

Alcohols, Phenols and Ethers

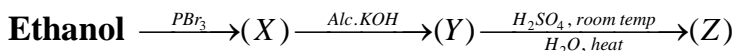
Preparation and Properties of Alcohols

- Number of isomers represented by molecular formula $C_4H_{10}O$ is**
1) 3 2) 4 3) 7 4) 10
- Lucas reagent is**
1) Anhydrous $ZnCl_2$ and conc. HCl 2) anhydrous $ZnCl_2$ and conc. HNO_3
3) Hydrus $ZnCl_2$ and conc. HNO_3 4) hydrous $ZnCl_2$ and conc. KCl
- $CO + H_2 \xrightarrow[300^\circ C / 300 atm]{X (Catalyst)} CH_3OH$, the catalyst X is**
1) Fe 2) Cr_2O_3 / ZnO 3) V_2O_5 4) Al_2O_3
- An industrial method for the preparation of methanol is**
1) By reaction CH_4 with steam at $900^\circ C$ with a nickel catalyst
2) By reduction of HCHO with $LiAlH_4$
3) By catalytic reduction of CO in presence of $ZnO - Cr_2O_3$
4) By reaction of HCHO with NaOH (aq)
- Rectified spirit contains**
1) 75% alcohol 2) 95.5% alcohol 3) 56% alcohol 4) 100% alcohol
- What are the products of the following reactions?**
 $C_6H_5OCH_2CH_2OH \xrightarrow[Heat]{Excess HBr} ?$
1) $C_6H_5OH + BrCH_2CH_2OH$ 2) $C_6H_5OH + HOCH_2CH_2OH$
3) $C_6H_5OH + BrCH_2CH_2Br$ 4) $C_6H_5Br + HOCH_2CH_2OH$
- Absolute alcohol cannot be obtained by simple fractional distillation because**
1) Pure C_2H_5OH is unstable.
2) C_2H_5OH forms hydrogen bonding with water.
3) Boiling point of C_2H_5OH is very close to that of water.
4) Constant boiling point azeotropic mixture is formed with water.

8. A compound (X) of the formula C_3H_8O yields a compound C_3H_6O on oxidation. To which of the following class of compounds could (X) belong?

- 1) Aldehyde 2) Secondary alcohol 3) Alkene 4) Tertiary alcohol

9. Identify (Z) in the following reaction series



- 1) $H_2C = CH_2$ 2) CH_3CH_2OH
3) $CH_3CH_2OSO_3H$ 4) $C_2H_5OC_2H_5$

10. Sodium ethoxide has reacted with ethanoyl chloride. The compound that is produced in this reaction is

- 1) Ethyl Ethanoate 2) Ethyl Chloride 3) Diethyl Ether 4) 2-Butanone

11. For a given alcohol, the order of reactivity with halogen acids is

- 1) $HI > HBr > HCl$ 2) $HI > HCl > HBr$ 3) $HCl > HBr > HI$ 4) $HBr > HI > HCl$

12. Which of the following alcohols gives the best yield of dialkyl ether on being heated with a trace of sulphuric acid?

- 1) 1-Pentanol 2) 2-Pentanol 3) Cyclopentanol 4) 2-Propanol

13. $X \xrightarrow{PCl_5} C_2H_5Cl$, $Y \xrightarrow{PCl_5} CH_3COCl$, X and Y are

- 1) $(C_2H_5)_2O$ and CH_3CO_2H 2) C_2H_5I and C_2H_5CHO
3) C_2H_5OH and C_2H_5CHO 4) C_2H_5OH and CH_3CO_2H

14. Reaction of butanone with methyl magnesium bromide followed by hydrolysis gives

- 1) 2-methyl-2-butanol 2) 2-butanol
3) 3-methyl-2-butanol 4) 2-pentanol

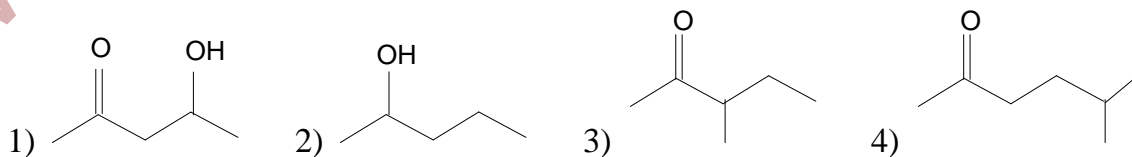
15. Following compounds are given

- i) CH_3CH_2OH ii) CH_3COCH_3 iii) $(CH_3)_2CHOH$ iv) CH_3OH

Which of the above compound(s), on being warmed with iodine solution and NaOH, will give iodoform?

- 1) (i) and (ii) 2) (i), (iii) & (iv) 3) only (ii) 4) (i), (ii) and (iii)

16. Which of the following is a tertiary alcohol?
- 1) 2-methylpropan-1-ol 2) 2-methyl propan-2-ol
3) 3-methylbutan-1-ol 4) 3-methylbutan-2-ol
17. When 3, 3-dimethylbutan-2-ol is heated with conc. H_2SO_4 the major product obtained is
- 1) 2, 3-dimethyl but-1-ene
2) 3, 3-dimethyl but-1-ene
3) 2, 3-dimethyl but-2-ene
4) cis and trans isomers of 2, 3-dimethyl but-2-ene
18. Methylated spirit is
- 1) 100% alcohol 2) 95.6% alcohol + 4.4% water
3) 90% alcohol + 9% methanol + pyridine etc. 4) Power alcohol
19. Which of the following represents neo-pentyl alcohol?
- 1) $CH_3CH(CH_3)CH_2CH_2OH$ 2) $CH_3(CH_2)_3OH$
3) $(CH_3)_3C-CH_2OH$ 4) $CH_3CH_2CH(OH)C_2H_5$
20. Propan-1-ol and propane -2-ol can be distinguished by
- 1) Oxidation with alkaline $KMnO_4$ followed by reaction with Fehling solution
2) Oxidation with acidic dichromate followed by reaction with Fehling solution
3) Oxidation by heating with copper followed by reaction with Fehling solution
4) Oxidation with conc. H_2SO_4 followed by reaction with Fehling solution
21. How many optically active stereo isomers are possible for butan-2, 3-diol?
- 1) 1 2) 2 3) 3 4) 4
22. Which one of the following will most readily be dehydrated in acidic condition?



30. Among the following the most stable compound is
- 1) cis-1, 2-cyclohexanediol
 - 2) trans-1, 2-cyclohexanediol
 - 3) cis-1, 3-cyclohexanediol
 - 4) trans-1, 3-cyclohexanediol
31. A compound 'X' undergoes reduction with LiAlH_4 to yield 'Y'. When vapours of 'Y' are passed over freshly reduced copper at 300°C , 'X' is formed. What is 'Y'?
- 1) CH_3COCH_3
 - 2) CH_3CHO
 - 3) $\text{CH}_3\text{CH}_2\text{OH}$
 - 4) $\text{CH}_3-\text{O}-\text{CH}_3$
32. When phenyl magnesium bromide reacts with tertiary butanol, the product formed will be
- 1) Phenol
 - 2) Benzene
 - 3) Tertiary butyl phenyl ether
 - 4) Tertiary butyl benzene
33. Match the List I with List II and pick the correct matching from the codes as given below
- | List I | List II |
|----------------------------|------------------------------|
| A) Propane – 1, 2, 3-triol | 1) Cyclic ether |
| B) Ethane-1, 2-diol | 2) Absolute ethanol + Petrol |
| C) Tetra hydrofuran | 3) Dynamite |
| D) Power alcohol | 4) Denatured alcohol |
| E) Methylated spirit | 5) Terylene |
- Codes
- 1) A-1, B-2, C-3, D-4, E-5
 - 2) A-1, B-3, C-5, D-4, E-2
 - 3) A-3, B-2, C-4, D-5, E-1
 - 4) A-3, B-5, C-1, D-2, E-4
34. In the Victor Meyer's test the colours given by 1° , 2° and 3° alcohols are respectively
- 1) Red, Colorless, Blue
 - 2) Red, Blue, Colorless
 - 3) Colorless, Red, Blue
 - 4) Red, Blue, Violet
35. Phenol can be distinguished from ethanol by the following reagents except
- 1) Sodium
 - 2) NaOH / I_2
 - 3) Neutral FeCl_3
 - 4) $\text{Br}_2 / \text{H}_2\text{O}$

36. Phenyl magnesium bromide reacts with methanol to give
- 1) A mixture of anisole and Mg (OH) Br
 - 2) A mixture of benzene and Mg (OMe) Br
 - 3) A mixture of toluene and Mg (OH) Br
 - 4) A mixture of phenol and Mg (Mg) Br
37. Starch is converted to ethanol by fermentation, the sequence of enzymes used is
- 1) Amylase, Maltase, Zymase
 - 2) Diastase, Maltase, Zymase
 - 3) Amylase, Invertase, Zymase
 - 4) Amylase, Zymase, Maltase
38. An organic compound 'A' containing C, H and O has a pleasant odour with b.p 78°C. On boiling 'A' with conc. H₂SO₄, a colorless gas is produced which decolorizes bromine water and alkaline KMnO₄. The organic liquid 'A' is
- 1) C₂H₅Cl
 - 2) C₂H₅COOCH₃
 - 3) C₂H₅OH
 - 4) C₂H₆
39. In the following sequence of reactions,
- $$CH_3CH_2OH \xrightarrow{P+I_2} (A) \xrightarrow[\text{ether}]{Mg} (B) \xrightarrow{HCHO} (C) \xrightarrow{H_2O} (D)$$
- The compound D is
- 1) Propanol
 - 2) Butanol
 - 3) n-butyl alcohol
 - 4) n-propyl alcohol
40. A fruity smell is obtained by the reaction of ethanol with
- 1) CH₃COCH₃
 - 2) PCl₅
 - 3) CH₃COOH
 - 4) CH₃CHO
41. Methyl alcohol when reacted with carbon monoxide using cobalt or rhodium as catalyst, compound 'A' is formed. 'A' on heating with HI in the presence of red phosphorous as catalyst 'B' is formed. Identify 'B'
- 1) CH₃COOH
 - 2) CH₃CHO
 - 3) CH₃CH₂I
 - 4) CH₃CH₃
42. RCH₂CH₂OH can be converted to RCH₂CH₂COOH by the following sequence of steps
- 1) PBr₃, KCN, H₃O⁺
 - 2) PBr₃, KCN, H₂/p⁺
 - 3) KCN, H₃O⁺
 - 4) HCN, PBr₃, H₃O⁺
43. Which of the following will produce only one product on reduction with LiAlH₄?
- 1) CH₃COOCH₂CH₃
 - 2) CH₃CH₂OCOCH₂CH₃
 - 3) CH₃CH₂OCOCH₃
 - 4) CH₃CH₂OCOCH₂CH₂CH₃

49. Ethyl alcohol can be manufactured from starch by the process of fermentation. Which enzymes stepwise complete the fermentation reaction?

- 1) Diastase, Invertase, Zymase 2) Maltase, Zymase, Invertase
3) Maltase, Maltase, Zymase 4) Diastase, Zymase and Lactase

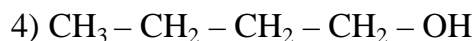
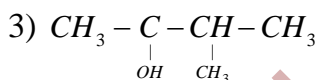
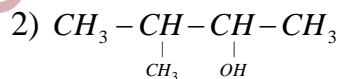
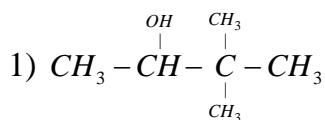
50. If ethanol dissolves in water, then which of the following would be happened?

- 1) Absorption of heat and decrease in volume
2) Emission of heat and decrease in volume
3) Absorption of heat and increase in volume
4) Emission of heat and increase in volume

51. Aliphatic primary amines on reaction with NaNO_2/HCl give

- 1) Only Primary alcohol 2) Only Secondary alcohol
3) Only Tertiary alcohol 4) Primary, Secondary and Tertiary alcohol

52. Which of the following alcohols will dehydrate most rapidly when treated with conc. H_2SO_4 ?



Key

1) 3 2) 1 3) 2 4) 3 5) 2 6) 3 7) 4 8) 2 9) 2 10) 1

11) 1 12) 1 13) 4 14) 1 15) 4 16) 2 17) 3 18) 3 19) 3 20) 3

21) 2 22) 1 23) 1 24) 4 25) 1 26) 3 27) 3 28) 4 29) 2 30) 4

31) 3 32) 2 33) 4 34) 2 35) 1 36) 2 37) 2 38) 3 39) 4 40) 3

41) 4 42) 1 43) 1 44) 4 45) 1 46) 4 47) 2 48) 1 49) 3 50) 3

51) 4 52) 3

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3. Perkin's reaction
4. Reimer-Tiemann reaction
- 8. Picric acid is a yellow coloured compound. Its chemical name is**
1. m-nitrobenzoic acid
2. 2, 4, 6-trinitrophenol
3. Trinitrotoluene
4. Trinitroaniline
- 9. Phenol reacts with bromine in carbon disulphide at low temperature to give**
1. m-bromophenol
2. o- and p-bromophenol
3. p-bromophenol
4. 2, 4, 6-tribromophenol
- 10. The bromination of phenol in aqueous medium produces**
- 1) 2 – bromophenol
- 2) 4 – bromophenol
- 3) 2, 4, 6 – tribromophenol
- 4) a mixture of 2 – and 4 – bromophenols
- 11. Phenol on treating with concentrated H_2SO_4 at $15-20^\circ C$ mainly produces**
- 1) Phenol -2 – sulfonic acid
- 2) Phenol -4 – sulfonic acid
- 3) A 50% mixture of ortho and para phenol sulfonic acid
- 4) Phenol – 2, 4, 6 – trisulfonic acid
- 12. Phenol on treating with concentrated H_2SO_4 at $100^\circ C$ mainly produces**
- 1) Ortho – phenolsulfonic acid
- 2) Para – phenolsulfonic acid
- 3) A 50% mixture of ortho – and para – phenolsulfonic acid
- 4) Phenol – 2, 4, 6 – trisulfonic acid
- 13. Which one of the following compounds would undergo nitration with greatest ease?**
1. Benzene
2. Phenol
3. Nitrobenzene
4. Benzoic acid
- 14. In the reaction $\xrightarrow{NaNO_2+HCl, 0^\circ C} X \xrightarrow{H_2O, warm} Y$; Y is**
1. C_6H_5Cl
2. C_6H_6
3. C_6H_5OH
4. C_6H_5CHO

15. On distilling 2 – hydroxy benzoic acid with Zn dust, it gives

- 1) Phenol 2) Benzoic acid 3) Benzaldehyde 4) A polymeric compound

16. Phenol is

1. A base weaker than ammonia 2. An acid stronger than carbonic acid
3. An acid weaker than carbonic acid 4. A neutral compound

17. Phenols is less acidic than

1. p-nitrophenol 2. Ethanol 3. Cresol 4. Benzyl alcohol

18. The most acidic compound among the following is

- 1 Phenol 2. Ethanol 3. 3,5-dinitrophenol 4. 4-methoxy phenol

19. Which of the following is most volatile?

1. p-nitrophenol 2. m-nitrophenol 3. O-nitro phenol 4. All of these

20. $C_6H_5OH + CHCl_3 + NaOH \rightarrow$ **Salicylaldehyde**

The electrophile involved in the above reaction is

1. Dichloromethyl cation ($\overset{\oplus}{C}HCl_2$) 2. Dichlorocarbene ($:CCl_2$)
3. Trichloromethyl anion ($\overset{\ominus}{C}Cl_3$) 4. Formyl cation ($\overset{\oplus}{C}HO$)

21. The lowest pK_a is that of

- 1) Ethanol 2) Propanol 3) Propane 4) Phenol

22. Assertion (A): Phenols are more acidic than aliphatic alcohols.

Reason (R): Phenoxides are stabilized by resonance.

- 1) Both A & R are correct, R is the correct explanation of A.
2) Both A & R are correct, R is not the correct explanation of A.
3) A is correct but R is incorrect.
4) A is incorrect but R is correct.

23. Which of the following order is true regarding the acidic nature of phenol?

- 1) Phenol > o – Cresol > o – Nitro phenol

2) Phenol > o – Cresol < o – Nitro phenol

3) Phenol < o – Cresol < o – Nitro phenol

4) Phenol < o – Cresol > o – Nitro phenol

24. In the following compounds

I. Phenol

II. 4-methyl phenol

III. 3-nitrophenol

IV. 4-nitrophenol

The order of acidity is

1. III > IV > I > II 2. I > IV > III > II 3. II > I > III > IV 4. IV > III > I > II

25. Assertion (A): p-Nitro phenol is stronger acid than o-nitro phenol.

Reason (R): Intermolecular hydrogen bonding makes ortho-isomer weaker acid than Para-isomer.

1) Both A & R are correct, R is the correct explanation of A.

2) Both A & R are correct, R is not the correct explanation of A.

3) A is correct but R is incorrect.

4) A is incorrect but R is correct.

26. In the Liebermann's nitroso reaction, sequential changes in the colour of phenol occurs as

1) Deep Blue → Red → Deep Blue

2) Red → Deep Blue → Green

3) Red → Green → White

4) White → Red → Green

27. Which of the following is most acidic?

1) Phenol

2) Benzyl alcohol

3) m – Chlorophenol

4) Cyclohexanol

Key

1) 3 2) 1 3) 3 4) 3 5) 2 6) 4 7) 4 8) 2 9) 2 10) 3

11) 2 12) 2 13) 2 14) 2 15) 2 16) 3 17) 1 18) 3 19) 3 20) 2

21) 4 22) 1 23) 2 24) 4 25) 1 26) 1 27) 3

Ethers

1. The following represents ether

1) $(\text{RCO})_2\text{O}$ 2) RCOOR 3) RCOR 4) ROR

2. Which of the following is simple ether?

1) CH_3OCH_3 2) $\text{CH}_3\text{OC}_2\text{H}_5$
3) $\text{CH}_3\text{CH}_2\text{OCH}(\text{CH}_3)_2$ 4) $\text{C}_2\text{H}_5\text{OC}_3\text{H}_7$

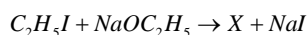
3. The number of metameric ethers possible with the formula $\text{C}_4\text{H}_{10}\text{O}$ is

1) 4 2) 3 3) 2 4) 5

4. Excess of $\text{C}_2\text{H}_5\text{OH}$ at 140°C reacts with conc. H_2SO_4 , and then compound formed is

1) Diethyl Ether 2) Diethyl Sulphate
3) Ethylene 4) Ethylene Hydrogen Sulphate

5. What is Y in the following reactions?



Functional isomer of 'X' is

1) $\text{C}_2\text{H}_5\text{I}$ 2) $\text{C}_2\text{H}_5\text{OH}$ 3) C_2H_4 4) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$

6. Phenol on heating with NaOH followed by reaction with alkyl halide gives
- 1) Acetone 2) Ether 3) Ethanol 4) Acetic acid
7. Ethers are obtained by
- 1) Reaction of alkyl halide with dry ZnO
2) Reaction of alkyl halide with moist ZnO
3) Reaction of alkyl halide with dry Ag₂O
4) Reaction of alkyl halide with moist Ag₂O
8. Sodium phenoxide reacts with methyl iodide and gives anisole. The reaction is known as
- 1) Kolbe's reaction 2) Williamson's reaction
3) Friedel Crafts reaction 4) Riemer - Tiemann reaction
9. Anisole by reacting with methyl chloride and anhydrous AlCl₃ will produce
- 1) P- methyl anisole 2) O- methyl anisole
3) Both 1 and 2 4) m- methyl anisole
10. With boiling water or steam diethyl ether gives
- 1) (C₂H₅)₂ SO₄ 2) C₂H₅OH 3) CH₂ = CH₂ 4) C₂H₅OH + C₂H₅HSO₄
11. The correct statement regarding oxygen atom of ether is
- 1) Chemically less reactive 2) Acts as a Lewis base
3) Undergoes sp³ hybridisation 4) All the above
12. Heating of methyl phenyl ether with HI gives
1. Methanol + iodobenzene 2. Methyl iodide + iodobenzene
3. Methyl alcohol + benzyl alcohol 4. Methyl iodide + phenol
13. C₂H₅ - O - C₂H₅ + CO $\xrightarrow[100\text{atm}]{BF_3/500^\circ C}$ X, here "X" is
- 1) CH₃COOH 2) CH₃COOC₂H₅ 3) CH₃CH₂COOC₂H₅ 4) C₃H₇COOC₂H₅

14. What is X in the following reaction $(C_2H_5)_2O + (CH_3CO)_2O \xrightarrow[\text{anhydrous}]{ZnCl_2} X$

- 1) $CH_3COC_2H_5$ 2) Ethyl Ethanoate
3) Methyl Propanoate 4) Diethyl Ketone

15. In which one of the following reactions, primary alkyl halide is not formed as one of the product

- 1) $(CH_3)_2O + HI \rightarrow$ 2) $CH_3OCH(CH_3)_2 + HI \rightarrow$
3) $CH_3OCH_2CH_3 + HI \rightarrow$ 4) $CH_3OC(CH_3)_3 + HI \rightarrow$

16. When diethyl ether is treated with Cl_2 in sunlight, the product is

- 1) $CH_3CHClOCH_2CH_3$ 2) $CH_3CHClOCHClCH_3$
3) $CCl_3CCl_2OCCl_2CCl_3$ 4) $CH_3CHClOCCl_2CH_3$

17. Natalite is

- 1) Ether + petrol 2) Alcohol + petrol 3) Alcohol + ether 4) Alcohol + KI + I_2

18. Which of the following is used as freezing mixture?

- 1) Mixture of ether and liquid CO_2
2) Mixture of ether and ethyl alcohol
3) Mixture of ether and dry ice
4) Mixture of ethyl alcohol and dry ice

19. The IUPAC name of $CH_3OCH(CH_3)_2$ is

- 1) 1 – Methoxy 1 – methyl ethane 2) 3 – Methoxy Propane
3) Methyl Isopropyl Ether 4) 2 – Methoxy Propane

20. Match the following.

List - I

List - II

- A) $C_2H_5OC_2H_5$ 1) Anisole
B) $C_2H_5OCH_3$ 2) Simple ether
C) $C_2H_5OC_2H_5 + \text{dry ice}$ 3) Natalie

D) $C_2H_5OC_2H_5 + C_2H_5OH$ 4) Mixed ether

5) Refrigerant

The correct match is

A	B	C	D
1. 2	1	5	3
2. 2	4	5	3
3. 2	4	5	1
4. 1	2	3	4

21. Match the following.

List - I

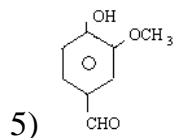
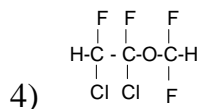
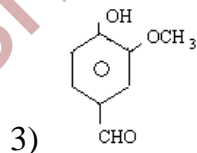
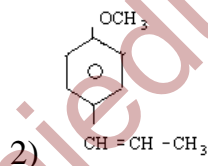
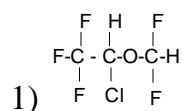
A) Enthronone

B) Vanillin

C) Isoflurane

D) Anethole

List - II



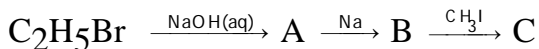
The correct match is

A	B	C	D
1. 2	3	1	5
2. 4	5	3	2

3. 4 5 1 2

4. 1 4 5 3

22. The product C in the following sequence of reaction is



1) Butane 2) Ethane 3) Methyl ethyl ether 4) Propane

23. Assertion (A): Ethyl alcohol reacts with alumina at and gives diethyl ether.

Reason (R): Ethyl alcohol undergoes dehydration.

- 1) Both A and R are true and R is the correct explanation to A.
- 2) Both A and R are true and R is not the correct explanation to A.
- 3) A is true but R is false.
- 4) A is false but R is true.

24. Ethylene reacts with HBr forming 'X' which on reaction with moist Ag₂O gives 'Y'. When 'Y' is heated with alumina at 350⁰C compound Z is formed. Then X and Z are

- 1) Bromo Ethane, Ethanol 2) Ethanol, Ethoxy, Ethane
- 3) Ethyl Bromide, Diethyl Ether 4) Bromo Ethane, Ethene

25. $\text{C}_2\text{H}_5 - \text{O} - \text{C}_2\text{H}_5 + \text{CO} \xrightarrow[100\text{atm}]{\text{BF}_3/500^\circ\text{C}} \text{X}$, The functional isomer of 'X' is

- 1) CH_3COOH 2) $\text{CH}_3\text{CH}_2\text{COOC}_2\text{H}_5$ 3) $\text{C}_4\text{H}_9\text{COOH}$ 4) $\text{C}_3\text{H}_7\text{COOC}_2\text{H}_5$

26. $2\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[\text{H}_2\text{SO}_4]{140^\circ\text{C}} \text{B}$



The functional groups present in B and C are respectively

- 1) Ester, Ether 2) Ether, Ester 3) Alcohol, Ester 4) Ester, Alcohol

27. Which one of the following is the best method for making isopropyl methyl ether?

- 1) $\text{CH}_3\text{I} + (\text{CH}_3)_2\text{CHOH} \rightarrow$ 2) $\text{CH}_3\text{I} + (\text{CH}_3)_2\text{CHO}^- \rightarrow$



Key

1) 2 2) 1 3) 2 4) 1 5) 2 6) 2 7) 3 8) 2 9) 3 10) 2

11) 4 12) 4 13) 3 14) 2 15) 4 16) 3 17) 3 18) 3 19) 4 20) 2

21) 3 22) 3 23) 1 24) 4 25) 3 26) 2 27) 4

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