[15/A-2] SEAT No._____ No. of printed pages: 03

SARDAR PATEL UNIVERSITY

M.Sc. (Chemistry), Semester – I

March 22, 2019 :: Friday

Time: 10:00 A.M. – 1:00 P.M.

ORGANIC CHEMISTRY-I [PS01CCHE02] (OLD COURSE)

Note: Figures to the right indicate full marks. **Total marks: 70**

Q-1 **Select the correct answer and mention only the code of correct answer against their question numbers.** **[08]**

a. Which of the following groups has the highest priority according to CIP sequence rule?

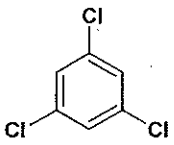
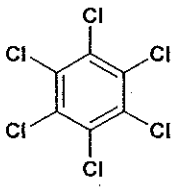
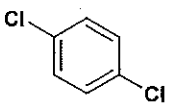
(i) $-C\equiv CH$ (iii) $-CH(OH)CH_3$

(ii) $-C(H)=CH_2$ (iv) $-CH_2CH_2OH$

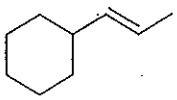
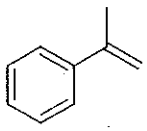
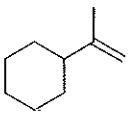
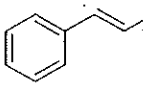
b. Which of the following is ***wrong*** statement regarding elimination reaction?

(i) E2 mechanism is always bimolecular.
(ii) E2 mechanism is generally second order.
(iii) E2 mechanism usually occur in one step.
(iv) E2 mechanism usually occur in two step.

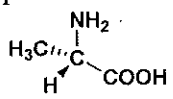
c. When the *cis* isomer of $C_6H_6Cl_6$ (1,2,3,4,5,6-Hexachlorocyclohexane) is heated with alc.KOH, major product will be

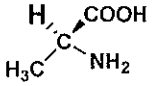
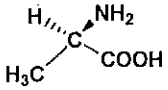
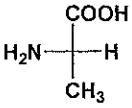
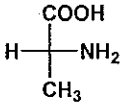
(i)  (ii)  (iii)  (iv) 

d. Which alkene is the most reactive in acid catalysed hydration?

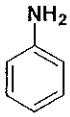
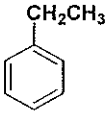
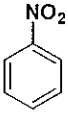
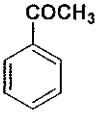
(i)  (ii)  (iii)  (iv) 

e. Which of (i)-(iv) shows the same compound as the following?



(i)  (ii)  (iii)  (iv) 

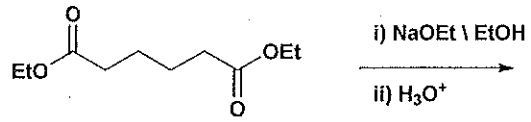
f. Which of (i)-(iv) is the most suitable starting material for the synthesis of m-ethyl aniline.

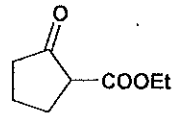
(i)  (ii)  (iii)  (iv) 

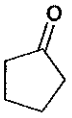
(P.T.O.)

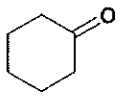
g. Which intermediate is formed in Wolff's reaction?
(i) carbene (ii) ketene (iii) carbocation (iv) carbanion

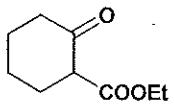
h. Which is the main product of the following reaction?



(i) 

(ii) 

(iii) 

(iv) 

Q-2 Answer ANY SEVEN of the following in short. [14]

a. Explain the rules to determine chirality descriptor for a compound with chiral axis.
b. Chirality is neither necessary nor the sufficient condition for the occurrence of diastereotopic ligands in molecule. Explain.
c. How mass spectroscopy can confirm the existence of benzyne intermediate.
d. Schmidt reaction is more advantageous over Curtius reaction. Explain.
e. Why E2 elimination preferred anti conformation?
f. What is meant by ipso substitution and give the factors favouring ipso substation.
g. Friedel–Crafts reaction of benzene with (R)-2-chlorobutane produces optically active or racemic product. Explain.
h. Explain 1,1- elimination with example
i. cis-1,2-Dimethylcyclohexane is optically inactive even though it has two chiral centers. Explain.

Q-3 [A] Explain the following. [06]

(i) Chirality is independent of viewer's side in allenes.
(ii) Define prochiral centre. Assign prochiral descriptors to methylene hydrogens in 2*S*-chloro butane

Q-3 [B] Discuss in detail. [06]

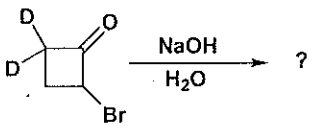
(i) Chirality is the geometric property of whole molecule and does not depend on individual atoms
(ii) Show that rotation of 90° is not allowed in Fischer projection formula.

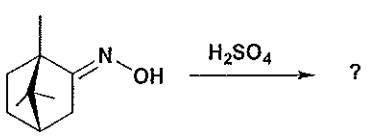
OR

Q-3 [B] Do as directed. [06]

(i) Describe the limitations of Fischer projection formula.
(ii) Discuss Klyne-Prelog terminology by citing suitable example.

Q-4 [A] Complete the following transformation with detail mechanism [06]

(i) 

(ii) 

Q-4 [B] Answer the following **[06]**

(i) 1, 2-hydride shift in Wagner Meerwein rearrangement does not change molecular skeleton.

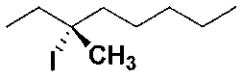
(ii) State and explain Hammond's postulate via citing suitable example.

OR

Q-4 [B] Write a note on (i) Demjanov rearrangement (ii) Claisen condensation. **[06]**

Q-5 [A] Do as directed **[06]**

(i) How many distinct alkenes can result from *E2* elimination of the compound below? Give their structures and IUPAC names.



(ii) Give the difference between Cope and Chugaev elimination

Q-5 [B] Answer the following. **[06]**

(i) What major product results when 2-bromo-2-methylbutane is treated with sodium ethoxide.

(ii) Discuss the factors favouring Hofmann elimination *via* citing suitable example.

OR

Q-5 [B] Hydroxylation of *cis*- & *trans*-2-butene with $KMnO_4$ is stereospecific. Explain. **[06]**

Q-6 [A] Explain in detail. **[06]**

(i) Discuss the sulphonation of Naphthalene.

(ii) Justify H_2SO_4 acts as catalyst in nitration of benzene while acts as a reagent in sulphonation of benzene.

Q-6 [B] Describe in brief. **[06]**

(i) Electrophilic substitution of Naphthalene is more favoured at position – 1 rather than position – 2.

(ii) Nitration of aniline gives meta derivative as a major product.

OR

Q-6 [B] Answer the following. **[06]**

(i) "Electrophilic substitution on phenol favoured in ortho and para position" Justify.

(ii) Primary kinetic isotope effect is not observed for nitration of benzene.