CHAPTER

15 CHEMISTRY IN EVERYDAY LIFE

Syllabus

- *Chemicals in medicines : analgesics, tranquillizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.*
- *Chemicals in food – preservatives, artificial sweetening agents, elementary idea of antioxidants.*
- *Cleansing agents – soaps and detergents, cleansing action.*

Chapter Analysis

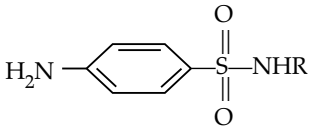
List of Topics	2016		2017		2018
	D	OD	D	OD	D/OD
Definitions	–	–	1Q (3 marks)	1Q (3 marks)	–
Soap	–	–	–	–	1Q (3 marks)*
Antiseptics	–	–	–	–	1Q (3 marks)*
Food Preservatives	–	–	–	–	1Q (3 marks)*

- * One question of 3 marks with one question each of 1 mark on Soap, Tincture of Iodine and Food Preservative was asked.

On the basis of above analysis it can be said that from exam point of view, Soap, Antiseptics and Food Preservatives and definitions of various drugs with their examples are the most important topics of the chapter.

Revision Notes

- **Drugs :** Drugs are the chemical substances of low molecular mass, interacting with macromolecular targets and produce a biological response.
- **Medicines :** Drugs which produce a therapeutic and useful response.
- **Chemotherapy :** It is the science in which chemicals are used in the treatment of diseases due to bacterial invasion. These chemicals destroy the microorganisms without affecting any material extent (the tissues of the host).
- **Classification of Drugs :**
  - **(i) On the basis of pharmacological effect :** Most useful for doctors as it provides the whole range of drugs available for the treatment of a particular type of problem. *e.g.*, analgesics have pain killing effect, antiseptics kill or arrest the growth of microorganisms.
  - **(ii) On the basis of drug action :** It is based on the action of a drug on a particular biochemical process. *e.g.*, all histamines inhibit the action of the compound histamines, which causes inflammation of the body.
  - **(iii) On the basis of chemical structure :** Drugs which have common structural features and often have similar pharmacological activity. *e.g.*, sulphonamides have common structural feature.



(iv) On the basis of molecular targets : Drugs generally interact with biological macromolecules such as carbohydrates, proteins, lipids and nucleic acids called target molecules. This classification is based upon the type of the molecular target with which the drug interacts.

- Enzymes are the proteins which perform the role of biological catalysts in the body. Carrier proteins carry polar molecules across the cell membrane.
- **Catalytic action of enzymes :**

(i) The prime function of an enzyme is to hold the substrate for a chemical reaction. Active sites of enzymes hold the substrate molecule in a suitable position, such that it can be attacked by the reagents effectively. Substrates bind to the active site of the enzymes through many kinds of interactions like ionic bonding, hydrogen bonding, van der Waals or dipole-dipole interactions.

(ii) The second function of an enzymes is to provide functional groups that will attack the substrate and carry out chemical reaction.

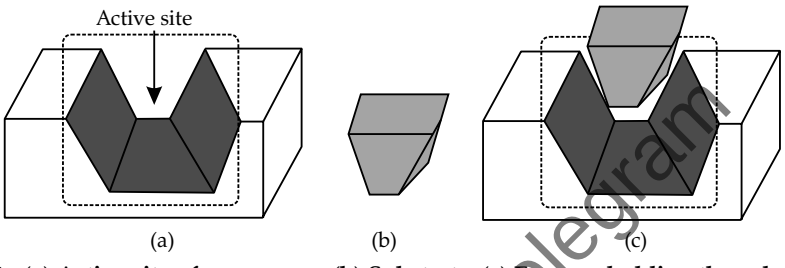
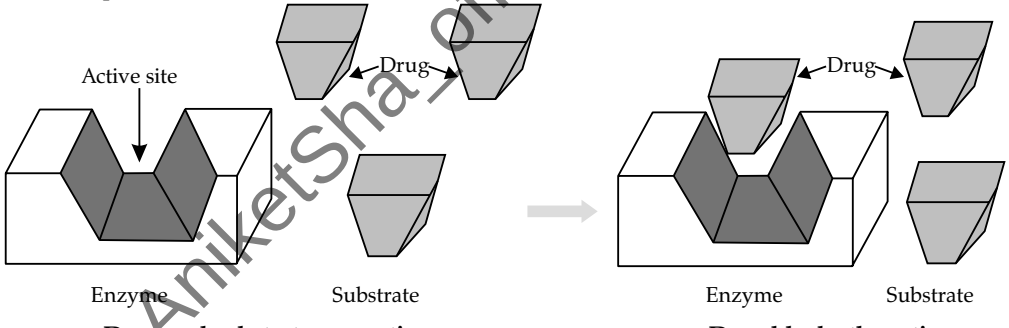


Fig. 1 : (a) Active site of an enzyme, (b) Substrate, (c) Enzyme holding the substrate

- **Drug-enzyme interactions :** Drugs can block the binding site of the enzyme and prevent the binding of substrate, or can inhibit the catalytic activity of the enzyme. Such drugs are called enzyme inhibitors.

Drugs inhibit the attachment of substrate on active site of enzymes in two ways :

(i) Drugs compete with natural substrate for their attachment on the active sites of enzymes. Such drugs are called competitive inhibitors.



Drug and substrate competing for active site of enzyme

Drug blocks the active site of enzyme

Fig. 2 : Drug and substrate competing for active site

(ii) Instead of joining to the enzyme's active site, some drugs bind to a different site of enzyme which is called allosteric site. This can change the shape of the active site in such a way that the substrate can't recognize it. If the bond formed between an enzyme and an inhibitor is a strong covalent bond and cannot be broken easily, then the enzyme is blocked permanently. The body then degrades the enzyme inhibitor complex and synthesises the new enzyme.

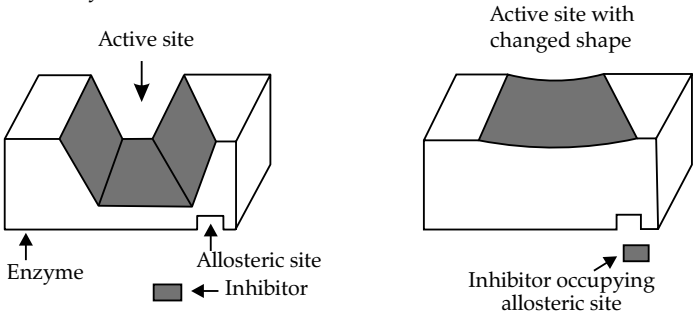


Fig. 3 : Non-competitive inhibitor changes the active site of enzyme after binding all allosteric site

- **Receptors as drug targets :** Proteins that are crucial to body's communication process are called as receptors. They are embedded in the cell membrane in such a way that their small part possessing active site projects out of the surface of the membrane and opens on the outside region of the cell membrane.

  Message between two neurons and that between neurons to muscles is communicated through chemical receptors. To accommodate a messenger, shape of the receptor site changes. This brings about the transfer of message into the cell. Thus, chemical messenger gives message to the cell without entering the cell.
- **Antagonists :** Drugs that bind to the receptor site and inhibit its natural function are called antagonists. These are useful when blocking of message is needed.
- **Agonists :** Drugs that mimic the natural messenger by switching on the receptor are called agonists. These are useful when there is lack of natural chemical messenger.
- **Types of drugs on the basis of therapeutic action :**
  - **(i) Analgesics :** These are the medicines which give relief from pain. They are of two types :
    - **(a) Non-narcotic (non-addictive) analgesics :** Aspirin (2-acetoxy benzoic acid), paracetamol, phenylbutazone or butazolidine etc. are the common examples of this group. Aspirin is the most common analgesic with antipyretic properties. Also has anti blood clotting action. It also reduces body temperature in fever.
    - **(b) Narcotic analgesics :** These are the drugs which produce sleep and unconsciousness *e.g.*, opium, alkaloids like morphine, codeine, heroine (morphine diacetate) etc. These are, however, addictive drugs, hence used in severe pain only.
  - **(ii) Antiseptic :** These are the chemicals which prevent the growth of microorganisms or kill them but are not harmful to human beings. These are applied externally to the living tissues such as wounds, cuts and diseased skin surfaces. Dettol (chloroxylenol + α-terpineol), bithional, furacin, dilute solution of boric acid are common example of antiseptics.
  - **(iii) Disinfectant :** These are chemicals which kill microorganisms or prevent their growth but are not safe for human beings. These are applied to inanimate objects such as floors, drainage systems. Some substances can act as an antiseptic as well as disinfectant by varying the concentration. For example, 0.2% solution of phenol is an antiseptic while its one percent solution is disinfectant.
  - **(iv) Tranquillizers :** It is a group of chemical substances which is used in the treatment of stress, and severe mental stress. These are essential component of sleeping pills and psychotherapeutic drugs. These are of two types :
    - **(a) Barbiturates :** (Derivatives of barbituric acid)—These are sleep inducing and hence also called hypnotics. *e.g.*, veronal, amytal, nembutal, luminal and seconal.
    - **(b) Non-hypnotic tranquillizers :** Chlordiazepoxide and meprobamate are relatively mild tranquillizers which are used for relieving tension. Equanil is another non hypnotic tranquillizer which is used for controlling depression and hypertension. Valium, serotonin, reserpine etc. are some other tranquillizers.
  - **(v) Antimicrobials :** These are drugs which are used to cure diseases caused by a variety of microbes such as bacteria, fungi, virus etc. Antibiotic, antiseptic and disinfectants etc. are all antimicrobials.
  - **(vi) Antibiotics :** These are the chemical substances (prepared wholly or partially by chemical synthesis) which in low concentration, either kill or inhibit the growth of microorganisms. Penicillin is a narrow spectrum antibiotic whereas ampicillin and amoxicillin are wide spectrum antibiotic which exerts antimicrobial activity on more than one type of microorganisms.
  - **(vii) Sulpha drugs :** These are derivatives of sulphanilamide. These have antibacterial powers and are used as medicines for various diseases. These are also used as antibiotics. Sulpha drugs are used against diseases like pneumonia, tuberculosis, diphtheria, etc. *e.g.* sulphadiazine, sulphathiazole.
  - **(viii) Antifertility drugs :** These are the chemical substances used to control the pregnancy in woman. *e.g.*, norethindrone and ethinylestradiol etc.
  - **(ix) Antihistamines :** These drugs are also called as anti allergy drugs and are used to treat allergy. *e.g.*, skin rashes, conjunctivitis, inflammation of conjunctiva of eye, and rhinitis (inflammation of nasal mucosa). *e.g.*, diphenhydramine, chlorpheniramine.
- **Antioxidants :** These are the other important and necessary food additives. These compounds retard the action of oxygen on the food and thereby help in its preservation. They also reduce the rate of involvement of free radicals in the aging process. *e.g.*, butylated hydroxy toluene (BHT) and butylated hydroxy anisole (BHA) are used as antioxidants.
- **Antacid :** An antacid is a substance that removes the excess of acid and raise the pH of stomach to appropriate level. The most commonly used antacids are magnesium hydroxide, magnesium carbonate and sodium bicarbonate etc.
- **Chemicals in food :** Chemicals are added to food for various purposes like, for preservation, for enhancing their appeal and for adding nutritive value etc. Some uses are discussed below :
  - **(i) Artificial Sweeteners :** These are the chemical compounds which are non-nutritive in nature and used as substituent for sugar in foods and beverages specially soft drinks. Some common artificial sweeteners are :
  - **(a) Saccharin :** It is useful as a sugar substitute for diabetic persons and those who need to control their calorie intake.

(b) Aspartame : It is methyl ester of dipeptide formed from aspartic acid and phenylalanine. Aspartame is used only in cold foods and soft drinks as it is unstable at cooking temperature.

(c) Alitame : It is a high potency sweetener. The control of sweetness of food is difficult while using alitame.

(d) Sucralose : It is trichloro derivative of sucrose. It is stable at cooking temperature.

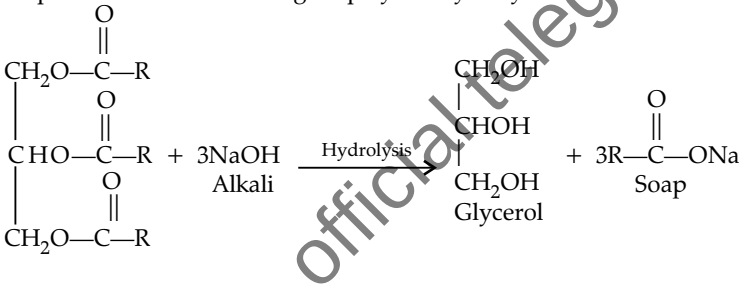
- **Food preservatives :** Food preservatives are the substances which are capable of inhibiting or arresting the process of fermentation, acidification of the food. *e.g.*, sodium benzoate, sodium metabisulphite.
- **Soaps :** Soaps are sodium or potassium salts of long chain fatty acids and are prepared by a process called saponification, in which fat reacts with alkali.
- **Synthetic detergent :** These are soapless soap and are of three types :

(a) Anionic detergents : These are sodium salts of sulphonated long chain alcohols or hydrocarbons. *e.g.*, sodium dodecylbenzene sulphonate these are used in toothpaste and household works.

(b) Cationic detergents : These are quaternary ammonium salts of amines with acetates, chlorides or bromides *e.g.*, cetyltrimethyl ammonium bromide and are expensive. These have germicidal property and are expensive.

(c) Non-ionic detergents : They do not contain any ion in their constitution. *e.g.*, liquid dishwash detergents.

- **Biodegradable and non-biodegradable detergents :** Detergents which contain straight chain hydrocarbons are biodegradable. On the other hand, detergents which have branched chain hydrocarbons are non-biodegradable and this leads to environmental pollution.
- **Saponification :** The process of manufacturing soap by the hydrolysis of oils and fats with aqueous alkalis.



Know the Terms

- **Neurologically active drugs :** The drugs which are used to cure tension and anxiety.
- **Hypnotics :** These are sleep inducing medicines.
- **Salting out of soap :** This is the process by which soap is separated from glycerol.
- **Fillers :** The chemical substances which are added to laundry soaps. *e.g.*, sodium silicate, borax etc.
- **Spectrum :** The full range of microorganism attacked by an antibiotic.
- **Hard soaps :** Sodium salts of fatty acids.
- **Soft soaps :** Potassium salts of fatty acids.

Very Short Answer-Objective Type Questions (1 mark each)

A. Multiple choice Questions:

Q. 1. Which of the following statements is not correct.

(a) Some antiseptics can be added to soaps.
(b) Dilute solutions of some disinfectants can be used as antiseptic.
(c) Disinfectants are antimicrobial drugs.
(d) Antiseptic medicines can be ingested.

U **[NCERT Exemp. Q. 1, Page 228]**

Ans. Correct option : (d)

Explanation : Antiseptic medicines such as antibiotics cannot be ingested. Antiseptics are applied to the living tissues such as wounds, cuts and diseased skin surfaces.

Q. 2. The most useful classification of drugs for medicinal chemists is :

(a) on the basis of chemical structure.
(b) on the basis of drug action.
(c) on the basis of molecular targets.
(d) on the basis of pharmacological effect.

R **[NCERT Exemp. Q. 4, Page 228]**

Ans. Correct option : (c)

Explanation : Biomolecules, such as carbohydrates, lipids, proteins and nucleic acids, are target molecules of drugs and usually interact with drugs. These drugs possess some common structural feature, may have the same mechanism of action on a specific drug target.

Q. 3. The compound that causes general anti-depressant action on the central nervous system belongs to the class of :

(a) analgesics. **(b) tranquillizers.**
(c) narcotic analgesics. **(d) antihistamines.**

R **[NCERT Exemp. Q. 8, Page 229]**

Ans. Correct option : (b)

Q. 4. Compound which is added to soap to impart antiseptic properties is _____.

(a) sodium laurylsulphate

(b) sodium dodecylbenzenesulphonate

(c) rosin

(d) bithional

R **[NCERT Exemp. Q. 9, Page 229]**

Ans. Correct option : (d)

Explanation : Bithional is added to soaps to reduce the odours produced by bacterial decomposition of organic matter on the skin due to its antiseptic properties.

Q. 5. Equanil is _____.

(a) artificial sweetener.

(b) tranquilizer.

(c) anti-histamine.

(d) anti-fertility drug.

R **[NCERT Exemp. Q. 10, Page 229]**

Ans. Correct option : (b)

Explanation : Equanil is a tranquilizer which is used in controlling depression and hypertension.

Q. 6. A narrow spectrum antibiotic is active against _____ .

(a) Gram-positive or Gram-negative bacteria.

(b) Gram-negative bacteria only.

(c) Single organism or one disease.

(d) Both Gram-positive and Gram-negative bacteria.

R **[NCERT Exemp. Q. 7, Page 229]**

Ans. Correct option : (a)

Explanation : A narrow spectrum antibiotic is active against Gram-positive or Gram-negative bacteria.

Q. 7. Which of the following will not enhance nutritional value of food?

(a) Minerals

(b) Artificial sweeteners

(c) Vitamins

(d) Amino acids

U **[NCERT Exemp. Q. 16, Page 231]**

Ans. Correct option : (b)

Explanation : Artificial sweeteners are non-caloric substitutes for sugar.

Q. 8. Which of the following enhances lathering property of soap?

(a) Sodium carbonate

(b) Sodium rosinate

(c) Sodium stearate

(d) Trisodium phosphate

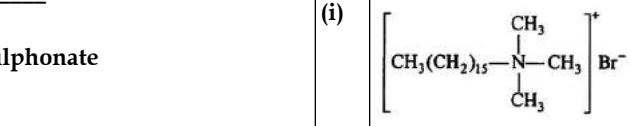
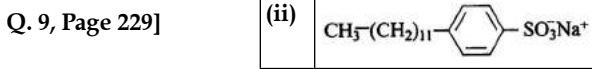
R **[NCERT Exemp. Q. 11, Page 230]**

Ans. Correct option : (b)

Explanation : A gum called rosin is added in soaps (e.g., shaving soaps) which form sodium rosinate that enhances lathering property of soap.

B. Match the following :

Q. 1. Match the detergents given in Column I with their uses given in Column II.

	Column I		Column II
(i)		(a)	Dishwashing powder
(ii)		(b)	Laundry soap
(iii)	$C_{17}H_{35}COO\ NA^+ + Na_2CO_3$ + Rosin	(c)	Hair conditioners
(iv)	$CH_3(CH_2)_{16}COO - (CH_2CH_2O)_n - CH_2 - CH_2OH$	(d)	Toothpaste

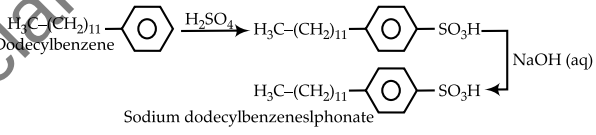
[NCERT Exemp. Q. 81, Page 236]

Ans. (i) → c, (ii) → d, (iii) → b, (iv) → a

Explanation :

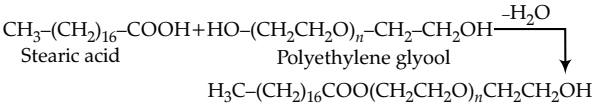
(i) Hair shampoos/conditioners are made up of cationic detergents. These are quaternary ammonium salts of amines with chlorides, bromides or acetates, *e.g.*, cetyltrimethyl ammonium bromide.

(ii) Anionic detergents are used in toothpaste *e.g.*, sodium dodecylbenzenesulphonate. It can be prepared as follows :



(iii) Laundry soaps contain fillers like sodium rosinate. Sodium silicate, borax and sodium carbonate. Sodium rosinate makes the soap to lather well.

(iv) Dishwashing powder are non-ionic detergents



C. Answer the following:

Q. 1. What are limited spectrum antibiotics ? Give one example ? R **[CBSE Delhi 2013]**

Ans. Narrow spectrum antibiotics are effective against a single organism or disease and referred to as limited spectrum antibiotics, *e.g.*, penicillin G. **1**

Answering Tip

- As it is a one mark question, answer only what is being asked in the question.

AI **Q. 2. What is meant by narrow spectrum antibiotics ?** R **[CBSE Foreign 2012]**

Ans. The antibiotics which kill or inhibit a short range of gram-positive or gram-negative bacteria are known as narrow spectrum antibiotics. **1**

Commonly Made Error

- Students often get confused between narrow and broad spectrum antibiotics.

Q. 3. State a reason for the following statement : The use of sweetener aspartame is limited to cold foods and drinks. A&E **[CBSE Foreign 2012]**

Ans. Because it is unstable at high temperature. **1**

Q. 4. What is the cause of a feeling of depression in human beings ? Name a drug which can be useful treating depression. AE + R **[CBSE OD 2011; KVS]**

Ans. Low level of noradrenaline is responsible for the feeling of depression in human beings. ½
Iproniazid is a drug, used to counteract the effect of depression. ½

Short Answer Type Questions (2 marks each)

AI **Q. 1. Explain the following terms with suitable examples :**
(i) Cationic detergents
(ii) Anionic detergents. R **[CBSE Delhi 2013]**

Ans. (i) Cationic detergents : These are quaternary ammonium salts of amines with acetates, chlorides and bromides, *e.g.*, cetyltrimethylammonium bromide. **1**

(ii) Anionic detergents : These are sodium salts of sulphonated long chain alcohols or hydrocarbons *e.g.*, sodium dodecylbenzene sulphonate. **1**

Q. 2. Describe and illustrate with an example, a detergent. R **[CBSE OD 2012]**

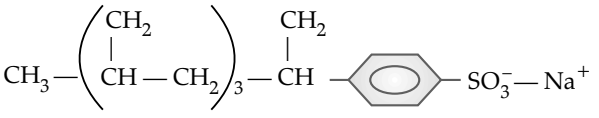
Ans. They are sodium or potassium salts of sulphonated long chain hydrocarbons *e.g.*, sodium alkyl benzene sulphonate *i.e.*, sodium dodecylbenzene sulphonate. **1**

1

AI **Q. 3. What are biodegradable and non-biodegradable detergents ? Give one example of each class.** R **[CBSE Foreign 2012; KVS]**

Ans. Biodegradable detergents : Detergents which are decomposed by microorganisms present in the environment are called biodegradable detergents. These detergents have linear alkyl chains. Sodium lauryl sulphate and sodium dodecylbenzene sulphonate are examples of biodegradable detergents. **1**

Non-biodegradable detergents : Detergents are those which are not degraded by microorganisms. Such detergents cause environmental problem. It is observed that such detergents contain branched chain which is not attacked by bacteria. Example of non-biodegradable detergents is given below :



Sodium 4 - (1, 3, 5, 7 - tetramethyloctal)
(Benzenesulphonate)

½ + ½

Q. 4. What are food preservatives ? Name two such substances. R **[CBSE OD 2012]**

Ans. Chemical substances which are used to protect food against bacteria, fungi are called food preservatives *e.g.*, sodium benzoate, sodium metabisulphite. **2**

Q. 5. Differentiate between disinfectants and antiseptics. Give one example of each group. U **[CBSE OD 2012]**

Ans. Disinfectant : These are chemicals which kill microorganisms or prevent their growth but are not safe for human beings. These are applied to inanimate objects such as floors, drainage systems. Some substances can act as an antiseptic as well as disinfectant by varying the concentration. For example, 0.2% solution of phenol is an antiseptic while its one percent solution is disinfectant.

Antiseptic : These are the chemicals which prevent the growth of micro-organisms or kill them but are not harmful to human beings. These are applied externally to the living tissues such as wounds, cuts and diseased skin surfaces. Dettol (chloroxylenol + α-terpineol), bithional, furacin, dilute solution of boric acid are common example of antiseptics. **1 + 1**

Q. 6. With reference to which classification has the statement, "ranitidine is an antacid" been given? C **[NCERT]**

Ans. The above 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. Antacids are the medicinal agents which decreases the excess level of hydrochloric acid in stomach. Ranitidine belongs to the class of Histamine receptors blockers, where they block the action of H_2 receptors present in stomach, which are responsible for the excess secretion of gastric acid in stomach. **2**

Long Answer Type Questions-I (3 marks each)

AI **Q. 1. What are the following substances ? Give one example of each one of them :**
(i) Tranquillizers,
(ii) Food preservatives,
(iii) Synthetic detergents. R **[CBSE Delhi 2012]**

Ans. (i) Tranquillizers : are chemicals compounds used for the treatment of stress and mild or even severe mental diseases. *e.g.*, equanil/meprobamate/veronal.
(Or any one correct example) ½ + ½

(ii) Food preservatives : are the compounds which prevent spoilage of food due to microbial growth. *e.g.,* sodium benzoate, vinegar.

(Or any one correct example) ½ + ½

(iii) Synthetic detergents : are cleansing agents which have all the properties of soap but actually do not contain any soap. *e.g.,* Sodium lauryl sulphate.

(or any one correct example) ½ + ½

[CBSE Marking Scheme 2012]

Answering Tip

- Write the answer followed by example. Avoid unnecessary explanations.

Q. 2. (i) What are disinfectants ? Give an example.

(ii) Give two examples of macromolecules that are chosen as drug target.

(iii) What are anionic detergent ? Give an example.

R **[CBSE Delhi 2014]**

Ans. (i) Disinfectants are the chemicals which kill or prevent the growth of microorganisms.
For example : 1% solution of phenol. ½ + ½

(ii) Proteins, Nucleic acid. ½ + ½

(iii) Anionic detergents are sodium salts of sulphonated long chain alcohols or hydrocarbons. In anionic detergents, the anionic part of the molecule is involved in the cleansing action. ½

Example : Sodium lauryl sulphate, sodium dodecylbenzene sulphonate (any one) ½

[CBSE Marking Scheme 2014]

Q. 3. Define the following :

(i) Anionic detergents

(ii) Broad spectrum antibiotics

(iii) Antiseptic R **[CBSE Delhi Set-1 2017]**

Ans. (i) Anionic detergents are sodium salts of sulphonated long chain alcohol or hydrocarbons/ alkylbenzene sulphonate or detergents whose anionic part is involved in cleansing action. **1**

(ii) Broad spectrum antibiotics: Antibiotics which kill or inhibit a wide range of Gram-positive and Gram-negative bacteria. **1**

(iii) Antiseptic are the chemicals which either kill or prevent growth of microbes on living tissue. **1**

[CBSE Marking Scheme 2017]

Q. 4. Define the following :

(i) Cationic detergent

(ii) Narrow spectrum antibiotics

(iii) Disinfectant R **[CBSE Delhi Set-2 2017]**

Ans. (i) Cationic detergents are quaternary ammonium salts of amines with acetates chlorides or bromides as anions, cationic part has long chain hydrocarbons/detergents whose cationic part is involved in cleansing action. **1**

(ii) Narrow spectrum antibiotics are effective mainly against Gram-positive and gram-negative bacteria **1**

(iii) Disinfectants kill or prevent growth of microbes and are applied on inanimate/non-living objects **1**

[CBSE Marking Scheme 2017]

Q. 5. Define the following :

(i) Anionic detergents :

(ii) Limited spectrum antibiotics

(iii) Tranquillizers R **[CBSE Delhi Set-3 2017]**

Ans. (i) Anionic detergents are sodium salts of sulphonated long chain alcohol or hydrocarbons/ alkylbenzene sulphonate or detergents whose anionic part is involved in cleansing action. **1**

(ii) Limited spectrum antibiotics are effective against a single organism or disease. **1**

(iii) Tranquillizers are class of chemicals used for treatment of stress or mild or severe mental disease.

[CBSE Marking Scheme 2017] 1

Q. 6. Define the following :

(i) Anionic detergents

(ii) Narrow Spectrum antibiotics

(iii) Antacids R **[CBSE OD Set-2 2017]**

Ans. (i) Anionic detergents are sodium salts of sulphonated long chain alcohol or hydrocarbons/ alkylbenzene sulphonate or detergents whose anionic part is involved in cleansing action. **1**

(ii) Narrow spectrum antibiotics are effective mainly against Gram-positive and gram-negative bacteria. **1**

(iii) Chemical compound which are used for the treatment of excess acid produced in the stomach.

[CBSE Marking Scheme 2017] 1

OR

(16) (a) Anionic Detergents

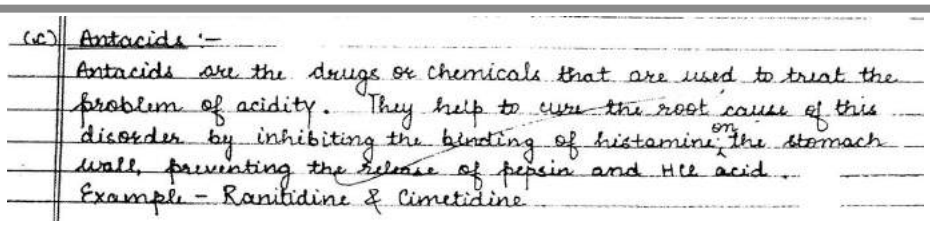
The detergents which are sodium salts of long chain sulphonate hydrocarbons are called anionic detergents. In such detergents, the micelles are formed by the long chain hydrocarbon (hydrophobic) and sulphate ion (hydrophilic and negatively charged).

Example

Sodium-n-dodecyl benzene sulphonate.

(b) Narrow Spectrum Antibiotics :-

The antibiotics which are effective against either gram positive or Gram negative bacteria are called narrow spectrum antibiotics. Penicillin-G has a narrow spectrum.


(c) Antacids :–
Antacids are the drugs or chemicals that are used to treat the problem of acidity. They help to cure the root cause of this disorder by inhibiting the binding of histamine on the stomach wall, preventing the release of pepsin and HCl acid.
Example – Ranitidine & Cimetidine
3
[Topper's Answer 2017]

Q. 7. (i) Name a substance which can be used as an antiseptic as well as disinfectant.
(ii) Name an artificial sweetener whose use is limited to cold food and drinks.
(iii) What are cationic detergents?
R **[CBSE Comptt. OD Set-1, 2, 3 2017]**

Ans. (i) Phenol / 0.2% phenol is antiseptic while 1% is disinfectant. **1**
(ii) Aspartame. **1**
(iii) Cationic detergents are quaternary ammonium salts of amines with acetates, chlorides or bromides anions/Cationic part has a long chain hydrocarbons which is involved in cleansing action. **1**
[CBSE Marking Scheme 2017]

AI **Q. 8. Write the therapeutic action of following on human body and mention the class of drugs to which each of these belong :**
(i) Ranitidine
(ii) Morphine
(iii) Aspirin R **[CBSE Comptt. Delhi Set-1, 2 2017]**

Ans. (i) Treatment of hyperacidity ½
Class : Antacids ½
(ii) Relieve pain and produce sleep ½
Class : Narcotic analgesics ½
(iii) Relieve pain and reduce fever ½
Class : Non- Narcotic analgesics / Analgesics ½
[CBSE Marking Scheme 2017]

Q. 9. Write the therapeutic action of following on human body and mention the class of drugs to which each of these belong :
(i) Equanil
(ii) Aspirin
(iii) Chloramphenicol
R **[CBSE Comptt. Delhi Set-3 2017]**

Ans. (i) Controlling depression and hypertension ½
Class : Tranquillizers ½
(ii) Relieve pain and reduce fever ½
Class : Non- Narcotic analgesics / Analgesics ½
(iii) Kills or inhibits the growing of micro organisms ½
Class : Antibiotic ½
[CBSE Marking Scheme 2017]

Q. 10. (i) Give two examples of macromolecules that are chosen as drug targets.
(ii) What are antiseptics ? Give an example.
(iii) Why is the use of aspartame limited to cold foods and soft drinks ? R + A&E **[CBSE Delhi 2014]**

Ans. (i) Carbohydrates, lipids, proteins, enzymes, nucleic acids **(Any two)**. ½ + ½
(ii) Antiseptics are the chemical substances which are used to kill or prevent the growth of microbes, *e.g.*, Dettol/Iodoform/Boric acid/phenol (or any other correct example). ½ + ½
(iii) Because it is unstable at cooking temperature. **1**
[CBSE Marking Scheme 2014]

Q. 11. (i) Name sweetening agent used in the preparation of sweets for a diabetic patient.
(ii) What are antibiotics ? Give an example.
(iii) Give two examples of macromolecules that are chosen as drug targets. R **[CBSE Delhi 2014]**

Ans. (i) Sucralose (or any other) **1**
(ii) Antibiotics are the chemical substances that inhibit the growth or even destroy microorganisms. ½
Example : Ofloxacin, Chloramphenicol (or any other) ½
(iii) Proteins, Nucleic acid. ½ + ½
[CBSE Marking Scheme 2014]

Q. 12. (i) Which one of the following is a food preservative equanil, morphine, sodium benzoate ?
(ii) Why is bithional added to soap ?
(iii) Which class of drug is used in sleeping pills ?
R + A&E **[CBSE Delhi 2013]**

Ans. (i) Sodium benzoate is a food preservative. **1**
(ii) Bithional is added to soaps to reduce the odours produced by bacterial decomposition of organic matter on the skin due to its antiseptic properties. **1**
(iii) Tranquillizers are used in sleeping pills. **1**

Q. 13. (i) What class of drug is ranitidine ?
(ii) If water contains dissolved Ca^{2+} ions, out of soaps and synthetic detergents, which will you use for cleaning clothes ?
(iii) Which of the following is an antiseptic ?
0.2% phenol, 1% phenol. R + U **[CBSE OD 2013]**

Ans. (i) It is an antacid and helps in removing acidity of stomach. **1**
(ii) As the water contain Ca^{2+} ions, therefore it is hard water. Hence synthetic detergents are preferred over the soaps for cleaning the clothes because calcium salts of detergents are soluble in water while calcium salts of soap are insoluble. As a result, lot of soap is wasted. **1**

(iii) 0.2% solution of phenol is used as an antiseptic whereas 1% solution of phenol acts as a disinfectant. **1**

Q. 14. (i) Pick out the odd one from among the following on the basis of their medicinal properties mentioning the reason : Luminal, Seconal, Phenacetin, Equanil.

(ii) Give an example of a substance that can act as a disinfectant as well as antiseptic depending upon its concentration. (Specify concentration)

(iii) Name any two macromolecules chosen as drug targets. R **[CBSE SQP 2016]**

Ans. (i) Phenacetin is an antipyretic, while the rest are tranquillizers. ½ + ½

(ii) 0.2% solution of phenol acts as antiseptic whereas 1% solution of phenol acts as disinfectant. **1**

(iii) Carbohydrates, proteins, nucleic acids, lipids.

(Any two) ½ + ½

Q. 15. (a) Why is bithional added to soap ?

(b) What is tincture of iodine ? Write its one use.

AI **(c) Among the following, which one acts as a food preservative ?**

Aspartame, Aspirin, Sodium Benzoate, Paracetamol A&E + R **[CBSE Delhi/OD 2018]**

Ans. (a) To impart antiseptic properties **1**

(b) 2-3% solution of iodine in alcohol – water mixture / iodine dissolved in alcohol , used as an antiseptic/ applied on wounds. ½+½

(c) Sodium benzoate / Aspartame **1**

[CBSE Marking Scheme 2018]

Detailed Answer:

(a) Bithional is added to the toilet soap to remove the bad odour produced by bacterial decomposition on skin and impart antiseptic properties. **1**

(b) Tincture iodine is 2-3% elemental iodine, along with KI or NaI dissolved in a mixture of ethanol and water.

It is used as an antiseptic for wounds. ½+½

Commonly Made Error

- The students usually mix up the examples and are not able to identify the medicinal properties of drugs given in the question.

Answering Tip

- Learn examples of all the types of drugs mentioned in the chapters carefully.

Q. 16. Give reasons for the following:

(i) Use of aspartame as an artificial sweetener is limited to cold foods.

(ii) Metal hydroxides are better alternatives than sodium hydrogen carbonate for treatment of acidity.

(iii) Aspirin is used in prevention of heart attacks.

A&E **[CBSE SQP 2018-2019]**

Ans. (i) It is unstable at cooking temperature. **1**

(ii) Excessive hydrogencarbonate can make the stomach alkaline and trigger the production of even more acid. Metal hydroxides being insoluble do not increase the pH above neutrality. **1**

(iii) Aspirin has anti blood clotting action. **1**

[CBSE Marking Scheme 2018]

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