Paper / Subject Code: 65812 / Pharmaceutical Organic Chemistry- I

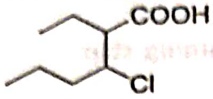
Sem-II 2022-2023

Duration: 3 Hours **Total marks: 75**

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

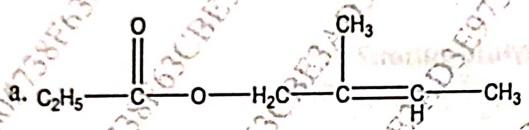
Q. 1 Choose appropriate option for following multiple choice based questions. **20**

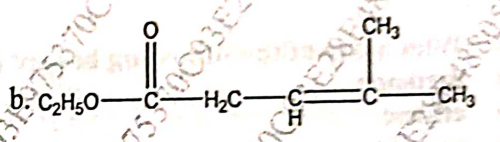
1 What is the IUPAC Name for the following compound?

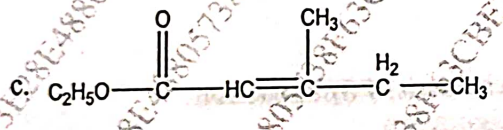


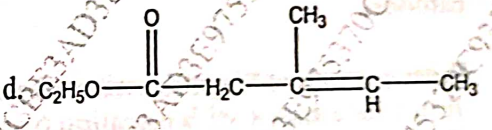
a 4-chloro-3-heptanoic acid
b 2-chloro-1-ethylpentanoic acid
c 3-chloro-2-ethylpentanoic acid
d 3-chloro-2-ethylhexanoic acid

2 Identify the correct structure for ethyl 3-methylpent-3-enoate









a a
b b
c c
d D

3 Which of the following nitro compounds will show tautomerism?
a Cl_3NO_2
b $C_6H_5NO_2$
c $(CH_3)_3CNO_2$
d $CH_3CH_2NO_2$

4 Methyl propyl ether and diethyl ether are the example of .....
a Chain isomerism
b Metamerism
c Functional group isomerism
d Chain isomerism

5 Select correct IUPAC nomenclature for neohexane.
a 2-methylbutane
b 2-methylpentane
c 2,2-dimethylbutane
d 2,2-dimethylpropane

6 Chlorination of methane to give CCl4 is an example of
a electrophilic addition
b free radical substitution
c nucleophilic addition
d electrophilic substitution

7 Why isotope effect is observed in E2 reaction?
a because it is bi molecular reaction
b because it is second order reaction
c because breaking of B carbon-hydrogen occur in rate determining step
d none of these

8 Which of the following reacts with HBr in presence of a peroxide to give anti Markovnikoff's product
a 1-butene
b 2,3 dimethyl 2 butene
c 2- butene
d 3 hexene

9 Which one of the following has sp^2 hybridization?
a methane
b ethane
c acetylene
d Ethylene

10 Which statement best describes the mechanism of S_N2 reaction?
a Front side attack with retention of configuration
b Front side attack with inversion of configuration
c Back side attack with retention of configuration
d Back side attack with inversion of configuration

11 Which of the following will be least reactive in an S_N2 reaction?
a 1-chloro-4-methylhexane
b 1-chloro-2-ethylhexane
c 3-chloroheptane
d 1-chloro-3-ethylpentane

12 Which nucleophile is required to convert 1-bromobutane to butyl methyl ether?
a ethoxide ion
b methoxide ion
c butoxide ion
d hydroxide ion

13 Acetone reacts with methyl magnesium bromide in an inert solvent to give an adduct, which, on acidic hydrolysis gives --
a An alcohol which gives turbidity almost immediately with Lucas reagent
b An aldehyde
c An alcohol which gives turbidity in 10 min with Lucas reagent
d An alcohol which gives no visible turbidity with Lucas reagent

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14 Tollen's reagent is --
a 2,4 Dintrophenylhydrazine in H2SO4
b Sodium carbonate, Sodium citrate & Copper sulphate pentahydrate
c Chromium trioxide with dilute H2SO4
d Silver nitrate with NaOH and Ammonium hydroxide

15 Which statement about the carbonyl group is not true?
a The carbonyl carbon is sp2 hybridised
b The bond angles among the three atoms attached to the carbonyl carbon are 120 degree.
c The three atoms attached to the carbonyl carbon form a non-planar geometry
d The carbonyl group forms resonance structures

16 What type of reaction takes place upon treatment of a ketone with HCN to form a cyanohydrin?
a Nucleophilic addition
b Nucleophilic substitutionc
c Electrophilic addition
d Electrophilic substitution

17 On heating aldehydes with Fehling's solution,____coloured precipitate is formed
a Pink
b Black
c Yellow
d Brick red

18 Arrange the following compounds in order of decreasing acidity?
BrCH2CH2COOH (2) CH2CH(Br)COOH (3) CH3CH(F)COOH
a (1) > (2) > (3)
b (3) > (2) > (1)
c (3) > (1) > (2)
d (2) > (1) > (3)

19 Which of the following compound is expected to be most basic?
a Aniline
b Methylamine
c Hydroxylamine
d Ethylamine

20 The products of the reaction of a carboxylic acid & an alcohol would be
a ketone & water
b amide & water
c acid chloride & water
d ester & water

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

1. a) Explain the mechanism for the formation of 2-Bromo, 2-methyl propane and 1-Bromo, 2-methyl propane from 2-methyl propene on reaction with HBr. Comment on the stabilities of intermediates and products. **10**
   b) Write a note on dehydration of 2-butanol. Give detailed reaction mechanism.

2. a) A. Predict the product of the reaction of neopentyl bromide and methanol. Depict the suitable mechanism for the same. **10**
   b) Give reason: Why polar solvents favors S_N1 and polar aprotic solvents favors S_N2 reaction.
3. Write the products and detailed reaction conditions for the following reactions- **10**
   i. 2-Methyl pentanal + Dilute NaOH
   ii. 1-Phenylpropanone + Dilute NaOH
   iii. Methanal + Concentrated NaOH
   iv. 2,2-Dimethylbutanal + Concentrated NaOH
   v. Benzaldehyde + Acetic Anhydride

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

1. With a help of a suitable aldehyde or a ketone as a starting material, discuss the mechanism of synthesis of the following compounds (1) 2-Methyl-2-butanol (2) 2-Butenal **5**
2. Give any two methods of synthesis of aliphatic carboxylic acids. Depict the mechanism for any one of these methods. **5**
3. a) Draw structures for the following compounds. (Any 3) **5**
   i. 1-ethoxy-2-nitropropane
   ii. 5-chlorohex-3-en-2-one
   iii. 3-cyclopentylbutanamide
   iv. 5-fluorohex-3-yn-1-ol
   b) Which type of tautomerism but-1-en-1-amine exhibit? Draw a structure of its tautomer.
4. Discuss in detail halogenation of alkanes with example. Give use of paraffin **5**
5. Explain SP2 hybridization in Ethene. Give shape and geometry. **5**
6. Give the name of reagents to carry out following conversions. **5**
   i. Ethyl alcohol to acetic acid
   ii. 1-propanol to propene
   iii. 2-bromo-2-methylpropane to 2-methylpropene
   iv. 2-bromopropane to propane
   v. Propene to 1-bromopropane
7. Explain any three methods for synthesis of alcohols. **5**
8. Write structures and uses of (1) Hexamine (2) Vanilin (3) Acetone (4) Benzaldehyde (5) Cinnamaldehyde **5**
9. Give reasons - Alkyl amines are more basic than ammonia Write a note on Hinsberg test. Write structure and uses of ethanolamine & amphetamine **5**

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