

Duration: 3 Hours

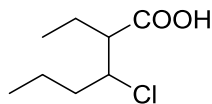
Total marks: 75

N.B.: 1. All questions are compulsory

2. Figures to right indicate full marks

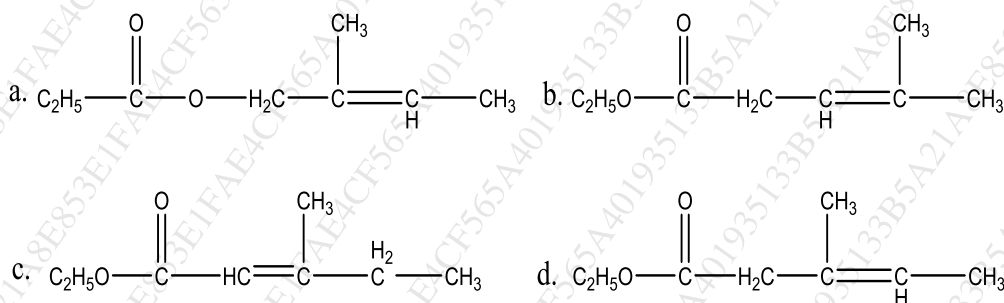
**Q. 1 Choose appropriate option for following multiple choice based questions. 20**

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  $\text{Cl}_3\text{NO}_2$
- 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 neoheptane.

- a 2-methylbutane
- b 2-methylpentane
- c 2,2-dimethylbutane
- d 2,2-dimethylpropane

- 6 Chlorination of methane to give  $\text{CCl}_4$  is an example of
  - a electrophilic addition
  - b free radical substitution
  - c nucleophilic addition
  - d electrophilic substitution
- 7 Why isotope effect is observed in  $\text{E}_2$  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  $\text{HBr}$  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  $\text{sp}^2$  hybridization?
  - a methane
  - b ethane
  - c acetylene
  - d Ethylene
- 10 Which statement best describes the mechanism of  $\text{S}_{\text{N}}2$  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  $\text{S}_{\text{N}}2$  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

- 14 Tollen's reagent is --
- 2,4 Dinitrophenylhydrazine in H<sub>2</sub>SO<sub>4</sub>
  - Sodium carbonate, Sodium citrate & Copper sulphate pentahydrate
  - Chromium trioxide with dilute H<sub>2</sub>SO<sub>4</sub>
  - Silver nitrate with NaOH and Ammonium hydroxide
- 15 Which statement about the carbonyl group is not true?
- The carbonyl carbon is sp<sup>2</sup> 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?  
 BrCH<sub>2</sub>CH<sub>2</sub>COOH      (2) CH<sub>2</sub>CH(Br)COOH      (3) CH<sub>3</sub>CH(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**

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