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SEAT No. _____

No of printed pages: 02

SARDAR PATEL UNIVERSITY
M.Sc. (Chemistry) Semester-I Examination
Thursday, 25th October 2018
Organic chemistry-I: PS01CCHE02

Time: 10:00 am to 01:00 pm

Marks: [70]

Note: Right hand figures indicate marks

Q-1 Select the correct answer from the option given below. [08]

1. Double bond formation at the bridge head position in certain bicyclic systems is not favoured - this is the statement describing _____.
 (a) Hoffman Rule (b) Saytzeff Rule (c) Bredt's Rule (d) Epling Rule
2. Which of the following reactions does not involve carbanion as the intermediate?
 (a) Favorskii rearrangement (b) Curtius rearrangement
 (c) Dieckmann Condensation (d) Darzen glycidic ester condensation
3. Which reaction is used for homologation of aldehyde?
 (a) Arndt-Eistert reaction (b) Tiffeneau Demjanov reaction
 (c) Dieckmann Condensation (d) Darzen glycidic ester condensation
4. Which of the following is used as a solvent in Friedel-Craft reaction?
 (a) Xylene (b) Benzene (c) Nitrobenzene (d) Toluene
5. OsO₄ hydroxylation is carried out in the presence of _____.
 (a) H₂O₂ (b) H₂SO₄ (c) HNO₃ (d) BH₃
6. 1-butene and 2-butene are _____.
 (a) positional isomers (b) skeleton isomers
 (c) metamers (d) ring chain isomers
7. The methylene protons in 2-butanol are _____.
 (a) enantiotopic (b) diastereotopic (c) homotopic (d) constitutionally heterotopic
8. Which of the following reaction is the example of aromatic nucleophilic substitution reaction?
 (a) Chichibabin reaction (b) Friedel-craft reaction
 (c) Sulphonation of benzene (d) Halogenation of benzene

Q-2 Answer the following (Any Seven) [14]

1. Describe the procedure to assign chirality symbols to helical compounds.
2. Define metamers and tautomers giving suitable examples.
3. Explain Saytzeff's rule with example.
4. Why anti conformation is favored for bimolecular elimination?
5. Why Chugaev reaction is less *syn*-stereoselective than Cope reaction?
6. Describe factors favouring *ipso* substitution.
7. Why naphthalene undergoes electrophilic substitution at a faster rate than benzene?
8. How mass spectrometry is applicable for confirmation of arylne intermediate?
9. Give the method to trap carbene intermediate.

(1)

(PTO)

- Q-3 [A] Answer the followings. [06]
1. Describe limitations of Fischer Projection formula by taking proper examples.
 2. Describe CIP procedure to assign chirality descriptor to 6,6'-diacetamidobiphenyl-2,2'-dicarboxylic acid. Why does the molecule lose optical activity upon saponification?

- [B] Answer the followings. [06]
1. Write a note on pseudo-chiral center.
 2. Explain Atropisomerism with potential energy diagram by citing proper example.

OR

- [B] Answer the followings. [06]
1. How topicity can be decided by symmetry operation? Explain using proper examples.
 2. Justify, chirality is the geometric property of whole molecule and does not depend on individual atoms.

- Q-4 [A] Answer the followings. [06]
1. Show that Schmidt reaction provides better synthetic alternative over Beckmann reaction.
 2. Discuss on the basis of P.K.I.E, nitration of benzene is two step reaction (P.K.I.E=1).

- [B] Justify the following statements. [06]
1. Favorskii rearrangement involves cyclopropanone as the intermediate.
 2. Sommelet Hauser rearrangement involves 2,3-sigmatropic shift.

OR

- [B] Write a note on [06]
1. Wagner-Meerwein rearrangement.
 2. Benzil-Benzilic acid rearrangement

- Q-5 [A] *cis*-2-butene upon reaction with peracid gives *dl*-pair while its reaction with KMnO_4 gives *meso* compound. Justify the statement giving mechanism. [06]

- [B] Justify the following statements. [06]
1. Any increase in bulk of substrate will favours Hofmann elimination.
 2. Neomenthyl chloride undergoes dehydrochlorination faster than menthyl chloride.

OR

- [B] Answer the followings. [06]
1. Stability of carbocation produced decides the route of electrophilic addition to diene, explain giving suitable example.
 2. Describe Curtin-Hammett Principle.

- Q-6 [A] "Electrophilic substitution on phenol is favoured in *ortho* and *para* positions where as nitrobenzene gives *meta* substituted product" Justify the statement. [06]

- [B] Justify the followings. [06]
1. Friedel-Craft acylation is more advantageous over Friedel Craft alkylation in the preparation of ethylbenzene from benzene.
 2. Nitration of pyridine occurs at position-3.

OR

- [B] H_2SO_4 acts as a catalyst in nitration of benzene, while it is a reagent in sulfonation of benzene, explain. [06]

— X —

(2)