

130
A-9

No. of printed pages 03

SARDAR PATEL UNIVERSITY
M. Sc. (Chemistry)
Semester-I Examination
October 24, 2016 Monday
Time: 10:00 am – 1:00 pm
ORGANIC CHEMISTRY-I [PS01CCHE02]

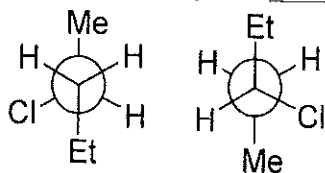
Maximum Marks – 70

Q-1 Select the correct answer from the choices given below each of the following questions. Write only [08] the correct code of answer in the answer book; e.g. 1(a)-(iv).

(a) Benzene diazonium chloride can undergo diazo coupling with _____.
(i) anisole (ii) m-dinitrobenzene (iii) salicylic acid (iv) benzoic acid

(b) Dimedone is used for differential characterization and separation of aldehydes and ketones because _____.
(i) it is a cheaper reagent. (ii) it yields derivatives with aldehydes.
(iii) it has an active methylene group. (iv) it readily yields derivatives with ketones.

(c) The pair of structures given below represent _____.

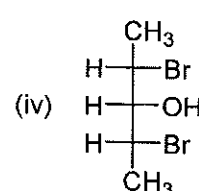
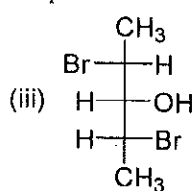
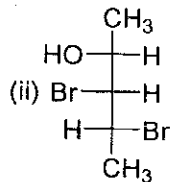
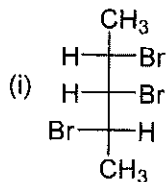


(i) enantiomers (ii) diastereomers (iii) homomers (iv) positional isomers

(d) Oxidation of 2-propanol with potassium dichromate at 40°C shows primary kinetic isotope effect to be 5.9. This suggests that _____.

- (i) C-H bond breaking is not involved in rate determining step.
(ii) C-D bond formation occurs in rate determining step.
(iii) C-D bond breaking requires less energy than C-H bond.
(iv) C-H bond breaking is involved in rate determining step.

(e) In which of the following compounds carbon-3 is a chirotopic and stereogenic?

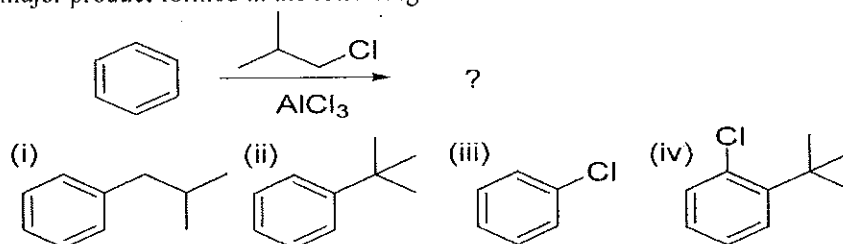


(f) Which is the correct route for preparing 1,3-dibromopropane from 3-bromopropene?

- (i) bromination in presence of UV light (ii) bromination in presence of FeBr₃
(iii) hydrobromination in presence of peroxide (iv) acid catalyzed hydrobromination

1

(g) Predict the major product formed in the following reaction.



- (h) E1cb mechanism involves _____.
- (i) simultaneous bond breaking of C-H and C-Y bonds
 - (ii) irreversible breaking of C-H bond followed by C-Y bond breaking
 - (iii) C-Y bond breaks first then C-H bond breaks
 - (iv) breaking of C-H bond in a reversible step followed by C-Y bond breaking

Q-2 Answer ANY SEVEN.

[14]

- (a) Explain the formation of ethane as a byproduct during photochlorination of methane.
- (b) How will you confirm concertedness of Baeyer-Villiger Rearrangement by crossover experiment?
- (c) Why Friedel Craft acylation is more preferred than Friedel Craft alkylation in preparing ethylbenzene?
- (d) What is ipso substitution? List the factors favouring such substitution.
- (e) Hoffmann rearrangement is intramolecular, explain.
- (f) Highlight the differences between E1 and E2 mechanisms.
- (g) Which factors affect degree of anti stereoselectivity in addition of halogens to alkene?
- (h) What is second order Beckmann rearrangement? When it can happen?
- (i) How topicity can be decided by symmetry?

Q-3

(a) Justify the following statements.

[06]

- (i) Enantiotopic and homotopic ligands co-exist in n-butane.
- (ii) Carbon-3 in 2R,4S-dihydroxy-3-bromopentane is pseudochirogenic.

(b) Answer the following.

[06]

- (i) What is Atropisomerism? How configurational symbol can be assigned to an active biphenyl compound?
- (ii) Draw Fischer projection for 3R-bromo-2R-butanol. Convert it to Newman projection and designate all three stable staggered conformations by Klyne-Prelog terminology.

OR

(b) Answer the following.

[06]

- (i) Explain the limitations of Fischer projection.
- (ii) Describe the method to determine chirality symbol for compounds with chiral plane citing suitable example.

Q-4

(a) Answer the following.

- (i) Give mechanism for synthesizing acetanilide from acetophenone by Schmidt reaction.
- (ii) Show that Favorskii rearrangement involves cyclopropanone as the intermediate.

[06]

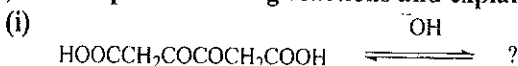
(b) Explain the following statements.

- (i) 1,2-hydride shift does not change carbon skeleton of the molecule in Wagner- Meerwein rearrangement
- (ii) Sommelet-Hauser rearrangement involves 2,3-sigmatropic shift.

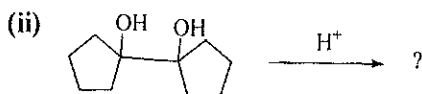
[06]

OR

(b) Complete following reactions and explain their mechanism.



[06]



Q-5

(a) Explain the following statements.

- (i) Orientation of addition in hydrobromination of propene is governed by relative stability of the intermediates.
- (ii) Iodide ion induced debromination reaction of diastereomeric 2,3-dibromobutanes is stereospecific.

[06]

(b) Answer the following.

- (i) Discuss base induced dehydrochlorination of 2S-chlorobutane.
- (ii) What are the differences between Chugaev reaction and Cope elimination reaction?

[06]

OR

(b) Justify the following statements.

- (i) Any crowding in the transition state, irrespective of its origin, favours Hoffmann elimination over Saytzeff elimination.
- (ii) Neomenthyl chloride undergoes base induced dehydrochlorination reaction at 200 times faster than that of its diastereomer menthyl chloride.

[06]

Q-6

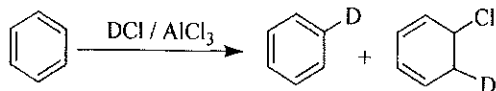
(a) Answer the following.

- (i) Primary kinetic isotope effect is not observed for nitration of benzene. What information can be obtained about the mechanism of this reaction?
- (ii) Why does nitration of aniline give significant amount of *meta* derivative?

[06]

(b) Answer the following.

- (i) Which of the following products do you expect in the given reaction? Justify your choice.



[06]

- (ii) What is Ozonolysis? Show that molozonide is involved as the intermediate in ozonolysis of alkene.

OR

(b) Explain the following statements.

- (i) Bromination of *cis*-2-butene is not a concerted process.
- (ii) In sulphonation of naphthalene, naphthalene-1-sulphonic acid is the product of kinetic control.

[06]

3



