

[Total No. of Questions - 9] [Total No. of Printed Pages - 4]
(2064)

14772

B. Pharmacy 2nd Semester Examination
Pharmaceutical Chemistry-III (Organic Chemistry) (O.S.)
HBP-108

Time : 3 Hours

Max. Marks : 80

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 : Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper. All the subparts of the question in Section E are compulsory.

SECTION - A

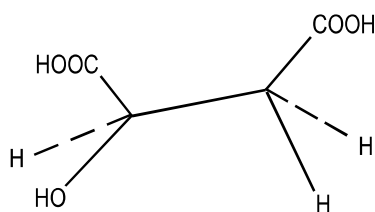
1. (a) List the main points of difference between orbit and orbital.
(b) Describe the formation of covalent bond on the basis of
(i) Concept
(ii) Valence bond theory
taking at least two examples in each case.
(c) What are the bonding and antibonding molecular orbitals? Describe LCAO method for their formation. What are the important characteristics of each of these? (5+5+6=16)
2. (a) Define the term 'Hybridisation'? Using the concept of hybridisation, explain the shapes of PCl_5 and SF_6 molecules.
(b) Why are some covalent bonds polar? What is a dipole? How do dipole moments of molecules of CO_2 , CH_4 , H_2O and NH_3 help in ascertaining their structure?
(c) Write a note on the wave equation.
(d) On the basis of intermolecular forces and thermal energy. Explain why substances exist in three different states.
(4+4+3+5=16)

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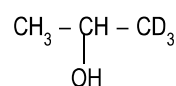
[P.T.O.]

SECTION - B

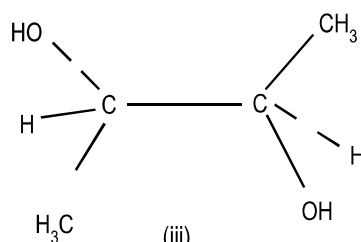
3. (a) What is meant by "Isomerism"? Discuss the various types of structural isomerism giving at least one example in each case.
- (b) Explain D and L system of assigning absolute configuration to a pair of stereoisomers. What are its limitations?
- (c) Which of the following molecules show optical activity? Justify your answer.



(i)



(ii)



(iii)

(6+7+3=16)

4. (a) Draw the various conformations of n-butane and compare their relative stability.
- (b) Define and explain the term Geometrical Isomerism. State the necessary and sufficient conditions for a molecule to exhibit geometrical isomerism. How can you explain the fact that derivatives of cyclohexane exhibit geometrical isomerism even though they do not contain a double bond.
- (c) Define optical activity. Discuss the various methods for the resolution of a racemic mixture. (6+5+5=16)

SECTION - C

5. (a) What are Hydrocarbons? How are they classified?

- (b) Give three methods for the preparation of alkanes. Describe with labelled diagram the laboratory preparation of methane from sodium acetate and soda lime.
- (c) Justify the statement. Benzene is a highly unsaturated compound but behaves like a saturated compound.
- (d) Discuss briefly the mechanism of nitration in benzene.
(2+6+4+4=16)
6. (a) What are primary, secondary, tertiary alcohols? Starting with Grignard Reagents how will you obtain each one of these. What happens when these three classes of alcohols are
- Passed over heated copper
 - Oxidised with $K_2Cr_2O_7$ and H_2SO_4
- (b) What is Williamson's Synthesis? What type of compounds are prepared by this synthesis? Give one example.
- (c) Give the reaction and mechanism of
- Ozonolysis of alkenes
 - Hydroboration of alkenes. (6+4+6=16)

SECTION - D

7. (a) How are the following preparations carried out?
- Benzaldehyde from benzoyl chloride.
 - Acetophenone from benzene.
 - Butanone from 2-Butanol.
 - Ethanol from 2-Butene.
- (b) Write reactions stating conditions for the following conversions
- Toluene to Benzaldehyde
 - Benzene to Benzophenone
- (c) What do you mean by nucleophilic addition reaction? Give its mechanism.
- (d) Explain why aldehydes undergo nucleophilic addition reactions more readily than ketones.
- (e) How does acetaldehyde react with
- Ammoniacal $AgNO_3$
 - NH_2OH
 - HCN
(4+2+2+2+6=16)

[P.T.O.]

8. (a) How will you account for the following:
- (i) A carboxylic acid does not form an oxime or a hydrazone although there is present a carboxyl group in carboxylic functional group.
 - (ii) Why does not propanoic acid give test for carbonyl group?
 - (iii) A $>C=O$ group behaves differently in aldehydes and acids.
 - (iv) The bond length of $>C=O$ in carboxylic acids is slightly larger than in aldehydes and ketones.
- (b) Acetic acid gives a proton (H^+) while ethyl alcohol does not when both contain an $-OH$ group.
- (c) Formic acid is stronger acid than acetic acid. Explain.
- (d) Why pKa value of chloroacetic acid is lower than pKa value of acetic acid? Explain.
- (e) Give the reactions and mechanisms of
- (i) Oxidation of aldehydes with Fehling solution.
 - (ii) Alkaline hydrolysis of Esters. (4+2+2+2+6=16)

SECTION - E

9. (a) What is the order of reactivity of HCl, HBr, HI with alcohols?
- (b) What is the order of acidic character of an alcohol, a carboxylic acid and a phenol?
- (c) How will you synthesize salicylic acid from phenol?
- (d) What is coupling reaction? Give Eqn.
- (e) Electrophilic substitution in case of aromatic amines takes place more readily than in Benzene. Why?
- (f) Secondary amines are more basic than primary amines and primary amines are more basic than ammonia. Explain.
- (g) What happens when
- (i) Aniline is treated with $NaNO_3$ and dil HCL at 273 K.
 - (ii) Chloroform is treated with aniline in the presence of Alcoholic KOH.
- (h) What is Fehling solution? Write the chemical name and structure of Rochelle Salt. (2×8=16)