M 5/164

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Monsoon, 2024

B. Pharm 3rd. Semester Examination

Pharmaceutical Organic Chemistry II – Theory

Course Code: BP301T

Full Marks – 75 **Time – 3 hours**

The figure in the margin indicates full marks for the questions.

1. Multiple choice questions (MCQ) (Answer all questions): **20 x 1=20**

(i) Cycloalkanes have the same molecular formula as:
(a) Alkanes
(b) Alkenes
(c) Alkynes
(d) Cycloalkenes

(ii) The bond angle between carbon atoms in cyclohexane is
(a) 60°
(b) 90
(c) 109°
(d) 120°

(iii) Which of the following is a common sign of rancidity in food?
(a) Increased sweetness
(b) Off-flavors and odors
(c) Enhanced color
(d) Improved texture

(iv) Which of the following is a common example of a drying oil?
a) Olive oil
b) Linseed oil
c) Coconut oil
d) Castor oil

(v) The process of nitration involves the introduction of which functional group into an aromatic compound?
a) $-NO_2$
b) $-NH_2$
c) -COOH
d) -OH

(vi) Huckel's rule states that a planar, cyclic, conjugated molecule is aromatic if it contains __ π-electrons.

a) 2
b) 4
c) 6
d) 8

(vii) The primary characteristic of drying oil is:

a) They remain liquid at room temperature.
b) They polymerize upon exposure to air.
c) They are insoluble in water.
d) They contain no unsaturated fatty acids.

(viii) Salicylic acid is a type of __ acid.

a) Aliphatic
b) Aromatic
c) both a and b
d) None

(ix) Phenols are __ acidic than alcohol.

a) More
b) Less
c) Similar
d) None

(x) Toluene on oxidation with $KMnO_4$ gives:

a) Toluic acid
b) Benzoic acid
c) Salicylic acid
d) Phthalic acid

(xi) Resonance structures are:

a) One structure of substance with identical positions of atom
b) Two or more structures of substance with identical positions of atoms
c) Unstable structures of substance with identical positions of atoms
d) None

(xii) Electron withdrawing groups __ the acidity of benzoic acid.

a) Decrease
b) Increase
c) Similar
d) None

(xiii) Which of the following is most acidic?

a) o-cresol
b) p-cresol
c) p-nitrophenol
d) p-chlorophenol

(xiv) Fats and oils are:
a) Monoesters of glycerol
b) Diesters of glycerol
c) Triesters of glycerol
d) Diesters of glycol

(xv) Liquid oils can be converted to solid fats by__
a) Hydrogenation
b) Saponification
c) Hydrolysis
d) Oxidation

(xvi) Anthracene is __
a) Dicyclic aromatic hydrocarbon
b) Tricyclic aromatic hydrocarbon
c) Monocyclic aromatic hydrocarbon
d) Aliphatic hydrocarbon

(xvii) Higher the angle strain of cyclopropane indicates
a) Less stable
b) More stable
c) Constant
d) None

(xviii) Diazonium salt solution is treated with CuCl to give
a) Aryl chloride
b) Arylhydrazine
c) Anisole
d) Thiophenol

(xix) In the Friedel-Crafts acylation reaction, the acyl group is introduced into the aromatic ring using __
a) $AlCl_3$
b) $FeCl_3$
c) H_2SO_4
d) NaOH

(xx) Which reagent is used in the electrophilic substitution reaction of benzene to introduce a nitro group?
a) HNO_3 with H_2SO_4
b) Cl_2 with $FeCl_3$
c) Br_2 with $AlCl_3$
d) HBr with H_2SO_4

2. Short Answers (Answer any *seven*) (word limit 500) **7 x 5 =35**

(i) Define the terms: Reichert- Meissl (RM) number, saponification value, acid value, iodine value, rancidity of oil.

(ii) Draw the structures and therapeutic uses of DDT, Saccharin, Benzene hexachloride, Resorcinol, Cresol.

(iii) Explain Baeyer's strain theory of cycloalkanes.

(iv) Discuss the synthetic applications of aryl diazonium salts with chemical reactions.

(v) Elaborate the acidity of phenols indicating the effect of substituents on its acidity.

(vi) Explain the Haworth synthesis of phenanthrene.

(vii) Discuss the substitution reactions and ring opening reactions of cycloalkanes.

(viii) Discuss Coulson and Moffitt's modification for stability of cycloalkanes.

(ix) Explain the mechanism for electrophilic substitution reaction. Give 2 examples of chemical reactions.

3. Long Answers (Answer any *two*) (word limit 1000) **2x10 =20**

(i) Differentiate between fats and oils. Elaborate the chemical reactions of fatty acid.

(ii) Discuss the reaction mechanism involved in the following:
   a) Friedel Crafts alkylation
   b) Reimer-Tiemann reaction

(iii) Explain how benzoic acid can be prepared. Discuss 4 important chemical reactions of benzoic acid.