

Duration: 3 Hours

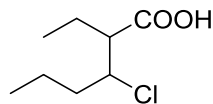
Total marks: 75

N.B.: 1. All questions are compulsory

2. Figures to right indicate full marks

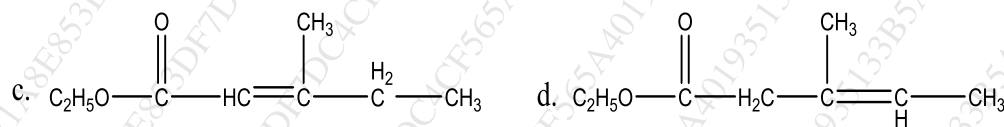
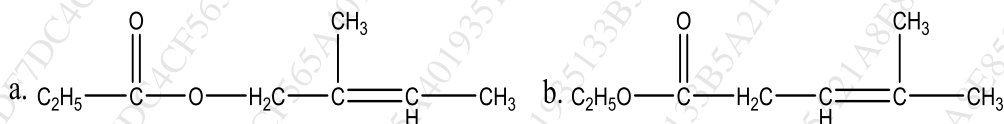
Q. 1 Choose appropriate option for following multiple choice based questions. 20

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 $\text{C}_6\text{H}_5\text{NO}_2$
 c $(\text{CH}_3)_3\text{CNO}_2$
 d $\text{CH}_3\text{CH}_2\text{NO}_2$

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 CCl_4 is an example of
- electrophilic addition
 - free radical substitution
 - nucleophilic addition
 - electrophilic substitution
- 7 Why isotope effect is observed in E_2 reaction?
- because it is bi molecular reaction
 - because it is second order reaction
 - because breaking of B carbon-hydrogen occur in rate determining step
 - none of these
- 8 Which of the following reacts with HBr in presence of a peroxide to give anti Markovnikoff's product
- 1-butene
 - 2,3 dimethyl 2 butene
 - 2- butene
 - 3 hexene
- 9 Which one of the following has sp^2 hybridization?
- methane
 - ethane
 - acetylene
 - Ethylene
- 10 Which statement best describes the mechanism of $\text{S}_{\text{N}}2$ reaction?
- Front side attack with retention of configuration
 - Front side attack with inversion of configuration
 - Back side attack with retention of configuration
 - Back side attack with inversion of configuration
- 11 Which of the following will be least reactive in an $\text{S}_{\text{N}}2$ reaction?
- 1-chloro-4-methylhexane
 - 1-chloro-2-ethylhexane
 - 3-chloroheptane
 - 1-chloro-3-ethylpentane
- 12 Which nucleophile is required to convert 1-bromobutane to butyl methyl ether?
- ethoxide ion
 - methoxide ion
 - butoxide ion
 - hydroxide ion
- 13 Acetone reacts with methyl magnesium bromide in an inert solvent to give an adduct, which, on acidic hydrolysis gives --
- An alcohol which gives turbidity almost immediately with Lucas reagent
 - An aldehyde
 - An alcohol which gives turbidity in 10 min with Lucas reagent
 - An alcohol which gives no visible turbidity with Lucas reagent

- 14 Tollen's reagent is --
- 2,4 Dinitrophenylhydrazine in H₂SO₄
 - Sodium carbonate, Sodium citrate & Copper sulphate pentahydrate
 - Chromium trioxide with dilute H₂SO₄
 - Silver nitrate with NaOH and Ammonium hydroxide
- 15 Which statement about the carbonyl group is not true?
- The carbonyl carbon is sp² hybridised
 - The bond angles among the three atoms attached to the carbonyl carbon are 120 degree.
 - The three atoms attached to the carbonyl carbon form a non-planar geometry
 - The carbonyl group forms resonance structures
- 16 What type of reaction takes place upon treatment of a ketone with HCN to form a cyanohydrin?
- Nucleophilic addition
 - Nucleophilic substitution
 - Electrophilic addition
 - Electrophilic substitution
- 17 On heating aldehydes with Fehling's solution, _____ coloured precipitate is formed
- Pink
 - Black
 - Yellow
 - Brick red
- 18 Arrange the following compounds in order of decreasing acidity?
BrCH₂CH₂COOH (2) CH₂CH(Br)COOH (3) CH₃CH(F)COOH
- (1) > (2) > (3)
 - (3) > (2) > (1)
 - (3) > (1) > (2)
 - (2) > (1) > (3)
- 19 Which of the following compound is expected to be most basic?
- Aniline
 - Methylamine
 - Hydroxylamine
 - Ethylamine
- 20 The products of the reaction of a carboxylic acid & an alcohol would be
- ketone & water
 - amide & water
 - acid chloride & water
 - 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 SP^2 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**
