

SARDAR PATEL UNIVERSITY

M.Sc.(Chemistry) Semester-I Examination 22nd April 2015 Wednesday

Time: 10.30-1.30pm

ORGANIC CHEMISTRY-I [PS01CCHE02]

Total Marks-70

Q.1 Select the correct answer from the choices given below for each of the following questions. 08

- (a) The number of stereoisomers possible for $\text{CH}_3-(\text{CHOH})_4-\text{CH}_3$ are
 (i) 2 (ii) 6 (iii) 10 (iv) 4
- (b) In certain bicyclic systems, double bond doesn't form at the bridge head positions; is the statement describing
 (i) Saytzaiff's rule (ii) Hoffman rule
 (iii) Bredt's rule (iv) Markonikoff's rule
- (c) Chirality means _____
 (i) Topicity (ii) Stereogenicity (iii) Dissymmetry (iv) Superimposability
- (d) An ester containing α -hydrogen undergoes base catalyzed condensation with another ester to give β -ketoester is _____ condensation.
 (i) Claisen (ii) Knoevenagel (iii) Dieckman (iv) Doebner
- (e) Schmidt reaction is a _____ synthesis.
 (i) Two steps (ii) Three steps
 (iii) Six steps (iv) One step
- (f) Paracyclophane exhibits chirality due to _____
 (i) Conjugated double bonds (ii) Centre of symmetry
 (iii) Plane of symmetry (iv) C_2 -axis of symmetry
- (g) Hybridization of carbocation is considered to be
 (i) SP (ii) SP^3 (iii) SP^2 (iv) None
- (h) In electrophilic aromatic substitution reactions, NO_2 exhibits
 (i) Deactivating & m-directing effect (ii) Deactivating & o,p-directing effect
 (iii) Activating & m-directing effect (iv) activating and o,p-directing effect

Q.2 Answer the following (Any seven) 14

- (a) Explain the formation of ethane as a byproduct during photo-chlorination of methane.
- (b) What is the importance of cross-over experiment in deciding the reaction mechanism?
- (c) Explain umploung approach with an appropriate example.
- (d) State Bredt's rule.
- (e) How would you detect benzyne intermediate using mass spectroscopy?
- (f) How topicity can be decided by symmetry operations? Explain with proper examples.
- (g) Discuss the synthesis of 1-propanol and 2-propanol from 1-propene.
- (h) "Ozonolysis of alkene involves molozonide" Justify the statement.
- (i) What do you mean by Michael acceptor & Michael donor? Explain with suitable examples.

Q.3 (a) Answer the following. 06

- (I) Explain atropisomerism by citing suitable example of biphenyl compound.
- (II) Explain the limitation of Fischer projection formula.

(b) Justify the following statements. 06

- (i) Enantiotopic & diastereotopic ligands co-exist in cyclopropanol.
- (ii) "All prochiral centres are prostereogenic but the reverse is not true".

OR

(b) Comment on the mechanism of following reactions. 06

- (I) Nitration of benzene using primary Kinetic Isotope effect.
- (II) Baeyer villiger reaction by isotope labeling method.

Q.4(a) Answer the following. **06**

- (i) Show that peracid leads to anti stereoselectivity during hydroxylation of an alkene.
- (ii) Explain how Schmidt reaction is favorable over Beckmann reaction?

(b) Attempt the following as directed.

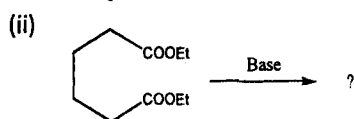
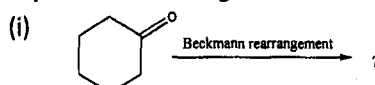
- (i) Bromination of an alkene is anti stereoselective & non-concerted process. Justify.
- (ii) 2,3-sigmatropic shift is being observed in Sommelet-Hauser rearrangement. Explain how? **06**

OR

(b) Write note on following. **06**

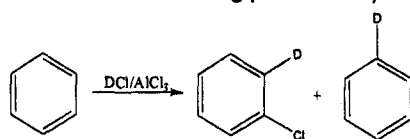
- (i) Semipinacol-Pinacolone rearrangement
- (ii) Favoraski rearrangement.

Q.5(a) Explain the following transformations. **06**



(b) Answer the following **06**

- (i) Explain the Stork-enamine reaction with suitable example.
- (ii) Which of the following product do you expect in the given reaction? Justify your choice.



OR

(b) Explain the following. **06**

- (i) Diekmann condensation is an intramolecular Claisen condensation.
- (ii) What is difference between E_2 and E_{1CB} mechanism?

Q.6(a) Answer the following. **06**

- (i) Explain the effect of temperature on the sulphonation of naphthalene in detail.
- (ii) Show that Fridel Craft acylation is preferred over Fridel Craft alkylation to prepare ethyl benzene from benzene.

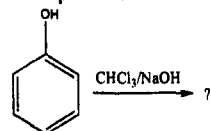
(b) Answer the following. **06**

- (i) What do you mean by ipso substitution?
- (ii) How would you prepare cumene from benzene?
- (iii) Phenol gives ortho & para-substituted product in electrophilic substitution reaction.

OR

(b) Answer the following. **06**

- (i) Complete the following reaction.



- (i) How Chugaev and Cope reaction is different from each other?
- (ii) Show that Hoffman elimination is being favored by any crowding whether it is originated from departing group Y, alkyl part-R or from base (B).
