

**2020**  
(CBCS)  
(2<sup>nd</sup> Semester)  
**CHEMISTRY**  
SECOND PAPER (CHEM/2/CC/121)  
**(Organic chemistry-I)**

**1. Choose the correct answer from below:**

- i) In general the inductive effect of the alkyl groups is in the order
  - a)  $3^0 > 2^0 > 1^0$
  - b)  $1^0 > 2^0 > 3^0$
  - c)  $2^0 > 1^0 > 3^0$
  - d) None of the above
- ii) Stability of carbonium ion follows
  - a) Primary > Secondary > Tertiary
  - b) Secondary > tertiary > primary
  - c) Tertiary > secondary > Primary
  - d) None of the above
- iii) Which one of the following is said to have +I effect
  - a) COOH
  - b) F
  - c) CH<sub>3</sub>-
  - d) OH
- iv) The central atom of carbanion is said to posses
  - a) sp-hybridized orbital
  - b) sp<sup>3</sup> -hybridized orbital
  - c) sp<sup>2</sup>-hybridized orbital
  - d) None of the above
- v) Boron trifluoride acts as an electrophile because it has
  - a) Lone pair of electrons
  - b) Vacant orbitals
  - c) Three fluorine directly bonded to it
  - d) None of the above

vi) The carbon-carbon distance in benzene ring is

- a)  $1.40 \text{ \AA}^0$
- b)  $1.6 \text{ \AA}^0$
- c)  $1.2 \text{ \AA}^0$
- d)  $0.4 \text{ \AA}^0$

vii) The heat of hydrogenation of benzene is

- a) 40 kcal/mole
- b) 30 kcal/mole
- c) 50 kcal/mole
- d) None of the above

viii) The number of pi-electrons in naphthalene is

- a) 10
- b) 8
- c) 12
- d) 6

ix) The reactivity of aromatic halogen towards nucleophilic substitution is

- a) Lower than that of alkyl halides
- b) Higher than that of alkyl halides
- c) Equal to that of alkyl halides
- d) None of the above

x) The coupling reaction of aryl and alkyl halides in the presence of sodium ether to form alkylated aromatic hydrocarbons is referred to as

- a) Aldol condensation
- b) Wurtz-Fittig reaction
- c) Gattermann reaction
- d) Reimer-Tiemann reaction

xi) When hydrogen cyanide is added to benzaldehyde in the presence of alkali cyanide the following compound is formed

- a) Phenylhydrazone
- b) Benzoic acid
- c) Cyanohydrin
- d) None of the above

xii) The decreasing order of reactivity of ketones is

- a) Acetone > Ethyl methyl ketone > Diethyl ketone
- b) Ethyl methyl ketone > Acetone > Diethyl ketone
- c) Diethyl ketone > Acetone > Ethyl methyl ketone
- d) None of the above

xiii) The acidity of chlorobutanoic acids are in the order of

- a) 2-Chlorobutanoic acid > 3-Chlorobutanoic acid > 4-Chlorobutanoic acid
- b) 4-Chlorobutanoic acid > 3-Chlorobutanoic acid > 2-Chlorobutanoic acid
- c) 3-Chlorobutanoic acid > 4-Chlorobutanoic acid > 2-Chlorobutanoic acid
- d) None of the above

xiv) Methyl ketones on oxidation with halogen and sodium hydroxide give

- a) Amine
- b) Aldehyde
- c) Ketone
- d) Carboxylic acid

xv) Esterification is a reaction between carboxylic acid and

- a) Alcohol
- b) Ketone
- c) Aldehyde
- d) None of the above

xvi) The tertiary amine with all the alkyl group the same is referred to as

- a) Mixed amine
- b) Symmetrical amine
- c) Unsymmetrical amine
- d) None of the above

xvii) The Hybridisation of central N-atom in amine is

- a)  $sp$
- b)  $sp^2$
- c)  $sp^3$
- d) None of the above

xviii) In general the order of basic strength in amine is

- a)  $1^0 > 2^0 > 3^0$
- b)  $2^0 < 3^0 > 1^0$
- c)  $3^0 > 1^0 > 2^0$
- d)  $1^0 < 2^0 > 3^0$

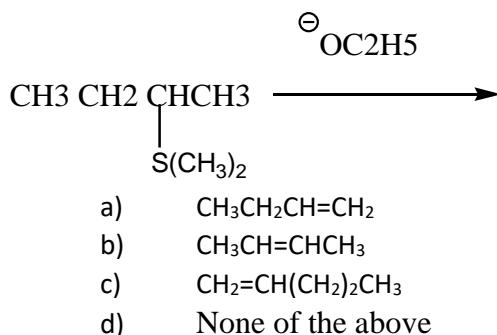
xix) When the given amine is treated with benzenesulphonyl chloride in the presence of cold aqueous NaOH, primary amine produces

- a) N-alkylsulphonamide
- b) N,N-dialkylsulphonamide
- c) Benzene
- d) None of the above

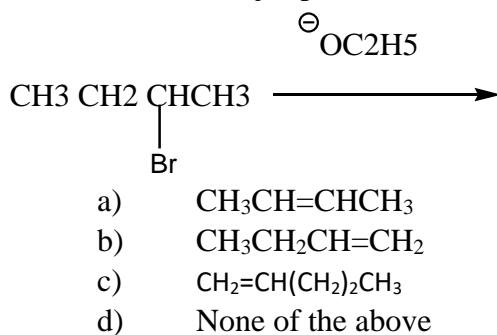
xx) Secondary amine reacts with nitrous acid to give

- a) Alcohol
- b) Nitrosoamine
- c) Trialkylammonium nitrite
- d) None of the above

xxi) In the following elimination reaction the major product will be



xxii) Predict the major product of



xxiii) The order of reactivity of alkyl group for SN2 reaction is

- a) Tertiary > Secondary > Primary > Methyl
- b) Primary > Methyl > Secondary > Tertiary
- c) Methyl > Primary > secondary > Tertiary
- d) None of the above

xxiv) For halide ions the nucleophilic reactivities follow the order

- a)  $\text{I}^- > \text{Br}^- > \text{Cl}^- > \text{F}^-$
- b)  $\text{F}^- > \text{Cl}^- > \text{Br}^- > \text{I}^-$
- c)  $\text{Br}^- > \text{Cl}^- > \text{I}^- > \text{F}^-$
- d)  $\text{Cl}^- > \text{Br}^- > \text{F}^- > \text{I}^-$

xxv) Reaction of alcohol and thionyl chloride to give alkyl chloride with the retention of configuration takes place through

- a) SN1 reaction
- b) SN2 reaction
- c) SNI reaction
- d) None of the above

**2. Fill in the blanks**

i) A group of atom in a conjugated system is said to have \_\_\_\_\_ when the direction of electron displacement is away from it

ii) The effect which causes a temporary polarization in the substrate molecule at the seat of a multiple bond by shift of an electron-pair from one atom to the other under the influence of electrophilic reagent is called \_\_\_\_\_

iii) A covalent bond undergoes fission when each of the departing atoms makes away with one of the bonding pair of electrons is known as \_\_\_\_\_

iv) The resonance stabilisation of benzene is \_\_\_\_\_

v) According to Huckel rule the number of pi-electrons in an aromatic compound will be equal to \_\_\_\_\_

vi) The bond angle in benzene ring is \_\_\_\_\_

vii) Benzaldehyde condenses with hydroxylamine and \_\_\_\_\_ to form benzaldoxime and phenylhydrazone

viii) The boiling point of benzaldehyde is \_\_\_\_\_

ix) Phenol ionises in water to form \_\_\_\_\_ ion

x) Ammonia when dissolve in water forms \_\_\_\_\_ and hydroxide ion

xi) \_\_\_\_\_ amines having no available hydrogen atom on nitrogen do not react with CS<sub>2</sub>

xii) Primary \_\_\_\_\_ form carbylamine when warmed with chloroform and ethanoic solution of KOH

xiii) A substitution reaction where bond making and bond breaking occur simultaneously is called \_\_\_\_\_

xiv) The conversion of the (+) form to (-) form or vice versa, without recourse to resolution is known as \_\_\_\_\_. It is observed in SN2 reaction

xv) Among the given halide ions ( $F^-$ ,  $Cl^-$ ,  $Br^-$ ,  $I^-$ ) the best nucleophile in polar aprotic solvent is \_\_\_\_\_

**Answer key (The correct answer is given in bold letter)**

1. Choose the correct answer from below:

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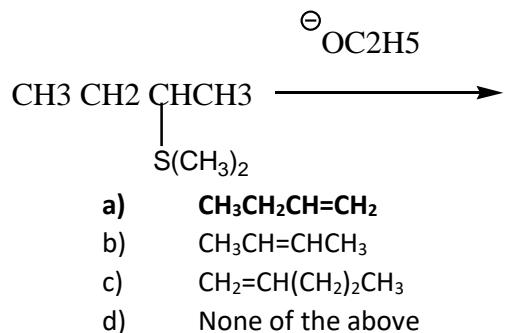
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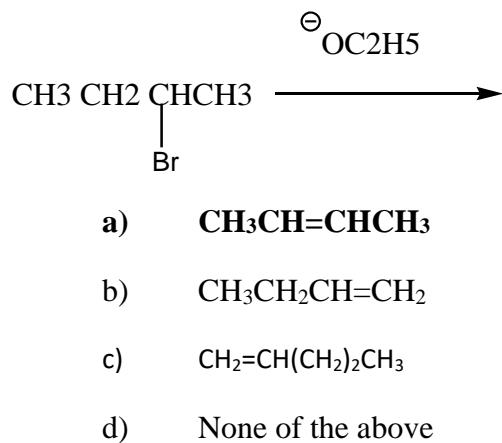
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- b) F<sup>-</sup>> Cl<sup>-</sup>> Br<sup>-</sup>> I<sup>-</sup>
- c) Br<sup>-</sup>> Cl<sup>-</sup>> I<sup>-</sup>> F<sup>-</sup>
- d) Cl<sup>-</sup>> Br<sup>-</sup>> F<sup>-</sup>> I<sup>-</sup>

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- viii) The boiling point of benzaldehyde is **179° C**
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- xiv) The conversion of the (+) form to (-) form or vice versa, without recourse to resolution is known as **walden inversion**. It is observed in SN2 reaction
- xv) Among the given halide ions (F<sup>-</sup>, Cl<sup>-</sup>, Br<sup>-</sup>, I<sup>-</sup>) the best nucleophile in polar aprotic solvent is **F<sup>-</sup>**