Duration: 3 Hours **Total Marks: 75**

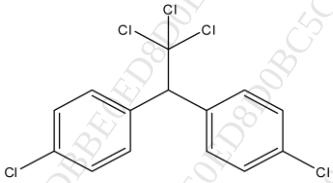
N.B.: 1. All questions are compulsory
2. Figures to right indicate full marks

Q. 1 Choose the appropriate option for following multiple choice-based questions. **(20)**

1. Halogens are o/p directors for electrophilic aromatic substitution due to

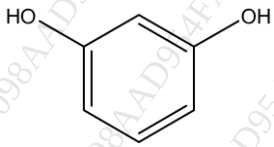
a) Resonance effect
b) Inductive effect
c) Steric effect
d) Electronegativity

2. The given structure is _____ and is used as _____



a) DDT, pesticide
b) Chloramine, disinfectant
c) Saccharin, sweetener
d) BHC, agricultural insecticide

3. Identify the structure and its use



a) Resorcinol, topical analgesic
b) o-cresol, antiseptic
c) m-cresol, disinfectant
d) m-cresol, antiseptic

4. Decalin is obtained on reduction of naphthalene using _____

a) Na/EtOH
b) Na/Isoamyl alcohol
c) H_2/Ni
d) $NaBH_4$

5. Order of reactivity of Benzene, naphthalene, anthracene and phenanthrene towards Electrophilic Aromatic Substitution Reactions is: -

a) Benzene < naphthalene < anthracene and phenanthrene
b) Phenanthrene > benzene > naphthalene > anthracene
c) Benzene < naphthalene < phenanthrene < anthracene
d) Benzene > naphthalene > anthracene and phenanthrene

6. Dimerization of ——---- occurs in presence of U. V. light and xylene as a solvent

a) naphthalene
b) anthracene
c) Phenanthrene
d) 1-naphthol

7. _____ does not undergo Birch Reduction

a) Naphthalene
b) Anthracene
c) Phenanthrene
d) Biphenyl

8. *para* fluoro benzoic acid is less acidic than *para* chloro benzoic acid because—

a) +R-effect dominates the -I effect in p-fluoro benzoic acid

b) -I -effect dominates the +R effect in p-fluoro benzoic acid

c) +R-effect dominates the -I effect in p-chloro benzoic acid

d) -R-effect dominates the -I effect in p-chloro benzoic acid

9. _____ can be used to convert -COOH to -CH_2OH

a) Catalytic hydrogenation
b) $LiAlH_4$
c) $NaBH_4$
d) Sn/ HCl

10. Carboxylic acids can react with _____ while phenols react with _____

a) $NaHCO_3$ & NaOH, only $NaHCO_3$
b) $NaHCO_3$, only NaOH
c) $NaHCO_3$ & NaOH, only NaOH
d) Both can react with $NaHCO_3$ & NaOH

11 The groups -OCH3 and -NH2 in the p- position of aniline _____ basicity

a) Increase
b) Decrease
c) Do not affect
d) None of the above

12 Benzamide on reaction with bromine in alkaline medium (NaOH) gives:

a) Benzoic acid and ammonia

b) 3-Bromobenzoic acid and ammonia

c) Aniline

d) 2,4-Dibromobenzoic acid and ammonium bromide

13 Melting point of fat is _____ and melting point of oil is _____

a) Higher, higher
b) Lower, lower
c) Higher, lower
d) Lower, higher

14 _____ are tri-esters of a long chain of saturated fatty acids with glycerol.

a) Waxes
b) Oils
c) Fats
d) Lipid

15 Which of the following is cyclic fatty acid

a) Cerebronic acid
b) Ricinoleic acid
c) Chaulmoogric acid
d) Oleic acid

16 Identify the correct example of omega free fatty acid

a) Stearic acid
b) Myristic acid
c) Linoleic acid
d) Lauric acid

17 Cyclopropane reacts with chlorine in absence of sunlight light to form_____

a) 1-Chlorocyclopropane
b) 1,3-dichlorocyclopropane
c) 1,1-dichlorocyclopropane
d) 1,2-dichlorocyclopropane

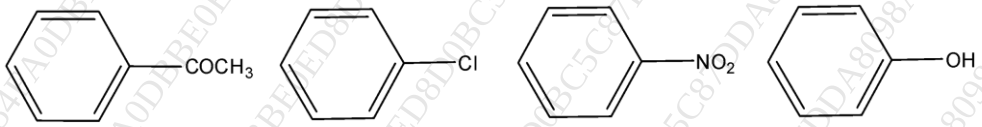
18 According to Baeyer's theory deviation, the normal bond angle is
a) 60 **c)** 109.5
b) 70 **d)** 45

19 According to Mohr's theory cycloalkanes are
a) Two dimensional **c)** Non planar
b) Three dimensional **d)** None of the above

20 According to Mohr's theory more the value of angle strain
a) Less stable is the ring **c)** No effect on stability
b) More stable is the ring **d)** Ring remains in plane

Q. 2 Answer any TWO questions **(20)**

a) 1. Identify the molecule which is least reactive towards electrophilic aromatic substitution. Justify your answer. Use the least reactive molecule to synthesize benzene nitrile. **(05)**



2. Describe qualitative tests used to identify phenols with reactions. **(05)**

b) 1) What are axial and equatorial bonds of cyclohexane? Write the complete reactions along with products of cyclopropane with the following reagents. **(05)**
i) Br_2 /CCl_4 dark ii) H_2 /Ni 80°C iii) Cl_2 /UV light iv) Conc. HBr.

2) Discuss in detail the reaction mechanism of the soap making process. How does saponification help in standardization of oils? **(05)**

c) 1) a) Give structure and names of the principal organic products expected from mono nitration of 1) o-cresol 2) p-chloro aniline **(05)**
b) Give Huckel's rule of aromaticity

2) a) Arrange the following molecules in increasing order of Acidity and justify. **(05)**
ortho hydroxybenzoic acid, meta hydroxybenzoic acid, para hydroxybenzoic acid and benzoic acid.
b) How benzoic acid reacts with $NaHCO_3$

Q. 3 Answer any SEVEN questions **(35)**

a) What do you mean by drying oils? Explain how drying of oils is associated with Iodine value?

b) State and explain the significance of the various analytical values used to control the quality of oils.

c) Explain Beyer strain theory? Enlist various limitations

d) Draw the reaction involved during rancidity of oil. Comment on Analytical, synthetic, and other evidence in the derivation of structure of benzene.

e) Write the reactions and give reaction conditions when aniline reacts with
1) Benzoyl chloride 2) Bromine

f) Justify: "Preferred position for electrophilic aromatic substitution in anthracene is position 9 or 10". Give the synthesis of anthracene using Diel Alder's Reaction.

g) Explain the effect of temperature on orientation of incoming electrophile in naphthalene towards electrophilic aromatic substitution reaction.

h) Discuss the steps involved in the Azo-coupling reaction. Give the significance of pH in this reaction. Give the uses of Azo compounds.

i) Convert the followings **(Any 2)**
1) Benzene to 3-Ethylbenzene nitrile
2) Benzaldehyde to 3-Aminobenzaldehyde
3) Toluene to 3,5-Dinitrobenzoic acid
