

SEAT No. \_\_\_\_\_



No. of printed pages : 02

[A-3]

**SARDAR PATEL UNIVERSITY**  
B. Sc. (Second Semester) EXAMINATION (NC)  
Wednesday, 28<sup>th</sup> September, 2022  
09.30 A.M. to 11.30 A.M.  
US02CCHE01 - ORGANIC CHEMISTRY

Total Marks : 70

Note : (i) All questions are to be attempted. (ii) Figures to the right indicate marks.

- Q.1 Choose the correct option for the following :** [10]
- (i) Deviation of the bond angle in Cyclobutane is \_\_\_\_\_ than in Cyclopropane.  
(a) greater (b) smaller (c) equal (d) None of this
  - (ii) Hydrolysis of  $\text{CH}_3\text{MgBr}$  produces \_\_\_\_\_.  
(a) Methyl alcohol (b) Methane (c) Ethane (d) None of this
  - (iii) Norbornane is a \_\_\_\_\_ type of compound.  
(a) monocyclic (b) bicyclic (c) tricyclic (d) heterocyclic
  - (iv) Which of the following carbocation is less stable ?  
(a)  $2^\circ$  (b)  $3^\circ$  (c)  $1^\circ$  (d)  $^+\text{CH}_3$
  - (v) Addition of HBr to 1-Propene in presence of  $\text{H}_2\text{O}_2$  follow \_\_\_\_\_.  
(a) Saytzeff rule (b) Markovnikov's rule (c) Anti - Markovnikov's rule  
(d) None of this
  - (vi)  $\text{E}_1$  reaction is a \_\_\_\_\_ step reaction.  
(a) single (b) Two (c) three (d) None of this
  - (vii) Which of the following intermediate involve during  $\text{S}_\text{N}2$  reaction mechanism.  
(a) free radical (b) carbocation (c) carbanion (d) pentavalent transition state
  - (viii) Organic compound upon homolytic cleavage produces \_\_\_\_\_.  
(a) Carbocation (b) anion (c) free radicals (d) None of this
  - (ix) Which of the following is deactivating group ?  
(a) - OH (b) -  $\text{NH}_2$  (c) -  $\text{CH}_3$  (d) - CHO
  - (x) Which of the following is a catalyst in Clemmensen reduction ?  
(a)  $\text{NH}_2\text{NH}_2/\text{KOH}$  (b)  $\text{Zn}/\text{Hg}$ , conc. HCl (c)  $\text{NH}_2\text{NH}_2$  (d) none of these

- Q.2 State whether the following statements are true or false.** [08]
- (i) Cycloalkanes have the same general molecular formula as alkanes.
  - (ii) Wurtz reaction is used to prepare symmetrical alkane.
  - (iii) Isobutylene on reaction with HI gives  $3^\circ$  Butyl iodide.
  - (iv) Ozonolysis of 2 - Butyne gives Formic acid.
  - (v) Benzyne intermediate involve during elimination addition type reaction mechanism.
  - (vi) 2 - Bromo - 3 - methylanisole do not react with  $\text{NH}_2^-/\text{NH}_3$ .
  - (vii) - COOH is an ortho-para directing group.
  - (viii) Catalyst use for the Friedal - Craft alkylation reaction of benzene is anhydrous  $\text{AlCl}_3$ .

P.T.O.

**Q.3 Answer the following short Questions (Attempt any ten) :** [20]

- (i) Write structural formula for : (a) 1,3 - Dimethylcyclohexane  
(b) 1,3 - Cyclohexadiene
- (ii) Differentiate between: Wurtz reaction and Corey House reaction.
- (iii) Define : (a) Free radical (b) Hydrocarbon
- (iv) Give the Ozonolysis of 2-Methyl-2-pentene.
- (v) Explain : 1 - Butyne gives white precipitates with Tollen's reagent but 2 - Butyne does not.
- (vi) Give the synthesis of 1-Butyne from Acetylene.
- (vii) Define : (a) Nucleophile (b) Electrophile
- (viii) Explain : The rate of  $S_N2$  reaction depends on the concentration of nucleophile while that of  $S_N1$  does not.
- (ix) Write structural formula for : (a) n - Butylbromide (b) Isopropylchloride
- (x) Distinguish between chlorination of Toluene in presence of light and in presence of catalyst  $FeCl_3$ .
- (xi) Classify the following into *o*- & *p*- directing and *m*-directing group :  
-CH<sub>3</sub> , -OH, -CHO, -NO<sub>2</sub> , -NH<sub>2</sub>, -COOH
- (xii) Write structural formula for : (a) Ethylbenzene (b) Diphenylmethane

**Q.4 Answer the following (Attempt any four) :** [32]

- (i) Write reaction mechanism for the chlorination of Methane. Also calculate the relative yield of isomeric products obtained upon monochlorination of n-Propane. The relative reactivity of 1<sup>o</sup>, 2<sup>o</sup> and 3<sup>o</sup> H atoms are 1 : 3.8 : 5 respectively.
- (ii) Explain : Cyclopropane is more prone to undergo ring opening reaction than cyclopentane.. Also discuss successful and unsuccessfulness of Baeyer's angle strain theory.
- (iii) Write reaction mechanism for the addition of HCl to Propene. Also write a note on oxymercuration - demercuration reaction.
- (iv) Discuss kinetics and mechanism for E1 and E2 reaction. Also distinguish between : E1 and E2 reaction.
- (v) Write reaction mechanism for the formation of aniline from chlorobenzene via benzyne intermediate in presence of  $NH_2^- / NH_3$ . Also discuss low reactivity of aryl and vinyl halides.
- (vi) Write all possible isomeric structure for the compound having molecular formula  $C_5H_{11}Cl$  and classify them as 1<sup>o</sup>, 2<sup>o</sup> and 3<sup>o</sup> and give their IUPAC name. Also distinguish between :  $S_N1$  and  $S_N2$  reactions.
- (vii) Write reaction mechanism for the Friedel Crafts alkylation of benzene. Also discuss limitation of Friedel Crafts alkylation reaction.
- (viii) Write reaction mechanism for the nitration of benzene. Also explain that Nitrobenzene upon further nitration gives *m*-dinitrobenzene as a major product.