This question paper contains 4 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **5801**

Unique Paper Code : **3182012302**

Name of the Paper : **Medicinal Chemistry (UGCF-NEP)**

Name of the Course : **B.Sc. (Hons) Biomedical Science**

Semester : **III**

Duration : **3 Hours** Maximum Marks : **90**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all.

Question No. **1** is compulsory.

Give illustrations and examples wherever required.

(Subparts of the questions should be attempted together).

1. (*a*) Briefly explain the following (any *six*) : 6×2=12

   (*i*) Bioavailability

   (*ii*) Log P

   (*iii*) Pre-systemic metabolism

   (*iv*) Topliss scheme

   (*v*) Scatchard plot

   (*vi*) ADME

   (*vii*) Caffeine.

P.T.O.

(*b*) Distinguish between (any *three*) : 3×4=12

(*i*) Graded and Quantal Response

(*ii*) Carrier-Linked Prodrug and Bioprecursor

(*iii*) Intracellular and Extracellular receptor

(*iv*) Reversible and Irreversible Inhibitor

(*v*) Drug tolerance and Drug dependence.

(*c*) State whether the given statement is true *or* false. Justify your answer : 3×2=6

(*i*) An antagonist binds to the receptor and activates it to produce a biological response.

(*ii*) Hydrophilicity of the drug is an important factor responsible for its poor absorption.

(*iii*) A partial agoinst has lower efficacy than a full agonist due to its lower receptor affinity.

2. (*i*) Explain the mechanism of action of DNA-alkylating agents with the help of a diagram. Provide a suitable example of a DNA-alkylator drug. Also, discuss the key properties and clinical significance of DNA-alkylating agents.

(*ii*) Briefly describe three key descriptors commonly used in QSAR studies in drug design.

(*iii*) Explain the concept of bio-isosterism in drug design. Discuss the different types of bio-isosteric modifications, providing suitable examples for each. 5,5,5

3. (*i*) Explain how GPCRs work with the help of a labelled diagram.

(*ii*) What do target specificity and selectivity between species mean ? Why are they important in finding and developing drug targets ?

(*iii*) Explain allosteric antagonism with the help of a labelled diagram. How does allosteric regulation affect receptor activity ? 5,5,5

4. (*i*) Explain how clavulanic acid acts a suicide substrate for bacterial beta-lactamase enzyme.

(*ii*) Discuss the concept of antisense therapy with the help of a schematic diagram. Explain its advantages.

(*iii*) Explain the importance of the double reciprocal plot in enzyme kinetics. Draw and compare the plots for competitive and non-competitive inhibition. 5,5,5

5. (*i*) What is a lead compound in drug discovery ? Discuss the advantages and disadvantages of using natural compounds as sources of lead compounds.

(*ii*) Explain the differences between agonists, partial agonists and inverse agonists based on their effects on receptor activity. Use dose-response curves (DRCs) to illustrate these differences.

(*iii*) Using a hypothetical diagram of a drug and receptor, illustrate and explain the various weak forces involved in drug-receptor interactions. 5,5,5

6. (*i*) Why is the levodopa-carbidopa combination preferred over dopamine for the treatment of Parkinson's disease ? Discuss the rationale behind this strategy.

(*ii*) What are receptor sensitization and desensitization ? Explain their significance in regulating receptor activity.

(*iii*) Discuss Rule of Five and its significance in drug discovery. 5,5,5