UNIVERSITY OF THE PUNJAB

Third Semester – 2019

Examination: B.S. 4 Years Program

(Clash)

Roll No. in Fig. .....

Roll No. in Words. .....

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Signature of Supdt.:

PAPER: Chemistry-III (Organic Chemistry) **MAX. TIME: 15 Min.**

Course Code: CHEM-201/CHM-21304 Part–I (Compulsory) **MAX. MARKS: 10**

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1. Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)

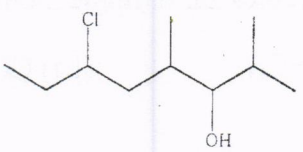
1. Which of the following statement is most suitable to an SN_1 reaction?

I) The rate limiting step of the reaction involves the alkyl halide and the nucleophile.
II) The order of reactivity is methyl > 1 > 2 > 3 (i.e., methyl is most reactive)
III) The rate limiting step of the reaction involves only the alkyl halide.
IV) Attack of nucleophile on substrate from rear would give product with inverted configuration.

2. Conversion of an optically active compound into an equimolar mixture of enantiomers is known as:

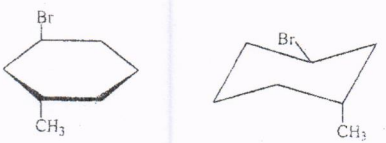
(I) Tautomerization (II) Racemization (III) Epimerization (IV) None of them

3. How many stereoisomers are possible for given compound?



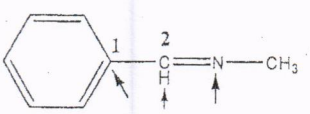
(I) 12 (II) 8 (III) 4 (IV) 16

4. What is the stereochemical relationship between the following two molecules?



I) Geometrical isomers II) Enantiomers III) Diastereomers IV) Identical

5. Which set of hybridization states of C1, C2, and N of the following molecule is correct?



(I) C1 sp^2, C2 sp^3, N sp^3 (II) C1 sp^2, C2 sp^2, N sp^3
(III) C1 sp^2, C2 sp^2, N sp^2 (IV) C1 sp^2, C2 sp^3, N sp^2

P.T.O.

6. Which of the following is not a meta director.

(I) CN (II) OH (III) COOH (IV) CHO

7. How many pi molecular orbital are present in molecular presentation of benzene.

(I) 8 (II) 2 (III) 4 (IV) 6

8. The reaction of benzene with an acid chloride in presence of lewis acid as catalyst is known as

(I) Perkin Raction (II) Friedel Craft acylation
(III) Wurtz reaction (IV) Williamson's synthesis

9. The oxidation of isopropyl alcohol with Cr_3O in Glacial CH_3COOH would yield

(I) Propane (II) Propanol (III) Propanone (IV) Propanoic acid

10. Which one of the following molecules has a dipole moment?

(I) CS_2 (II) $CHCl_3$ (III) CCl_4 (IV) O_2

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PAPER: Chemistry-III (Organic Chemistry) **MAX. TIME: 2 Hrs. 45 Min.**

Course Code: CHEM-201/CHM-21304 Part – II **MAX. MARKS: 50**

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q2. Give brief answers to the following questions.

(1). Why aniline is less basic than cyclohexylamine (2)

(2) Explain Torsional strain with example. (2)

(4) Why ethanol has higher boiling point than that of dimethyl ether. (2)

(5) Draw all conformers of 1-tert-butyl-4-methylcyclohexane and point out most stable conformer and give reason. (4)

(6) Why tertiary alcohol reacts with HBr faster than secondary alcohol. (2)

(7) Why o-hydroxybenzoic acid is more acidic than p-hydroxybenzoic acid. (2)

(9) How will you convert C_2H_5Br into propane. (2)

(10) How could you differentiate between nonaromatic and antiaromatic by huckel rule. (4)

Q3. (a) How will you convert followings. (6)

(i) vic-dihalide into 1-propyne (ii) 2-butene into cis-butane-2,3-diol

(iii) Prop-1-ene into propane (vi) Prop-1-ene into 3-bromoprop-1-ene

(v) Prop-1-ene into 1-bromopropane (vi) Ethylene oxide into 1-propanol

(b) Design suitable syntheses of the following compounds starting from benzene. Show all the steps in each case. (6)

(i) Benzophenone (ii) 4-bromo-3-nitrobenzoic acid (iii) Phthalic anhydride

(c) Explain the difference between: (8)

(i) Conjugation and hyperconjugation

(ii) Resonance and tautomerism

(iii) Constitutional isomerism and Stereoisomerism

(iv) Center of symmetry and axis of symmetry

(d) Explain SN1 mechanism with examples. (5)

(e) Draw both the geometrical isomers for the following compounds and assign Z or E to each of them. (5)

(i) 2-pentene (ii) 3-methyl-2-pentene (iii) 2-Iodo-2-butene

(iv) 1-Bromo-1,2-dichloroethylene (v) Maleic acid

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Course Code: CHEM-201/CHM-21304 Part–I (Compulsory) **MAX. MARKS: 10**

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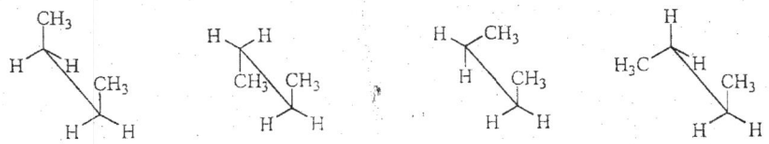
Q.1. Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)

1. Which of the following compound would not show hydrogen bonding.

(I) $C_2H_5NH_2$ (II) $C_2H_5OC_2H_5$ (III) C_2H_5OH (IV) C_2H_5COOH

2. Which of the following conformers is least stable?



(I) (II) (III) (IV)

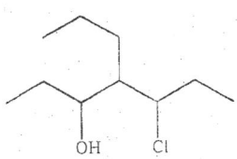
3. Which of the following symbol is used to represent principal quantum number?

(I) *l* (II) n (III) m (IV) s

4. Which of the following group exhibit positive inductive effect (+I).

(I) -CHO (II) C=O (III) –CN (IV) SiR_3

5. A correct IUPAC name for the following compound is:



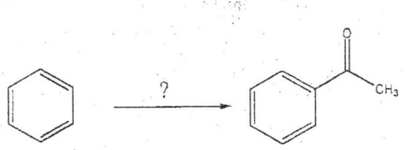
(I) 4-propyl-5-chloro-heptan-3-ol (II) 4-propyl-3-chloroheptan-5-ol

(III) 4-(1-chloropropyl)-heptan-3-ol (IV) 5-chloro-4-propylheptan-3-ol

6. Which pair of groups contains both ortho and para directing group.

(I) NH_2, CN (II) NH_2, $N(CH_3)_2$ (III) COOH, OH (IV) $N(CH_3)_3$, CHO

7. Which of the following reagents would be the best reactants for the following synthesis.



(I) CH_3OCH_3, $AlCl_3$ (II) CH_3COOH, $AlCl_3$

(III) CH_3CHO, $AlCl_3$ (IV) CH_3COCl, $AlCl_3$

8. How many Number of lone pair of electrons occupied by oxygen of water molecule are

(I) one (II) Two (III) Three (IV) Four

9. Williamson's synthesis is method for the preparation of .....

(I) Alcohol (II) Ester (III) Ether (IV) Carboxylic acid

10. An acid chloride react with hydrazine to yield a.....

(I) Hydrazone (II) Oxime (III) Hydrazide (IV) sami carbazone

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ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q2. Give brief answers to the following questions.

1. Explain and illustrate Sp, Sp2 and Sp3 hybridization with examples. (6)
2. How will you prepare 2-phenylpropan-2-ol from acetone. (2)
3. Why chloroacetic acid is more acidic than acetic acid. (2)
4. Why acetamide is a weaker base than methylamine. (2)
5. Why and how nitro group is deactivating and meta directing. (2)
6. Define hyperconjugation with examples. (2)
7. Explain why SO_2 is a polar molecule while CO_2 is a non polar molecule. (2)
8. Why diethyl ether would not show hydrogen bonding. (2)

Q3.(a) How would you distinguish between Primary, Secondary and tertiary alcohols by chemical tests and write chemical equations. (6)

(b) Design suitable syntheses of the following compounds starting from benzene. Show all the steps in each case. (6)

(i) 2-chlorobenzoic acid (ii) 1-methyl-3-nitrobenzene (iv) Benzophenone

(c) Draw the structures of the following compounds. (4)

(i) spiro[4,5]decane (ii) 3-ethyl-4-isopropyl-1-heptene

(iii)1,6-dimethyl cyclohexene (iv) p-methylanisole

(d) Write different methods for preparation cycloalkane. (4)

(e) Describe different methods for resolution of racemic mixtures. (5)

(f) Give a comparison of SN_1 and SN_2 reaction. (5)