while disinfectants are applied to inanimate objects such as floors, drainage system, instruments, etc. Disinfectants are harmful to the living tissues.

Iodine is an example of a strong antiseptic. Tincture of iodine (2 – 3 percent of solution of iodine in alcohol – water mixture) is applied to wounds. 1 percent solution of phenol is used as a disinfectant.

Question 16.11:

Why are cimetidine and ranitidine better antacids than sodium hydrogen carbonate or magnesium or aluminium hydroxide?

Answer

Antacids such as sodium hydrogen carbonate, magnesium hydroxide, and aluminium hydroxide work by neutralising the excess hydrochloric acid present in the stomach. However, the root cause for the release of excess acid remains untreated.

Cimetidine and rantidine are better antacids as they control the root cause of acidity. These drugs prevent the interaction of histamine with the receptors present in the stomach walls. Consequently, there is a decrease in the amount of acid released by the stomach. This is why cimetidine and rantidine are better antacids than sodium hydrogen carbonate, magnesium hydroxide, and aluminium hydroxide.

Question 16.12:

Name a substance which can be used as an antiseptic as well as disinfectant.

Answer

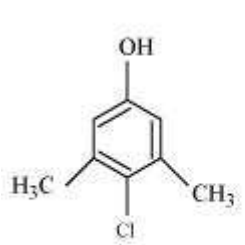
Phenol can be used as an antiseptic as well as a disinfectant. 0.2 percent solution of phenol is used as an antiseptic, while 1 per cent of its solution is used as a disinfectant.

Question 16.13:

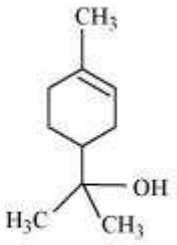
What are the main constituents of dettol?

Answer

The main constituents of dettol are chloroxylenol and α-terpineol.



Chloroxylenol



α – Terpineol

Question 16.14:

What is tincture of iodine? What is its use?

Answer

Tincture of iodine is a 2 – 3 percent solution of iodine in alcohol – water mixture. It is applied to wounds as an antiseptic.

Question 16.15:

What are food preservatives?

Answer

Food preservatives are chemicals that prevent food from spoilage due to microbial growth. Table salt, sugar, vegetable oil, sodium benzoate (C_6H_3COONa), and salts of propanoic acid are some examples of food preservatives.

Question 16.16:

Why is use of aspartame limited to cold foods and drinks?

Answer

Aspartame becomes unstable at cooking temperature. This is the reason why its use is limited to cold foods and drinks.

Question 16.17:

What are artificial sweetening agents? Give two examples.

Answer

Artificial sweetening agents are chemicals that sweeten food. However, unlike natural sweeteners, they do not add calories to our body. They do not harm the human body. Some artificial sweeteners are aspartame, saccharin, sucrolose, and alitame.

Question 16.18:

Name a sweetening agent used in the preparation of sweets for a diabetic patient.

Answer

Artificial sweetening agents such as saccharin, alitame, and aspartame can be used in preparing sweets for diabetic patients.

Question 16.19:

What problem arises in using alitame as artificial sweetener?

Answer

Alitame is a high potency sweetener. It is difficult to control the sweetness of food while using alitame as an artificial sweetener.

Question 16.20:

How are synthetic detergents better than soap?

Answer

Soaps work in soft water. However, they are not effective in hard water. In contrast, synthetic detergents work both in soft water and hard water.

Therefore, synthetic detergents are better than soaps.

Question 16.21:

Explain the following terms with suitable examples

(i) Cationic detergents

(ii) Anionic detergents and

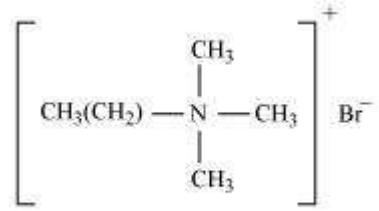
(iii) Non-ionic detergents

Answer

(i) Cationic detergent

Cationic detergents are quaternary ammonium salts of acetates, chlorides, or bromides. These are called cationic detergents because the cationic part of these detergents contains a long hydrocarbon chain and a positive charge on the N atom.

For example: cetyltrimethylammonium bromide



Cetyltrimethylammonium bromide

(ii) Anionic detergents

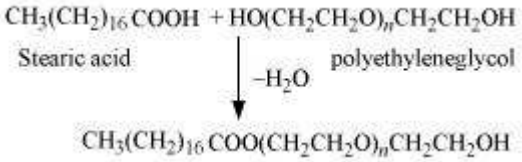
Anionic detergents are of two types:

1.Sodium alkyl sulphates: These detergents are sodium salts of long chain alcohols. They are prepared by first treating these alcohols with concentrated sulphuric acid and then with sodium hydroxide. Examples of these detergents include sodium lauryl sulphate ($C_{11}H_{23}CH_2OSO_3^-Na^+$) and sodium stearyl sulphate ($C_{17}H_{35}CH_2OSO_3^-Na^+$).

2.Sodium alkylbenzenesulphonates: These detergents are sodium salts of long chain alkylbenzenesulphonic acids. They are prepared by Friedel-Crafts alkylation of benzene with long chain alkyl halides or alkenes. The obtained product is first treated with concentrated sulphuric acid and then with sodium hydroxide. Sodium 4-(1-dodecy) benzenesulphonate (SDS) is an example of anionic detergents.

(iii) Non-ionic detergents

Molecules of these detergents do not contain any ions. These detergents are esters of alcohols having high molecular mass. They are obtained by reacting polyethylene glycol and stearic acid.



Question 16.22:

What are biodegradable and non-biodegradable detergents? Give one example of each.

Answer

Detergents that can be degraded by bacteria are called biodegradable detergents. Such detergents have straight hydrocarbon chains. For example: sodium lauryl sulphate

Detergents that cannot be degraded by bacteria are called non-biodegradable detergents. Such detergents have highly-branched hydrocarbon chains. For example: sodium -4- (1, 3, 5, 7- tetra methyl octyl) benzene sulphonate

Question 16.23:

Why do soaps not work in hard water?

Answer

Soaps are sodium or potassium salts of long-chain fatty acids. Hard water contains calcium and magnesium ions. When soaps are dissolved in hard water, these ions displace sodium or potassium from their salts and form insoluble calcium or magnesium salts of fatty acids. These insoluble salts separate as scum.

$$\underset{\text{Soap}}{2C_{17}H_{35}COONa} + CaCl_2 \longrightarrow 2NaCl + \underset{\substack{\text{Isoluble calcium stearate} \\ \text{(soap)}}}{\left(C_{17}H_{35}COO\right)_2 Ca}$$

This is the reason why soaps do not work in hard water.

Question 16.24:

Can you use soaps and synthetic detergents to check the hardness of water?

Answer

Soaps get precipitated in hard water, but not in soft water. Therefore, soaps can be used for checking the hardness of water.

However, synthetic detergents do not get precipitated either in hard water or in soft water. Therefore, synthetic detergents cannot be used for checking the hardness of water.

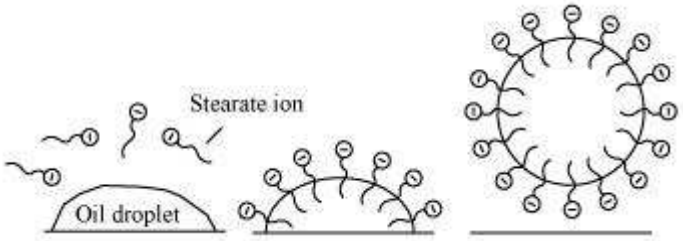
Question 16.25:

Explain the cleansing action of soaps.

Answer

Soap molecules form micelles around an oil droplet (dirt) in such a way that the hydrophobic parts of the stearate ions attach themselves to the oil droplet and the hydrophilic parts project outside the oil droplet. Due to the polar nature of the

hydrophilic parts, the stearate ions (along with the dirt) are pulled into water, thereby removing the dirt from the cloth.



Question 16.26:

If water contains dissolved calcium hydrogen carbonate, out of soaps and synthetic detergents which one will you use for cleaning clothes?

Answer

Synthetic detergents are preferred for cleaning clothes. When soaps are dissolved in water containing calcium ions, these ions form insoluble salts that are of no further use. However, when synthetic detergents are dissolved in water containing calcium ions, these ions form soluble salts that act as cleansing agents.

Question 16.27:

Label the hydrophilic and hydrophobic parts in the following compounds.

(i) $CH_3(CH_2)_{10}CH_2OSO_3^-Na^+$

(ii) $CH_3(CH_2)_{15}\overset{+}{N}(CH_3)_3\overset{-}{B}r$

(iii) $CH_3(CH_2)_{16}COO(CH_2CH_2O)_nCH_2CH_2OH$

Answer

(i) $\underbrace{CH_3(CH_2)_{10}CH_2}_{\text{hydrophobic part}}\underbrace{OSO_3^-Na^+}_{\text{hydrophilic apart}}$

(ii) $\underbrace{CH_3(CH_2)_{15}}_{\text{hydrophobic part}}\underbrace{\overset{+}{N}(CH_3)_3\overset{-}{B}r}_{\text{hydrophilic part}}$

(iii) $\underbrace{CH_3(CH_2)_{16}}_{\text{hydrophobic part}}\underbrace{COO(CH_2CH_2O)_n\,CH_2CH_2OH}_{\text{hydrophilic part}}$

Text solution

Question 16.1:

Sleeping pills are recommended by doctors to the patients suffering from sleeplessness but it is not advisable to take its doses without consultation with the doctor, Why?

Answer

Most drugs when taken in doses higher than recommended may cause harmful effects and sometimes, may even lead to death. Hence, a doctor should always be consulted before taking any medicine.

Question 16.2:

With reference to which classification has the statement, 'ranitidine is an antacid" been given?

Answer

The given statement refers to the classification of pharmacological effects of the drug. This is because any drug that is used to counteract the effects of excess acid in the stomach is called an antacid.

Question 16.3:

Why do we require artificial sweetening agents?

Answer

A large number of people are suffering from diseases such as diabetes and obesity. These people cannot take normal sugar i.e., sucrose as it is harmful for them. Therefore, artificial sweetening agents that do not add to the calorie intake of a person are required. Saccharin, aspartame, and alitame are a few examples of artificial sweeteners.

Question 16.4:

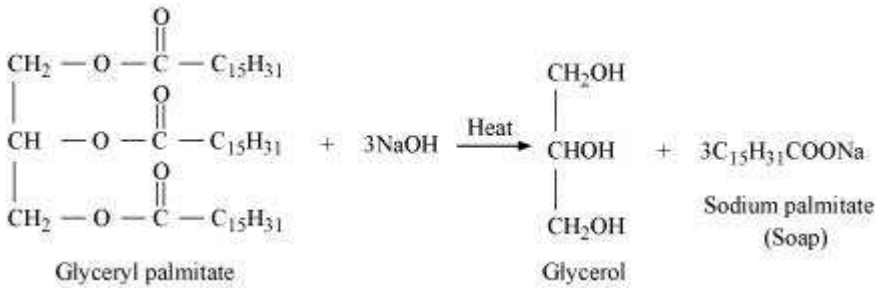
Write the chemical equation for preparing sodium soap from glyceryl oleate and glyceryl palmitate. Structural formulae of these compounds are given below.

(i) $(C_{15}H_{31}COO)_3C_3H_5$ – Glyceryl palmitate

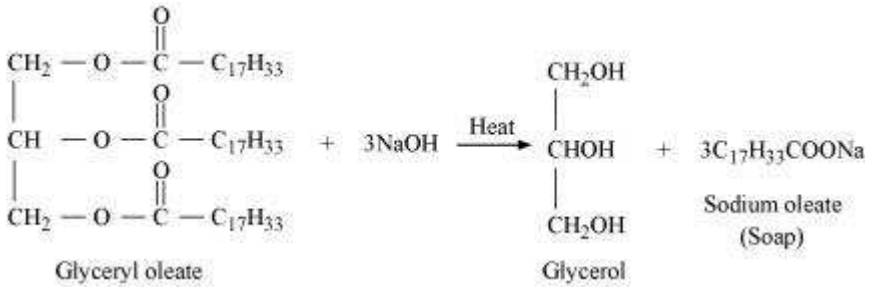
(ii) $(C_{17}H_{33}COO)_3C_3H_5$ – Glyceryl oleate

Answer

(i)

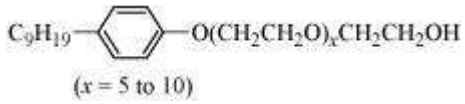


(ii)

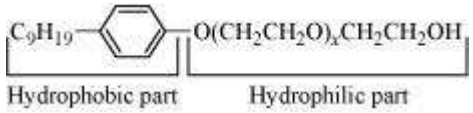


Question 16.5:

Following type of nom-ionic detergents are present in liquid detergents, emulsifying agents and wetting agents. Label the hydrophilic and hydrophobic parts in the molecule. Identify the functional group (s) present in the molecule.



Answer



Functional groups present in the molecule are:

(i) Ether, and

(ii) primary alcoholic group