

**Question 16.1:**

Why do we need to classify drugs in different ways?

Answer

The classification of drugs and the reasons for classification are as follows:

(i) On the basis of pharmacological effect:

This classification provides doctors the whole range of drugs available for the treatment of a particular type of problem. Hence, such a classification is very useful to doctors.

(ii) On the basis of drug action:

This classification is based on the action of a drug on a particular biochemical process. Thus, this classification is important.

(iii) On the basis of chemical structure:

This classification provides the range of drugs sharing common structural features and often having similar pharmacological activity.

(iv) On the basis of molecular targets:

This classification provides medicinal chemists the drugs having the same mechanism of action on targets. Hence, it is the most useful to medicinal chemists.

Question 16.2:

Explain the term target molecules or drug targets as used in medicinal chemistry.

Answer

In medicinal chemistry, drug targets refer to the key molecules involved in certain metabolic pathways that result in specific diseases. Carbohydrates, proteins, lipids, and nucleic acids are examples of drug targets.

Drugs are chemical agents designed to inhibit these target molecules by binding with the active sites of the key molecules.

Question 16.3:

Name the macromolecules that are chosen as drug targets.

Answer

The macromolecules chosen as drug targets are carbohydrates, lipids, proteins, and nucleic acids.

**Question 16.4:**

Why should not medicines be taken without consulting doctors?

Answer

A medicine can bind to more than one receptor site. Thus, a medicine may be toxic for some receptor sites. Further, in most cases, medicines cause harmful effects when taken in higher doses than recommended. As a result, medicines may be poisonous in such cases. Hence, medicines should not be taken without consulting doctors.

Question 16.5:

Define the term chemotherapy.

Answer

The use of chemicals for therapeutic effect is called chemotherapy. For example: the use of chemicals in the diagnosis, prevention, and treatment of diseases

Question 16.6:

Which forces are involved in holding the drugs to the active site of enzymes?

Answer

Either of the following forces can be involved in holding drugs to the active sites of enzymes.

- (i) Ionic bonding
- (ii) Hydrogen bonding
- (iii) Dipole – dipole interaction
- (iv) van der Waals force

Question 16.7:

While antacids and antiallergic drugs interfere with the function of histamines, why do these not interfere with the function of each other?

Answer

Specific drugs affect particular receptors. Antacids and anti-allergic drugs work on different receptors. This is the reason why antacids and anti-allergic drugs do not interfere with each other's functions, but interfere with the functions of histamines.

**Question 16.8:**

Low level of noradrenaline is the cause of depression. What types of drugs are needed to cure this problem? Name two drugs.

Answer

Anti-depressant drugs are needed to counteract the effect of depression. These drugs inhibit enzymes catalysing the degradation of the neurotransmitter, noradrenaline. As a result, the important neurotransmitter is slowly metabolised and then it can activate its receptor for longer periods of time.

Two anti-depressant drugs are:

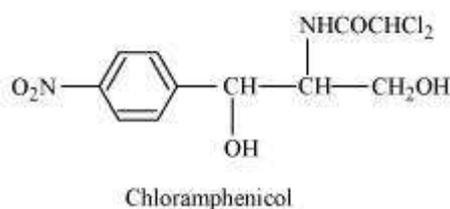
- (i) Iproniazid
- (ii) Phenelzine

Question 16.9:

What is meant by the term 'broad spectrum antibiotics'? Explain.

Answer

Antibiotics that are effective against a wide range of gram-positive and gram-negative bacteria are known as broad spectrum antibiotics. Chloramphenicol is a broad spectrum antibiotic.



It can be used for the treatment of typhoid, dysentery, acute fever, pneumonia, meningitis, and certain forms of urinary infections. Two other broad spectrum antibiotics are vancomycin and ofloxacin. Ampicillin and amoxicillin –synthetically modified from penicillin – are also broad spectrum antibiotics.

Question 16.10:

How do antiseptics differ from disinfectants? Give one example of each.

Answer

Antiseptics and disinfectants are effective against micro-organisms. However, antiseptics are applied to the living tissues such as wounds, cuts, ulcers, and diseased skin surfaces,



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 ranitidine 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 ranitidine 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

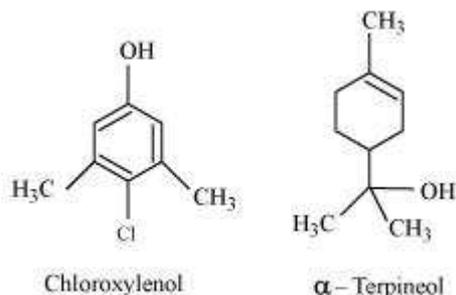
Phenol can be used as an antiseptic as well as a disinfectant. 0.2 percent solution of phenol is used as an antiseptic, while 1 per cent of its solution is used as a disinfectant.

Question 16.13:

What are the main constituents of dettol?

Answer

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

**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_5COONa), 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, sucralose, 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

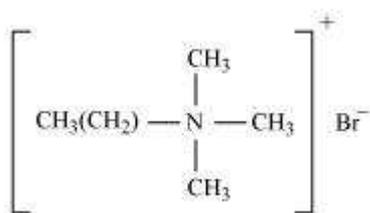
- (i) Cationic detergents
- (ii) Anionic detergents and
- (iii) Non-ionic detergents

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

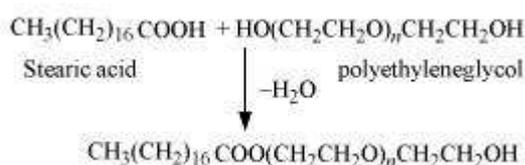
Anionic detergents are of two types:

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 ($\text{C}_{11}\text{H}_{23}\text{CH}_2\text{OSO}_3^- \text{Na}^+$) and sodium stearyl sulphate ($\text{C}_{17}\text{H}_{35}\text{CH}_2\text{OSO}_3^- \text{Na}^+$).

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-dodecyl) 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



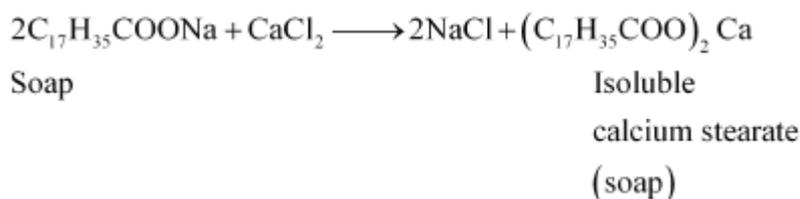
Detergents that cannot be degraded by bacteria are called non-biodegradable detergents. Such detergents have highly-branched hydrocarbon chains. For example: sodium -4- (1, 3, 5, 7- tetra methyl octyl) benzene sulphonate

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.



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:

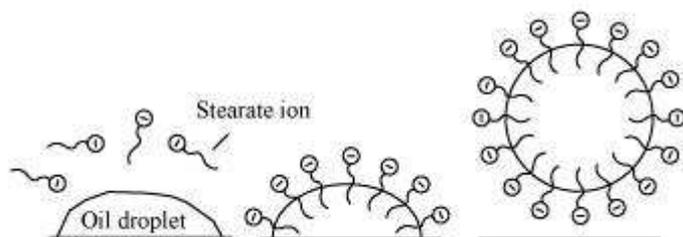
Explain the cleansing action of soaps.

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:**

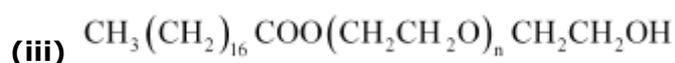
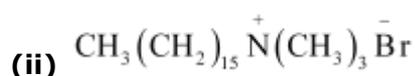
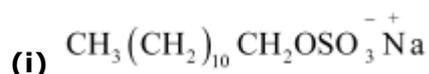
If water contains dissolved calcium hydrogen carbonate, out of soaps and synthetic detergents which one will you use for cleaning clothes?

Answer

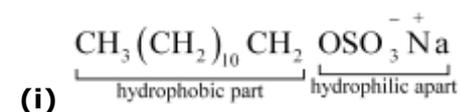
Synthetic detergents are preferred for cleaning clothes. When soaps are dissolved in water containing calcium ions, these ions form insoluble salts that are of no further use. However, when synthetic detergents are dissolved in water containing calcium ions, these ions form soluble salts that act as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

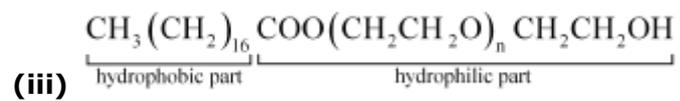
Question 16.27:

Label the hydrophilic and hydrophobic parts in the following compounds.



Answer







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:

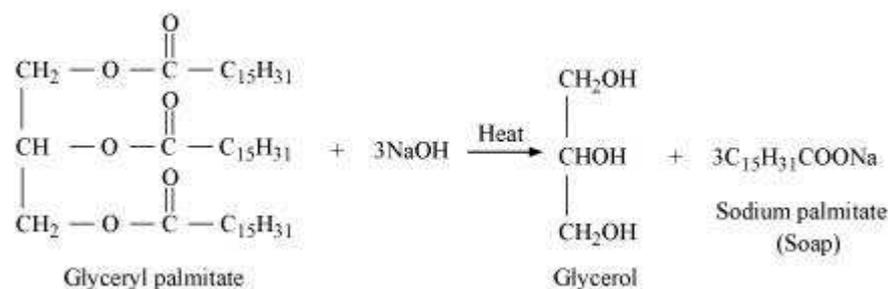
Write the chemical equation for preparing sodium soap from glyceryl oleate and glyceryl palmitate. Structural formulae of these compounds are given below.

(i) $(C_{15}H_{31}COO)_3 C_3H_5$ – Glyceryl palmitate

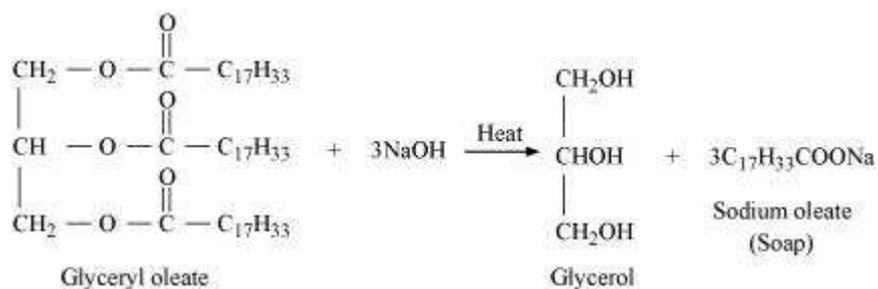
(ii) $(C_{17}H_{33}COO)_3 C_3H_5$ – Glyceryl oleate

Answer

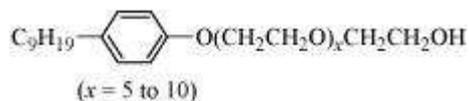
(i)



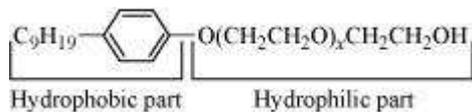
(ii)

**Question 16.5:**

Following type of non-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

CHAPTER -16 CHEMISTRY IN EVERYDAY LIFE

3 Marks Chapter

POINTS TO BE REMEMBERED

1. **DRUGS** – Drugs are chemical of low molecular masses, which interact with macromolecular targets and produce a biological response.
2. **CHEMOTHERAPY**- The use of chemicals for therapeutic effect is called chemotherapy.
3. **CLASSIFICATION OF DRUGS** –
 - (a) **ON THE BASIS OF PHARMACOLOGICAL EFFECT**-drugs for a particular type of problem as analgesics-----for pain relieving.
 - (b) **ON THE BASIS OF DRUG ACTION**-Action of drug on a particular biochemical process.
 - (c) **ON THE BASIS OF CHEMICAL ACTION**-Drugs having similar structure .eg-sulpha drugs.
 - (d) **ON THE BASIS OF MOLECULAR TARGETS**- Drugs interacting with biomolecules as lipids, proteins.
4. **ENZYMES AS DRUG TARGETS**
 - (i) **CATALYTIC ACTION OF EN ZYMES-**
 - (a) Enzymes have active sites which hold the substrate molecule .it can be attracted by reacting molecules.
 - (b) Substrate is bonded to active sites through hydrogen bonds, ionic bonds, Vander Waal or dipole –dipole interactions.
 - (ii) **DRUG- ENZYME INTERACTIONS-**
 - (a)Drug complete with natural substrate for their attachments on the active sites of enzymes .They are called competitive inhibitors.

(b)Some drugs binds to a different site of the enzyme called allosteric sites which changes the shape of active sites.
5. **ANTAGONISTS**- The drugs that bind to the receptor site and inhibit its natural function.
6. **AGONISTS**-Drugs mimic the natural messenger by switching on the receptor.
7. **ANTACIDS**-These are compounds which neutralize excess acid of stomach.eg-Aluminium hydroxide, Magnesium hydroxide.
8. **ANTI HISTAMINES**-The drugs which interfere with the natural action of histamines and prevent the allergic reaction. eg- rantidine,tegarnet, avil.
9. **TRANQUILIZERS**-The class of chemical compounds used for the treatment of stress,mild or even severe mental diseases. Eg-idardil, iproniagid, luminal, second equaquil .
10. **ANALGESICS**-They reduce pain without causing impairment of consciousness, mental confusion or some other disturbance of the nervous system.
Eg - aspirin, seridon , phenacetin.
11. **ANTIMICROBIALS**-They tend to prevent/destroy or inhibit the pathogenic action of microbes as bacteria ,virus ,fungi etc .They are classified as

(i) ANTIBIOTICS-These are the chemical substances which are produced by micro-organisms.

Eg- Penicillin , ofloxacin .

NARROW SPECTRUM ANTI-BIOTICS-These are effective mainly against gram positive or gram negative bacteria. Eg- Penicillin , streptomycin.

BROAD SPECTRUM ANTI-BIOTICS-They kill or inhibit a wide range of micro-organisms.

eg- chloramphenicol , tetracycline .

(ii) ANTISEPTICS OR DISINFECTANT-These are which either kill/inhibit the growth of micro-organisms

Antiseptics are applied to the living tissues such as wounds, cuts, ulcers etc. eg- furacine, chloroxylenol & terpinol (dettol) . Disinfectant are applied to inanimate objects such as floors , drainage , system.

Eg- 0.2% solution of phenol is an antiseptic while 1% solution is a disinfectant.

12. ANTIFERTILITY DRUGS- These are the chemical substances used to control the pregnancy. They are also called oral contraceptives or birth control pills.

Eg- Mifepristone, norethindrone.

13. ARTIFICIAL SWEETNING AGENTS-These are the chemical compounds which give sweetening effect to the food without adding calories.

They are good for diabetic people eg- aspartame, saccharin, alitame , sucralose.

14. FOOD PRESERVATIVES- They prevent spoilage of food to microbial growth. eg- salt, sugar, and sodium benzoate.

15. CLEANSING AGENTS-

(i) SOAPS- They are sodium or potassium salts of long chain fatty acids. They are obtained by the saponification reaction, when fatty acids are heated with aqueous sodium hydroxide.

They do not work well in hard water.

(iii) TOILET SOAP-That are prepared by using better grade of fatty acids and excess of alkali needs to be removed. Colour & perfumes are added to make them attractive.

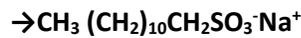
(iv) MEDICATED SOAPS- Substances of medicinal value are added. eg- Buthional , dettol.

16. SYNTHETIC DETERGENTS-They are cleaning agents having properties of soaps, but actually contain no soap. They can be used in both soft and hard water. They are-

(i) ANIONIC DETERGENTS-They are sodium salts of sulphonated long chain alcohols or hydrocarbons. eg- sodium lauryl sulphate. They are effective in acidic solution.



(lauryl alcohol)



(Sodium lauryl sulphate)

(ii) **CATIONIC DETERGENTS**- They are quaternary ammonium salts of amines with acetates, chlorides, or bromides. They are expensive and used to a limited extent. eg- cetyltrimethylammonium bromide

(iii) **NON-IONIC DETERGENTS**- They do not contain any ions. Some liquid dishwashing detergents which are of non-ionic type.

17. **BIODEGRADABLE DETERGENTS**- The detergents which are linear and can be attacked by micro-organisms are biodegradable.

Eg -sodium 4-(1-dodecyl) benzene sulphate.

18. **NON-BIODEGRADABLE DETERGENTS**- The detergents which are branched and cannot be decomposed by micro-organisms are called non-biodegradable. eg-sodium 4-(1,3,5,7-tetramethyloctyl)-benzene sulphate. It creates water pollution.

VERY SHORT ANSWER TYPE QUESTION

(1 marks)

Q-1 Define the term chemotherapy?

Ans-1 Treatment of diseases using chemicals is called chemotherapy.

Q-2 why do we require artificial sweetening agents?

Ans-2 To reduce calorie intake.

Q-3 what are main constituents of Dettol?

Ans-3 Chloroxylenol & Terpinol.

Q-4 what type of drug is paracetamol?

Ans-4 It is an antipyretic.

Q-5 Name the drug that are used to control allergy?

Ans-5 Antihistamines.

Q-6 Why is the use of aspartame limited to cold food and drinks?

Ans-6 It is unstable at cooking temperature and decomposes.

Q-7 What are tranquilizers? Give an example?

Ans-7 They are the drugs used in stress, mild to severe mental disease.

Q-8 what type of drug chloramphenicol?

Ans-8 It is broad spectrum antibiotic.

Q-9 Why is biethional is added to the toilet soap?

Ans-9 It acts as antiseptics.

Q-10 what are food preservatives?

Ans-10 The substances that prevent spoilage of food due to microbial growth. eg- sodium benzoate.

SHORT ANSWER TYPE QUESTION

(2 marks)

Q-1 Mention one important use of the following-

(i) Equanil (ii) Sucrolose

Ans-1 (i) Equanil- It is a tranquilizer.

(ii) Sucrolose-It is an artificial sweetener.

Q-2 Define the following and give one example-

(i) Antipyretics (ii) Antibiotics

Ans-2 (i) Antipyretics- Those drugs which reduce the temperature of feveral body are called Antipyretics.

Eg - Paracetamol

(ii) Antibiotics-The drugs which prevent the growth of other micro-organisms. Eg- Pencillin.

Q-3 Name the medicines used for the treatment of the following-

(i) Tuberculosis (ii) Typhoid Tuberculosis- Sterptomycin

Typhoid- Cholororophenicol

Q-4 what are tincture of iodine?

Ans-4 2-3% iodine solution of alcohol water is called tincture of Iodine. It is a powerful antiseptics and is applied on wounds.

Q- 5 What is artificial sweetening agent? Give two examples?

Ans-5 The substances which give sweetening to food but don't add calorie to our body .

Eg- Saccharin, alitame.

Q-6 How is synthetic detergents better than soaps?

Ans- 6 (i) Detergents can be used in hard water but soaps cannot be used.

(ii) Detergents have a stronger cleansing action than soaps.

Q-7 what are sulpha drugs? Give two examples?

Ans-7 a group of drugs which are derivatives of sulphanilamide and are used in place of antibiotics is called sulpha drugs.

Eg- sulphadizine, sulphanilamide.

Q-8 what forces are involved in holding the active sites of the enzymes?

Ans-8 The forces are involved in holding the active sites of the enzymes are hydrogen bonding , ionic bonding , dipole-dipole attractions or Vander waals force of attractions.

Q-9 Describe the following giving an example in each

case- (i) Edible colours

(ii) Antifertility drugs

(i) Edible colours- They are used for dying food.
Eg- saffron is used to colour rice.

(ii) Antifertility drugs- Those drugs which control the birth of the child are called antifertility drugs.

Q-10 Give two examples of organic compounds used as antiseptics?

Ans-10 Phenol (0.2%), iodoform

SHORT ANSWER TYPE QUESTION

(3 marks)

Q-1 what are Biodegradable and non-biodegradable detergents? Give one example of each.

Ans-1 Detergents having straight hydrocarbon chain and are easily decomposed by micro-organisms are called Biodegradable detergents.The detergents having branched hydrocarbon chain and are not easily decomposed by micro-organisms are called Non-Biodegradable detergents.

Q-2 what are barbiturates? To which class of drugs do they belong? Give two examples.

Ans-2 Derivatives of barbituric acid are called barbiturates.They are tranquilizers. They also act as hypnotics. eg- luminal , seconal.

Q-3 what is the use of –

(i) Benadryl (ii) sodium benzoate (iii) Progesterone

Ans-3 (i) Antihistamines

(ii) Preservatives

(iii) Antifertility drug

Q-4 Identify the type of drug-

(i) Ofloxacin (ii) Aspirin (iii) Cimetidine

Ans- 4 (i) Antibiotic (ii) Analgesics & Antipyretics

(iii) Antihistamines & antacid

Q-5 Describe the following with suitable example-

(i) Disinfectant (ii) Analgesics

(iii) Broad spectrum antibiotics

(i) Disinfectant- chemicals used to kill the micro-organisms can applied on non living articles.

(ii) Analgesics- They are the drugs which are used to relieve pain . eg – Aspirin , Ibuprofen.

(iii) Broad spectrum antibiotics- They kill the wide range of gram positive and gram negative bacteria.

Eg- Chloramphenicol , ofloxacin.