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M. Pharmacy 1st Semester Examination
Advanced Pharmaceutical Chemistry-I
MP-211

Time : 3 Hours

Max. Marks : 90

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Three sections (A, B and C) in the question paper have 2 very long questions carrying 25 marks each, 4 long questions carrying 10 marks each and 9 short questions carrying 5 marks each respectively. Attempt 1 question from section A, 3 questions from section B and 7 questions from section C.

SECTION - A

Attempt only ONE question.

1. (a) The restricted rotation gives rise to perpendicular dissymmetric planes in biphenyls (containing four large groups), allenes, spiranes and compound with exocyclic double bonds. Discuss the optical activity with examples.
(b) Briefly discuss the cis-trans isomerism in monocyclic compounds. (20+5=25)
2. Outline the mechanism for aliphatic nucleophilic substitution reactions such as S_N1 and S_N2 with examples. Compare and contrast the mechanism keeping the following points in view.
 - (i) Kinetics
 - (ii) Dependence on nucleophile, leaving group and solvent

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(iii) Steric effects and stereochemistry

(iv) Rearrangement(s) (5+20=25)

SECTION - B

Attempt only THREE question.

3. Justify that Hoffmann rearrangement shows
 - (i) Retention of stereochemistry in migrating group. (5)
 - (ii) Intramolecularity. (5+5=10)
4. Explain the relevance of the activity of the substrate, reagents, catalyst and solvent in asymmetric organic synthesis. (10)
5. Discuss the enantioselective synthesis of (S) (-) Atenolol. Outline the technique used in this chiral technology. Write chemical equations, reagent and conditions precisely. (5+2+3=10)
6. Depict all radiative and radiationless processes in a Jablonski diagram. Discuss these by taking one example each of excited aliphatic ketone and aromatic hydrocarbon separately. (5+2½+2½=10)

SECTION - C

Attempt only SEVEN questions.

7. Write precise chemical equations with structure formulae of reactant, reagent, reactive intermediate(s) and product(s) for the allylic bromination of cyclohexene with NBS (5)
8. Outline the mechanism of Mannich reaction. Give atleast two examples. (5)
9. Mention the use of Reformatsky reaction in drug synthesis. Give atleast two examples. (5)

10. Write the structural formula of Diltiazem hydrochloride. How many chiral centres are present in it? Which one is more sensitive towards strong base such as KOH? Explain. (1+1+1+2=5)
11. How the allyl group is converted to $-\text{CH}_2\text{CH}_2\text{CHO}$ during the chiral synthesis of thienamycin. Write both steps with the name of reagents. (5)
- Write brief notes on Franck-Condon principle and photosensitization. (2½+2½=5)
13. Write photolysis of 5-Phenylhexan-2-one at 280 nm. Mention the names of products. Explain their formation. (2+1+2=5)
14. How does a room temperature ionic liquid behave in a reaction? Give names and structure formulae of atleast two ionic liquid. Mention their uses in synthesis of organic compounds including enantioselective reduction of vinyl carboxylic acid. (1+2+2=5)
15. What is a super critical fluid? What are advantages and disadvantages of using super critical carbonyl oxides in extractions? Mention certain uses including the one for Diel-Alder reaction. (1+2+2=5)