

Sample Question Bank Nov-2020

M.Sc.Sem I (A.T.K.T)

Subject : Chemistry-III (Organic)

1) A reaction $A \rightarrow B$ occurs in a single step and has a ΔG° of 50 KJ/mol. According to the Hammond Postulate, the structure of the transition state for this reaction would most resemble:

- (a) the reactant, A
- (b) the product, B
- (c) it would be an equal hybrid of A and B
- (d) the reaction intermediate

2) Which of the following pairs does not show an acid and its conjugate base?

- a) HNO_3 and NO_3^-
- b) H_2SO_4 and HSO_4^-
- c) H_2SO_4 and SO_4^{2-}
- d) HSO_4^- and SO_4^{2-}

3) Which compound is most acidic?

- a) CH_4
- b) NH_3
- c) H_2O
- d) H_2S

4) Which of the following is an accurate statement of Hammond's postulate?

- a) The transition state of an endothermic reaction will resemble the starting materials (reactants) more than the product
- b) the transition state of an exothermic reaction will resemble the starting materials (reactants) more than the product
- c) the transition state of an exothermic reaction will resemble the products more than the starting materials (reactants)
- d) the difference in energy between the starting materials (reactants) and transition state controls the rate of a reaction

5) Which compound is most acidic?

- a) FCH₂CO₂H
- b) ClCH₂CO₂H
- c) BrCH₂CO₂H
- d) ICH₂CO₂H

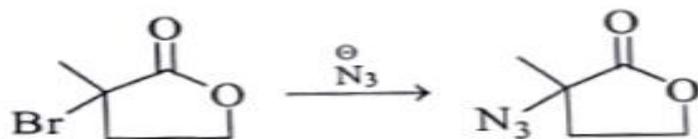
6) BF₃ reacts in liquid HF to give:

- a) HBF₄
- b) [BF₂]⁺
- c) [H₂F]⁺
- d) [HF₂]⁻

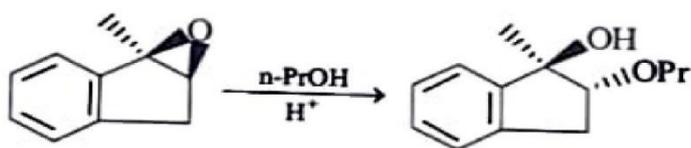
7) Which compound is least acidic?

- a) FCH₂CO₂H
- b) ClCH₂CO₂H
- c) BrCH₂CO₂H
- d) ICH₂CO₂H

8) Among the following reactions, which one is **INCORRECT**?

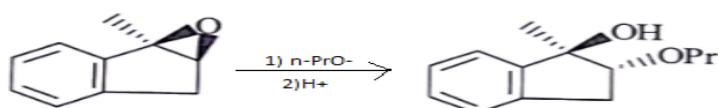


a)

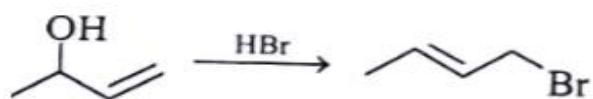


b)

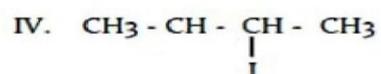
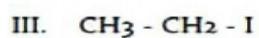
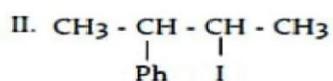
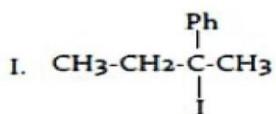
c)



d)



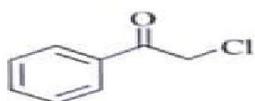
9) What will be the correct order of **SN2/E2** ratio for the % yield of the product of the following halides?



- a) III > IV > II > I
- b) III > II > IV > I
- c) I > III > IV > II
- d) II > I > III > IV

10) Which one is an excellent substrate for **SN²** reaction?

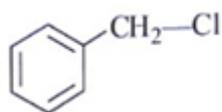
a)



b)



c)

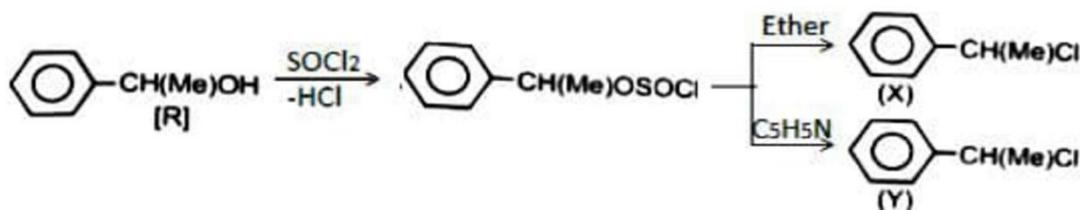


d)

11) What is the following statement is **incorrect** about nucleophiles?

- a) Nucleophiles have an unshared electron pair and can make use of this to react electron deficient species
- b) The nucleophilicity of an elements (an electron donor) generally increases on going down to a group in the periodic table
- c) A nucleophile is electron-deficient species.
- d) All good nucleophiles are good bases when we deals across the period.

12). Which configuration will be adopted by X and Y respectively?



- a) R,R
- b) R,S
- c) S,S
- d) S,R

13) What is the **correct** order of nucleophilicity in the following options?

- a) $(\text{CH}_3)_3\text{CO}^- > \text{CH}_3^-$
- b) $\text{CH}_3\text{S}^- > \text{CH}_3\text{SH}$
- c) $\text{CH}_3\text{CH}_2\text{CH}_2\text{O}^- < (\text{CH}_3)_3\text{CO}^-$
- d) $(\text{CH}_3\text{CH}_2)_3\text{N} > (\text{CH}_3\text{CH}_2)_3\text{P}$

14) Which of the following statement is false?

- a) Aromaticity can be determined based NMR chemical shift.
- b) The protons attached to the aromatic ring are shifted upfield from the normal olefinic region.

- c) Aromatic compounds have ability to sustain induced current
- d) Aromatic compounds are diatropic

15). Homotropyllium cation shows which of the following property?

- a) Aromatic
- b) Homo-aromatic
- c) Non aromatic
- d) Anti-aromatic

16) Simple axis of symmetry is designated as _____

- a) C_n
- b) S_n
- c) i
- d) σ

17) Tetracoordinate chiral centre in organic compound is provided by _____ hybrid carbon.

- a) sp
- b) sp^2
- c) sp^3
- d) dsp^2

18) Which of the following statement is incorrect with respect to molecules with tricoordinated chiral centre

- a) Molecules with tricoordinate chiral centre undergoes racemisation and optically inactive
- b) Molecules with tricoordinate chiral centre do not undergoes racemisation
- c) Tricoordinate derivative of carbon undergo inversion and give conformational enantiomers
- d) Tricoordinate derivative of carbon undergo inversion and give conformational distereoisomers

19) When carbon chain is written in zig-zag fashion having two chiral centres and if two substituents are on adjacent chiral centres are on same side then prefix used as _____

- a) Erythro
- b) Threo
- c) Syn
- d) Anti

20) Among the following which spiran compound is optically inactive?

- a) Spiro [3,2] hexane
- b) Spiro [3,3] heptan-2,6-dicarboxylic acid
- c) 6-Amino-2-methyl spiro[4,3] octane
- d) spirohydantoin

21) Which of the following statement is not true for allene system?

- a) Allene with odd number of cumulated double bonds are not chiral
- b) Allene with odd number of cumulated double bonds are chiral
- c) Allene with even number of cumulated double bonds are chiral

- d) Cumulated carbons of the allenes are in a linear geometry
- 22) Two faces are enantiotopic if addition to either of the faces gives _____
- Enantiomer
 - Distereomer
 - Homomer
 - Both Enantiomer and Distereomer
- 23) Cyclopentene on oxidation with dilute KMnO_4 in presence of alkali gives _____
- Cis-1,2-cyclopentanediol
 - Trans-1,2-cyclopentanediol
 - Cyclopentane
 - Cyclopentenone
- 24) CrO_3 -Pyridine complex reagent is known as _____
- Corey's reagent
 - Jone's reagent
 - Collin's reagent
 - Cornforth reagent
- 25) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$ on reaction with selenium dioxide (SeO_2) gives _____ as major product
- $\text{C}_6\text{H}_5\text{CHO}$
 - $\text{C}_6\text{H}_5\text{COCH}_3$
 - $\text{C}_6\text{H}_{10}\text{O}$
 - $\text{C}_6\text{H}_5\text{CH}_3$
- 26) The conversion of ketones to esters with peracids is known as _____
- Clemmensen oxidation
 - Baeyer-villiger oxidation
 - Dakin reaction
 - Etard oxidation
- 27) Sodium borohydride (NaBH_4) is used for the _____
- Reduction of aldehydes to alcohols
 - Reduction of Cyano group to amines
 - Reduction of nitro group to amines
 - Reduction of ester group to carboxylic acid
- 28) Reduction of Aromatic rings by sodium metal in liquid ammonia with ethanol gives unconjugated dihydro derivatives is known as _____
- Birch reduction
 - Diimide reduction
 - Wolff-kishner reduction
 - Clemmensen reduction
- 29) Diimide reagent is used for the reduction of _____
- $\text{C}=\text{C}$
 - $\text{N}=\text{N}$
 - $\text{O}=\text{O}$
 - All the above
- 30) Which of the following statement is not true w.r.to clemmensen reduction?
- Reduction of ketone to corresponding hydrocarbon
 - Reduction of carbonyl group to primary alcoholic group
 - Zinc amalgam in hydrochloric acids used as catalyst

- d) Mechanism involves transfer of electron from metal surface to carbon atom of protonated carbonyl group