QP Code : 76118

(3 Hours) [Total Marks : 75

N.B. : (1) **All** questions are **compulsory**
(2) **Figures** to the **right** indicate **full** marks.

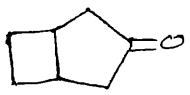
1. Attempt **any five** of the following :-
   (a) Give an account of E_T solvatochromism scale. 3
   (b) Nor-bornylene on treatment with $KMnO_4$ gives exo-norbornadiol. Justify the same. 3
   (c) Compound A and B undergo photodecarbonylation resulting in the formation of I & II (from A) and III and IV (from B). Give the structures of I,II,III, and IV 3

(i)

$\xrightarrow{h\nu}$ CO + I + II

[A]

(ii)



$\xrightarrow{h\nu}$ CO + III + IV

[B]

   (d) Explain mechanism of Pinacol-Pinacolone rearrangement 3
   (e) Discuss Cram's Rule with one example. 3
   (f) Illustrate Bredt's rule with two examples. 3
   (g) Explain antiaromaticity with two examples. 3
   (h) What are pericyclic reactions? How are they classified. 3

2. (a) The Taft equation is a structure reactivity equation that correlates only field effect. Explain the same. 6

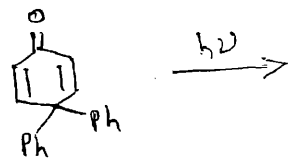
OR

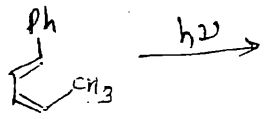
   (a) Discuss the cleavage of a bond β to the carbonyl group in photochemical reactions of ketones. 6

[TURN OVER]

(b) Derive Hammett equation. Give the significance of parameters σ_x and ρ in the determination of reaction mechanism with two examples. 5

(c) Predict the products in the following reactions and give their mechanism. 4

i) 

ii) 

OR

(c) What are photochemical quenchers? Discuss giving suitable examples, the principle involved in photoquenching processes. 4

3. (a) Discuss the structural features, symmetry and stability of cis and trans decalin. 6

OR

(a) Explain the following :-

(i) Neomenthyl chloride undergoes E_2 elimination at much faster rate as compared to menthyl chloride. 6

(ii) cis-Decalin though disymmetric, cannot be resolved.

(b) Give an account of resolution of racemates by biochemical transformation. What are its drawback? 5

(c) What are chiral solvating agents? With two examples, illustrate the use of CSA for determination of enantiomeric composition. 4

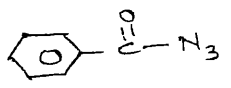
OR

(c) What is axial-α- haloketone rule? Give any one example to illustrate its application. 4

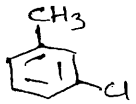
4. (a) What are the salient features of Sharpless epoxidation? Show how it can be used for kinetic resolution of racemic allyl alcohols. 6

OR

(a) Complete the following reactions and identity the reactive species generated in each reaction. 6

(i)  $\xrightarrow[R_3CH]{h\nu}$?

(ii) $Br\cdot CH_2-\overset{O}{\overset{\|}{C}}-Br$ $\xrightarrow[C_2H_5OH]{Zn}$?

(iii)  $\xrightarrow[Liq.\,NH_3]{KNH_2}$?

(b) Account for chiral oxazolines in different types of asymmetric transformation. **5**

(c) Discuss the factors affecting the stability of carbocation **4**

OR

(c) Give synthesis of L-DOPA by Knowles method. **4**

5. (a) Discuss (4+2) & (2+2) cycloaddition reaction on the basis of FMO method. **6**

OR

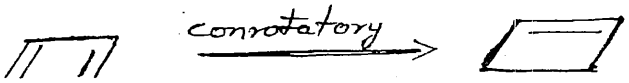
(a) Explain aromaticity of :- **6**

(i) Annulenes

(ii) Sydnones.

(b) What are sigmatropic rearrangement reactions? Explain it using Huckel-Mobias method. **5**

(c) Draw correlation diagram for the following conversion. **4**



(c) Explain aromatically of ferrocene. **4**
