Unit

16

CHEMISTRY IN EVERYDAY LIFE

I. Multiple Choice Questions (Type-I)

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

(i) Some antiseptics can be added to soaps.

(ii) Dilute solutions of some disinfectants can be used as antiseptic.

(iii) Disinfectants are antimicrobial drugs.

(iv) Antiseptic medicines can be ingested.

2. Which is the correct statement about birth control pills?

(i) Contain estrogen only.

(ii) Contain progesterone only.

(iii) Contain a mixture of estrogen and progesterone derivatives.

(iv) Progesterone enhances ovulation.

3. Which statement about aspirin is **not** true

(i) Aspirin belongs to narcotic analgesics.

(ii) It is effective in relieving pain.

(iii) It has antiblood clotting action.

(iv) It is a neurologically active drug.

4. The most useful classification of drugs for medicinal chemists is _____.

(i) on the basis of chemical structure.

(ii) on the basis of drug action.

(iii) on the basis of molecular targets.

(iv) on the basis of pharmacological effect.

5. Which of the following statements is correct?

(i) Some tranquilisers function by inhibiting the enzymes which catalyse the degradation of noradrenaline.

(ii) Tranquilisers are narcotic drugs.

(iii) Transquilisers are chemical compounds that do not affect the message transfer from nerve to receptor.

(iv) Tranquilisers are chemical compounds that can relieve pain and fever.

6. Salvarsan is arsenic containing drug which was first used for the treatment of _____.

(i) syphilis

(ii) typhoid

(iii) meningitis

(iv) dysentry

7. A narrow spectrum antibiotic is active against _____.

(i) gram positive or gram negative bacteria.

(ii) gram negative bacteria only.

(iii) single organism or one disease.

(iv) both gram positive and gram negative bacteria.

8. The compound that causes general antidepressant action on the central nervous system belongs to the class of _____.

(i) analgesics

(ii) tranquilizers

(iii) narcotic analgesics

(iv) antihistamines

9. Compound which is added to soap to impart antiseptic properties is _____.

(i) sodium laurylsulphate

(ii) sodium dodecylbenzenesulphonate

(iii) rosin

(iv) bithional

10. Equanil is _____.

(i) artificial sweetener

(ii) tranquilizer

(iii) antihistamine

(iv) antifertility drug

11. Which of the following enhances leathering property of soap?

(i) Sodium carbonate

(ii) Sodium rosinate

(iii) Sodium stearate

(iv) Trisodium phosphate

12. Glycerol is added to soap. It functions _____.

(i) as a filler.

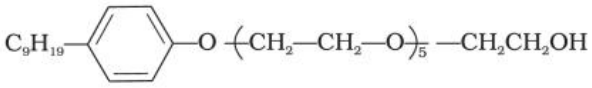
(ii) to increase leathering.

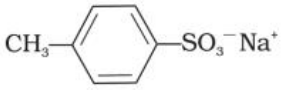
(iii) to prevent rapid drying.

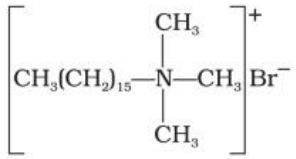
(iv) to make soap granules.

13. Which of the following is an example of liquid dishwashing detergent?

(i) $CH_3(CH_2)_{10}—CH_2OSO_3^-Na^+$

(ii) 

(iii) 

(iv) 

14. Polyethyleneglycols are used in the preparation of which type of detergents?

(i) Cationic detergents

(ii) Anionic detergents

(iii) Non-ionic detergents

(iv) Soaps

15. Which of the following is **not** a target molecule for drug function in body?

(i) Carbohydrates

(ii) Lipids

(iii) Vitamins

(iv) Proteins

16. Which of the following statements is **not** true about enzyme inhibitors?

(i) Inhibit the catalytic activity of the enzyme.

(ii) Prevent the binding of substrate.

(iii) Generally a strong covalent bond is formed between an inhibitor and an enzyme.

(iv) Inhibitors can be competitive or non-competitive.

17. Which of the following chemicals can be added for sweetening of food items at cooking temperature and does not provide calories?

(i) Sucrose

(ii) Glucose

(iii) Aspartame

(iv) Sucrolose

18. Which of the following will **not** enhance nutritional value of food?

(i) Minerals

(ii) Artificial sweeteners

(iii) Vitamins

(iv) Aminoacids

II. Multiple Choice Questions (Type-II)

Note : In the following questions two or more options may be correct.

19. Which of the following statements are **incorrect** about receptor proteins?

(i) Majority of receptor proteins are embedded in the cell membranes.

(ii) The active site of receptor proteins opens on the inside region of the cell.

(iii) Chemical messengers are received at the binding sites of receptor proteins.

(iv) Shape of receptor doesn't change during attachment of messenger.

20. Which of the following are **not** used as food preservatives?

(i) Table salt

(ii) Sodium hydrogencarbonate

(iii) Cane sugar

(iv) Benzoic acid

21. Compounds with antiseptic properties are _____.

(i) $CHCl_3$

(ii) CHI_3

(iii) Boric acid

(iv) 0.3 ppm aqueous solution of Cl_2

22. Which of the following statements are correct about barbiturates?

(i) Hypnotics or sleep producing agents.

(ii) These are tranquilizers.

(iii) Non-narcotic analgesics.

(iv) Pain reducing without disturbing the nervous system.

23. Which of the following are sulpha drugs?

(i) Sulphapyridine

(ii) Prontosil

(iii) Salvarsan

(iv) Nardil

24. Which of the following are antidepressants?

(i) Iproniazid

(ii) Phenelzine

(iii) Equanil

(iv) Salvarsan

25. Which of the following statements are **incorrect** about penicillin?

(i) An antibacterial fungus.

(ii) Ampicillin is its synthetic modification.

(iii) It has bacteriostatic effect.

(iv) It is a broad spectrum antibiotic.

26. Which of the following compounds are administered as antacids?

(i) Sodium carbonate

(ii) Sodium hydrogencarbonate

(iii) Aluminium carbonate

(iv) Magnesium hydroxide

27. Amongst the following antihistamines, which are antacids?

(i) Ranitidine

23/04/18

(ii) Brompheniramine

(iii) Terfenadine

(iv) Cimetidine

28. Veronal and luminal are derivatives of barbituric acid which are _____.

(i) Tranquilizers

(ii) Non-narcotic analgesic

(iii) Antiallergic drugs

(iv) Neurologically active drugs

29. Which of the following are anionic detergents?

(i) Sodium salts of sulphonated long chain alcohol.

(ii) Ester of stearic acid and polyethylene glycol.

(iii) Quarternary ammonium salt of amine with acetate ion.

(iv) Sodium salts of sulphonated long chain hydrocarbons.

30. Which of the following statements are correct?

(i) Cationic detergents have germicidal properties

(ii) Bacteria can degrade the detergents containing highly branched chains.

(iii) Some synthetic detergents can give foam even in ice cold water.

(iv) Synthetic detergents are not soaps.

III. Short Answer Type

31. What is the average molecular mass of drugs?

32. Write the uses of medicines.

33. What are antiseptics?

34. Which type of drugs come under antimicrobial drugs?

35. Where are receptors located?

36. What is the harmful effect of hyperacidity?

37. Which site of an enzyme is called allosteric site?

38. What type of forces are involved in binding of substrate to the active site of enzyme?

39. What is the commonality between the antibiotic arsphenamine and azodye?

40. Which class of drugs is used in sleeping pills?

41. Aspirin is pain relieving antipyretic drug but can be used to prevent heart attack. Explain.

42. Both antacids and antiallergic drugs are antihistamines but they cannot replace each other. Explain why?

43. What is a soft soap?

44. 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?

45. Explain why some times foaming is seen in river water near the place where sewage water is poured after treatment?

46. Which category of the synthetic detergents is used in toothpaste?

47. Hair shampoos belong to which class of synthetic detergent?

48. Dishwashing soaps are synthetic detergents. What is their chemical nature?

49. Draw the diagram showing micelle formation by the following detergent.

$CH_3(CH_2)_{10}CH_2OSO_3^-Na^+$

50. How does the branching of hydrocarbon chain of synthetic detergents affect their biodegradability?

51. Why is it safer to use soap from the environmental point of view?

52. What are analgesics?

53. What is the scientific explanation for the feeling of depression?

54. What is the basic difference between antiseptics and disinfectants?

55. Between sodiumhydrogencarbonate and magnesium hydroxide which is a better antacid and why?

56. Which analgesics are called opiates?

57. What is the medicinal use of narcotic drugs?

58. What are antagonistic drugs?

59. What is the mode of action of antimicrobial drugs?

60. What is the side product of soap industry? Give reactions showing soap formation.

61. What is the difference between bathing soap and washing soaps?

62. How are transparent soaps manufactured?

63. What is the advantage of using antihistamines over antacids in the treatment of acidity?

64. What are the functions performed by histamine in the body?

65. With the help of an example explain how do tranquilizers control the feeling of depression?

66. Why are certain drugs called enzyme inhibitors?

67. What are fillers and what role these fillers play in soap?

68. Sugar is the main source of energy as it produces energy on metabolic decomposition. But these days low calorie drinks are more popular, why?

69. Pickles have a long shelf life and do not get spoiled for months, why?

70. What is the difference between saccharin and saccharic acid?

71. Name an artificial sweetener which is derivative of sucrose.

72. Name two α-amino acids which form a dipeptide which is 100 times more sweet than cane sugar?

73. Aspartame is unstable at cooking temperature, where would you suggest aspartame to be used for sweetening?

74. Sodium salts of some acids are very useful as food preservatives. Suggest a few such acids.

75. Explain the role of allosteric site in enzyme inhibition?

76. How are receptor proteins located in the cell membrane?

77. What happens when the bond formed between an enzyme and an inhibitor is a strong covalent bond?

IV. Matching Type

Note : Match the items given in Column I with the items given in Column II.

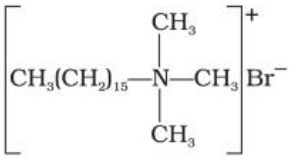
78. Match the medicines given in Column I with their use given in Column II.

Column I	Column II
(i) Ranitidine	(a) Tranquilizer
(ii) Furacine	(b) Antibiotic
(iii) Phenelzine	(c) Antihistamine
(iv) Chloramphenicol	(d) Antiseptic
	(e) Antifertility drug

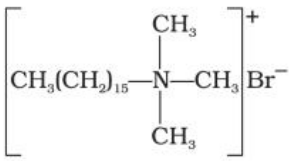
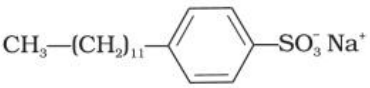
79. Match the soaps given in Column I with items given in Column II.

	Column I		Column II
(i)	Soap chips	(a)	dried miniature soap bubbles
(ii)	Soap granules	(b)	small broken pieces of soap formed from melted soaps
(iii)	Soap powder	(c)	soap powder + abrasives + builders (Na_2CO_3, Na_3PO_4)
(iv)	Scouring soap	(d)	soap powder + builders like Na_2CO_3 and Na_3PO_4

80. Match structures given in Column I with the type of detergents given in Column II.

	Column I		Column II
(i)	$CH_3(CH_2)_{16}COO(CH_2CH_2O)_nCH_2CH_2OH$	(a)	Cationic detergent
(ii)	$C_{17}H_{35}COO^-Na^+$	(b)	Anionic detergent
(iii)	$CH_3—(CH_2)_{10}CH_2SO_3^-Na^+$	(c)	Nonionic detergent
(iv)		(d)	Soap

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

	Column I		Column II
(i)		(a)	Dishwashing powder
(ii)		(b)	Laundry soap
(iii)	$C_{17}H_{35}COO^-Na^+ + Na_2CO_3 +$ Rosin	(c)	Hair conditioners
(iv)	$CH_3(CH_2)_{16}COO(CH_2CH_2O)_nCH_2CH_2OH$	(d)	Toothpaste

82. Match the class of compounds given in Column I with their functions given in Column II.

Column I	Column II
(i) Antagonists	(a) Communicate message between two neurons and that between neurons to muscles
(ii) Agonists	(b) Bind to the receptor site and inhibit its natural function
(iii) Chemical messenger	(c) Crucial to body's communication process
(iv) Inhibitors	(d) Mimic the natural messenger
(v) Receptors	(e) Inhibit activities of enzymes.

83. Match the classes of drugs given in Column I with their action given in Column II.

Column I	Column II
(i) Analgesics	(a) Inhibit the growth of microorganisms can be given orally.
(ii) Antiseptics	(b) Treatment of stress
(iii) Antihistamines	(c) Applied to inanimate objects
(iv) Antacids	(d) Prevents the interaction of histamine with its receptor
(v) Tranquilisers	(e) Pain killing effect
(vi) Antibiotics	(f) Applied to diseased skin surfaces
(vii) Disinfectants	(g) Treatment of acidity

V. Assertion and Reason Type

Note : In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(i) Assertion and reason both are correct statement but reason does not explain assertion.

(ii) Assertion and reason both are correct and reason explains the assertion.

(iii) Both assertion and reason are wrong statement.

(iv) Assertion is correct statement reason is wrong statement.

(v) Assertion is wrong statement reason is correct statement.

84. **Assertion** : Penicillin (G) is an antihistamine
Reason : Penicillin (G) is effective against gram positive as well as gram negative bacteria.

85. **Assertion** : Sulpha drug contain sulphonamide group.
Reason : Salvarsan is a sulpha drug.

86. **Assertion** : Receptors are crucial to body's communication process.
Reason : Receptors are proteins.

87. **Assertion** : Enzymes have active sites that hold substrate molecule for a chemical reaction.
Reason : Drugs compete with natural substrate by attaching covalently to the active site of enzyme.

88. **Assertion** : Chemical messengers are chemicals that enable communication of message between two neurons or between neurons and muscles.
Reason : Chemicals enter the cell through receptor.

89. **Assertion** : Transparent soaps are made by dissolving soaps in ethanol.
Reason : Ethanol makes things invisible.

90. **Assertion** : Sodium chloride is added to precipitate soap after saponification.
Reason : Hydrolysis of esters of long chain fatty acids by alkali produces soap in colloidal form.

91. **Assertion** : Competitive inhibitors compete with natural substrate for their attachment on the active sites of enzymes.
Reason : In competitive inhibition, inhibitor binds to the allosteric site of the enzyme.

92. **Assertion** : Non-competitive inhibitor inhibits the catalyic activity of enzyme by binding with its active site.
Reason : Non-competitive inhibitor changes the shape of the active site in such a way that substrate can't recognise it.

93. **Assertion** : Chemical messenger gives message to the cell without entering the cell.
Reason : Chemical messenger is received at the binding site of receptor proteins.

94. **Assertion** : Receptor proteins show selectivity for one chemical messenger over the other.
Reason : Chemical messenger binds to the receptor site and inhibits its natural function.

95. **Assertion** : All chemicals added to food items are called food preservatives.
Reason : All these chemicals increase the nutritive value of the food.

96. **Assertion** : Preservative are added to food items.
Reason : Preservatives inhibit the growth of microorganisms.

97. **Assertion** : Artificial sweeteners are added to the food to control the intake of calories.
Reason : Most of the artificial sweeteners are inert and do not metabolise in the body.

VI. Long Answer Type

98. In what respect do prontosil and salvarsan resemble. Is there any resemblance between azo dye and prontsil? Explain.

99. How do enzymes catalyse a chemical reaction in the living system? Explain drug target interaction taking the example of enzyme as target.

100. Synthetic detergents have advantage over usual soaps as far as cleansing power is concerned. But use of synthetic detergents over a long time creates environmental pollution. How can the pollution caused by synthetic detergents be minimised? Classify the detergents according to their chemical nature.

101. What are enzyme inhibitors? Classify them on the basis of their mode of attachments on the active site of enzymes. With the help of diagrams explain how do inhibitors inhibit the enzymatic activity.

ANSWERS

I. Multiple Choice Questions (Type-I)

1. (iv)	2. (iii)	3. (i)	4. (iii)	5. (i)	6. (i)
7. (i)	8. (ii)	9. (iv)	10. (ii)	11. (ii)	12. (iii)
13. (ii)	14. (iii)	15. (iii)	16. (iii)	17. (iv)	18. (ii)

II. Multiple Choice Questions (Type-II)

19. (ii), (iv)	20. (i), (iii)	21.(ii), (iii)	22. (i), (ii)
23. (i), (ii)	24. (i), (ii), (iii)	25. (iii), (iv)	26. (ii), (iv)
27. (i), (iv)	28. (i), (iv)	29. (i), (iv)	30. (i), (iii), (iv)

III. Short Answer Type

31. ~100–500u.

32. Medicines are used in diagnosis, prevention and treatment of diseases.

33. Antiseptics are chemicals which either kill or prevent the growth of microorganisms and are applied to living tissues.

34. Antiseptics, antibiotics and disinfectants.

35. Receptors are embedded in cell membrane.

36. Ulcer development in stomach.

37. Sites different from active site of enzyme where a molecule can bind and affect the active site is called allosteric site. Some drugs may also bind at this site.

38. Ionic bonding, hydrogen bonding, van der Waals interaction, dipole-dipole interaction.

39. Arsphenamine possesses —As═As— linkage that resembles —N═N— linkages in azodyes.

40. Tranquilizers

41. Aspirin prevents platelet coagulation and thus has antiblood clotting action therefore can prevent blood clogging in heart.

42. See page no. 444 of NCERT textbook for Class XII.

43. These are potassium salts of fatty acids.

44. 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.

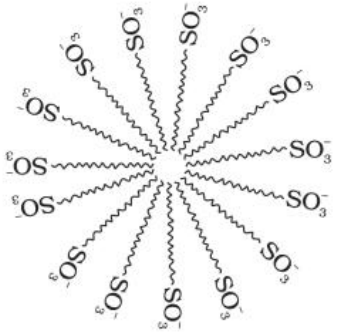
45. Detergents persist in water even after sewage treatment and cause foaming in river water.

23/04/18

46. Anionic detergent.

47. Cationic detergent.

48. Non-ionic detergents

49. 

50. Less branching leads to easy biodegradability.

51. Soaps are biodegradable while detergents are quite stable because of branching in hydrocarbon chain hence cause water pollution.

52. Analgesics are neurologically active pain killing drugs that reduce or abolish pain without causing impairment of consciousness, mental confusion, coordination or paralysis or some other disturbances of nervous system.

53. A person suffers from depression when he has low levels of noradrenaline. Noradrenaline is a neurotransmitter that plays a role in mood changes. Low levels of noradrenaline lower the signal-sending activity and make the person suffer from depression.

54. Antiseptics are applied to living tissues whereas disinfectants are applied to non living objects.

55. Magnesium hydroxide is a better antacid because being insoluble it does not allow the pH to increase above neutral. Hydrogencarbonate being soluble, its excess can make the stomach alkaline and trigger the production of even more acid.

56. Narcotic analgesics which are obtained from opium poppy are called opiates. Examples are morphine and its derivatives like heroin and codeine.

57. Since narcotic drugs relieve pain and produce sleep, these are chiefly used for the relief of postoperative pain, cardaic pain and pain of terminal cancer and in child birth.

58. Drugs that bind to the receptor site and inhibit its natural function are called antagonistic drugs.

59. Antimicrobial drugs can kill the microorganism such as bacteria, virus, fungi or other parasites. They can, alternatively, inhibit the pathogenic action of microbes.

60. [**Hint :** Glycerol.]

61. Bathing soaps are potassium salts of long chain fatty acids while washing soaps are sodium salts of long chain fatty acids.

62. Dissolving soap in ethanol followed by evaporating the excess solvent.

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

64. Histamine is a potent vasodilator. It contracts muscles in the gut and bronchi. It relaxes some other muscles e.g. in the walls of blood vessels. Histamine is also responsible for congestion in the nose associated with common cold and allergies. Also, histamine stimulates the release of pepsin and hydrochloric acid in the stomach.

65. See Class-XII NCERT, textbook page no. 444.

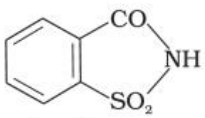
66. Enzymes have active sites that bind the substrate for effective and quick chemical reaction. The functional groups present at the active site of enzyme interact with functional groups of substrate via ionic bonding, hydrogen bonding, van der Waal interaction etc. Some drugs interfere with this interaction by blocking the binding site of enzyme and prevent the binding of actual substrate with enzyme. This inhibits the catalytic activity of the enzyme, therefore, these are called inhibitors.

67. Some substances are added to soap to affect the properties in order to make it useful for a particular application. Examples are sodium rosinate, sodium carbonate, etc. Sodium rosinate is added in laundry soaps, to increase lather and glycerol is added in shaving soaps, to prevent it from drying.

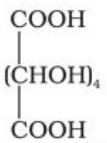
68. [**Hint :** In such drinks artificial sweetening agents are present which do not metabolise hence do not produce any energy.]

69. [**Hint :** Plenty of salt and cover of oil act as preservative. These do not allow bacteria to thrive on them.]

70.



Saccharin
(Artificial sweetener)



Saccharic acid
(obtained from oxidation of glucose by conc. HNO_3)

71. Sucrolose

72. Aspartic acid and phenylalanine.

73. In cold foods and soft drinks.

74. Benzoic acid, sorbic acid, propanoic acid.

75. **Hint :** For answer see page no. 441 of NCERT textbook for Class XII.

76. **Hint :** For answer see page no. 442 of NCERT textbook for Class XII.

77. **Hint :** For answer see page no. 442 of NCERT textbook for Class XII.

IV. Matching Type

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

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

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

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

82. (i) → (b) (ii) → (d) (iii) → (a) (iv) → (e) (v) → (c)

83. (i) → (e) (ii) → (f) (iii) → (d) (iv) → (g) (v) → (b)
(vi) → (a) (vii) → (c)

V. Assertion and Reason Type

84. (iii) 85. (iv) 86. (i) 87. (iv) 88. (iv) 89. (iv)

90. (ii) 91. (iv) 92. (v) 93. (ii) 94. (iv) 95. (iii)

96. (ii) 97. (ii)

VI. Long Answer Type

98. **Hint:** For answer see NCERT textbook for Class XII.

99. **Hint:** For answer see NCERT textbook for Class XII.

100. **Hint:** For answer see NCERT textbook for Class XII.

101. **Hint:** For answer see NCERT textbook for Class XII.