}_3\text{CH}_2\text{C}^+\text{H}.\text{CH}_3 \xrightarrow{\text{H}_2\text{O}} \text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$

Since X forms bisulphate and 2,4-dinitrophenylhydrazone, it means X has a carbonyl group formed due to oxidation of alcohol. This oxidation is due to coating of metal (Cu)



b Alcohol and X both give iodoform test.

c Alcohol and X can be separated by

- i. Distillation
- ii. Bisulphite formation only (X) forms Bisulphite complex(s) which can be decomposed

3. Mohan heard a lot of noise and weeping in nearby jhuggis. He looked courageous and went to inquire what had happened. He found that some people had taken spurious alcohol containing methanol and were crying with pain and were complaining of loss of eyesight. He immediately hired an auto rickshaw and packed it with 4 persons who had consumed spurious alcohol.

- a. How does methanol in drinking alcohol cause a problem?
- b. What treatment might the doctors have undertaken to save the patients?
- c. What message would you give to the person who consumed spurious alcohol?

Ans. (a) methyl alcohol is easily oxidized to formaldehyde and then to formic acid. Which may cause blindness and death

(b) doctors given an intravenous infusion of diluted ethanol. The enzyme responsible

for oxidation of HCHO to acid is swamped allowing time for kidneys to excrete methanol

(c) people should be educated not to drink cheap alcohol from unauthorized sources. It is not worth saving money when the life get endangered. It at all one has to drink, the stuff must be purchased from an authorized source.