CHEMISTRY IN EVERYDAYLIFE

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 ENZYMES**-
      (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**-Those are the chemicals substances which are produced by microorganisms.

   Eg- Pencilllin, 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 microorganisms. eg- chloramphenicol, tetracydine.

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

   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 an disinfectant.

12. **ANTIFERTILITY DRUGS**- These is 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 calorie.

   They are good for diabatic people eg- aspartame, saccharin, alitame, sucrolose.

14. **FOOD PRESERVATIVES**- They prevents 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 soapnification reaction, when fatty acids are heated with aqueous sodium hydroxide.

They do not work well in hard water.

(iii) **TOILETS 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 sulphonate. They are effective in acidic solution.

\[
CH_3(CH_2)CH_2OH \rightarrow CH_3(CH_2)_{10}CH_2OSO_3H
\]

(laurylalcohol)

\[
\rightarrow CH3(CH2)_{10}CH2SO_3Na^+
\]

(Sodium lauryl sulphonate)

(ii) **CATIONIC DETERGENTS**- They are quarternary ammonium salts of amines with acetates, chlorides, or bromides. They are expensive used to limited extent. eg- cetyltrimethylammoniumbromide

(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 sulphonate.

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

## THERAPEUTIC ACTION OF DIFFERENT DRUGS

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Action</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analgesics</td>
<td>Relieving pain</td>
<td>Aspirin, Analgin, Seridon, Anacine,</td>
</tr>
<tr>
<td>Analgesics</td>
<td>Reduce tension and pain.</td>
<td>Opium, Heroin, Pethidine, Codeine, Morphine</td>
</tr>
<tr>
<td>(Narcotic)</td>
<td>produceunconsciousness.</td>
<td>Penicillin G(Narrow Spectrum)</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Produced by micro - organism, that can inhibit the growth or destroy</td>
<td>Streptomycin, Ampicillin, Amoxycillin</td>
</tr>
<tr>
<td></td>
<td>other micro-organism.</td>
<td>Chloramphenicol Vancomycin, ofloxacin,</td>
</tr>
<tr>
<td>Antiseptics</td>
<td>Prevent the growth of micro-organism or kill them but not harmful to</td>
<td>Dettol, Bithional(in soap)</td>
</tr>
<tr>
<td></td>
<td>the living tissues.</td>
<td>Tincture iodine, 0.2% phenol,</td>
</tr>
<tr>
<td>Disinfectants</td>
<td>Kills micro-organisms, not safe for living tissues. It is used for</td>
<td>1% phenol, chlorine (Cl₂), Sulphurdioxide (SO₂)</td>
</tr>
<tr>
<td></td>
<td>toilets, instruments.</td>
<td></td>
</tr>
<tr>
<td>Antacids</td>
<td>Reduce or neutralise the acidity.</td>
<td>NaHCO₃, Al(OH)₃ gel, MgCO₃, Mg(OH)₂, AlPO₄</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>Reduce release of acid.</td>
<td>Cimetidine(Tegamet), Ranitidine (Zantac),</td>
</tr>
<tr>
<td></td>
<td>It is also used to treat allergy</td>
<td>Brompheniramine (Dimetapp), Terfenadine (Seldane)</td>
</tr>
<tr>
<td>Tranquilizers</td>
<td>Reduce the mental anxiety, stress, (sleeping pill)</td>
<td>Valium, Serotonin, Veronal, Equanil, Amytal, Nembutal, Luminal, Seconal</td>
</tr>
<tr>
<td>Antipyretics</td>
<td>Reduce body temperature</td>
<td>Aspirin, Paracetamol, Analgin, Phenacetin.</td>
</tr>
<tr>
<td>Antifertility</td>
<td>These are the steroids used to control the pregnancy</td>
<td>Norethindrone, Ethynylestradiol (novestrol)</td>
</tr>
<tr>
<td>drugs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CHEMICALS IN FOOD

<table>
<thead>
<tr>
<th>Sweetening Agent</th>
<th>Saccharine, Aspartame(for cold foods), Alitame, Sucrolose(stable at cooking temp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Preservative</td>
<td>Salt, sugar, veg. oils, sodium benzoate</td>
</tr>
</tbody>
</table>

### CLEANSING AGENTS
<table>
<thead>
<tr>
<th>Substance</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soap</td>
<td>Na / K –salt of long chain fatty acids. Not work in hard water becoz with Ca and Mg salt soap produce insoluble scum.</td>
</tr>
<tr>
<td>Anaionic detergent</td>
<td>Sodium laurylsulphate. Used in household work / in tooth paste</td>
</tr>
<tr>
<td>Cationic detergent</td>
<td>Cetyltrimethyl ammonium bromide. Hair conditioner / germicidal properties</td>
</tr>
<tr>
<td>Non ionic detergent</td>
<td>Ester of searic acid and polyethylene glycol. Liquid dishwashing</td>
</tr>
</tbody>
</table>

Detergents with highly branched hydrocarbon parts are non biodegradable and hence water pollutants so branching is minimized which are degradable and pollution is prevented.

**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 constituent of Dettol?
Ans-3 Choloroxylenol&Terpinol.

Q-4 what type drug phenaticinis?
Ans-4 It is antipyretics.

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 decompose.

Q-7 What is tranquilizers? Give an example?
Ans-7 They is the drug used in stress, mild severe mental disease.

Q-8 what type of drug chloramphenicol?
Ans-8 It is broad spectrum antibiotic.

Q-9 Why is biothional 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 benzonate.

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 several 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-3 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-4 what is the use of –
(i) Benadryl (ii) sodium benzoate (iii) Progesterone
Ans-3 (i) Antihistamines
(ii) Preservatives
(iii) Antifertility drug
Q-5 Identify the type of drug-
(i) Ofloxacin (ii) Aspirin (iii) Cimetidine
Ans- 4 (i) Antibiotic (ii) Analgesics & Antipyretics
(iii) Antihistamines & antacid
Q-6 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.

**VERY SHORT ANSWER TYPE QUESTIONS** (1 marks)

Ques.1- Name one antioxidant used in wine and beers.
Sol.- Sulphur dioxide and sulphites (sodium sulphate and sodium metabisulphite).

Ques.2- Name one antioxidant commonly used to increase the storage life of butter.
Sol.- Addition of BHA (butylated hydroxyl anisole) increases the storage life of butter.

Ques.3- Which category of the synthetic detergents is used in toothpaste?
Sol.- Anionic detergent.

Ques.4- Why the cleansing action of synthetic detergents is not affected by hard water?
Sol.- The anions of synthetic detergents do not get precipitated in the presence of Ca²⁺/Mg²⁺ ions.

Ques.5- Pickles have a long shelf life and do not get spoilt for months. Why?
Sol.- Pickles are treated with excessive salt or oil. These substances act as preservatives and do not allow bacteria to survive. Hence, the pickles remain safe.

Ques.6- What is the difference between bathing soap and washing soap?
Sol.- Bathing soaps are potassium salts of long chain fatty acids while washing soaps are sodium salts of long chain fatty acids.

Ques.7- Name the anionic detergent that is largely in use among household detergents.
Sol.- Alkyl benzene sulphonate.
Ques.8- If water contains dissolved calcium bicarbonate, out of soaps and synthetic detergents which one will you use for cleaning clothes?
Sol.- Calcium carbonate makes H₂O hard. Thus, soap cannot be used, as it gets precipitated in hard water. In contrast, a synthetic detergent does not get precipitated in hard water because its calcium salt is also soluble in water. Hence, synthetic detergents can be used for cleaning clothes in hard water.

Ques.9- Why soaps do not work in hard water?
Sol.- Hard water contains calcium and magnesium salts. In hard water, soaps get precipitated as calcium and magnesium soaps which being insoluble stick to the cloth as gummy masses.

Ques.10- Can you use soaps and synthetic detergents to check the hardness of water?
Sol.- Hard water contains calcium and magnesium ions. Soaps get precipitated as insoluble calcium and magnesium soaps in hard water but detergents do not. Synthetic detergents produce foam in both soft and hard water. Thus, soaps cannot but synthetic detergent can be used to check the hardness of water.

Ques.11- What problem arises in using alitame as artificial sweetener?
Sol.- Alitame is a high potency artificial sweetener. Thus, the controlling of sweetness of food is difficult while using it.

Ques.12- Name the sweetening agent used in the preparation of sweets for a diabetic patient.
Sol.- Saccharin.

Ques.13- What are artificial sweetening agents? Give two examples.
Sol.- Artificial sweeteners are chemical substances which are sweet in taste but do not add calories to our body, e.g., saccharin, aspartame, sucralose etc.

Ques.14- Why is use of aspartame limited to cold foods and drinks?
Sol.- Aspartame decomposes at baking or cooking temperatures and hence can be used only in cold foods and drinks.

Ques.15- What are food preservatives?
Sol.- Chemical substances which are used to protect food against bacteria, yeasts and moulds are called preservatives, e.g., sodium metabisulphite, sodium benzoate.

Ques.16- 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.

\[ C_9H_{19}0\overset{\text{O}}{\underset{0(CH_2 CH_2)_{x}CH_2 CH_2OH}{\text{O}}}(x=5 \text{ to } 10) \]
Ques.17- Why does we require artificial sweetening agents?
Sol. - (i) To control intake of calories.
          (ii) As a substitute of sugar for diabetics.
Ques.18- What class of drugs is ranitidine?
Sol. - It is an antacids as helps in removing acidity of stomach.
Ques.19- Name a drug that acts both as an antipyretic and analgesic.
Sol. - Aspirin (2-acetoxy benzoic acid).
Ques.20- Why is it important to choose the molecular target for a drug?
Sol. - To obtain the therapeutic activity of the drug.
Ques.21- Name the forces involved in blinding of substrate to the active site of enzyme.
Sol. - Ionic bonding, hydrogen bonding, van der waals’ interaction or dipole-dipole interaction.
Ques.22- Write the formula for sulphanilic acid and mention any one of its uses.
Sol. - \( \text{H}_2\text{N} \begin{array}{c} \text{SO}_3\text{H} \end{array} \)
      It is used in the manufacture of dyes and drugs.
Ques.23- What is the harmful effect of hyperacidity?
Sol. - It can cause ulcers in the stomach.
Ques.24- Where are receptors located?
Sol. - Receptors are embedded in the cell membrane.
Ques.25- Write the average molecular mass of drugs.
Sol. - It is of the order of 100-150u.
Ques.26- Define antipyretic with an example.
Sol. - Chemicals which are used to bring down the body temperature during highfever are called antipyretics. e.g., paracetamol, aspirin etc.
Ques.27- Give the function of wide spectrum antibiotics with an example.
Sol.- These antibiotics kill or inhibit a wide range of gram-positive and gram-negative bacteria. Chloramphenicol is a wide spectrum antibiotic and is used for the treatment of typhoid, dysentery, meningitis and acute fever.

Ques.28- Write the name of types of antimicrobial drug.
Sol.- Antibiotics, antiseptics and disinfectants.

Ques.29- Write the uses of medicines.
Sol.- In diagnosis, prevention and treatment of disease.

Ques.30- Why is bithional added to toilet soap?
Sol.- Bithional is added to soaps to impart them antiseptic properties.

Ques.31- List two major classes of antibiotics and give one example of each class.
Sol.- Bactericidal – Penicillin
      Bacteriostatic – Chloramphenicol.

Ques.32- Define the term antihistamines giving a suitable example.
Sol.- Antihistamines are the drugs which interfere with the natural action of histamine by competing with histamine for binding sites of receptors where histamine exerts its effects, e.g., brompheniramine, terfenadine etc.

Ques.33- Define the term tranquilizers and give an example.
Sol.- Tranquilizers are drugs which reduce anxiety and produce feeling of well-being. e.g., equanil.

Ques.34- Describe the term antiseptics, giving suitable examples.
Sol.- Antiseptics are those chemicals which prevent the growth of microorganisms without affecting living tissues e.g., H₂O₂, boric acid solution etc.

Ques.35- What is tincture of iodine? What is its use?
Sol.- Tincture of iodine is 2-3% solution of iodine in alcohol and water. It is a powerful antiseptic and applied on wounds.

Ques.36- What are the main constituents of dettol?
Sol.- Chloroxylenol and α-terpineol in a suitable solvent.

Ques.37- Name a substance which can be used as an antiseptic as well as disinfectant.
Sol.- 0.2% solution of phenol can be used as an antiseptic while 1% solution of phenol acts as a disinfectant.

Ques.37- Define the term chemotherapy.
Sol.- Chemo means chemicals; therapy means treatment i.e., chemotherapy means ‘the treatment of a disease with the help of chemical in the form of medicines’. It involves diagnosis, prevention and treatment of diseases.
Ques.38- Name the macromolecules that are chosen as drug targets.
Sol.- Macromolecules such as nucleic acids, proteins, carbohydrates and lipids are chosen as drug targets.

SHORT ANSWER TYPE QUESTIONS [2 MARKS]

1. What are antioxidants?
   ;- Antioxidants are important and necessary food additives help in food preservation by retarding the action of oxygen on food. These are more reactive towards oxygen than the food material they are protecting. e.g. butylated hydroxyl toluene(BHT) and butylated anisole(BHA).

2. Describe the following with examples.
   I Preservatives
   II Biodegradable detergent
   ;- I Those chemical which are used to prevent food from spoilage are called preservatives, e.g. sodium benzoate.
   II 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 dodecyl-benzenesulphonate are examples of biodegradable detergents.

3. Explain the cleansing action of soap.
   ;- Soaps forms micelle with water above certain concentration. Then the non-polar part(hydrocarbon) of the soap is oriented towards the grease of the cloth and the polar part towards the water. With the excess of water, the micelles with dirt and grease particles washed away.

4. How are synthetic detergents better than soaps?
Hard water contains calcium and magnesium ions. Therefore, in hard water, soaps get precipitated as calcium and magnesium salts which being insoluble stick to the cloth as gummy mass. Hence, the soap cannot be used with hard water.

\[
2\text{Cl}17\text{H}35\text{COO}^- \text{Na}^+ + \text{CaCl}_2 \rightarrow 2\text{NaCl} + (\text{C}_{17}\text{H}_{35}\text{COO})_2\text{Ca}
\]

On the other hand, calcium and magnesium salts of detergents are soluble in water so they easily form lather with hard water.

5. If soap has high alkali content, it irritates skin. How can the amount of excess alkali be determined? What can be the source of excess alkali?

Acid base titration can be used to determine the excess amount of alkali in soap. The excess alkali left after hydrolysis of oil can be the source of alkalinity in soap.

6. State the function along with one example each of

I Antihistamines  II Antifertility drug

I Thee counteract the effect of histamines which is generated in body causing to allergy. e.g chlorpheniramine

II These drug are used to control unwanted pregnancies in women and to control population. e.g norethindrone, novestrol etc.

7. What are the advantages of using drugs like ranitidine over normal basic and antacids in the treatment of acidity?

Antacids control only the symptoms and not the cause. They work by neutralizing the acid production of stomach. They do not control the cause of production of more acid. Antihistamines are the drug that suppress the action of histamines which is the chemical responsible for stimulation of secretion of pepsin and HCL in the stomach. They influence and prevent the binding of histamine with the receptors present in the stomach wall resulting in lower acid production and therefore better treatment.

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

Drugs designed to cure some ailment in one organ in the body do not produce any effect to the other because they work on different receptors. For instance, secretion of histamine cause allergy. It also cause acidity due to release of HCL in the stomach. Since, antiallergic and antacids drugs work on different receptors, thus, antihistamines remove allergy while antacid removed acidity.
9. How do antiseptics differ from disinfectants? Give one example of each.

Antiseptics are the chemical substance which prevent the growth of microorganisms and are capable of killing them without harming the human tissues. These are applied on wounds, ulcer, cuts and diseased skin surface. e.g dettol, savlon, furacin, soframycin etc.

Disinfectants are chemical substance which kill microorganism but they are unsafe for living tissues. These are used for the inanimate object as in toilets, drains, floor etc. e.g phenol (1% solution) and chlorine (0.2 to 0.4 ppm).

10. What is meant by the term “broad spectrum antibiotics”? Explain.

Antibodies which kill or inhibit a wide range of harmful or disease-causing bacteria are called broad spectrum antibiotics. These are equally effective against gram-positive and gram-negative bacteria (Both). e.g. ampicillin and amoxicillin.

11. Which forces are involved in holding the drugs to the active site of enzyme?

Ionic bonding, hydrogen bonding, dipole-dipole interaction or van der Waals’ interaction-OH group of serine, -COOH group of aspartic acid and phenyl ring of phenylaniline help to bind the drugs to the enzyme.

12. With reference to which classification has the statement “ranitidine is an antacid” been given?

This statement refers to the classification of drugs according to pharmacological effect because any drug which used to neutralize the excess acid present in the stomach will be called an antacid. And ranitidine prevent the interaction of hisamine with the receptors present in the stomach wall. Hisamine stimulates the secretion of pepsin and HCL in the stomach.

13. 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?

Sleeping pills contain drugs that may be tranquilizers or antidepressants. They affected the nervous system, relieve anxiety, stress, irritability or excitement. But they should strictly be used under a supervision of a doctor. If not, the uncontrolled and over dosage can cause harm to the body and mind because in higher dosage these drugs act as poisons.
14. Write the formula of aspirin and its IUPAC name. Why should it not be taken on empty stomach?

Aspirin or (2-acetoxi benzoic acid)

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

SHORT ANSWER TYPE QUESTIONS { 3 Marks Question }

Que.1:- Why do we need to classify drugs in different ways?

Sol.:-- Different types of classification to drugs is beneficial for the people related to different fields. Drugs usefulness has been classified in four basis. Each classification has its own utility.

(1) On the basis of pharmalogical effect This classification is useful for doctor because it provides them the whole range of drugs available for the treatment of a particula problem.

(2) On the basis of dug action It is useful for choosing the correct lead compound for designing the synthesis of a desired drug.

(3) On the basis of chemical structure It 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 result.

(4) On the basis of molecular targets It is useful for medicinal chemists so that they can design a drug which is the most effective for a particular receptive site.

Que.2:- (1) Which one of the following is food preservative?

Equanil, morphine, sodium benzoate

(2) Why is bithional is added to soap?

(3) Which class of drugs is ussed in sleeping pills?

Sol.:-- (1)Sodium benzoate food preservative. MOrholine- narcoticangesic. Equanil-Tranquillize

(2) Bithional is added to soap to reduce foam generating bacterial decomposition of organic matter on the skin, due to its antiseptic properties.

(3) Tranquillizer are used in sleeping pills because they relieve stress fatigue by inducing sense of well-being.
Que.3: Name the action of the following on the human body
1. Luminal  2. Streptomycin  3.Analgin
1. Luminal It is called sedative tranquilizer. It produce sleep and is habit forming.
2. Streptomycin It is an antibiotic and used to cure tuberculosis.
3. Analgin It is anti pyretic and analgesic. It lowers the body temperature in fever and gives relief from pain.

Que.4: What are analgesic medicine? how are they classified and when they are commonly recommended for use?
Sol.: The drugs which give relief from pain are known as analgesics.
1. Narcotics These give relief from pain but are habit forming. Hence, they should be given only in case of acute pain but not regularly, e.g., morphine
2. Non- narcotics (non-addictive) These are not habit forming and do not cause addiction, e.g., aspirin.

Que.5: How do antihistamines cure allergy of the body?
Sol.: Histamines interact with the binding sites of receptor in the body to produce allergy. Antihistamines compete with histamines for these binding sites of receptor and hence do not allow histamine to produce allergy.

Que.6: Why are cimetidine and ranitidine better antacids than sodium hydorgen carbonate or magnesium or aluminium hydroxide?
Sol.: Antacids NaHCO3, Mg(OH)2 Or Al(OH)3 neutralise the excess acid produced in the stomach but their prolong use can cause the production of excess acid in the stomach which is harmful and may without such side effects as they prevent interaction of histamine stimulates the secretion of acid. Thus, these are better antacid than NaHCO3, Mg(OH)2 or Al(OH)3.

Que.7: Low level of noradrenaline is the cause of depression. What types of drugs are needed to cure this problem? Name two drugs.
Sol.: In low level of neurotransmitter, These drugs inhibit the enzymes which catalyse the inhibited, noradrenaline if the enzyme is inhibited, noardrenaline is slowly metabolised and thus, activates its receptor for longer periods of time thereby reducing depression. Iproniazid and phenelzine are such two drugs.

Que.8: Explain the term, target molecules or drug targets as used in medicinal chemistry.
Drugs interact with macromolecules like proteins, carbohydrates, lipids and nucleic acid and hence these are called target molecules.

Proteins perform several roles in the body. Proteins which act as biological catalyst are called enzymes, those which are involved in communication systems are called receptors. Carried protein carries 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.

Que.9: Account for the following.
1. Aspirin drug helps in prevention of heart attacks.
2. Diabetic patients are advised to take artificial sweeteners instead of natural sweeteners.
3. Detergents are non-biodegradable while soap is degradable.

Sol.: (1) Due to anti-blood clotting action, aspirin is used for prevention of heart attacks.
(2) As artificial sweeteners provide less calories than natural sweeteners.
(3) Detergents have highly branched hydrocarbon chains, which cannot be degraded by bacteria so they get accumulated while soap containing straight chains which can be degraded easily.

Que.10: (1) Give one example of non-ionic detergent.
(2) Give one example of cationic detergent.
(3) Why is bithional added to toilet soap?

Sol.: (1) CH₃(CH₂)₁₆COO(CH₂CH₂O)ₙ CH₂CH₂OH
(2) Cetyltrimethyl ammonium chloride
(3) It acts as an antiseptic
Que.11:- Why are the detergents have straight hydrocarbon groups better than the detergents having branched chain hydrocarbons groups?
Sol.: - Detergen having straight chain hydocarbon group are more biodegredable in comparision to the detergent having straight chain hydrocarbon are easily broke down or decomposed by microrganism whivh are present in water bodies.
Therefore, these cause less water pollution, hence are better than detergnts having branched chain hydocarbons.

Que.12:- What is the diffrence between saccharin and asccharic acid?
Sol.: - Saccharic is an artificial sweetener its structure is as follows

\[
\begin{align*}
\text{CHO} & \quad \text{COOH} \\
\text{(CHOH)}_4 & \quad \text{(CHOH)}_4 \\
\text{CH}_2\text{OH} & \quad \text{COOH} \\
\text{Glucose} & \quad \text{Saccharic acid}
\end{align*}
\]

Saccharic acid is obtained by the oxidation of glucose with conc. HNO_3

Que13:- Describe the following giving one example of each
(1) Detergents    (2) Food preservatives
(1) Substance which helps in the removal of fats which bind with other materials to the fabric or skin are called derergents. There are two types of detergents
(a) Soap  These are Sodium or potassium salt of long chain fatty acid like stearic and palmitic acids. These soaps do not work with harda water.
(b) Synthetic detergents These are anioic, cationic and an-ionic detergent which work with hard water als. e.g., sodium lauryl sulphate and cetytrimethyl ammonium bromide etc.
(2) Substance which prevent spoilage of food due to microbial growth are calle food preservatives e.g., table salt, sugar, vegetable oil.
Que.14: What are fillers and what role do they play in soap?
Sol.: Some substances are added to soap to make it more useful for particular applications e.g. sodium rosinate is added to laundry soap to increase its foaming capacity. Glycerol is added in shaving soaps to prevent them from rapid drying.

Que.15: Label the hydrophilic and hydrophobic parts in the following compounds.

(i) \(\text{CH}_3(\text{CH}_2)_{10}\text{CH}_2\text{OSO}_3\text{Na}^+\)
(ii) \(\text{CH}_3(\text{CH}_2)_{15}\text{N}^+(\text{CH}_3)_3\text{Br}^-\)
(iii) \(\text{CH}_3(\text{CH}_2)_6\text{COO}(\text{CH}_2\text{O})_n\text{CH}_2\text{CH}_2\text{OH}\)
Sol.:

Que.16: What are the following substance? Give one example of each.

1) Food Preservatives  
2) Antioxidants  
3) Artificial sweeteners

Sol.: (1) Food Preservatives These prevent spoilage of food due to the microbial growth. Some common preservatives are table salt, sugar, vegetable oils, and sodium benzoate

(2) Antioxidants Antioxidant is one of the most important and necessary food additives. These compounds retard the action of oxygen on food, thus reducing its speed of decomposition by oxidation. Hence, they help in prevention of food. These act as sacrificial material, i.e., these are more reactive towards oxygen than are they are protecting. e.g., Butylated Hydroxy Toluene

(3) Artificial sweetening agents They are the chemical substance which provide sweetness to the food without increasing the calorie to the body. These compounds are used as substitutes for sugar in food and beverages especially soft drinks.

VALUE BASED QUESTIONS [ 4 MARKS ]

1. Natural sweeteners cannot be used by diabetic patients. Such people use saccharin (o-sulphobenzimide), aspartame, sucralose (trichloro derivatives of
sucrose) and alitame as artificial sweetener. These are boon to those people who want to control their calorie intake.

Now give the answer of the following questions

I Give the advantage of using saccharin.

II What is the the draw back of alitame? Give one artificial sweetener which is better than alitame and why?

III Which artifical sweeterner has the highest sweetening capacity?

IV Give the value of possessed by people taking less sugar.

I It is 550 times as sweet as sugar. It is harmless and excreted through the urine from the body, unchanged.

II The sweetness of alitame is difficult to control. Sucralose is better than alitame because it is stable at cooking temperature. Its appearance as well as taste are like sugar. Also it does not provide calories.

III Alitame has the highest sweetening capacityt 2000 times greater than cane sugar.

IV These people protect themselves from diabetes and heart ailments and are more useful to society.

2. There were washermen, Ramu and gopi in village. Both used to wash their clothes on same pond but Ramu’s service was better than Gopi. Gopi was worried that why his clothes were not washed well. One day Gopi asked Ramu, that how he can provide better service. Ramu has advised him to use the detergents.

Answer the following questions

I Why Gopi’s service was not better?

II Why Ramu has advised Gopi to use detergents?

III How many types of detergents are found and Write their names?

IV What value did you obtain from the above discussion?

I Gpoi was using soap while Ramu was using detergents. As we know, detergent is a better cleansing agent than soap. So, Gopi’s service was poor than Ramu.

II Ramu has advised Gopi to use detergents to improve cleansing quality as detergents show better action in soft as well as in hard water.
III There are mainly three types of detergents:

A. Cationic Detergent  
   (Cetyltrimethyl ammonium bromide)

B. Anionic Detergent  
   \( \text{CH}_3(\text{CH}_2)_{10}\text{CH}_2\text{OSO}_3\text{NA}^+ \)

C. Non Ionic Detergent  
   \( \text{CH}_3(\text{CH}_2)_{16}\text{COO(CH}_2\text{CH}_2\text{O})_n\text{CH}_2\text{CH}_2\text{OH} \)

IV Values obtained are: human welfare, environmental awareness and social development.

CHEMISTRY IN EVERYDAY LIFE

VERY SHORT ANSWER TYPE QUESTIONS (1 marks)

Ques.1 - Name one antioxidant used in wine and beers.  
Sol.- Sulphur dioxide and sulphites (sodium sulphate and sodium metabisulphite).

Ques.2 - Name one antioxidant commonly used to increase the storage life of butter.  
Sol.- Addition of BHA (butylated hydroxyl anisole) increases the storage life of butter.

Ques.3 - Which category of the synthetic detergents is used in toothpaste?  
Sol.- Anionic detergent.

Ques.4 - Why the cleansing action of synthetic detergents is not affected by hard water?  
Sol.- The anions of synthetic detergents do not get precipitated in the presence of \( \text{Ca}^{2+}/\text{Mg}^{2+} \) ions.

Ques.5 - Pickles have a long shelf life and do not get spoilt for months. Why?  
Sol.- Pickles are treated with excessive salt or oil. These substances act as preservatives and do not allow bacteria to survive. Hence, the pickles remain safe.

Ques.6 - What is the difference between bathing soap and washing soap?  
Sol.- Bathing soaps are potassium salts of long chain fatty acids while washing soaps are sodium salts of long chain fatty acids.

Ques.7 - Name the anionic detergent that is largely in use among household detergents.  
Sol.- Alkyl benzene sulphonate.

Ques.8 - If water contains dissolved calcium bicarbonate, out of soaps and synthetic detergents which one will you use for cleaning clothes?
Sol.- Calcium carbonate makes H\textsubscript{2}O hard. Thus, soap cannot be used, as it gets precipitated in hard water. In contrast, a synthetic detergent does not get precipitated in hard water because its calcium salt is also soluble in water. Hence, synthetic detergents can be used for cleaning clothes in hard water.

Ques.9- Why soaps do not work in hard water?
Sol.- Hard water contains calcium and magnesium salts. In hard water, soaps get precipitated as calcium and magnesium soaps which being insoluble stick to the cloth as gummy masses.

Ques.10- Can you use soaps and synthetic detergents to check the hardness of water?
Sol.- Hard water contains calcium and magnesium ions. Soaps get precipitated as insoluble calcium and magnesium soaps in hard water but detergents do not. Synthetic detergents produce foam in both soft and hard water. Thus, soaps cannot but synthetic detergent can be used to check the hardness of water.

Ques.11- What problem arises in using alitame as artificial sweetener?
Sol.- Alitame is a high potency artificial sweetener. Thus, the controlling of sweetness of food is difficult while using it.

Ques.12- Name the sweetening agent used in the preparation of sweets for a diabetic patient.
Sol.- Saccharin.

Ques.13- What are artificial sweetening agents? Give two examples.
Sol.- Artificial sweeteners are chemical substances which are sweet in taste but do not add calories to our body, e.g., saccharin, aspartame, sucralose etc.

Ques.14- Why is use of aspartame limited to cold foods and drinks?
Sol.- Aspartame decomposes at baking or cooking temperatures and hence can be used only in cold foods and drinks.

Ques.15- What are food preservatives?
Sol.- Chemical substances which are used to protect food against bacteria, yeasts and moulds are called preservatives, e.g., sodium metabisulphite, sodium benzoate.

Ques.16- 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.

\[
\text{C}_9\text{H}_{19}\text{O} \quad \bigcirc \quad \bigcirc \quad 0(\text{CH}_2\text{CH}_2\text{O})_x\text{CH}_2\text{CH}_2\text{OH} \\
(x=5 \text{ to } 10)
\]

Sol.- \[\text{C}_9\text{H}_{19}\text{O} \quad \bigcirc \quad \bigcirc \quad 0(\text{CH}_2\text{CH}_2\text{O})_x\text{CH}_2\text{CH}_2\text{OH}\]
Hydrophobic/non-

Hydrophilic/polar

Polar part

part

Functional groups present (i) either; (ii) alcohol.

Ques.17- Why does we require artificial sweetening agents?
Sol.- (i) To control intake of calories.
(ii) As a substitute of sugar for diabetics.

Ques.18- What class of drugs is ranitidine?
Sol.- It is an antacids as helps in removing acidity of stomach.

Ques.19- Name a drug that acts both as an antipyretic and analgesic.
Sol.- Aspirin (2-acetoxy benzoic acid).

Ques.20- Why is it important to choose the molecular target for a drug?
Sol.- To obtain the therapeutic activity of the drug.

Ques.21- Name the forces involved in blinding of substrate to the active site of enzyme.
Sol.- Ionic bonding, hydrogen bonding, van der waals’ interaction or dipole-dipole interaction.

Ques.22- Write the formula for sulphanilic acid and mention any one of its uses.
Sol.- \( \text{H}_2\text{N} \quad \text{SO}_{3}\text{H}. \)
   It is used in the manufacture of dyes and drugs.

Ques.23- What is the harmful effect of hyperacidity?
Sol.- It can cause ulcers in the stomach.

Ques.24- Where are receptors located?
Sol.- Receptors are embedded in the cell membrane.

Ques.25- Write the average molecular mass of drugs.
Sol.- It is of the order of 100-150u.

Ques.26- Define antipyretic with an example.
Sol.- Chemicals which are used to bring down the body temperature during highfever are called antipyretics. e.g., paracetamol, aspirin etc.

Ques.27- Give the function of wide spectrum antibiotics with an example.
Sol.- These antibiotics kill or inhibit a wide range of gram-positive and gram-negative bacteria. Chloramphenicol is a wide spectrum antibiotic and is used for the treatment of typhoid, dysentery, meningitis and acute fever.
Ques.28- Write the name of types of antimicrobial drug.
Sol.- Antibiotics, antiseptics and disinfectants.

Ques.29- Write the uses of medicines.
Sol.- In diagnosis, prevention and treatment of disease.

Ques.30- Why is bithional added to toilet soap?
Sol.- Bithional is added to soaps to impart them antiseptic properties.

Ques.31- List two major classes of antibiotics and give one example of each class.
Sol.- Bactericidal – Penicillin
       Bacteriostatic – Chloramphenicol.

Ques.32- Define the term antihistamines giving a suitable example.
Sol.- Antihistamines are the drugs which interfere with the natural action of histamine by competing with histamine for binding sites of receptors where histamine exerts its effects, e.g., brompheniramine, terfenadine etc.

Ques.33- Define the term tranquilizers and give an example.
Sol.- Tranquilizers are drugs which reduce anxiety and produce feeling of well-being. e.g., equanil.

Ques.34- Describe the term antiseptics, giving suitable examples.
Sol.- Antiseptics are those chemicals which prevent the growth of microorganisms without affecting living tissues e.g., H₂O₂, boric acid solution etc.

Ques.35- What is tincture of iodine? What is its use?
Sol.- Tincture of iodine is 2-3% solution of iodine in alcohol and water. It is a powerful antiseptic and applied on wounds.

Ques.36- What are the main constituents of dettol?
Sol.- Chloroxylenol and α-terpineol in a suitable solvent.

Ques.37- Name a substance which can be used as an antiseptic as well as disinfectant.
Sol.- 0.2% solution of phenol can be used as an antiseptic while 1% solution of phenol acts as a disinfectant.

Ques.38- Define the term chemotherapy.
Sol.- Chemo means chemicals; therapy means treatment i.e., chemotherapy means ‘the treatment of a disease with the help of chemical in the form of medicines’. It involves diagnosis, prevention and treatment of diseases.

Ques.38- Name the macromolecules that are chosen as drug targets.
Macromolecules such as nucleic acids, proteins, carbohydrates and lipids are chosen as drug targets.

SHORT ANSWER TYPE QUESTIONS [2 MARKS]

1. What are antioxidants?

Antioxidants are important and necessary food additives help in food preservation by retarding the action of oxygen on food. These are more reactive towards oxygen than the food material they are protecting. e.g. butylated hydroxyl toluene(BHT) and butylated anisole(BHA).

2. Describe the following with examples.

I Preservatives

II Biodegradable detergent

I Those chemical which are used to prevent food from spoilage are called preservatives, e.g. sodium benzoate.

II 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 dodecyl-benzenesulphonate are examples of biodegradable detergents.

3. Explain the cleansing action of soap.

Soaps forms micelle with water above certain concentration. Then the non-polar part(hydrocarbon) of the soap is oriented towards the grease of the cloth and the polar part towards the water. With the excess of water, the micelles with dirt and grease particles washed away.

4. How are synthetic detergents better than soaps?
Hard water contains calcium and magnesium ions. Therefore, in hard water, soaps get precipitated as calcium and magnesium salts which being insoluble stick to the cloth as gummy mass. Hence, the soap cannot be used with hard water.

\[2\text{Cl}17\text{H}35\text{COO}^-\text{Na}^+ + \text{CACl}_2 \rightarrow 2\text{NaCl} + (\text{C}_{17}\text{H}_{35}\text{COO})_2\text{Ca}\]

On the other hand, calcium and magnesium salts of detergents are soluble in water so they easily form lather with hard water.

5. If soap has high alkali content, it irritates skin. How can the amount of excess alkali be determined? What can be the source of excess alkali?

- Acid base titration can be used to determine the excess amount of alkali in soap. The excess alkali left after hydrolysis of oil can be the source of alkalinity in soap.

6. State the function along with one example each of
   I Antihistamines   II Antifertility drug
   - I They counteract the effect of histamines which is generated in body causing to allergy. e.g chlorpheniramine
   II These drug are used to control unwanted pregnancies in women and to control population. e.g norethindrone, novestrol etc.

7. What are the advantages of using drugs like ranitidine over normal basic and antacids in the treatment of acidity?

- Antacids control only the symptoms and not the cause. They work by neutralizing the acid production of stomach. They do not control the cause of production of more acid. Antihistamines are the drug that suppress the action of histamines which is the chemical responsible for stimulation of secretion of pepsin and HCL in the stomach. They influence and prevent the binding of histamine with the receptors present in the stomach wall resulting in lower acid production and therefore better treatment.

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

Drugs designed to cure some ailment in one organ in the body do not produce any effect to the other because they work on different receptors. For instance, secretion of histamine cause allergy. It also cause acidity due to release of HCL in the stomach. Since, antiallergic and antacids drugs work on different receptors, thus, antihistamines remove allergy while antacid removed acidity.
9. How do antiseptics differ from disinfectants? Give one example of each.

Antiseptics are the chemical substance which prevent the growth of microorganisms and are capable of killing them without harming the human tissues. These are applied on wounds, ulcer, cuts and diseased skin surface. e.g dettol, savlon, furacin, soframycin etc.

Disinfectants are chemical substance which kill microorganism but they are unsafe for living tissues. These are used for the inanimate object as in toilets, drains, floor etc. e.g phenol (1% solution) and chlorine (0.2 to 0.4 ppm).

10. What is meant by the term “broad spectrum antibiotics”? Explain.

Antibodies which kill or inhibit a wide range of harmful or disease-causing bacteria are called broad spectrum antibodies. These are equally effective against gram-positive and gram-negative bacteria (Both). e.g. ampicillin and amoxicillin.

11. Which forces are involved in holding the drugs to the active site of enzyme?

Ionic bonding, hydrogen bonding, dipole-dipole interaction or van der Waals’ interaction. OH group of serine, -COOH group of aspartic acid and phenyl ring of phenylaniline help to bind the drugs to the enzyme.

12. With reference to which classification has the statement “ranitidine is an antacid” been given?

This statement refers to the classification of drugs according to pharmacological effect because any drug which used to neutralize the excess acid present in the stomach will be called an antacid. And ranitidine prevent the interaction of histamine with the receptors present in the stomach wall. Histamine stimulates the secretion of pepsin and HCL in the stomach.

13. 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?

Sleeping pills contain drugs that may be tranquilizers or antidepressants. They affected the nervous system, relieve anxiety, stress, irritability or excitement. But they should strictly be used under a supervision of a doctor. If not, the uncontrolled and over dosage can cause harm to the body and mind because in higher dosage these drugs act as poisons.
14. Write the formula of aspirin and its IUPAC name. Why should it not be taken on empty stomach?

- Aspirin or (2-acetoxy benzoic acid)

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

SHORT ANSWER TYPE QUESTIONS {3 Marks Question}

Que.1:- Why do we need to classify drugs in different ways?

Sol.:- Different types of classification to drugs is benificial for the people related to different fields. Drugs usefulness has been classified in four basis. Each classification has its own utility.

(1) On the basis of pharmalogical effect This classification is useful for doctor because it provides them the whole range of drugs available for the treatment of a particular problem.

(2) On the basis of dug action It is useful for choosing the correct lead compound for designing the synthesis of a desired drug.

(3) On the basis of chemical structure It 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 result.

(4) On the basis of molecular targets It is useful for medicinal chemists so that they can design a drug which is the most effective for a particular receptive site.

Que.2:- (1) Which one of the following is food preservative?

Equanil, morphine, sodium benzoate

(2) Why is bithional is added to soap?

(3) Which class of drugs is used in sleeping pills?

Sol.:- (1) Sodium benzoate food preservative. MORpholine- narcoticangesic. Equanil- Tranquillize

(2) Bithional is added to soap to reduce foam generating bacterial decomposition of organic matter on the skin, due to its antiseptic properties.
(3) Tranquillizer are used in sleeping pills because they relieve stress fatigue by inducing sense of well-being.

Que.3:- Name the action of the following on the human body
1. Luminal 2. Streptomycin 3.Analgin

1. Luminal It is called sedative tranquilizer. It produce sleep and is habit forming.
2. Streptomycin It is an antibiotic and used to cure tuberculosis.
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Sol.: The drugs which give relife from pain are known as analgesics.
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2. Non- narcotics (non-addictive) These are not habit foarming and do not cause addiction, e.g., aspirin.

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Que.8: Explain the term, target molecules or drug targets as used in medicinal chemistry.

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(2) 

\[
\text{Cetyltrimethyl ammonium chloride}
\]
(3) It acts as an antiseptic

Que.11: Why are the detergents have straight hydrocarbon groups better than the detergents having branched chain hydrocarbons groups?
Sol.: Detergen having straight chain hydocarbon group are more biodegradable in comparison to the detergent having straight chain hydrocarbon are easily broke down or decomposed by microrganism which are present in water bodies. Therefore, these cause less water pollution, hence are better than detergnts having branched chain hydocarbons.

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Sol.: Saccharic is an artificial sweetener its structure is as follows

![Saccharic acid structure](image)

Saccharic acid is obtained by the oxidation of glucose with conc. HNO₃

Que13: Describe the following giving one example of each

(1) Detergents (2) Food preservatives

(1) Substance which helps in the removal of fats which bind with other materials to the fabric or skin are called detergents. *There are two types of detergents*

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Sol.:-

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VALUE BASED QUESTIONS [ 4 MARKS ]

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Now give the answer of the following questions

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III Which artificial sweetener has the highest sweetening capacity?

IV Give the value of possessed by people taking less sugar.

; I It is 550 times as sweet as sugar. IT is harmless and excreted through the urine from the body, unchanged.

II The sweetness of alitame is difficult to control. Sucralose is better than alitame because it is stable at cooking temperature. Its appearance as well as taste are like sugar. Also it does not provide calories.

III Alitame has the highest sweetening capacityt 2000 times greater than cane sugar.

IV These people protect themselves from diabetes and heart alimaents and are more useful to society.

2. There were washermen, Ramu and gopi in village. Both used to wash their clothes on same pond but Ramu’s service was better than Gopi. Gopi was worried that why his clothes were not washed well. One day Gopi asked Ramu, that how he can provide better service. Ramu has advised him to use the detergents.

Answer the following questions

I Why Gopi’s service was not better?

II Why Ramu has advised Gopi to use detergents?

III How many types of detergents are found and Write their names?

IV What value did you obtain from the above discussion?

; I Gpoi was using soap while Ramu was using detergents. As we know, detergent is a better cleansing agent than soap. So, Gopi’s survice was poor than Ramu.

II Ramu has advised Gopi to use detergents to improve cleansing quality as detergents show better action in soft as well as in hard water.
III There are mainly three types of detergents;

A Cationic Detergent
   (Cetyltrimethyl ammonium bromide)
B Anionic Detergent
   CH\(_3\)(CH\(_2\))_{10}CH\(_2\)OSO\(_3^-\)Na\(^+\)
C Non Ionic Detergent
   CH\(_3\)(CH\(_2\))_{16}COO(CH\(_2\)CH\(_2\)O\(_n\))CH\(_2\)CH\(_2\)OH

IV Values obtained are; human welfare, environmental awareness and social development.