

Hours

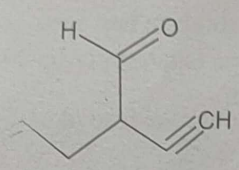
Total Marks: 75

All Questions Are Compulsory
Figures to right indicate full marks

Answer the following multiple choice questions: (20)

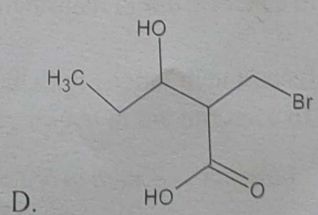
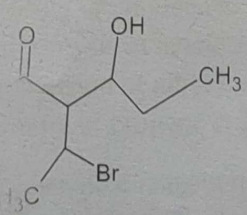
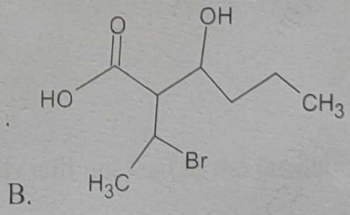
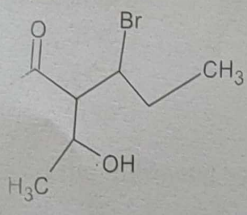
1. Ethyl ether and methyl propyl ether are examples of which type of isomerism?
a) Chain isomerism
b) Position isomerism
c) Functional isomerism
d) Metamerism

2. What is the IUPAC Name for the following compound?

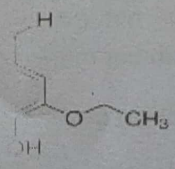


- a) 4-pent-1-en-5-yn
- b) 4-pent-5-en-1-yn
- c) 4-pent-4-enal
- d) 4-pent-4-en-1-yn

3. Identify the correct structure for 2-(1-bromoethyl)-3-hydroxypentanoic acid

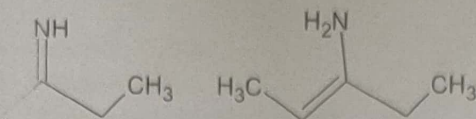


4. What is the common name for the following compound?



- a) Benzaldehyde
- b) Cinnamaldehyde
- c) Cinnillin
- d) Benzyl benzoate

Identify the relationship between the following pair of compounds.

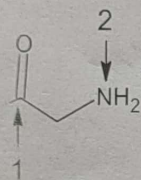


- keto-enol tautomerism
- imine-amine tautomerism
- positional isomerism
- inductive effect

Analysis of 4-methyl-pent-2-ene will give

- acetaldehyde and butanone
- methyl propanal and formaldehyde
- acetone and acetaldehyde
- methyl propanal and acetaldehyde

State the hybridization of each highlighted atom:



- 1(sp³), 2(sp²)
- 1(sp²), 2(sp³)
- 1(sp), 2(sp²)
- 1(sp²), 2(sp²)

Which of the following synthetic methods will not lead to the formation of alkane?

- Hydrogenating of ethylene at 200-300°C in hydrogen in the presence of nickel catalyst
- Electrolysis of acetic anhydride
- Conversion of alkyl halide to lithium dialkyl copper then treated with alkyl halide
- Hydrogenating of propene at 200-300°C in hydrogen in the presence of palladium catalyst

Which is a suitable reagent to favor an E2 reaction over S_N2 reaction.

- Sodium cyanide in DMSO
- Potassium iodide in acetone
- Potassium tert-butoxide in butanol
- Potassium iodide in acetone

Propene on reaction with hot potassium permanganate solution gives.....

- ethylene glycol
- acetic acid
- acetone
- propane

Q11. Which is the most suitable reagent used for oxidation of ethyl alcohol to acetaldehyde as a final product?

- A. KMnO_4 , H_2SO_4
- B. Chromic acid
- C. Pyridinium chlorochromate
- D. All the above

Q12. Identify the mechanism involved in the conversion of 2-chloropropane to 2-methoxy propane?

- A. E_1
- B. E_2
- C. $\text{S}_{\text{N}}2$
- D. $\text{S}_{\text{N}}1$

Q13. Which of the following is the least reactive substrate in $\text{S}_{\text{N}}2$ reaction?

- A. 1-bromo-4-methyl hexane
- B. 1-bromo-2-ethyl hexane
- C. 1-bromoheptane
- D. 1-bromo-3-ethyl pentane

Q14. Which of the following reagents effectively convert acetaldehyde to 2-propanol?

- A. KMnO_4
- B. CH_3MgBr , HCl , H_2O
- C. NaBH_4
- D. HCN

Q15. Which of the following compounds does not undergo a Cannizzaro reaction?

- A. 2-phenylacetaldehyde
- B. 2,2-dimethyl butanal
- C. Benzaldehyde
- D. 2-chloro-2-methyl propanal

Q16. Select a false statement related to the Haloform test.

- A. Test reagents consist of halogen and alkali
- B. 2-pentanone will give positive haloform test
- C. 3-pentanone will give positive haloform test
- D. This test is used to distinguish methyl ketones from other ketones.

Q17. Arrange Ammonia, Dimethylamine, Ethylamine and Benzamide in decreasing order of basicity.

- A. Ammonia > Ethylamine > benzamide > Dimethylamine
- B. Ethylamine > Ammonia > Benzamide > Dimethylamine
- C. Dimethylamine > Ethylamine > Ammonia > Benzamide
- D. Dimethylamine > Ammonia > Benzamide > Ethylamine

Q18. Which reagent is used to convert propionamide to ethylamine?

- A. Excess of ammonia
- B. LiAlH_4
- C. NaNO_2 and HCl
- D. Bromine and aqueous NaOH

Q19. Which of the following acid is synthesized by the Kolbe reaction?

- A. Benzoic acid
- B. Salicylic acid
- C. Butanedioic acid
- D. 2-hydroxy propane-1,2,3-tricarboxylic acid

Q20. Which of the following compounds, reacting with nitrous acid form a soluble nitrite salt?

- A. Diethylamine
- B. Methyl propyl amine
- C. Isopropylamine
- D. Triethylamine

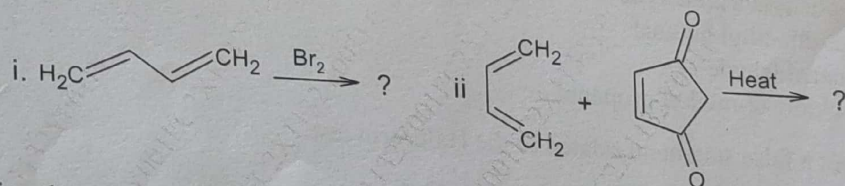
QII. Attempt any TWO questions from the following.

(20)

Q1. A. Predict the major product formed on heating 2-bromo-3,3-dimethylpentane with methanol, for E1 reaction and justify the answer by considering the Saytzeff rule.

B. Discuss the stereo-chemical implication of an $\text{S}_{\text{N}}2$ reaction with a suitable example and explain why inversion of configuration occurs.

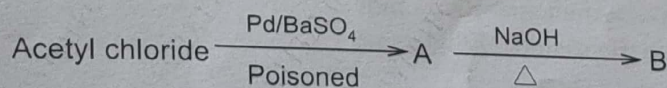
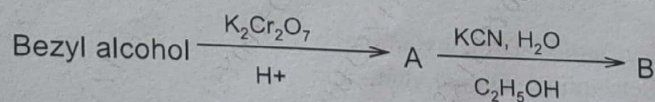
Q2. A. Complete the given reaction. Give all the possible products. Comment on the type of reaction involved.



B. Give the mechanism for any TWO reactions:

- i) Aldol condensation
- ii) Crossed Cannizzaro reaction
- iii) Perkin condensation

Q3. A. Complete the following reaction and give the name of the reaction involved.

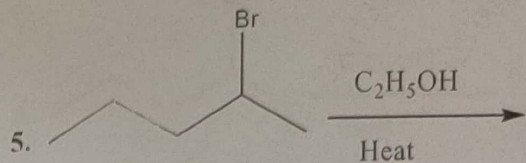
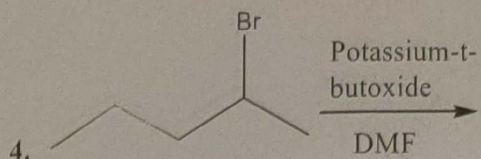
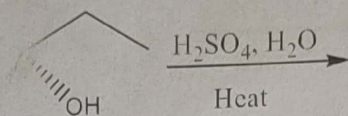
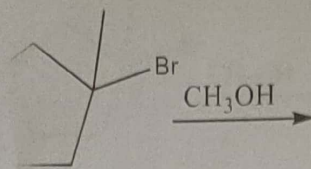
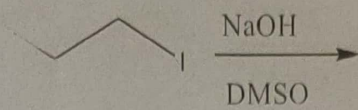


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Page 4 of 6

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major product for the following reaction and predict a dominant mechanism as per I2.



(35)

any SEVEN questions: -

the following acids in increasing order of acidity and justify the order.
H2(F)COOH, CH3CH2CH2CH2(Cl)COOH, CH3CH2CH2(F)CH2COOH.
 therapeutic use of methyl salicylate and mention the functional group detection test for salicylate.

the structures for the following compounds (Any 3).

- ethyl-3-oxo hexane nitrile
- ethyl butanoate
- ethyl-N,N-dimethyl butane-1-amine
- nitro-heptan-4-ol
- structures of the tautomer for

1,2-ol

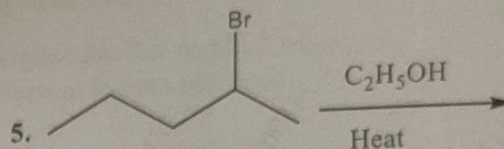
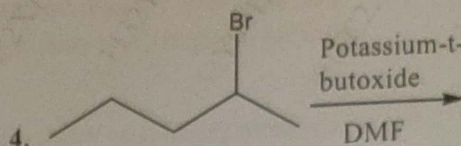
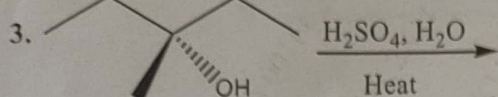
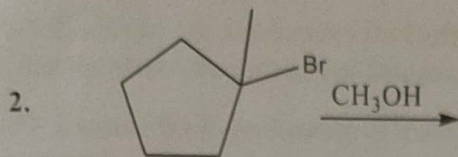
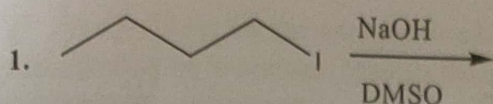
name of the reagents to carry out the following conversions

- ethane to 2-bromobutane
- ethylene to acetic acid
- pentene to 1-pentanol
- ethanol to 2-Butene
- methane to Propane

the mechanism of halogenation of alkane. Compare the reactivity of chlorine and bromine in the halogenation of alkane. Mention the therapeutic use of paraffin.

the method of alcohol preparation from the Grignard reagent and discuss a test for alcohol.

B. Give the major product for the following reaction and predict a dominant mechanism as $S_N1/S_N2/E1/E2$.



QIII. Answer any SEVEN questions: -

(35)

Q1 Arrange the following acids in increasing order of acidity and justify the order. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2(\text{F})\text{COOH}$, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2(\text{Cl})\text{COOH}$, $\text{CH}_3\text{CH}_2\text{CH}_2(\text{F})\text{CH}_2\text{COOH}$.
Give the therapeutic use of methyl salicylate and mention the functional group detection test for the methyl salicylate.

Q2. A. Draw the structures for the following compounds (Any 3).

- 2-methyl-3-oxo hexane nitrile
- Methyl butanoate
- 2-ethyl-*N,N*-dimethyl butane-1-amine
- 2-nitro-heptan-4-ol

B. Draw the structures of the tautomer for

- aniline
- Pent-2-en-2-ol

Q3. Give the name of the reagents to carry out the following conversions

- Butene to 2-bromobutane
- Propylene to acetic acid
- 1-Pentene to 1-pentanol
- 2-Butanol to 2-Butene
- Bromoethane to Propane

Q4. Discuss the mechanism of halogenation of alkane. Compare the reactivity of chlorine and bromine in the halogenation of alkane. Mention the therapeutic use of paraffin.

Q5. Give the method of alcohol preparation from the Grignard reagent and discuss a qualitative test for alcohol.

Q6. Discuss the two synthetic methods for the preparation of aromatic aldehyde. Give the structure and therapeutic use of Paraldehyde.

Q7. Give products for the nucleophile addition of Grignard reagent, ammonia and phenylhydrazine to acetone. Discuss the qualitative test used to distinguish between acetaldehyde and acetone.

Q8. Elaborate the mechanism for Hoffmann elimination from quaternary ammonium salts. Give the structure and uses of Dimethyl phthalate and hexamine.

Q9. Explain the hybridization of methyl bromide. Compare the S_N1 and S_N2 reactions concerning the solvent used and justify the solvent selection in both reactions.
