REV-01
MSC/13/18

2022/07

M.Sc. CHEMISTRY
FOURTH SEMESTER
MEDICINAL CHEMISTRY
MSC - 402A

(Use Separate Answer Scripts for Objective & Descriptive)

Duration: 3 hrs. Full Marks: 70

(PART-A: Objective)

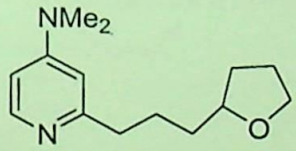
Time: 30 min. Marks: 20

Choose the correct answer from the following: ***1X20=20***

1. Bacterial cell wall is a polymer of hetero-polysachharide crosslinked with peptide chain. The suger units of hetero-polysachharide are:
   a. N-acetyl glucoseamine and N-acetyl muramic acid.
   b. N-acetyl galactoseamine and N-acetyl muramic acid
   c. N-acetyl glucoronic acid and N-acetyl muramic acid
   d. N-acetyl glucoseamine and N-acetyl cialic acid.

2. Any given drug will express its activity through
   a. Enzyme inhibition
   b. binding with specified cell receptors
   c. Binding with DNA
   d. any of these.

3. The following compound has potent antifungal activity in a cell free system but poor activity in mice.



   Why is it not effective in mice? The reason could be.
   a. The compound is sterically crowded.
   b. The compound is basic and cannot cross the membrane barrier.
   c. The compound is highly basic and in physiological condition get protonated in GI track, becomes highly polar and cannot cross non-polar cell membrane.
   d. All statements are wrong.

4. Potency of a drug is found to increase when -Cl group is introduced in p-position in phenyl moiety of the lead compound of a drug. Which of the following group is likely to increase the potency further when the -Cl group is displaced with?
   a. -Cl in 3- and 4- position
   b. $-NMe_2$
   c. -OH
   d. -OMe

5. A highly polar drug:
   a. Will be easily absorbed in the GI track.
   b. Will be held up inside the lipid bi-layer of cell membrane.
   c. Need to administered by injection for proper absorption.
   d. None of the above is correct.

6. Chloramphenicol is -
   a. Antiseptic and disinfectant
   b. Broad spectrum antibiotic
   c. Antifertility drug
   d. Antihistamine

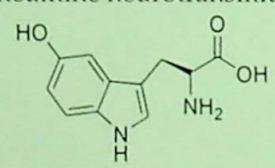
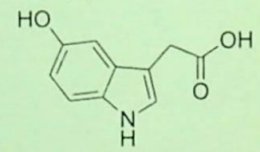
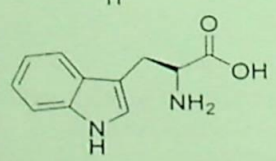
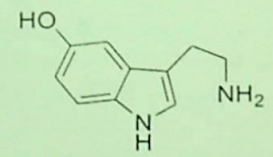
7. β -Lactam compounds are effective inhibitors of cell wall synthesis. this is because, their geometry is similar to
   a. Bactoprene
   b. N-acetyl-glucosamine
   c. Alanyl-alanine residue
   d. None of them

8. Sulbactam functions as an inhibition for the enzyme
   a. β -Lactamase
   b. Ligase
   c. Transpeptidase
   d. Racemase

9. Crosslinking of peptidoglycan chain is catalyzed by
   a. Oxidase
   b. Amidases
   c. Transpeptidases
   d. Hydrolases

10. 50S subunit contains
   a. 23S & 55 rRNA complexed with 34 polypeptides
   b. 23S & 5S rRNA complexed with 38 polypeptides
   c. 23S & 5S rRNA complexed with 43 polypeptides
   d. 23S & 5S rRNA complexed with 21 polypeptides

11. Serotonin is a monoamine neuro-transmitter, its biosynthesis occurs from
   a. L-Tyrosine
   b. L-Glycine
   c. L-Tryptophan
   d. L-Leucine

12. Monoamine neurotransmitter, serotonin is metabolized to
   a. 
   b. 
   c. 
   d. 

13. Drugs acting as monoamine oxidase inhibitors are
   a. Anaesthetics
   b. Cardiovascular
   c. Anti-depressants
   d. Anti-neoplastic

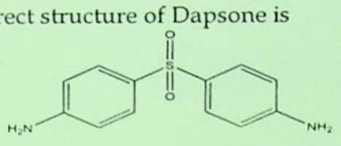
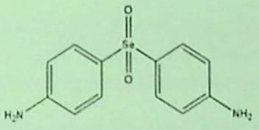
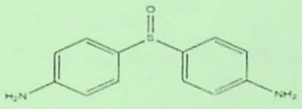
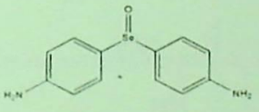
14. Nephrotoxicity refers to the damages in
   a. Kidney
   b. Liver
   c. Heart
   d. Eye

15. An example of non-halogenated anaesthetic is
   a. Enflurane
   b. Halothane
   c. Isoflurane
   d. Cyclopropane

16. NSAID refers to
    a. Steroidal anti-inflammatory drug
    b. Non-steroidal Anti-inflammatory drug
    c. Steroidal inflammatory narcotic drug
    d. Non-steroidal inflammatory drug

17. Ibuprofen is a derivative of
    a. Butanoic acid
    b. Propionic acid
    c. Hexanoic acid
    d. Ethanoic acid

18. Ethambutol is a
    a. Anti-cancer agent
    b. Anti-pyretic agent
    c. Antituberculosis agent
    d. Cardiovascular drug

19. Correct structure of Dapsone is
    a. 
    b. 
    c. 
    d. 

20. An important side effect of melphalan is
    a. sores or ulcers in the mouth
    b. Ovarian cancer
    c. Bone marrow depression
    d. All of the above

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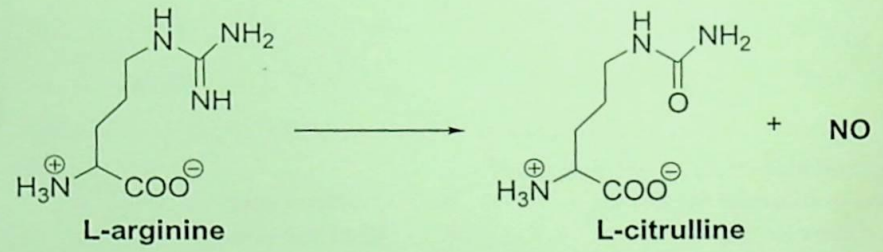
PART-B : Descriptive

Time : 2 hrs. 40 min. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. a. What do you mean by pinocytosis? 2
   b. Discuss the Structure Activity Relationship (SAR) of penicillin. 3
   c. Write the structure of enflurane. Give its industrial synthetic route. 2
   d. Draw the structure of Melphalan. Describe its activity in treatment of cancer cells. 1+2 = 3

2. a. Nitric oxide synthase Catalyses the the conversion of L-argenine to L-citrulline and nitric oxide. If you want to interfere with the production of NO, design at least three potential leads. 3



L-arginine L-citrulline

   b. Write the linear Hansch equation correlating drug potency with lipophilicity. 2
   c. What do you mean by lead compound in drug discovery? Illustrate with example lead discovery and lead modification of any specific drug molecule. 5

3. a. Explain the mode of action of streptomycin. 2
   b. Define translocation and transpeptidation? Explain their role in the synthesis of protein. 3
   c. What are the inhibitors of protein synthesis? Discuss the mechanism of inhibition of protein synthesis by such inhibitors. 5

4. a. The penicillin on being hydrolyzed with hot dilute inorganic acids is known to give an amine known as D-penicilliamine. Elucidate the structure of D-penicillamine. 5
   b. Write the complete the synthesis of Penicillin-V 5

5. a. What is hepatotoxicity? Give the example of a drug having this side effect? Explain with example how it happens? **2+1+2 =5**

   b. What is isosterism? Give short account of classical and nonclassical bio-isosterism. **5**

6. a. What is the usage of an antidepressant drug? Give an example of monoamine transmitter and discuss its biosynthesis and metabolization. **1+4=5**

   b. Write the structure of one anesthetic drug. Mention the type of anesthetic it belongs to. Discuss its synthetic route. **1+1+3 =5**

7. a. Write down the structure of methyldopa. Mention one of its uses. Describe the synthesis of methyldopa. **1+1+3 = 5**

   b. What is Tranquillizer? Draw the structure of Diazepam. Describe the synthesis of Diazepam. **1+1+3 = 5**

8. a. Write down the structure of Dapsone. Mention one of its uses. Describe the synthesis. **1+1+3 =5**

   b. Write the structure of Diclofenac and describe its synthetic procedure. **1+4= 5**

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