

Time : 3 Hours

Max. Marks : 75

Note: The question paper contains three sections I, II, III, Section I is compulsory. Attempt any two questions from section II and attempt any seven questions from section III.

SECTION-I

Short Answer (Compulsory)

Answer all the questions-

(20×1=20)

1. What is meant by de novo drug design?
 - a) The synthesis of a compound from simple starting materials.
 - b) The design of the synthesis required to generate a novel range of structures.
 - c) The design of a novel drug based on molecular modelling studies of a binding site.
 - d) The modification of a drug based on molecular modelling studies into how it binds to its target binding site.
2. The tetracyclines act as intercalating anticancer agents. Which of the following is a simplified analogue of tetracyclines?
 - a) Mitoxantrone
 - b) Teniposide
 - c) Daunorubicin
 - d) Dactinomycin
3. The following antibacterial agent was used in the Second World War-
 - a) Erythromycin
 - b) Proflavine
 - c) Chloramphenicol
 - d) Rifampicin
4. What is the molecular target for the vinca alkaloids used as anticancer agents?
 - a) The transport protein for serotonin
 - b) DNA
 - c) Cell membrane
 - d) Tubulin

5. Which type of infection could be orally treated with a highly polar antibacterial agent?
 - a) brain infection
 - b) kidney infection
 - c) gut infection
 - d) lung infection
6. Which of the following statements best describes structure-activity relationships (SAR)?
 - a) The study of which functional groups are important to the chemical reactivity of the drug.
 - b) The study of the physicochemical properties that are important to the absorption of a drug into the blood supply.
 - c) The study of the structural features of a drug that are important to its biological activity.
 - d) The study of the structural features of a drug that are important to its chemical stability.
7. Tioconazole is a non-polar antifungal agent which is used topically, whereas fluconazole is a polar drug which is used systemically. Which of the following statements is correct?
 - a) The heterocyclic groups in fluconazole contain more nitrogen atoms making the drug less polar.
 - b) Increased polarity decreases water solubility.
 - c) The fluorine substituents in fluconazole increase water solubility.
 - d) The alcohol group in fluconazole increases polarity.
8. Which of the following statements is true with respect to phosphate prodrugs?
 - a) Phosphate esters are more polar in nature than the parent drug.
 - b) Phosphate esters are less water soluble than the parent drug.
 - c) Phosphate esters are more likely to cross cell membranes than the parent drug.
 - d) Phosphate esters are resistant to drug metabolism.

[P.T.O.]

9. Which of the following drugs was not isolated from a natural source?
- quinine
 - morphine
 - isoniazid
 - artemisinin
10. What is meant by docking?
- The process by which two different structures are compared by molecular modelling.
 - The process by which a lead compound is simplified by removing excess functional groups.
 - The process by which drugs are fitted into their target binding sites using molecular modelling.
 - The process by which a pharmacophore is identified.
11. Which of the following is not a sulfonamide?
- Dapsone
 - sulfamethoxazole
 - sulfacetamide
 - sulfanilamide
12. Which of the following is a biosynthetic penicillin?
- Ampicillin
 - Amoxicillin
 - Benzylpenicillin
 - Propicillin
13. Which of the following is not a fluoroquinolone?
- Ciprofloxacin
 - Gatifloxacin
 - Norfloxacin
 - Nalidixic acid
14. Which of the following is a beta-lactamase inhibitor?
- Clavulanic acid
 - Subbactam
 - Tazobactam
 - All of the above
15. Which of the following is a macrolide antibiotic?
- Chloramphenicol
 - Ampicillin
 - Kanamycin
 - Erythromycin
16. Which of the following is an artemisinin derivative?
- artesunate
 - artemether
 - arteether
 - All of the above

17. Which of the following is not an Antitubercular antibiotic?
- Rifabutin
 - Capreomycin
 - Ribavirin
 - Cycloserine
18. Which of the following is an Antifungal antibiotic?
- Miconazole
 - Tolnaftate
 - Itraconazole
 - Natamycin
19. Which of the following is an Antigiardial drug?
- Furazolidone
 - Quinacrine
 - Metronidazole
 - All of the above
20. Which of the following is not an antiviral agent?
- Acyclovir
 - Indinavir
 - Atovaquone
 - None of the above

SECTION-II

(2×10=20)

Long Answer (Any Two)

- Give chemical classification of antibiotics. Write a detailed note on cephalosporins.
- Classify the anti-tubercular agents. Discuss the synthetic anti-tubercular agents.
- Describe the various parameters used in QSAR.

SECTION-III

(7×5=35)

Short Note Answer (Any Seven)

- Describe the various approaches used in drug design.
- Write synthesis, uses and mechanism of action of sulfacetamide.
- Give the chemical classification of anti-viral agents.
- Give synthesis and mechanism of action of ciprofloxacin.
- Discuss the SAR of quinolones. Write the synthesis and mechanism of action of pamaquine.
- Describe the concept of prodrug. Enlist its applications.
- Give the synthesis, uses and mechanism of action of tolinaftate.
- Describe the structure and mechanism of action of streptomycin.
- Classify anti-protzoal agents. Write synthesis, uses and MOA of metronidazole.