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2021

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

**Pharmacy**

**PHARMACEUTICAL ORGANIC CHEMISTRY – II (Theory)**

**(New Regulation)**

Full Marks – 75

Time – Three hours

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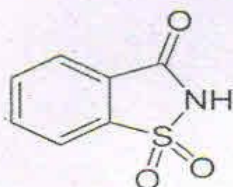
The figures in the margin indicate full marks  
for the questions.

1. Answer the following : (20 × 1 = 20)
- (i) The resonance energy theory of benzene is related to
- (a) Heat of hydrogenation
  - (b) Heat of combustion
  - (c) Heat of sublimation
  - (d) None of the above
- (ii) The product of Kolbe's reaction is \_\_\_\_\_.
- (a) Sodium salicylate
  - (b) Salicylic Acid
  - (c) Salicylaldehyde
  - (d) Sodium Carboxylate
- (iii) Electron withdrawing substituents
- (a) Stabilize the phenoxide ion and decrease the acidity of phenol
  - (b) Stabilize the phenoxide ion and increase the acidity of phenol
  - (c) Unstabilize the phenoxide ion and decrease the acidity of phenol
  - (d) Stabilize the phenoxide ion and neutralises the acidity of phenol

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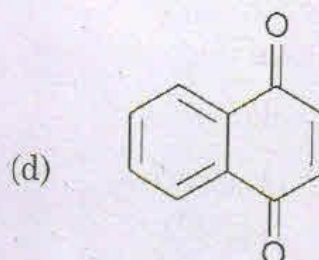
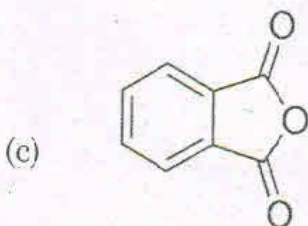
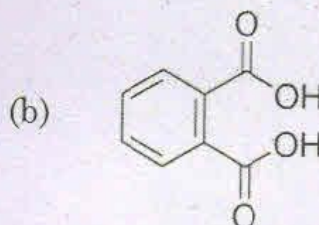
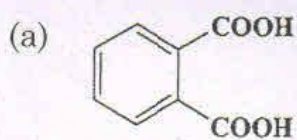
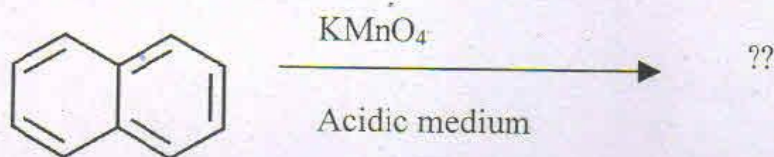
- (iv) Choose the correct statement about aromatic amine
- (a) Aromatic amines are much weaker bases than ammonia
  - (b) Alkyl substituted aryl amines are stronger bases than ammonia
  - (c) Aryl substituted aryl amines are weaker bases than ammonia
  - (d) All the above
- (v) In relation to benzene, OH, OR and NH<sub>2</sub> are \_\_\_\_\_ directing groups.
- (a) Ortho directing groups only
  - (b) Para directing groups only
  - (c) Ortho-para directing groups
  - (d) Meta directing groups

- (vi) The following structure is that of :



- (a) DDT
  - (b) BHC
  - (c) Chloramine
  - (d) Saccharine
- (vii) According to Huckel rule which of the following statements are correct:
- (a) The molecule or ion must be planar
  - (b) Molecule have cyclic delocalized electron clouds above and below the plane
  - (c) The total number of pi- electrons in the molecules should be  $(4n+2)$
  - (d) All the above
- (viii) Rancidity of lipids containing food is due to
- (a) Hydrogenation of unsaturated fatty acids
  - (b) Reduction of fatty acids
  - (c) Oxidation of fatty acids
  - (d) Dehydrogenation of unsaturated fatty acids

- (ix) Boiling point of phenols are higher than those of corresponding hydrocarbon and aryl halide because:
- strong association of molecules by intermolecular hydrogen bond
  - strong association of molecules by intramolecular hydrogen bond
  - strong association of molecules by covalent bonds
  - none of the above
- (x) Aniline on diazotization ( $\text{HNO}_2/\text{HCl}$ ) gives:
- Benzoylchloride
  - Benzyl Chloride
  - Benzene diazonium chloride
  - Benzoic acid
- (xi) According to the Baeyer's Strain theory:
- Each Carbon atom is  $\text{sp}^2$  hybridised
  - Any distortion or deviation from normal tetrahedral angle causes strain in the ring and produces instability
  - Greater the angle strain, less will be the reactivity of the cycloalkane
  - None of the above
- (xii) Naphthalene on reacting with  $\text{KMnO}_4$  in acidic medium gives \_\_\_\_\_.



- (xiii) The Banana-Bond model of cyclopropane is related to:
- (a) Bayer's theory
  - (b) Coulson-moffit's theory
  - (c) SACHE-Mohr theory
  - (d) Resonance energy theory
- (xiv) Choose the correct order for decreasing order of acidity
- (a) 2,4 dinitrophenol > p-nitrophenol > m-nitrophenol > p-cresol
  - (b) 2,4 dinitrophenol > m-nitrophenol > p-nitrophenol > p-cresol
  - (c) 2,4 dinitrophenol > p-nitrophenol > p-cresol > m-nitrophenol
  - (d) p-cresol > m-nitrophenol > p-nitrophenol > 2,4 dinitrophenol
- (xv) Iodine value indicates :
- (a) Number of alcoholic groups present in fat or oil
  - (b) Purity of edible fat or oil
  - (c) Molecular weight of fat or oil
  - (d) Degree of unsaturation present in fat or oil
- (xvi) In Haworth synthesis, phenanthrene is synthesized from \_\_\_\_\_
- (a) Naphthol
  - (b) Anthracene
  - (c) Naphthalene
  - (d) Diphenyl aldehyde
- (xvii) Anthracene undergoes electrophilic substitution reaction mainly at
- (a) C-1
  - (b) C-2
  - (c) C-9
  - (d) C-1 and C-2
- (xviii) In Wolf Kishner reduction, Cyclic ketones when reduced in presence of Zn amalgam and Conc. HCl, they give \_\_\_\_\_.
- (a) Cyclic aldehydes
  - (b) Cycloalkanes
  - (c) Cycloalkenes
  - (d) Cyclic acids

- (xix) Aromatic acids have higher boiling points due to \_\_\_\_\_.
- (a) More polarized OH bonds due to presence of electron withdrawing carbonyl group on the adjacent carbon
  - (b) More polarized OH bonds due to presence of resonance because of delocalized electrons of the aromatic ring
  - (c) More polarized OH bonds due to the electron withdrawing power of the oxygen atom of the OH group
  - (d) None of the above
- (xx) Hydrogenolysis of fats and oils gives the product/ products \_\_\_\_\_.
- (a) Glycerol and soap
  - (b) Glycerol and alcohol
  - (c) Only glycerol
  - (d) Glycerol and fatty acids

2. Answer the following questions (any *Seven*) (7 × 5 = 35)

- (a) Write a note on Electrophilic aromatic substitution with general mechanism and explain any one reaction with detail.
- (b) Write a note on Diazotization reaction.
- (c) Justify the following:
  - (i) Phenol is more acidic than alcohol
  - (ii) Aromatic amines are less basic than aliphatic amines.
- (d) Write a detailed note on Huckel's rule of aromaticity.
- (e) Comment on these followings :
  - (i) Why reactivity of Nitrobenzene is slow in comparison to Benzene.
  - (ii) Why Benzene undergoes substitution reaction instead of addition reaction? Justify.
- (f) Describe in detail about Bayer Strain Theory with its limitation.
- (g) Write down methods of preparation of Naphthalene.
- (h) Describe three different reactions of fatty acids with examples.
- (i) Write down the principle and significance of Iodine number.

3. Answer the following questions (any two)

(2 × 10 = 20)

- (a) Write down the structure and uses of the following :
- (i) DDT
  - (ii) Cresol
  - (iii) Saccharin
  - (iv) Naphthol
  - (v) BHC
- (b) (i) Write a note on Sachse's Mohr's theory.  
(ii) What do you mean by Rancidity. Explain in detail with example.
- (c) (i) 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>.
- (ii) Describe the various qualitative test of Phenol.
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