

- Q1. List two major classes of antibiotics and give one example of each class.
- Q2. Describe the following type of substance, giving suitable example : antiseptics.
- Q3. Describe the following giving a suitable example: antioxidants.
- Q4. Define the following and given one example : Tranquilizers.
- Q5. Describe and illustrate with an example, a detergent.
- Q6. Name a food preservative which is most commonly used by food producers.
- Q7. Name a substance that can be used as an antiseptic as well as disinfectant.
- Q8. Write the formula and IUPAC name of aspirin. Why should it not be taken on empty stomach?
- Q9. Soap is a weak antiseptic. What may be added to soaps to improve its antiseptic action?
- Q10. How are antiseptics different from disinfectants? Give one example of each of them.
- Q11. State an example and function of the following : wide spectrum antibiotics.
- Q12. Name one medicinal compound each that is used to treat (i) hypertension (ii) general body pain.
- Q13. Give an example of a narcotic which is used as an analgesic.
- Q14. Why is bithional added to toilet soap?
- Q15. Write the formula for sulphanilic acid and mention any one of its uses.
- Q16. What type of drug is chloramphenicol?
- Q17. Give one important use of each of the following in pharmacy:
(a) Equanil (b) Morphine
- Q18. Pick out the odd amongst the following compounds on the basis of their medicinal properties mentioning the reason : luminal, seconal phenacetin and equanil.
- Q19. What type of drug penicillin is?
- Q20. What is the use of a compound which is obtained from the bark of willow tree?
- Q21. Name a medicine which can act as analgesic as well as antipyretic. Give its chemical name.
- Q22. Why is ethanol added to soap?
- Q23. What type of drug phenacetin is?
- Q24. Pick out the odd one from the following on the basis of their medicinal properties mentioning the reason:
Chloroxylenol, phenol, chloramphenicol, bithional.

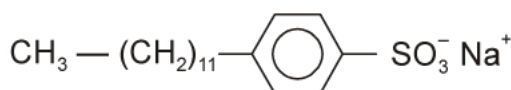
- Q25. Why is paracetamol preferred over aspirin?
- Q26. Give two examples of organic compounds used as antiseptics.
- Q27. Name a drug used in case of mental depression.
- Q28. Amoxicillin is semi-synthetic modification of.....
- Q29. What is the use of derivatives of barbituric acid?
- Q30. What is the use of the plant Rauwolfia serpentina in Ayurveda?
- Q31. Define soap.
- Q32. Name two narcotics which are used as analgesics.
- Q33. Name the chemical responsible for the antiseptic properties of dettol.
- Q34. What are food preservatives?
- Q35. What is tincture of iodine? What is its use?
- Q36. What are the main constituents of dettol?
- Q37. Why are cimetidine and ranitidine better antacids than sodium hydrogen carbonate of magnesium or aluminium hydroxide?
- Q38. What is meant by the term 'broad spectrum antibiotics'? Explain.
- Q39. While antacids and antiallergic drugs interfere with the function of histamines, why these not interfere with the function of each other?
- Q40. Which forces are involved in holding the drugs to the active site of enzymes?
- Q41. Define the terms chemotherapy.
- Q42. Why should not medicines be taken without consulting doctors?
- Q43. What problem arises in using alitame as artificial sweetener?
- Q44. Name the sweetening agent used in the preparation of sweets for a diabetic patient.
- Q45. Can you use soaps and synthetic detergents to check the hardness of water?
- Q46. Why do soaps not work in hard water?
- Q47. Explain the cleansing action of soaps.
- Q48. What are artificial sweetening agents? Give two examples.
- Q49. How are synthetic detergents better than soaps?
- Q50. Why is use of aspartame limited to cold foods and drinks?
- Q51. Mention one important use of each of the following:
(a) Equanil (b) sucralose
- Q52. State the functional along with one example each of : (i) antihistamines (ii) antioxidants.
- Q53. What are biodegradable and non-biodegradable detergents? Give one example of each class.

- Q54. Name a broad spectrum antibiotic and state two diseases for which it is prescribed.
- Q55. Define the following and give one example of each:
(a) Antipyretics (b) Antibiotics
- Q56. Describe the following giving an example, Antifertility drugs.
- Q57. Describe the following with examples:
(a) Preservatives (b) Biodegradable detergents
- Q58. Name the medicines used for the treatment of the following diseases:
(a) Tuberculosis (b) Typhoid
- Q59. Describe the following with an example each : (a) Antimicrobials (b) Analgesics.
- Q60. What for is each of the following medicines used? (a) Equanil (b) Bithional.
- Q61. Sulpha drugs work like antibiotics but they are not antibiotics. Is this a valid statement and why? Give one example of sulpha drug and antibiotics.
- Q62. What are antipyretic medicines? Name of them. Can it play any other role also?
- Q63. Write the formula of paracetamol. What is it used for in medicine ?
- Q64. Give three examples of sulpha drugs and write main uses.
- Q65. Give one important use of each of the following:
(a) Bithional (b) Chloramphenicol (c) Streptomycin (d) Paracetamol
- Q66. Name the action of the following on the human body:
(a) Aspirin (b) Penicillin (c) Phenacetin (d) Morphine
- Q67. Describe the functions of antibiotics and antiseptics. Give one example of each.
- Q68. What do you understand by broad spectrum antibiotics? Is penicillin a broad spectrum antibiotic? Name a place in India where penicillin is manufactured.
- Q69. Name the action of the following on the human body:
(a) Analgin (b) Luminal (c) seconal (d) Streptomycin
- Q70. Why do we need to classify drugs in different ways?
- Q71. Name the drug used in
(a) Typhoid (b) tuberculosis (c) pneumonia
- Q72. Low level of noradrenaline is the cause of depression. What type of drugs are needed to cure this problem? Name two drugs.
- Q73. Explain in term, target molecules drug targets as used in medicinal chemistry.
- Q74. (a) What is the problem with hard water for washing clothes with soap?
(b) Explain the following terms:
(i) Broad spectrum antibiotics (ii) Non-ionic detergents.
- Q75. What are detergents? How are they classified? Why are detergents preferred over soaps?
- Q76. Mention one use each of the following drugs:
(a) Ranitidine (b) Paracetamol (c) Tincture of iodine

- Q77. If water contains dissolved calcium hydrogencarbonate, out of soaps and synthetic detergents, which one will you use for cleaning clothes?
- Q78. Explain the following terms with suitable example:
(a) Cationic detergents (b) anionic detergents and (c) non-ionic detergents.
- Q79. What are biodegradable and non-biodegradable detergents? What are the consequences of using latter class of detergents?
- Q80. Define the following and give one example of each:
(a) Antihistamines, (b) Antacids
- Q81. Label the hydrophilic and hydrophobic parts in the following compounds:
(a) $\text{CH}_3(\text{CH}_2)_{10}\text{CH}_2\text{OSO}_3^- \text{Na}^+$ (b) $\text{CH}_3(\text{CH}_2)_{15} - \overset{+}{\text{N}}(\text{CH}_3)_3\text{Br}^-$
(c) $\text{CH}_3(\text{CH}_2)_{16}\text{COO}(\text{CH}_2\text{CH}_2\text{O})_n\text{CH}_2\text{CH}_2\text{OH}$

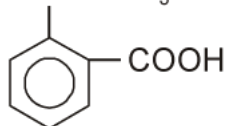
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- S1.** Narrow spectrum: penicillin.
Wide spectrum: Chloramphenicol
- S2.** Chemicals which prevent the growth of microorganisms without affecting living tissues are called antiseptics. For example, 0.2 % solution of phenol.
- S3.** Chemicals which are used to prevent oxidation and spoilage of food are called antioxidants. For example, butylated hydroxy anisole.
- S4.** Drugs which reduce anxiety and produce of feeling of well-being are called tranquilizers. For example, equanil and seconal.
- S5.** Sodium dodecylbenzenesulphonate whose structure is given below is an example of detergent.



- S6.** Common salt (NaCl) is used as food preservative.
- S7.** 0.2% solution of phenol is used as an antiseptic while 1% solution of phenol is used as disinfectant.

- S8.** OCOCH_3 Aspirin or 2-Acetoxybenzoic acid



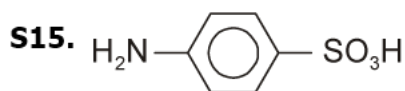
It generates salicylic acid on hydrolysis. Therefore, it should not be taken on empty stomach. The acid might damage cell walls.

- S9.** Bithional is added to soaps to improve its antiseptic properties.
- S10.** Antiseptics are chemicals which prevent the growth of microorganisms without affecting living tissues. For example, furcine, soframicyne, 0.2% solution of phenol.
Disinfectants are chemicals which kill microorganisms in toilets, sewage line, etc. They are harmful to living tissues. For example, 1% solution of phenol.
- S11.** Chloramphenicol is a wide spectrum antibiotic. It is used for the treatment of typhoid, dysentery, meningitis and acute fever. It is effective against a number of microorganisms.

- S12.** (a) Rauwolfia (b) Aspirin.

- S13.** Morphine.

S14. Bithional is added to soap to impart antiseptic properties. Its presence reduces undesirable odours resulting from bacterial decomposition.



It is used in the manufacture of dyes and drugs.

S16. It is a wide spectrum antibiotic. It is effective against a number of microorganisms.

S17. (a) Equanil is used as a tranquilizer used for the treatment of mental diseases.

(b) Morphine is a narcotic used for treating acute pain.

S18. Phenacetin is analgesic and antipyretic while others are tranquilisers (anti-depressants).

S19. Penicillin is an antibiotic.

S20. The compound is used as analgesic.

S21. Aspirin acts both as analgesic and antipyretic.

Its chemical name is : 2-acetoxybenzoic acid.

S22. Ethanol is added to make transparent soap.

S23. Phenacetin is an analgesic and antipyretic drug.

S24. Chloramphenicol is an antibiotic while others are antiseptics.

S25. Aspirin get hydrolysed to form salicylic acid which damages cell walls whereas paracetamol does not harm the cell walls. Secondly, aspirin cannot be given to ulcer patients.

S26. Phenol (0.2%), iodoform.

S27. Equanil is used in case mental depression.

S28. Penicillin.

S29. They are used as tranquilizers.

S30. It is used for lowering blood pressure

S31. Soap is sodium or potassium salt of higher fatty acid. For example, sodium stearate and sodium palmitate.

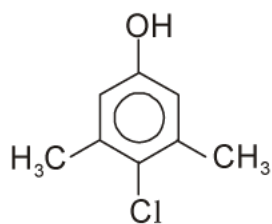
S32. Morphine and codeine are narcotics which are used as analgesics.

S33. Chloroxylenol and terpineol.

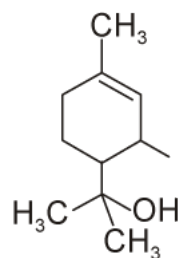
S34. Chemicals which are used to protect food against bacteria, yeasts and moulds are called preservatives. For example, sodium benzoate, sodium metabisulphite, etc.

S35. 2 – 3% solution of iodine in alcohol and water is called tincture of iodine. It is a powerful antiseptic. It is applied on wounds.

S36. Chloroxylenol and α -terpineol in a suitable solvent.



Chloroxylenol



Terpineol

S37. Sodium hydrogen carbonate or magnesium or aluminium hydroxide neutralises the excess HCl and raises the pH to an appropriate level in stomach. Therefore, these antacids control only the interaction of histamine with the receptors present in the stomach wall and thus release smaller amount of the acid.

S38. Broad spectrum antibiotics are effective against several different types of harmful bacteria. For example, tetracycline, chloramphenicol, ofloxacin, etc. Chloramphenicol can be used to cure typhoid, dysentery, acute fever, urinary infections, meningitis and pneumonia.

S39. Drugs designed to cure some ailment in one organ in the body do not produce affect to the other because they work on different receptors. For example, secretion of histamine causes allergy. It also causes acidity due to release of hydrochloric acid in the stomach. Since antiallergic and antacids drugs work on different receptors, therefore, antihistamines remove allergy while antacids remove acidity.

S40. One of more of hydrogen bonding, dipole-dipole interactions and van der Waals' interactions are involved in binding the drugs to active site.

S41. The branch of chemistry which deals with the treatment of diseases using chemicals is called chemotherapy. Analgesics, antipyretics, tranquilizers, antibiotics, etc., are used for chemotherapy.

S42. Side effects are caused when a drug binds to more than one receptor site. Therefore, a doctor must be consulted to choose the right drug which has the maximum affinity for a particular receptor site to have the desired effect and to keep off the side effect.

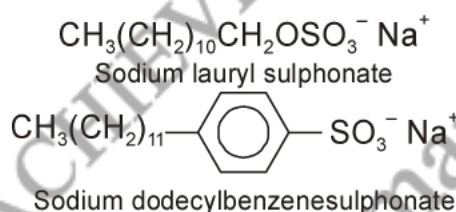
Further, does of the drug is also crucial because some drugs like opiates act as poisons and may cause death in higher doses.

S43. Alitame is a high potency artificial sweetener. It is 2000 times as sweet as ordinary sugar. Therefore, it is difficult to control the sweetness of the food to which it is added.

S44. Sucrolose is an appropriate sweetening agent because it is stable at cooking temperature.

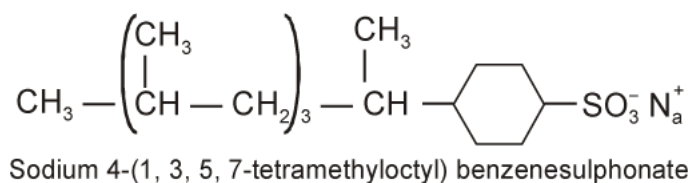
S45. Soaps get precipitated as insoluble calcium and magnesium soaps in hard water but detergents do not. Therefore, soaps but not synthetic detergents can be used to check the hardness of water.

- S46.** Hard water contains calcium and magnesium salts. Therefore, in hard water soaps get precipitated as calcium and magnesium soaps which being insoluble stick to the clothes as gummy mass and hinder the cleansing process.
- S47.** Above a certain concentration soap forms micelle with water. The hydrocarbon or non polar part of the soap molecule is oriented towards grease on the cloth, and the polar part is oriented towards water. With excess of water, the micelles containing dirt and grease particles are washed away.
- S48.** Artificial sweeteners are chemical substances which are sweet in taste but do not add any calories to our body. They are excreted as such through urine. For example, saccharin, aspartame, sucralose, etc.
- S49.** Synthetic detergents can be used in hard water as well in acidic solution. For example, in the case of anionic detergents sulphonic acids and their calcium and magnesium salts soluble in water. But the fatty acids and their calcium and magnesium salts in case of soaps are insoluble producing scum's which hinders the cleansing action.
- S50.** Aspartame decomposes at baking or cooking temperatures and hence can be used only in cold foods and drinks.
- S51.** (a) Equanil is tranquilizer.
(b) Surcralose is artificial sweetener.
- S52.** (a) Antihistamines are those drugs which counteract the effect of histamine which is generated in body due to allergy. Diphenylhydramine, promethazine and chlorpheniramine are example of antihistamines.
(b) Antioxidants are those chemicals which prevent oxidation of food and other materials. BHA (Butylated hydroxyl anisole) and BHT (Butylated hydroxyl toluene) are example of antioxidants.
- S53.** Biodegradable detergents are those detergents which are degraded by microorganisms and do not cause environmental problem. Examples of biodegradable detergents are given below :



It may be noted that biodegradable detergents have linear alkyl chains which are easily decomposed by bacteria.

Non-biodegradable detergents are those which are not degraded (decomposed) by micro-organisms. Such detergents cause environmental problem. It is observed that such detergents contain branched chain which is not attacked by bacteria. Example of non-biodegradable detergent is given below:



S54. Chloramphenicol is a broad spectrum antibiotic. It is used for the treatment of typhoid and dysentery.

S55. (a) **Antipyretics** : Drugs used for reducing the fever are known as antipyretics.

For examples : Aspirin and Paracetamol.

(b) **Antibiotics**: Drugs which kill or prevent the growth of bacteria and other microorganisms are called antibiotics.

For example, streptomycin and penicillin.

S56. Antifertility drugs: Drugs which control the birth of the child are called antifertility drugs. For example, Mifepristone and Progesterone.

S57. (a) **Preservatives**: Those chemicals which are used to prevent food from spoilage are called preservatives. For example, sodium benzoate.

(b) **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 dodecylbenzenesulphonate are example of biodegradable detergents

S58. (a) Streptomycin

(b) Chloramphenicol

S59. (a) **Antimicrobials**: Those drugs which kill microbes (microorganisms) are called antimicrobials. For example erythromycin, penicillin, tetracycline, lysozyme.

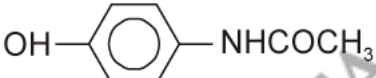
(b) Analgesics are those drugs which are used as pain relievers. For example. aspirin.

S60. (a) Equanil is used as tranquilizer for mental depression.

(b) Bithional is used as an antiseptic.

S61. Sulpha drugs are not obtained from microorganisms, therefore, they are not antibiotics. It is valid statement. Sulphadiazine is sulpha drug, tetracycline is antibiotic.

S62. Antipyretics are medicines which bring down the temperature of feveral body. For example, phenacetin. They act as analgesics (pain reliever) also.

S63. 

It is used as antipyretic.

S64. (a) Sulphadiazine.

(b) Sulphaguanidine

(c) Sulphanilamide

They are used in place of antibiotic to prevent the growth of microorganisms. They are used in sorethroat, cough and bronchitis.

- S65.** (a) Bithional is added to soaps so as to impart antiseptic properties.
- (b) Chloramphenicol is broad spectrum antibiotic used for curing typhoid, meningitis, dysentery, etc.
- (c) Streptomycin is used for treatment of T.B. (Tuberculosis).
- (d) Paracetamol is antipyretic and is used in bringing down temperature of febrile body.
- S66.** (a) **Aspirin** is an analgesic which is used relieving pain. It also prevents heart attack.
- (b) **Penicillin** is an antibiotic used against large number of infections caused by various cocci, gram positive bacteria, etc. It is an effective drug for pneumonia, bronchitis and sore throat.
- (c) **Phenacetin** is an antipyretic drug used to bring down temperature of body.
- (d) **Morphine** is a strong analgesic. It is a narcotic. It causes addiction. It gives relief from acute pain, induces sleep and unconsciousness is higher doses.
- S67.** According to latest definition, an antibiotic is a substance, produced wholly or partly by chemical synthesis, which in low concentrations inhibits the growth or destroys microorganisms by intervening in their metabolic processes. For examples, tetracycline is an antibiotic.
- Antiseptics are those chemicals which prevent the growth of microorganisms on wounds without harming living tissues. They are used externally, for example, Dettol.
- S68.** Broad spectrum antibiotics are used in treatment of diseases caused by wide range of microorganisms. Penicillin is narrow spectrum antibiotic. It is being manufactured at the Hindustan Antibiotics in Pimpri and IDPL, Rishikesh (Uttarakhand).
- S69.** (a) **Analgin** is antipyretic and analgesic. It brings down temperature of body and gives relief from pain.
- (b) **Luminal** Induces sleep and is habit forming. It is also called sedative tranquilizer.
- (c) **Seconal** is an antidepressant (tranquilizer). Sometimes the patients are highly depressed and lose self-confidence. This drug produces feeling of well-being and improves efficiency.
- (d) **Streptomycin** is an antibiotic. It is used to cure tuberculosis.
- S70.** To study different aspects of drugs, we need to classify them in different ways. Drugs have usefulness been classified depending (i) upon their pharmacological effect, (ii) upon their action particular biochemical process, (iii) on the basis of their chemical structure, and (iv) on the basis of molecular targets. Each classification has its own utility.

Classification on the basis of pharmacological effect is useful for doctors because it provides them the whole range of drugs available for the treatment of a particular problem.

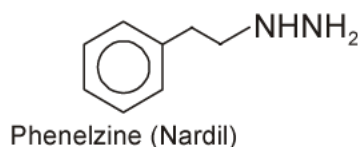
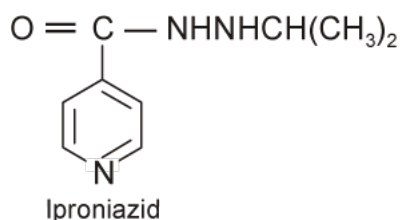
Classification on the basis of action on a particular biochemical process is useful for choosing the correct lead compound for designing the synthesis of a desired drug.

Classification on the basis of chemical structure helps us to design the synthesis of a number of structurally similar compounds having different substituents and then choosing the drug having least toxicity and giving best results.

Classification on the basis of molecular targets is useful for medicinal chemists so that they can design a drug which is most effective for a particular receptor site.

- S71.** (a) **Typhoid:** Chloramphenicol
 (b) **Tuberculosis:** Streptomycin
 (c) **Pneumonia:** Penicillin

S72. When the level of neurotransmitter, noradrenaline becomes low, antidepressant drugs are required. These drugs inhibit the enzymes which catalyse the degradation of noradrenaline. If the enzyme is inhibited, noradrenaline is slowly metabolised and hence activates its receptor for longer periods of time thereby reducing depression. Two important drugs are iproniazid and phenelzine (nardil).



S73. A knowledge of the physiological function of the drug target in the body helps us to choose a compound which can interact with the target.

These compounds are called lead compounds and drugs are designed using these compounds.

Drugs interact with macromolecules like proteins, carbohydrates, lipids and nucleic acids and hence these are called target molecules or drug targets. Proteins perform several roles in the body. Proteins which act as biological catalysts are called enzymes, those which are involved in communication system are called receptors. Carrier proteins carry polar molecules across the cell membrane. Nucleic acids have coded genetic information in the cell while, lipids and carbohydrates form structural part of cell membranes.

S74. (a) Hard water contains calcium ions which with soap to form calcium salt of soap which is insoluble in water. This forms scum and the soap goes waste.

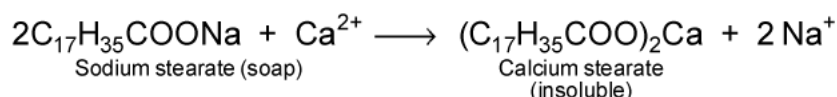


- (b) (i) **Broad spectrum antibiotics:** These are the medicines which are effective against several harmful microorganisms. Tetracycline, and chloramphenicol are examples of this type of antibiotics. Chloramphenicol is used to cure typhoid, dysentery, acute fever, urinary infectious, meningitis and pneumonia.
- (ii) **Non-ionic detergents:** Esters of high molecular mass formed by reaction between polyethylene glycol and stearic acid act as non-ionic detergents

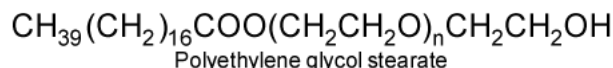


As it is an ester, it is non-ionic.

S75. (a) Hard water contains calcium ions which with soap to form calcium salt of soap which is insoluble in water. This forms scum and the soap goes waste.



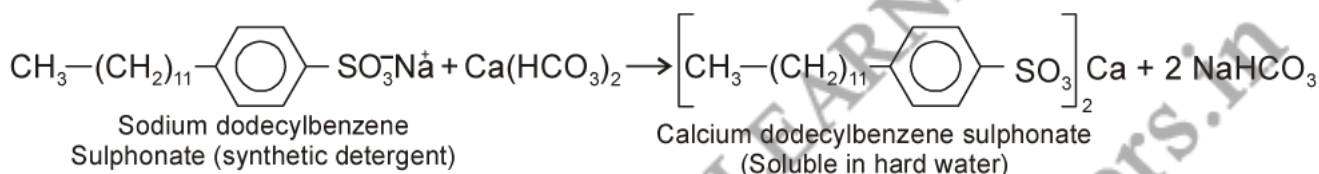
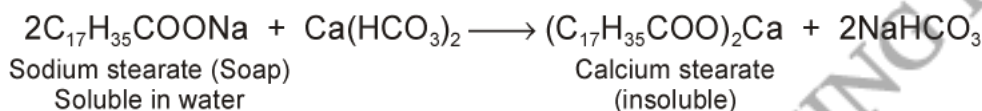
- (b) (i) **Broad spectrum antibiotics:** These are the medicines which are effective against several harmful microorganisms. Tetracycline, and chloramphenicol are examples of this type of antibiotics. Chloramphenicol is used to cure typhoid, dysentery, acute fever, urinary infectious, meningitis and pneumonia.
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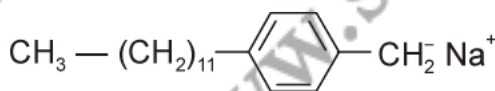
As it is an ester, it is non-ionic.

- S76.** (a) Ranitidine is used as antacid.
 (b) Paracetamol is used as analgesic and antipyretic drug.
 (c) Tincture of iodine is used as antiseptic.

S77. Water containing calcium hydrogen carbonate is hard water. Calcium ions react with soap to form calcium salts of soap which are insoluble. They form a gummy mass and stick to the clothes. This difficulty does not arise when we use detergents because calcium salts of detergents are soluble in water.



- S78.** (a) **Cationic detergents:** These are quaternary ammonium salts. For example, cetyltrimethylammonium chloride.
- (b) **Anionic detergents:** These are so called because a large part of their molecules are anions. These are of two types:
- (i) **Sodium alkyl sulphates:** For example, sodium lauryl sulphate, $\text{C}_{11}\text{H}_{23}\text{CH}_2\text{OSO}_3\text{Na}$.
- (ii) **Sodium alkylbenzenesulphonates:** The most widely used domestic detergent is sodium dodecylbenzenesulphonate (SDS).



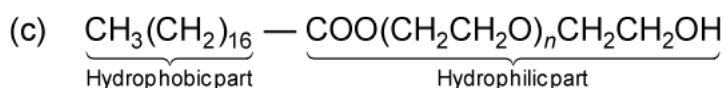
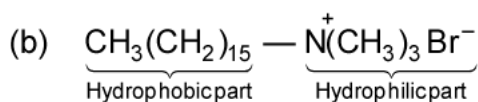
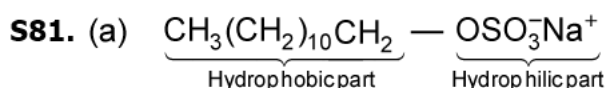
- (c) **Neutral or Non-ionic detergents:** These are esters of high molecular mass alcohols with fatty acids. For example, polyethylene glycol stearate,



S79. Biodegradable detergents are those detergents which are decomposed by microorganisms into harmless products. They do not create water pollution. Detergents having linear alkyl chains are biodegradable. Non-biodegradable detergents are those which are not decomposed by microorganisms in the environment. They create water pollution. For example, *n*-lauryl sulphonate is biodegradable whereas detergent with branched chains are non-biodegradable.

Consequence of using non-biodegradable detergents : Bacteria can not degrade this easily. Effluents containing such drugs reach the river, pond etc. These persist in water even after sewage treatment and causing foaming in river, ponds and streams and their water gets polluted.

- S80.** (a) **Antihistamines:** Drugs which counteract the effect of histamine which is produced due to allergy are called antihistamines. For example Chlorophnaramine.
- (b) **Antacids:** Drugs which are used in treating hyperacidity are called antacids. For example, $Mg(PH)_2$.



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