Exercise-1

PART - I : SUBJECTIVE QUESTIONS

Section (A) : Chemisty in every day life

A-1. Name two semisynthetic modifications of penicilin.

A-2. What is the role of boric acid in talcum powder ?

A-3. Name a phenolic antibacterial used in body deodorants.

A-4. Define the term chemotherapy.

A-5. Name one estrogen which is a constituent of an oral contraceptive.

A-6. What type of drug is ofloxacin ?

A-7. Name the medicine which can act both as an analgesic as well as an antipyretic.

A-8. Name two fixatives used in perfumes.

A-9. What is role of borax in cold creams ?

A-10. Name the fuel used in satellite SLV-3.

A-11. Why is bithional added to the toilet soap ?

A-12. Give one important use of each of the following in pharmacy ?
(i) Equanil (ii) Morphine

A-13. Explain the term, target molecules or drug-targets as used in medicinal chemistry.

A-14. Why should not medicines be taken without consulting doctors?

A-15. Which forces are involved in holding the drugs to the active site of enzymes?

A-16. What is tincture of iodine? What is its use?

A-17. What problem arises in using alitame as artificial sweetener?

A-18. Give names of two substances used as preservatives.

A-19. Give two examples of synthetic detergents.

A-20. Name the sweetening agent used in the preparation of sweet for a diabetic patient.

A-21. Why do soaps not work in hard water?

A-22. If water contains dissolved calcium bicarbonate, out of soaps and synthetic detergents which one will you use for cleaning clothes?

A-23. Label the hydrophilic and hydrophobic parts in the following compounds.
(i) $CH_3(CH_2)_{10}CH_2OSO_3^-\ Na^+$
(ii) $CH_3(CH_2)_{15}N^+(CH_3)_3Br^-$
(iii) $CH_3(CH_2)_{16}COO(CH_2CH_2O)_nCH_2CH_2OH^-$

A-24. Name one medicinal compound each that is used to treat :
(i) hypertension (ii) general body pain

A-25. Antacids and antiallergic drugs interfere with the function of histamines but why do these not interfere with the function of each other?

A-26. Low level of noradrenaline is the cause of depression, what types of drugs are needed to cure this problem? Name two drugs.

A-27. Why are cimetidine and ranitidine are better antacids than sodium bicarbonate or magnesium hydroxide or aluminium hydroxide.

A-28. How do omeprazole and lansoprazole act as antacids ?

A-29. What are the functions performed by histamine in the body ?

A-30. Name the substance which can act as both
(i) Analgesic and antipyretic. (ii) Antiseptic and disinfectant

A-31. What are food preservatives ?

PART - II : ONLY ONE OPTION CORRECT TYPE

Section (A) : Chemisty in every day life

A-1. Morphine is used as an
(A) Antipyretic (B) Antiseptic (C) Analgesic (D) Insecticide

A-2. Which of the following is not an alkaloid ?
(A) Reserpine (B) Morphine (C) Quinine (D) Phenylbutazone

A-3. The antibiotic used for curing tuberculosis is :
(A) Penicillin (B) Streptomycin (C) Tetracycline (D) Chloromycetin

A-4. The drugs used to get relief from pain are called :
(A) Antipyretics (B) Analgesics (C) Antibiotics (D) Antiseptics

A-5. A medicine which promotes secretion of urine is called :
(A) Diuretic (B) Antipyretic (C) Analgesic (D) Sedative

A-6. The antiseptic action of dettol is due to
(A) Chlorobenzene (B) Chloroxylenol (C) Chloroquine (D) Chloramphenicol

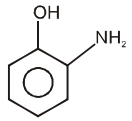
A-7. Octane number is zero for -
(A) Isoheptane (B) n-heptane (C) Isooctane (D) n-octane

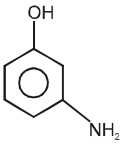
A-8. Which of the following is not an antiseptic drug ?
(A) Iodoform (B) Dettol (C) Gammexane (D) Gentian violet

A-9. Which of the following is not an antibiotic ?
(A) Penicillin (B) Sulphaguanidine (C) Chloramphenicol (D) None of these

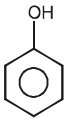
A-10. Which of the following is used as a “morning after pill” ?
(A) Norethindrone (B) ethynylestradiol (C) Mifepristone (D) Bithional

A-11. Which of the following is not true for antibiotics ?
(A) Tetracycline is one of the broad spectrum antibiotics which is effective against a large number of harmful micro-organism.
(B) Streptomycin is highly effective against microorganisms which cause tuberculosis.
(C) Penicillin has a narrow spectrum and certain persons are sensitive to it.
(D) Penicillin may be administered without testing the patients for sensitivity to it.

A-12. Which of the following gives paracetamol on acetylation ?
(A) 

(B) 

(C) 

(D) 

A-13. The most widely used antipyretic is
(A) Salicylic acid (B) Phenacetin (C) Paracetamol (D) Aspirin

A-14. Which statement is incorrect ?
(A) Salol is used as antiseptic
(B) Tincture of iodine is 2-3% solution of iodoform in alcohol-water.
(C) Thiourea and benzenethiol can be separated by water.
(D) Aspartame is used as sweetning agent in cold drinks.

PART - III : COMPREHENSION

Read the following passage carefully and answer the questions.

Comprehension #

Antibiotics are the chemical substances which are produced by micro-organisms like bacteria, fungi and moulds. Antibiotics can inhibit the growth or even destroy other micro-organisms. Now a days, synthetic antibiotics are also available. The first successful antibiotic produced was penicillin. The antibiotics may be either bacteriocidal (kills the organism in the body) or bacteriostatic (inhibits the growth of organism). Ampicillin and amoxycillin are modified antibiotics. Broad spectrum antibiotics are effective against several types of harmful micro-organisms.

1. Chloramphenicol is :
(A) antipyretic (B) broad spectrum antibiotic
(C) azo dye (D) tranquillizer

2. Which of the following is/are not an antibiotic ?
(A) Chloramphenicol (B) Sulphadiazine (C) Penicillin (D) Bithional

3. Which among the following antibiotics is bacteriostatic ?
(A) Penicillin (B) Ofloxacin (C) Aminoglycosiders (D) Erythromycin

4. Which of the following antibiotics is/are the modification of penicillins ?
(A) Ofloxacin (B) Ampicillin (C) Amoxycillin (D) Tetracycline

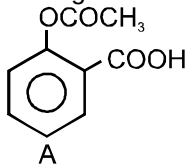
5. Which of the following antibiotics is effective against tuberculosis ?
(A) Chloromycetin (B) Tetracycline (C) Penicillin (D) Streptomycin

Exercise-2

JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

JEE(MAIN) OFFLINE PROBLEMS

1. Compound A given below is - **[AIEEE - 2002, 3/225]**



A

(1) Antiseptic (2) Antibiotic (3) Analgesic (4) Pesticide

2. Which of the following could act as a propellant for rockets ? **[AIEEE - 2003, 3/225]**
(1) Liquid hydrogen + liquid nitrogen (2) Liquid oxygen + liquid argon
(3) Liquid hydrogen + liquid oxygen (4) Liquid nitrogen + liquid oxygen

3. Which one of the following types of drugs reduces fever ? **[AIEEE - 2005, 1½, 225]**
(1) Tranquilizer (2) Antibiotic (3) Antipyretic (4) Analgesic

4. Aspirin is known as : **[AIEEE-2012, 4/120]**
(1) Acetyl salicylic acid (2) Phenyl salicylate
(3) Acetyl salicylate (4) Methyl salicylic acid

5. What is DDT among the following : **[AIEEE-2012, 4/120]**
(1) Greenhouse gas (2) A fertilizer
(3) Biodegradable pollutant (4) Non-biodegradable pollutant

6. The gas leaked from a storage tank of the Union Carbide plant in Bhopal gas tragedy was : **[JEE(Main)-2013, 4/120]**
(1) Methylisocyanate (2) Methylamine (3) Ammonia (4) Phosgene

7. Which of the following compounds is **not** an antacid ? **[JEE(Main)-2015, 4/120]**
(1) Aluminium hydroxide (2) Cimetidine
(3) Phenelzine (4) Ranitidine

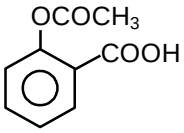
8. Which of the following is an anionic detergent ? **[JEE(Main)-2016, 4/120]**
(1) Sodium lauryl sulphate (2) Cetyltrimethyl ammonium bromide
(3) Glyceryl oleate (4) Sodium stearate

JEE(MAIN) ONLINE PROBLEMS

1. Which one of the following is used as Antihistamine ? **[JEE(Main) 2014 Online (11-04-14), 4/120]**
(1) Omeprazole (2) Chloramphenicol
(3) Diphenhydramine (4) Norethindrone

2. Aminoglycosides are usually used as : **[JEE(Main) 2014 Online (12-04-14), 4/120]**
(1) antibiotic (2) analgesic (3) hypnotic (4) antifertility

3. Phthalic acid reacts with resorcinol in the presence of concentrated H_2SO_4 to give : **[JEE(Main) 2014 Online (12-04-14), 4/120]**
(1) Phenolphthalein (2) Alizarin (3) Coumarin (4) Fluorescein

4.  is used as : **[JEE(Main) 2015 Online (10-04-15), 4/120]**
(1) Antithistamine (2) Antacid (3) Insecticide (4) Analgesic

5. Which artificial sweetener contains chlorine ? **[JEE(Main) 2015 Online (11-04-15), 4/120]**
(1) Sucralose. (2) Alitame (3) Aspartame (4) Saccharin

6. The artificial sweetener that has the highest sweetness value in comparison to cane sugar is : **[JEE(Main) 2016 Online (09-04-16), 4/120]**
(1) Saccharin (2) Sucralose (3) Alitame (4) Aspartame

7. Which of the following is a bactericidal antibiotic ? **[JEE(Main) 2016 Online (10-04-16), 4/120]**
(1) Erythromycin (2) Tetracycline (3) Ofloxacin (4) Chloramphenicol

8. The reason for "drug induced poisoning" is : **[JEE(Main) 2017 Online (08-04-17), 4/120]**
(1) Bringing conformational change in the binding site of enzyme
(2) Binding reversibly at the active site of the enzyme
(3) Binding irreversibly to the active site of the enzyme
(4) Binding at the allosteric sites of the enzyme

9. The correct match between items of List-I and List-II is : **[JEE(Main) 2018 Online (16-04-18), 4/120]**

	List-I		List-II
(A)	Phenelzine	(P)	Pyrimidine
(B)	Chloroxylenol	(Q)	Furan
(C)	Uracil	(R)	Hydrazine
(D)	Ranitidine	(S)	Phenol

(1) (A)-(S), (B)-(R), (C)-(Q), (D)-(P) (2) (A)-(R), (B)-(S), (C)-(P), (D)-(Q)
(3) (A)-(R), (B)-(S), (C)-(Q), (D)-(P) (4) (A)-(S), (B)-(R), (C)-(P), (D)-(Q)

10. The correct match between item–I and item–II. **[JEE(Main) 2019 Online (09-01-19), 4/120]**

	Item–I		**Item–II**
	(drug)		**(test)**
(A)	Chloroxylenol	(P)	Carbylamine test
(B)	Norethindrone	(Q)	Sodium hydrogencarbonate test
(C)	Sulphapyridine	(R)	Ferric chloride test
(D)	Penicillin	(S)	Bayer's test

(1) A $\rightarrow$ Q, B $\rightarrow$ P, C $\rightarrow$ S, D $\rightarrow$ R (2) A $\rightarrow$ Q, B $\rightarrow$ S, C $\rightarrow$ P, D $\rightarrow$ R
(3) A $\rightarrow$ R, B $\rightarrow$ S, C $\rightarrow$ P, D $\rightarrow$ Q (4) A $\rightarrow$ R, B $\rightarrow$ P, C $\rightarrow$ S, D $\rightarrow$ Q

11. The correct match between item (I) and item (ii) is: **[JEE(Main) 2019 Online (11-01-19), 4/120]**

	Item-I		**Item–II**
(A)	Norethindrone	(P)	Anti-biotic
(B)	Ofloxacin	(Q)	Anti-Fertility
(C)	Equanil	(R)	Hypertension
		(S)	Analgesics

(1) (A) → (Q); (B) → (R); (C) → (S)
(2) (A) → (R); (B) →(P); (C) → (S)
(3) (A) → (Q); (B) → (P); (C) → (R)
(4) (A) → (R); (B) →(P); (C) → (R)

12. The correct match between Item I and Item II is : **[JEE(Main) 2019 Online (11-01-19), 4/120]**

Item I		**Item II**	
(A)	Allosteric effect	(P)	Molecule binding to the active site of enzyme
(B)	competitive inhibitor	(Q)	Molecule crucial for communication in the body
(C)	Receptor	(R)	Molecule binding to a site other than the active site of enzyme
(D)	Poison	(S)	Molecule binding to the enzyme covalently

(1) (A) → (P); (B) → (R); (C) → (Q) ; (D) → (S)
(2) (A) → (R); (B) → (P); (C) → (S) ; (D) → (Q)
(3) (A) → (P); (B) → (R); (C) → (S) ; (D) → (Q)
(4) (A) → (R); (B) → (P); (C) → (Q) ; (D) → (S)

Answers

EXERCISE – 1

PART – I

A-1. Ampicillin and amoxicillin.

A-2. Boric acid acts as an antiseptic and as buffering agent.

A-3. Dichlorometaxylenol.

A-4. "The use of chemicals to destroy infectious micro organisms without causing any injury to the host is called as chemotherapy" .

A-5. Mestranol.

A-6. It is bactericidal antibiotic.

A-7. Aspirin.

A-8. Sandalwood oil, benzoin.

A-9. It stabilises the emulsion present in cold cream.

A-10. Polyurethane as fuel and ammonium perchlorate as the oxidiser.

A-11. Bithional is added to soap to reduce undesirable odour, resulting from bacterial decomposition of organic matter on skin.

A-12. (i) Equanil is a tranquiliser and is used for reducing depression.
(ii) Morphine is an alkaloid and is used as an analgesic.

A-13. Target molecules or drug-targets are the macromolecules such as carbohydrates, proteins, lipids, nucleic acids with which the drug interacts in our body to produce therapeutic effect.

A-14. Medicine should always be taken after consulting a doctor because any medicine if taken in overdoes may act as a poison. Moreover, only a doctor can diagnose the disease properly and prescribe the correct medicine in appropriate dose.

A-15. Drug is held to the amino acid residues of the protein present on the active site of the enzyme through forces such as ionic bonding, hydrogen bonding, van der Waals interaction or dipole-dipole interaction.

A-16. A 2-3% solution of iodine in alcohol-water mixture is called tincture of iodine. It is used as an antiseptic.

A-17. Alitame is a high potency sweetener. It is about 2000 times sweeter than sucrose, therefore, the control of sweetness of food is difficult while using it.

A-18. (i) Sodium benzoate (ii) Potassium metabisulphite.

A-19. The two examples of synthetic detergents are :
(i) Sodium lauryl sulphate (ii) Sodium dodecyl benzenesulphonate.

A-20. Ortho-sulphobenzimide, also known as saccharine can be used because it is non-nutritive and is excreted from the body in urine.

A-21. Cleansing action of soaps is because they are soluble in water and can emulsify grease and take it away in the water along with dirt present on grease. Now Ca^{2+} and Mg^{2+} ion present in water react with soap and make it insoluble in water.

$2C_{17}H_{35}COONa + MgCl_2 \longrightarrow (C_{17}H_{35}COO)_2Mg\downarrow + 2NaCl$

Soap (soluble in water) (Hardness of water) White ppt (Insoluble in water)

These insoluble soaps are useless as cleansing agent.

A-22. We will use synthetic detergent because calcium salts of detergents are soluble in water but that of soap are insoluble in water. Therefore, soap will form curdy white precipitate with calcium ions and some soap will be wasted in the process.

A-23. (i) $\underbrace{CH_3(CH_2)_{10}CH_2}_{\text{Hydrophobic or non-polar part}}-\underbrace{OSO_3^-Na^+}_{\text{Hydrophilic or polar part}}$

(ii) $\underbrace{CH_3(CH_2)_{15}}_{\text{Hydrophobic or non-polar part}}-\underbrace{\overset{+}{N}(CH_3)_3Br^-}_{\text{Hydrophilic or polar part}}$

(iii) $\underbrace{CH_3(CH_2)_{16}}_{\text{Hydrophobic part}}-\underbrace{COO(CH_2CH_2O)_nCH_2CH_2OH}_{\text{Hydrophilic part}}$

A-24. **(i) Hypertension :** Tranquilizers are effective in such mental disorder when ordinary hypnotics or sedatives fail. These are called as psychotherapeutic drugs. e.g., Barbituric acid.
(ii) General body pain : The chemicals which are used for relieving pain are called ANALGESICS. e.g. Aspirin.

A-25. Antacids and antiallergic drugs do not interfere with the function of each other because they work on different receptors. Thus, antihistamines (antiallergic drugs) do not affect the secretion of acid in stomach because they do not interact with the receptors present in the stomach wall.

A-26. Drugs which can inhibit the enzymes which catalase the degradation of noradrenaline are needed. This will slow down the process of metabolism of noradrenaline and will thus help in counteracting the effect of depression. **Iproniarid and phenelzine** are two such drugs.

A-27. Over production of hydrochloric acid in the stomach causes acidity. So, sodium bicarbonate or magnesium or aluminium hydroxide are used as treatment of acidity. However excessive bicarbonate can make the stomach alkaline and trigger the production of even more acid. But the drugs cimetidine and rantidine work in different way. They prevent the interaction of histamine with the receptors present in the stomach wall and this results in release of lesser amount of acid.

A-28. They prevent the release of HCl in the stomach.

A-29. Histamine is a potent vasodilater. (A chemical agent that causes dilation of the blood vessels)
(i) It contracts muscles in the gut and bronchi.
(ii) It relaxes some other muscles e.g., in the wall of blood vessels.
(iii) It is responsible for congestion in the nose associated with common cold and allergies.
(iv) It stimulates the release of pepsin and HCl in the stomach.

A-30. (i) Aspirin
(ii) 0.2 % solution of phenol acts as an antiseptic whereas 1% solution acts as a disinfectant.

A-31. The chemical which are used to stop undesirable change in food caused by microorganism and save them from spoiling are called preservatives.

PART – II

A-1.	(C)	**A-2.**	(D)	**A-3.**	(B)	**A-4.**	(B)	**A-5.**	(A)
A-6.	(B)	**A-7.**	(B)	**A-8.**	(C)	**A-9.**	(B)	**A-10.**	(C)
A-11.	(D)	**A-12.**	(C)	**A-13.**	(C)	**A-14.**	(B)		

PART – III

1.	(B)	**2.**	(B)	**3.**	(D)	**4.**	(BC)	**5.**	(D)

EXERCISE – 2

JEE(MAIN) OFFLINE PROBLEMS

1.	(3)	**2.**	(3)	**3.**	(3)	**4.**	(1)	**5.**	(4)
6.	(1)	**7.**	(3)	**8.**	(1)				

JEE(MAIN) ONLINE PROBLEMS

1.	(3)	**2.**	(1)	**3.**	(4)	**4.**	(4)	**5.**	(1)
6.	(3)	**7.**	(3)	**8.**	(3)	**9.**	(2)	**10.**	(3)
11.	(3)	**12.**	(4)						