Q.P. Code : 718102

(3 Hours) **[Total Marks : 70**

N.B. : (1) **All** questions are **compulsory**.

1. Answer the following questions.
   (a) Give the name and structure of a carbamate containing prodrug used as an anxiolytic agent. **1**
   (b) Give two examples of NSAIDs without a carboxylic acid functional group. Justify their advantages over the carboxylic acid containing NSAIDs. **2**
   (c) Indicate whether Phenoxybenzamine and prazosin have the same mechanism of action. Justify. **1**
   (d) The C3 position in the benzodiazepine ring has a unique role 2 play in the pharmacokinetics of the molecule. Explain this role. **1**
   (e) Name two antipsychotic agents that are derivatives of butyrophenone (structures not needed) **1**
   (f) Name a suicide inhibitor of the enzyme GABA-T and indicate its use. (structure needed) **1**
   (g) Give the name of an active metabolite of the following drug and indicate the use of both the drug and the active metabolite: 8-chloro-6-(4-methylpiperazin-1-yl)benzo[b][1,4]beozoxazepine. **1**
   (h) Identify the chiral centres in morphine and indicate the number of stereoisomers it has. **1**
   (i) A combination of levodopa and carbidopa is used in Parkinsons disease. Say T/F and justify. **1**
   (j) Give one example each of a reversible and irreversible acetyl cholinesterase inhibitor and its use. (structures not needed) **1**
   (k) Identify the following drug and indicate its use. **1**
   2-[4-(1, 2-diphenylbut-1-enyl) phenoxy]-N,N-dimethylethanamine
   (l) Give an example of a drug that inhibits the enzyme thyroperoxidase and indicate its use. **1**
   (m) β-Blockers may be used for treatment of hypertension, arrhythmia and glaucoma. Give one example of a β-blocker for each use (no structures to be drawn). **1**
   (n) Succinylcholine is used to induce short term paralysis. Say T/F. Justify and give the name of the enzyme that metabolizes succinylcholine. **1**

2. Answer the following questions.
   (i) Indicate the impact of the following structural changes in barbiturates. **4**
      (a) 1, 3, 5, 5 tetrasubsititution
      (b) Substitution of C-2 oxygen with sulphur.
      (c) Introduction of amino/hydroxyl groups at C-5 position.
      (d) A methyl group versus a propyl group on one of the N in barbiturates.

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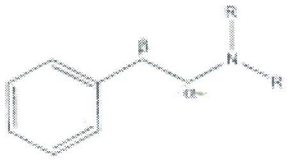
(ii) (a) Give the synthesis of dicyclomine indicating the reagents and reaction conditions used. **3**

(b) Some antidepressant drugs are associated with "cheese reaction". Say T/F and justify. **1**

(iii) Answer the following questions in relation to the phenylethylamine (structure drawn below) analogues active as adrenergic agents.



(a) A hydroxyl (OH) group is necessary at the β-position, what should be its configuration?

(b) How does the R group on the nitrogen affect α versus β-receptor selectivity?

(c) What is the effect of a group like methyl or ethyl at α position on metabolic stability?

3. Answer the following questions.

(i) Name and give structure of one drug with the following mechanism of action. **4**

(a) Drug that enhances biosynthesis of GABA

(b) Drug that inhibits degradation of GABA.

(c) Drug that inhibits the reuptake of GABA.

(d) Drug that binds to an allosteric site on the postsynaptic GABA-A receptor complex.

(ii) The following statements relate to the SAR of adrenocorticoids. Say T/F. Correct those that are false. **3**

(a) Introduction of methyl or hydroxy group at C-16 reduces mineralocorticoid activity.

(b) Delta cortocoids having double bond between C-1 and C-2 are less effective inrheumatoid arthritis.

(iii) (a) The geometrical isomer of transdiethylstilbesterol exhibits higher estrogenic activity than the cis isomer. Give reasons. **2**

(b) Explain the role of bisphosphonates in osteoporosis. **2**

4. Answer the following questions.

(i) Give the synthesis of haloperidol indicating the reagents and reaction conditions used. **3**

OR

With respect to phenothiazines answer the following questions.

(a) The impact of two carbon and three carbon alkyl chains at N-10 position on activity.

(b) The impact of chloro group and tritluoromethyl group on potency.

(c) Name and give the structure of a long acting phenothiazine analogue.

(ii) (a) Classify the following adaenergic drugs into various mechanistic classes. (structure not needed) **2**

(i) Phentolamine (ii) Ritodrine

(iii) Xylometazoline (iv) Labetolol

(b) Give the active/toxic metabolites of the following drugs. **2**

(i) Nabumetone (ii) Paracetamol

(iii) With respect to opioids answer the following questions. **4**

(a) Give one example of a rigid opioid. (structure needed)

(b) Give an example of a phase ll active metabolite of a rigid opioid and justify its activity.

(c) Give one example of endogenous opioid and indicate why it cannot be used as a drug.

(d) Indicate the receptor binding of endogenous, rigid and non-rigid opioids.

5. Answer the following questions.

(i) Give reasons for the following. Support your answer with suitable structures. (any **two**) **4**

(a) Pralidoxime is used as an antidote in organophosphate poisoning.

(b) In cholinergic drugs, the distance from the nitrogen to the ester group is important for activity.

(c) Physostigmine does not have a quaternary nitrogen but still has cholinomimetic activdy.

(ii) Give the synthesis of fluoxetine indicating the reagents and reaction conditions used. **3**

OR

With respect to antidepressant drugs answer the following questions.

(a) List the side-effects of tricyclic analogues and the reasons for the same.

(b) Name a reversible and selective monoamine oxidase inhibitor. (Structure needed)

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(c) Name a NET selective inhibitor and indicate the functional group responsible for this selectivity.

(iii) (a) Give one example each of opioids used as antidiarrheal drug and anaesthetic drug. (Structure needed) **2**

(b) Write a note on 19-nortestosterone derivatives. **2**

6. Answer the following questions.

(i) Give the synthesis of propranolol or labetolol indicating the reagents and reaction conditions used. **3**

(ii) With respect to NSAIDs answer the following questions. **4**

(a) Give any four chemical classes of NSAIDs with one example in each class.

(b) Comment on the therapeutic target of NSAIDs, the side effects associated with nonselective binding and benefits and problems with selective binding.

(iii) (a) What in MPP^+ ? What is its relation to haloperidol ? **2**

(b) In the $GABA_A$ receptor, indicate the binding site for the benzodiazepines? Is this site different from the barbiturate binding site ? **2**