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BP 301 T

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Azara, Hatkhowapara  
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2023

B.Pharm. 3<sup>rd</sup> Semester End-Term Examination

PHARMACEUTICAL ORGANIC CHEMISTRY - II

Full Marks - 75

Time - Three hours

The figures in the margin indicate full marks for the questions.

1. Multiple choice questions (MCQ/ Answer *all* questions) : (20 × 1 = 20)
- (i) Electron releasing group of Phenol
- (a) Stabilizes phenoxide ion and increases the acidity
  - (b) Destabilizes phenoxide ion and decreases the stability
  - (c) Stabilizes the phenoxide ion and decreases the acidity
  - (d) Destabilizes phenoxide ion and increases the acidity
- (ii) The product of Kolbe's reaction is
- (a) Sodium Salicylate
  - (b) Salicylic acid
  - (c) Salicylaldehyde
  - (d) Sodium Carboxylate
- (iii) Anthracene undergoes electrophilic substitution reaction mainly at
- (a) C-1
  - (b) C-2
  - (c) C-9
  - (d) C-1 and C-2
- (iv) Enzyme responsible for hydrolysis of fat is
- (a) Reductase
  - (b) Aconitase
  - (c) Lipase
  - (d) Kinase
- (v) Which of the compound is most basic
- (a) P-nitroaniline
  - (b) O-toluidine
  - (c) Aniline
  - (d) Methylamine
- (vi) Friedal craft acylation of benzene is used for preparation of
- (a) Aromatic aldehyde
  - (b) Aliphatic aldehyde
  - (c) Aromatic Ketone
  - (d) Aliphatic Ketone

[Turn over



(vii) Aniline on diazotization ( $\text{HNO}_2/\text{HCl}$ ) gives

- (a) Benzoylchloride (b) Benzyl chloride  
(c) Benzene diazonium salt (d) Benzoic acid

(viii) Benzene undergoes substitution reaction more easily than addition reaction because

- (a) It has a cyclic structure (b) It has three double bonds  
(c) It has six hydrogen atoms (d) There is delocalization of electrons

(ix) Formation of Decalin from Naphthalene occur through the following reaction

- (a) Oxidation (b) Nitration  
(c) Reduction (d) Chlorination

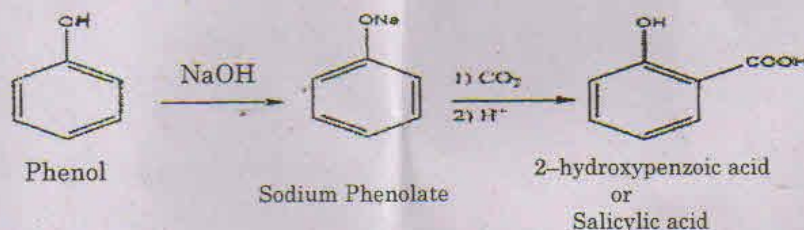
(x) Which of the following is having highest ring strain?

- (a) Cyclomethane (b) Cyclopropane  
(c) Cyclobutane (d) Cyclopentane

(xi) The synthesis of Phenol which uses Chlorobenzene as the starting material is known as

- (a) Reimer Tiemann reaction (b) Dows process  
(c) Hock method (d) Wurtz reaction

(xii) Identify the reaction



- (a) Hoffmann Bromide reaction (b) Wurtz Fittig reaction  
(c) Kolbe's reaction (d) Reimer Tiemann reaction

(xiii) Cyclopropane upon reaction with Bromine gives

- (a) 1, 2 - Dibromopropane (b) 1, 3 - Dibromopropane  
(c) 1, 4 - Dibromopropane (d) None of the above

(xiv) Electron withdrawing groups of aromatic amines

- (a) Increases the basicity (b) Decreases the basicity  
(c) Increases the acidity (d) Decreases the acidity



- (xv) Liquid oils can be converted to solid fats by
- (a) Hydrogenation (b) Saponification  
(c) Hydrolysis (d) Oxidation of double bond
- (xvi) Sodium phenoxide reacts with  $\text{CO}_2$  at  $125^\circ\text{C}$  under 5atm pressure to give Salicylic acid. The reaction is called
- (a) Kolbe's reaction (b) Wurtz reaction  
(c) Perkin reaction (d) HVZ reaction
- (xvii) Which of the following reagents may be used to distinguish between Phenol and Benzoic acid?
- (a) Aqueous NaOH (b) Tollens reagent  
(c) Neutral  $\text{FeCl}_3$  (d) Molisch reagent
- (xviii) On heating with fuming  $\text{H}_2\text{SO}_4$ , Aniline is sulphonated to form mainly \_\_\_\_\_
- (a) Sulphanilic acid (b) Salicylic acid  
(c) m-nitro aniline (d) Acetyl salicylic acid
- (xix) Which of the following compounds is most acidic?
- (a) o-cresol (b) p-nitrocresol  
(c) p-cresol (d) p-chlorophenol
- (xx) Gammexane is
- (a) Hexachloroethane (b) DDT  
(c) Hexachlorocyclohexane (d) TNT

2. Long Answer (Answer two out of three): (2 × 10 = 20)

(a) Write short notes on : (5 × 2 = 10)

- (i) Kolbe's reaction  
(ii) Reimer-Tiemann reaction  
(iii) Sulphonation of Benzene  
(iv) Coulsion and Moffitts theory  
(v) Acid value.

(b) Write a note on elucidation of Benzene. Write two chemical reactions of Benzene. (6 + 4)



- (c) (i) Describe the various qualitative test of Phenol. (4 + 6)
- (ii) What happens when Anthracene reacts with these following? Write the reaction.
- (1) Maleic anhydride
  - (2) Na/C<sub>2</sub>H<sub>5</sub>OH
  - (3) Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>.

3. Short answers (Answer seven out of nine) : (7 × 5 = 35)

- (a) Write a note on Electrophilic aromatic substitution with general mechanism and explain any one reaction with example.
- (b) Write down the criterias of a compound to produce aromaticity. Give the example of two aromatic compounds which obey Huckel rule. Explain the resonance of Benzene. (2 + 1 + 2 = 5)
- (c) Describe Bayer's strain theory and Sacht-Mohr's theory in stability of cyclohexane.
- (d) Give the Haworth synthesis of Naphthalene. Write three chemical reactions of Naphthalene.
- (e) Write brief notes on the following : (2.5 × 2 = 5)
- (i) Saponification value
  - (ii) Iodine value.
- (f) Explain the basicity of aromatic amines and discuss the effects of substituents on its basicity.
- (g) Explain why para-nitro phenol is more acidic than Phenol. Give two methods of preparation of Phenol.
- (h) What are fats and oils? Write the basic differences between fats and oils.
- (i) Write down the structures and uses of the following (any two) : (2.5 × 2 = 5)
- (i) Anthracene
  - (ii) DDT
  - (iii) Cresol.