

## Unit - 16

### CHEMISTRY IN EVERYDAY LIFE

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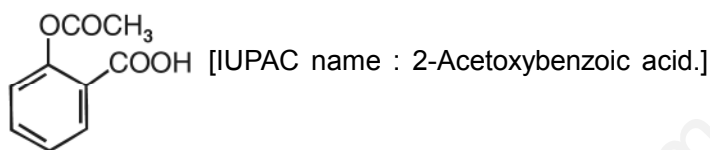
#### Points to Remember

1. A drug is a chemical agent which affects human metabolism and provides cure from ailment. If taken in doses higher than recommended, these may have poisonous effect.
2. Use of chemicals for therapeutic effect is called chemotherapy.
3. Drugs usually interact with biological macromolecules such as carbohydrates, proteins, lipids and nucleic acids. These are called target molecules.
4. Drugs are designed to interact with specific targets so that these have the least chance of affecting other targets. This minimises the side effects and localises the action of the drug.
5. Drugs like analgesics, antibiotics, antiseptics, disinfectants, antacids and tranquilizers have specific pharmacological functions.
6. Antifertility drugs are used to control population. These contain a mixture of synthetic estrogen and progesterone derivatives.
7. Chemicals are added to food for preservation, enhancing their appeal and adding nutritive value in them.
8. Artificial sweetening agents like aspartame, saccharin etc. are of great value to diabetic persons and people who need to control their calories.
9. These days detergents are much in vogue and get preference over soaps because they work even in hard water.
10. Synthetic detergents are classified into three main categories namely anionic, cationic and non-ionic.
11. Detergents with straight chain of hydrocarbons are preferred over branched chain as the latter are non-biodegradable and consequently cause environmental pollution.
12. The unbranched hydrocarbon side chains of the detergent molecule are prone to attack by bacteria, so the detergents are bio-degradable and pollution is prevented.

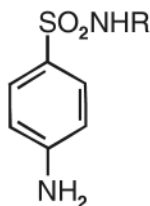
**VSA QUESTIONS (1 - MARK QUESTIONS)**

1. Write the formula and IUPAC name of aspirin.

[Hint :



2. Name two types of the drugs classified on the basis of pharmacological effect.
3. What is the role of Bithional in toilet soaps?
4. Why is sodium benzoate added to packed containers of jams and pickles?
5. Name the type of drugs having following structural formula :



[Hint : Sulpha Drugs].

6. Why the receptors embedded in cell membranes show selectivity for one chemical messenger over the other?

[Hint : The active site of receptor has specific shape and specific functional groups which can bind only specific messenger which fits in.]

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

[Hint : Classification based on pharmacological effect.]

8. Give the name of medicine used for the treatment of syphilis.

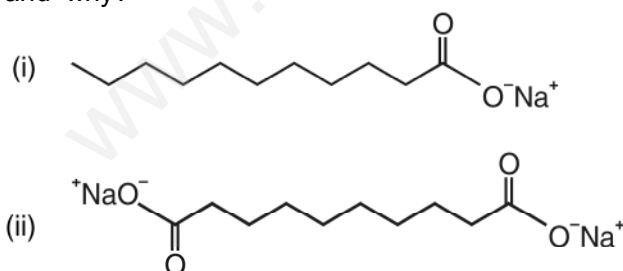
[Hint : Salvarsan].

9. Give the composition of tincture of iodine.

10. How does aspirin act as analgesic?

[Hint : Aspirin inhibits the synthesis of prostaglandins which cause pain.]

11. Name the antiseptic agents present in dettol.  
[Hint : Chloroxylenol and Terpineol].
12. What precaution should be taken before administering penicillin to a patient?  
[Hint : To confirm, beforehand that the patient is not allergic to penicillin.]
13. Explain why aspirin finds use in prevention of heart attacks?  
[Hint : Due to anti blood clotting activity.]
14. Mention one use of drug meprobamate.  
[Hint : Antidepressant drug.]
15. Name the derivative of sucrose which tastes like sugar and can be safely used by weight conscious people.
16. Why synthetic detergents are preferred over soaps for use in washing machines?  
[Hint : They work well even with hard water and not form any scum.]
- \*17. How is acidity cured with cimetidine?  
[Hint. : Cimetidine prevents the interaction of histamines with the receptors present in stomach wall.]
- \*18. While antacids and antiallergic drugs interfere with the function of histamines, why do these not interfere with the function of each other?  
[Hint. : Antacids and antiallergic drugs bind to the different receptor sites. Therefore, they do not interfere with the function of each other].
19. Which of the following two compounds can be used as a surface agent and why?



[Hint : Compound (i) acts as a surface agent because its one end is hydrophobic while the other end is hydrophilic in nature.]

20. What type of drug is chloramphenicol?
21. Name a chemical used as an antiseptic as well as disinfectant.
22. Give two examples of antidepressants.

**SA (I) TYPE QUESTIONS (2 - MARK QUESTIONS)**

1. What are antihistamines. Give two examples.
2. What are narcotic and non-narcotic analgesics? Give one example of each.
3. Explain the following terms as used in medicinal chemistry :  
(i) Target molecules                      (ii) Enzyme inhibitors.
4. Give one important use of each of following :  
(i) Equanil                                      (ii) Morphine
5. What are neurologically active drugs. Give two examples.
6. (i) What are antibiotics?  
(ii) What is meant by the term broad spectrum antibiotic?
7. From the given examples ciprofloxacin, phenelzine, morphine, ranitidine. Choose the drug used for  
(i) treating allergic conditions              (ii) to get relief from pain
8. Why a drug should not be taken without consulting a doctor? Give two reasons.
9. State the main difference between bacteriostatic and bacteriocidal antibiotics. Give one example of each.
10. What are antifertility drugs? Name the constituents of an oral contraceptive.
11. What do you mean by non-biodegradable detergents? How can we make biodegradable detergents?
- \*12. If water contains dissolved calcium hydrogencarbonate, which out of soap and detergent, will you prefer to use? Why?  
[Hint : We will use detergent because it will not form insoluble precipitate with  $\text{Ca}^{2+}$ ]
- \*13. What are barbiturates? What is the action of barbiturates on human body?  
[Hint : Barbaturic acid derivatives are called barbiturates. They are highly effective pain relieving agents.]
- \*14. Write the structures of soaps obtained by the hydrolysis of following fats:  
(i)  $(\text{C}_{15}\text{H}_{31}\text{COO})_3 \text{C}_3\text{H}_5$  Glyceryl palmitate  
(ii)  $(\text{C}_{17}\text{H}_{33}\text{COO})_3 \text{C}_3\text{H}_5$  Glyceryl oleate.  
[Hint : (i)  $\text{C}_{15}\text{H}_{31}\text{COO}^-\text{Na}^+$  (ii)  $\text{C}_{17}\text{H}_{33}\text{COO}^-\text{Na}^+$ ]

**SA (II) TYPE QUESTIONS (3 - MARK QUESTIONS)**

1.
  - (i) Why are artificial sweetening agents harmless when taken?
  - (ii) Name one such artificial sweetening agent.
  - (iii) Why is the use of aspartame as an artificial sweetener limited to cold foods?
2. Pick out the odd one amongst the following on the basis of their medicinal properties. Give suitable reason.
  - (i) Luminal, seconal, terfenadine, equanil.
  - (ii) Chloroxylenol, phenol, chloamphenicol, bithional.
  - (iii) Sucralose, aspartame, alitame, sodium benzoate.

**[Hint :**

- (i) Terfenadine is antihistamine other three are used as tranquilisers.
  - (ii) Chloramphenicol is a broad spectrum antibiotic. Other three have antiseptic properties.
  - (iii) Sodium benzoate is a food preservative. Other three are artificial sweetners.]
3. Give the main function of following in the body of human beings.
  - (i) Enzymes
  - (ii) Receptor proteins
  - (iii) Neurotransmitter
4. Identify the class of drug :
  - (i) Phenelzine (Nardin)
  - (ii) Aspirin
  - (iii) Cimetidine
5. Give the pharmacological function of the following type of drugs:
  - (i) Analgesics
  - (ii) Tranquilizers
  - (iii) Antifertility drugs

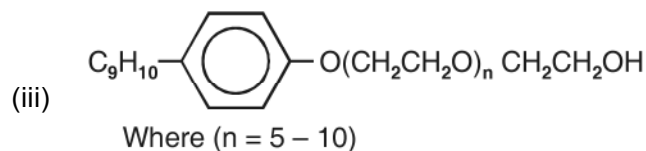
6. Give the name of medicine used in the treatments of following diseases:
- Typhoid
  - Joint pain (in Arthritis)
  - Hypertension
7. Give the class of drugs to which these substances belong :
- Bithional
  - Amoxycillin
  - Salvarsan
8. How are antiseptics different from disinfectants? How does an antibiotic differ from these two? Give one example of each of them.
9. Explain the following terms with suitable examples :
- Cationic detergents
  - Anionic detergents
  - Nonionic detergents
- \*10. Label hydrophilic and hydrophobic part in the following compounds :
- $\text{CH}_3(\text{CH}_2)_{10}\text{CH}_2\text{OSO}_3^- \text{Na}^+$
  - $\text{CH}_3(\text{CH}_2)_{15}\text{N}^+(\text{CH}_3)_3 \text{Br}^-$
  - $\text{CH}_3(\text{CH}_2)_{16}\text{COO} (\text{CH}_2\text{CH}_2\text{O})_n \text{CH}_2\text{CH}_2\text{OH}$

[Hint : (i)  $\frac{\text{CH}_3(\text{CH}_2)_{10}\text{CH}_2}{\text{hydrophobic}} \quad \frac{\text{OSO}_3^- \text{Na}^+}{\text{hydrophilic}}$

(ii)  $\frac{\text{CH}_3(\text{CH}_2)_{15}}{\text{hydrophobic}} \quad \frac{\text{N}^+ (\text{CH}_3)_3 \text{Br}^-}{\text{hydrophilic}}$

(iii)  $\frac{\text{CH}_3(\text{CH}_2)_{16}}{\text{hydrophobic}} \quad \frac{\text{COO} (\text{CH}_2\text{CH}_2\text{O})_4 \text{CH}_2\text{CH}_2\text{OH}}{\text{hydrophobic}}$

- \*11. Classify the following as cationic detergents, anionic detergents or nonionic detergents:
- $\text{CH}_3(\text{CH}_2)_{10} \text{CH}_2 \text{OSO}_3^- \text{Na}^+$
  - $[\text{CH}_3 - (\text{CH}_2)_{15} \text{N}(\text{CH}_3)_3]^+ \text{Br}^-$



**[Hint :** (i) Anionic detergent. (ii) Cationic detergent.  
(iii) Nonionic detergent.

\*12. How do enzyme inhibitors work? Distinguish between competitive and non-competitive enzyme inhibitors.

**[Hint :** An enzyme inhibitor either blocks the active site of enzyme or changes the shape of the active site by binding at an allosteric site. They are of two types.

- (i) Competitive enzyme inhibitor – It competes with natural substance for their attachment on the active sites of enzymes.
- (ii) Non-competitive enzyme inhibitor binds at allosteric site and changes the shape of the active site in such a way that the substrate can not recognise it.]