



Question-19

What is hydrogenation? What is its industrial application?

Solution:

It is a class of chemical reactions in which the net result is addition of hydrogen (H_2) to unsaturated organic compounds such as alkenes, alkynes, etc. Hydrogenation is widely applied to the processing of vegetable oils and fats. Complete hydrogenation converts unsaturated fatty acids to saturated ones.

Question-20

C_2H_5 , C_3H_8 , C_3H_6 , C_2H_2 and CH_4

Solution:

Alkenes and alkynes (unsaturated hydrocarbons) undergo addition reactions. From the above hydrocarbons C_2H_2 is an alkyne, whereas C_3H_6 is an alkene. So, C_3H_6 and C_2H_2 will undergo addition reactions.

Question-21

Give a test that can be used to differentiate chemically between butter and cooking oil.

Solution:

Bromine water test can be used to differentiate chemically between butter and cooking oil. Add bromine water to a little of cooking oil and butter taken in separate test tubes.

- Decolourising of bromine water by cooking oil (unsaturated compound)
- Butter (saturated compound) does not decolourise bromine water

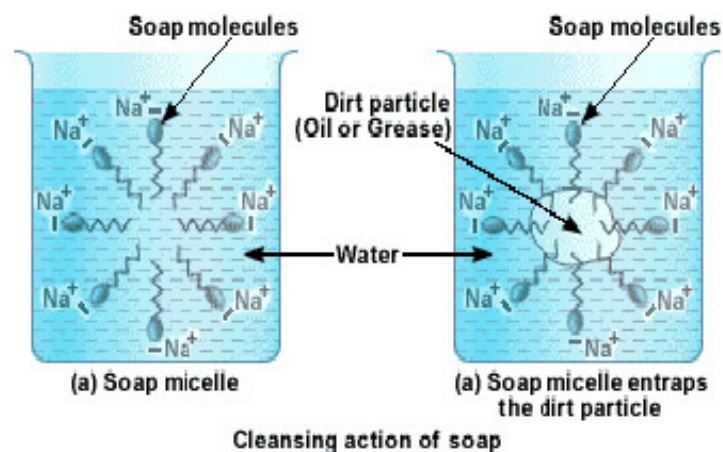
Question-22

Explain the mechanism of the cleaning action of soaps.

Solution:

We all know that soap is used to remove dirt and grime from substances. Generally dirt and grime get stuck because they have an oily component, which is difficult to remove, by plain brushing or washing by water. A soap molecule has two parts, a head and a tail i.e. the long chain organic part and the functional group $-COO^- Na^+$. A soap molecule has a tadpole like structure shown below.

The organic part is water insoluble but is soluble in organic solvents or in oil or grease. The ionic part is soluble in water, as water is a polar solvent. When soap is added to water in which dirty clothes are soaked, the two parts of the soap molecule dissolve in two different mediums. The organic tail dissolves in the dirt, grime or grease and the ionic head dissolves in water. When the clothes are rinsed or agitated, the dirt gets pulled out of the clothes, by the soap molecule. In this way soap does its cleaning work on dirty and grimy clothes or hands.



The soap molecules actually form a closed structure because of mutual repulsion of the positively charged heads. This structure is called a micelle. The micelle pulls out the dirt and grime more efficiently.

Question-23

Would you be able to check if water is hard by using a detergent?

Solution:

We would not be able to check whether a sample of water is hard by using a detergent, this is because a detergent forms lather easily even with hard water.

Question-24

People use a variety of methods to wash clothes. Usually after adding the soap, they 'beat' the clothes on a stone, or beat it with a paddle, scrub with a brush or the mixture is agitated in a washing machine. Why is agitation necessary to get clean clothes?

Solution:

It is necessary to shake to get clean clothes because the soap micelles, which entrap oily or greasy particles on the surface of dirty clothes, have to be removed from their surface. When the clothes which are wet by soap solution are beaten, the micelles containing oil or greasy dirt particles get removed from the surface of dirty clothes and go into water and the dirty cloth gets cleaned.

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