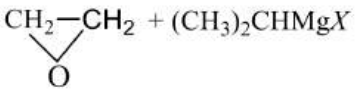
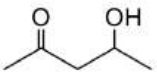
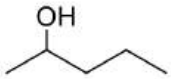
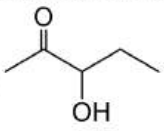
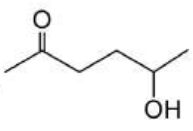
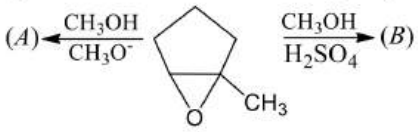
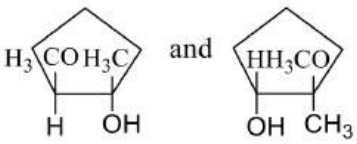
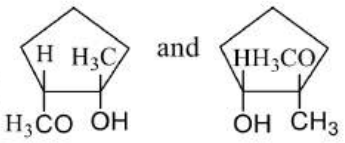
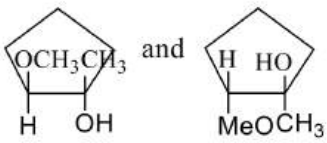
ALCOHOLS, PHENOLS AND ETHERS

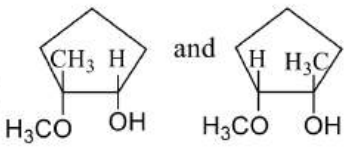
1. An organic compound 'X' on treatment with pyridinium chloro chromate in dichloromethane gives compound 'Y'. Compound 'Y',reacts with I_2 and alkali to form triiodomethane. The compound 'X' is
   a) C_2H_5OH b) CH_3CHO c) CH_3COCH_3 d) CH_3COOH
2. Ethyl alcohol is industrially prepared from the ethylene by:
   a) Permanganate oxidation
   b) Catalytic reduction
   c) Absorbing in sulphuric acid followed by hydrolysis
   d) Fermentation
3. CH_2ClCH_2OH is stronger acid than CH_3CH_2OH because:
   a) $+IE$ of Cl disperses – ve chare on O –atom to produce more stable anion
   b) $-IE$ of Cl disperses – ve charge on O –atom to produce more stable anion
   c) $+IE$ of Cl increases – ve charge on O –atom to alcohol
   d) None of the above
4. Alcohol $(CH_3)_2CHCH_2OH$ cannot be obtained by
   a) $HCHO + (CH_3)_2CHCH_2MgX$ b) 
   c) $(CH_3)_2CHCH_2CH_2MgX + O_2$ air d) $(CH_3)_2CHCHO + CH_3MgX$
5. Lucas reagent is used to distinguish among primary, secondary and tertiary:
   a) Alkyl halides b) Alcohols c) Aliphatic amines d) Aromatic amines
6. Ketone upon treatment with Grignard reagent gives
   a) Primary alcohol b) Secondary alcohol c) Tertiary alcohol d) Aldehyde
7. The starting material for the preparation of CH_3I in one step reaction is:
   a) CH_3OH b) C_2H_5OH c) CH_3CHO d) CH_3COCH_3
8. From methyl alcohol we get:
   a) Neoprene rubber
   b) Perspex rubber
   c) Bakelite a hard plastic
   d) Sponge rubber
9. Which one of the following will most readily be dehydrated in acidic condition?
   a)  b)  c)  d) 
10. *Tert*-butyl methyl ether on heating with anhydrous HI in ether gives
    a) $CH_3OH + (CH_3)_3Cl$ b) $CH_3I + (CH_3)_3COH$ c) $CH_3I + (CH_3)_3Cl$ d) None of the above
11. Diethyl ether is decomposed on heating with:
    a) NaOH b) Water c) $KMnO_4$ d) HI
12. Ether fire can be extinguished by:
    a) Sand b) Pyrene c) CO_2 d) All of these
13. Diethyl ether on reaction with CO in specific conditions forms:
    a) Acetic acid b) Carbon dioxide c) Ethyl propanoate d) Acetyl chloride

14. Most viscous among the following is:
    a) Propan-1-ol b) Propan-2-ol c) Propane-1, 2-diol d) Propane-1,2,3-triol
15. In the fermentation of sugar molasses, the percentage of ethanol formed is:
    a) 10 % b) 40 % c) 95 % d) 70 %
16. A liquid was mixed with ethanol and a drop of concentrated H_2SO_4 was added. A compound with a fruity smell was formed. The liquid was:
    a) HCHO b) CH_3COCH_3 c) CH_3COOH d) CH_3OH
17. Ethyl alcohol reacts with following to form a compound of fruity smell:
    a) PCl_5 b) $K_2Cr_2O_7 + H_2SO_4$ c) CH_3COOH d) CH_3COCH_3
18. Carbolic acid is
    a) HCOOH b) CH_3COOH c) C_6H_5COOH d) C_6H_5OH
19. 

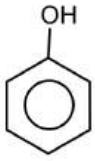
    A and *B* are
    a) 

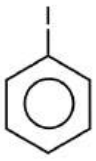
    b) 

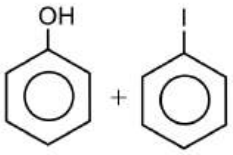
    c) 

    d) 

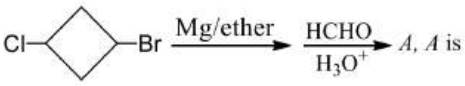
20. 2-methyl-2-butanol on treatment with HCl gives predominantly
    a) 2-chloro-3-methylbutane b) 2,2-dimethylpentane
    c) 2-chloro-2-methylbutane d) 1-chloro-2-methylbutane
21. In Williamson's synthesis ethoxy ethane is prepared by
    a) Passing ethanol over heated alumina
    b) Heating sodium ethoxide with ethyl bromide
    c) Treating ethyl alcohol with excess of H_2SO_4 at 430-440 K
    d) Heating ethanol with dry Ag_2O
22. Which of the following reacts fastest with a mixture of anhydrous $ZnCl_2$ and conc. HCl?
    a) Trimethyl carbinol
    b) Ethanol
    c) Propanol
    d) Methanol
23. Ethers are made free from peroxide linkage on distilling impure sample with:
    a) Conc. HNO_3 b) Conc. H_2SO_4 c) Conc. HCl d) None of these
24. Which of the property given below is not associated with glycerol?
    a) Formation of water and CO_2 on reduction
    b) Formation of tartronic acid on oxidation
    c) Formation of acrolein on dehydration
    d) Formation of allyl iodide with PI_3
25. The products obtained when anisole is heated in a sealed tube with HI are

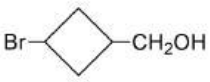
a)  + CH_3I

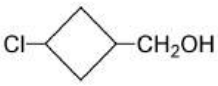
b)  + CH_3OH

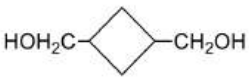
c) 

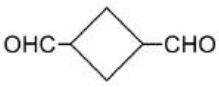
d) $CH_3OH + CH_3I$

26. 

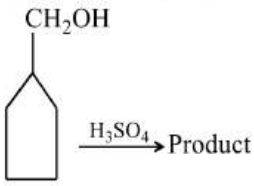
a) 

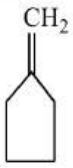
b) 

c) 

d) 

27. The product in the given reaction is:



a) 

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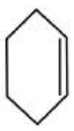
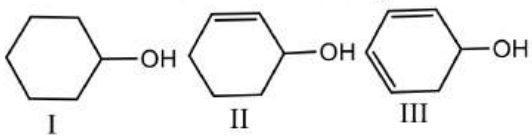
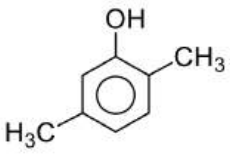
c) 

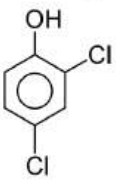
d) 

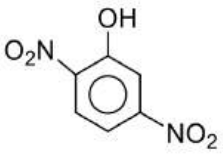
28. When CH_3MgI is made to react with acetone and the addition product formed is hydrolysed, we get:
a) A primary alcohol b) A secondary alcohol c) A tertiary alcohol d) An aldehyde
29. The factor adversely affecting the process of fermentation is:
a) Low concentration of sugar
b) High concentration of sugars
c) Presence of ammonium salts
d) Presence of air
30. The correct order of ease of dehydration of following is

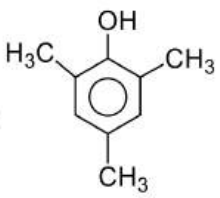


a) I > II > III b) III > II > I c) I > III > II d) III > I > II
31. The correct order of boiling point for primary (1°), secondary (2°) and tertiary (3°)alcohols is
a) 1° > 2° > 3° b) 3° > 2° > 1° c) 2° > 1° > 3° d) 2° > 3° > 1°
32. Which substance will not react with ϕ NNCl (ϕ = Phenyl) to give dye?

a) 

b) 

c) 

d) 

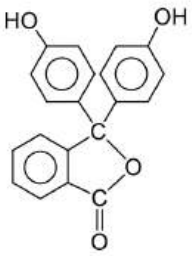
33. Phenol can be distinguished from ethanol by the following reagents except
a) Sodium b) $NaOH/I_2$
c) Neutral $FeCl_3$ d) Br_2/H_2O
34. The compound which does not react with sodium is:

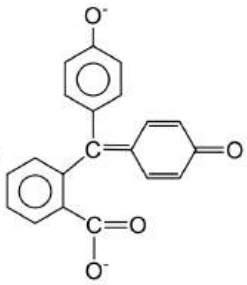
a) $CH_3CHOHCH_3$ b) $CH_3—O—CH_3$ c) CH_3COOH d) C_2H_5OH

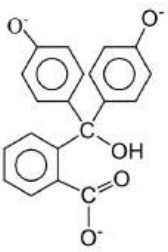
35. Ethylene glycol reacts with excess of PCl_5 to give
a) 1, 1-dichloroethane b) 1, 2-dichloroethane
c) 1, 1, 1-trichloroethane d) 2, 2-dichloroethane

36. Alcohol is sometimes used in:
a) Baking powder b) Paints c) Thermometers d) Weighing

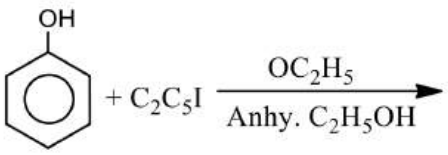
37. Phenolphthalein is formed by condensation of phthalic anhydride and ϕ OH. Which structure shows colour in basic medium?

a) 

b) 

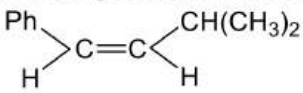
c) 

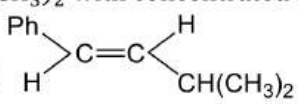
d) All of the above

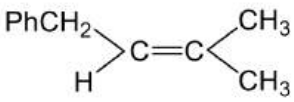
38. 

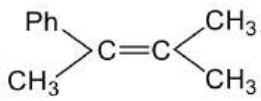
a) $C_6H_5OC_2H_5$ b) $C_2H_5OC_2H_5$ c) $C_6H_5OC_6H_5$ d) C_6H_5I

39. The major product in the reaction of $PhCH_2CH(OH)CH(CH_3)_2$ with concentrated H_2SO_4 is

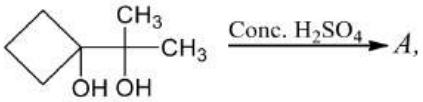
a) 

b) 

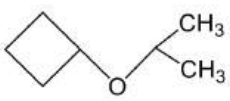
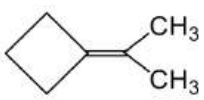
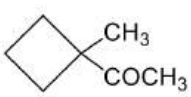
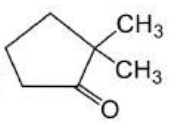
c) 

d) 

40. Which is not an alcohol?
a) $CH_2=CHCH_2OH$ b) CH_2OHCH_2OH c) $C_6H_5CH_2OH$ d) C_6H_5OH

41. 

The product *A* is

a)  b)  c)  d) 

42. Glycerol catches fire on mixing with:
a) $KMnO_4$ b) $K_2Cr_2O_7$ c) HNO_3 d) None of these

43. The end product of the reaction,

$CH_3OH \xrightarrow[300^\circ C]{Cu} A \xrightarrow{NaOH} B$ is :

a) Alkane
b) Carboxylic acid
c) Sodium salt of carboxylic acid
d) Ketone

44. What is the hybridisation of carbon and oxygen in electronic structure of ether?
a) sp^3 and sp^2 b) sp^3 and sp^3 c) sp and sp d) sp^2 and sp^2

45. During dehydration of alcohols to alkenes by heating with concentrated H_2SO_4 the initiation step is
a) Protonation of alcohol molecule
b) Formation of carbocation
c) Elimination of water
d) Formation of an ester

46. Which of the following is tertiary alcohol?
a) $CH_3—CH_2—OH$ b) $CH_3—CH_2—\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}—OH$ c) $CH_3—\underset{\displaystyle CH_2\\ \displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}—CH_2OH$ d) $\underset{\displaystyle CH_2—OH}{\overset{\displaystyle CH—OH}{\overset{|}{\underset{|}{CH_2—OH}}}}$

47. Which of the following reagent will convert glycerol to acrolein?
a) P_2O_5 b) Conc.H_2SO_4 c) $KHSO_4$ d) All of these

48. Among the following, which is least acidic?
a) Phenol b) *o*-cresol c) *p*-nitrophenol d) *p*-chlorophenol

49. Glycerol on heating with oxalic acid at 110°C gives
a) Ethanol b) Methanoic acid c) Ether d) Acetone

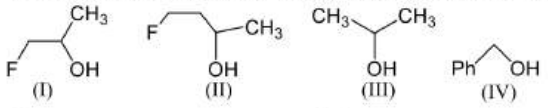
50. The dehydration of neo-pentanol gives mainly:
a) $CH_3—\underset{\displaystyle CH_3}{\overset{|}{CH}}—CH=CH_2$ b) $CH_3—\underset{\displaystyle CH_3}{\overset{|}{C}}—CH_2CH_3$ c) $CH_3—\underset{\displaystyle CH_3}{\overset{|}{C}}=CH—CH_3$ d) None of the above

51. Phenol, when it first reacts with concentrated sulphuric acid and then with concentrated nitric acid, gives
a) 2, 4, 6-trinitrobenzene b) *o*-nitrophenol
c) *p*-nitrophenol d) Nitrobenzene

52. Which of the following is dihydric alcohol?
a) Glycerol b) Ethylene glycol c) Catechol d) Resorcinol

53. Absolute alcohol contains:
a) 40% H_2O b) 10% H_2O c) 5% H_2O d) 100% C_2H_5OH

54. The order of reactivity of the following alcohols

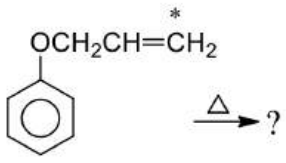


a) I > *II* > *III* > *IV* b) I > *III* > *II* > *IV* c) IV > *III* > *II* > *I* d) IV > *III* > *I* > *II*

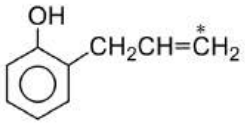
55. The most important ingredient of dynamite is:
a) Nitrobenzene b) Glycerine trinitrate c) Nitroaniline d) Nitrosobenzene

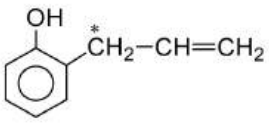
56. 2-methoxy butane is obtained by reacting diazomethane with
a) 2-butanol b) 1-butanol c) 2-butanone d) Butanal

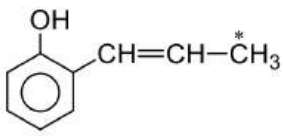
57. How many structural isomers are known for $C_4H_{10}O$?
a) 4 b) 3 c) 6 d) 7

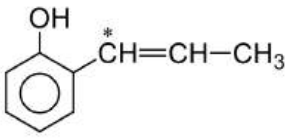
58. 

Product is

a) 

b) 

c) 

d) 

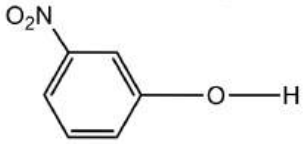
59. Amongst the following, HBr reacts fastest with
    a) Propane-1-ol
    b) Propane-2-ol
    c) 2-methyl propane-1-ol
    d) 2-methyl propane-2-ol
60. Physical properties of:
    a) Alcohols lie between alkanes and H_2O
    b) H_2O lie between alcohols and alkenes
    c) Alkenes lie between alcohols and H_2O
    d) None of the above
61. Which of the following ethers form peroxide readily?
    a) Me—O—Me b) Et—O—Et c) iPr—O— iPr d) Me— O— Et
62. Association of alcohol molecules takes place because of:
    a) Electrovalent bond b) Ionic bond c) Covalent bond d) Hydrogen bond
63. The reaction, $2CH_3CH_2\dot{O}H \xrightarrow[413\ K]{H^+} CH_3CH_2OCH_2CH_3$ is believed to occur through the formation of

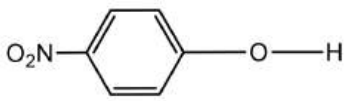
    a) $CH_3CH_2\overset{+}{O}H_2$

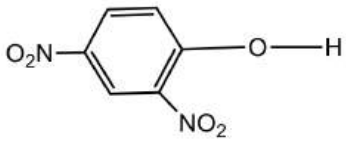
    b) $CH_3\overset{+}{C}H_2$

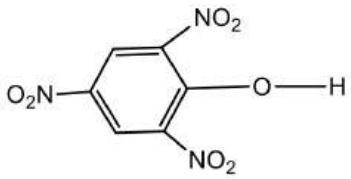
    c) $CH_3CH_2-\overset{+}{\underset{\displaystyle H}{\underset{|}{\ddot{O}}}}-CH_2CH_3$

    d) Both (b) and (c)
64. Ethyl iodide on treatment with dry Ag_2O will yield:
    a) Ethyl alcohol b) Diethyl ether c) Ethyl methyl ether d) Ethylene
65. Which of the following compounds is weakest acid?

    a) 

    b) 

    c) 

    d) 
66. Fusel oil is a mixture of:
    a) Alcohols b) Ethers c) Ethers and alcohols d) Alcohols and acetone
67. When benzene sulphonic acid and *p*-nitrophenol are treated with $NaHCO_3$, the gases released respectively are
    a) SO_2, NO_2 b) SO_2, NO c) SO_2, CO_2 d) CO_2, CO_2
68. Which is correctly matched?

	Alcohol	α -H	β-H	Colour in Victor Meyer test
A.	*X*	3	0	Colourless
B.	*Y*	1	6	Blue
C.	*Z*	0	9	Red

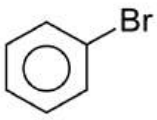
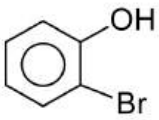
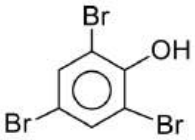
a) *A* and *B*
b) *B* and *C*
c) Only *C*
d) Only *B*

69. Lucas reagent is
a) Conc. HCl and anhydrous $ZnCl_2$
b) Conc. HNO_3 and hydrous $ZnCl_2$
c) Conc. HCl and hydrous $ZnCl_2$
d) Conc. HNO_3 and anhydrous $ZnCl_2$

70. An aldehyde on treatment with Zn/HCl yields:
a) 1° alcohol
b) 2° alcohol
c) 3° alcohol
d) None of these

71. In the reaction,
$A \xrightarrow[H_2SO_4]{K_2Cr_2O_7}$ acetone $\xrightarrow{\text{Oxidation}}$ acetic acid, *A* is
a) 1-propanol
b) 2-butanol
c) 2-propanol
d) Ethanol

72. When glycerol is treated with excess of HI, it produces:
a) 2-iodopropane
b) Allyl iodide
c) Propene
d) Glycerol tri-iodide

73. The product obtained by the reaction of HBr with phenol is
a) 
b) 
c) 
d) There is no reaction

74. An ether is more volatile than an alcohol having the same molecular formula. This is due to
a) Dipolar character of ethers
b) Alcohols having resonance structures
c) Intermolecular hydrogen bonding in ethers
d) Intermolecular hydrogen bonding in alcohols

75. Glycol condenses with ketones to give:
a) Cyclic acetals
b) Cyclic ketals
c) Acetaldehyde
d) Oxalic acid

76. In the following reaction sequence
$R-OH \xrightarrow{P+I_2} R-I \xrightarrow{AgNO_2} RNO_2 \xrightarrow{HNO_2}$ no reaction The alcohol is a
a) Primary alcohol
b) Secondary alcohol
c) Tertiary alcohol
d) Phenol

77. The explosive nitroglycerine is:
a) A soap
b) A salt
c) An ester
d) A complex compound

78. The compound $CH_3CH_2CH_2Br$ is converted into $CH_3CH_2CH_2OH$ by:
a) Dehydration
b) Hydrogenation
c) Elimination
d) Substitution

79. Consider the following reaction,
ethanol $\xrightarrow{PBr_3} X \xrightarrow{\text{alc. KOH}}$

$$Y \xrightarrow[\text{(ii) } H_2O, \text{ heat}]{\text{(i) } H_2SO_4 \text{ at room temperature}} Z;$$

The product *Z* is:
a) CH_3CH_2OH
b) $CH_2{=}CH_2$
c) $CH_3CH_2{-}O{-}CH_2{-}CH_3$

d) $CH_3—CH_2—O—SO_3H$

80. Glycerol reacts with potassium bisulphate to produce
a) Allyl iodide b) Allyl sulphate c) Acryl aldehyde d) Glycerol trisulphate

81. To prepare an ether by Williamson's synthesis, the reactants needed are
a) Ethyl alcohol and tert butyl alcohol
b) Sodium ethoxide and tert butyl bromide
c) Sodium tertiary butoxide and ethyl bromide
d) Sodium ethoxide and sodium tert butoxide

82. Fenton's reagent is:
a) $H_2O + FeSO_4$ b) $H_2O_2 + FeSO_4$ c) $H_2O_2 + ZnSO_4$ d) $NaOH + FeSO_4$

83. Which of the following is simple ether?
a) $C_6H_5OCH_3$ b) $CH_3OC_2H_5$ c) nPrOEt d) MeOMe

84. The number of methoxy groups in a compound can be determined by treating it with:
a) HI and $AgNO_3$ b) Sodium carbonate c) Sodium hydroxide d) Acetic acid

85. When C_2H_5OH is mixed with ammonia and passed over heated alumina, the compound formed is:
a) $C_2H_5NH_2$ b) C_2H_4 c) $C_2H_5OC_2H_5$ d) CH_3OCH_3

86. If there be a compound of the formula $CH_3C(OH)_3$, which one of the following compounds would be obtained form it without treatment with any reagent?
a) Methanol b) Ethanol c) Acetic acid d) Formaldehyde

87. In Lucas test an alcohol reacts immediately and gives insoluble chloride. The alcohol is
a) CH_3OH b) CH_3CH_2OH c) $(CH_3)_2CHOH$ d) $(CH_3)_3COH$

88. $(CH_3)_3CONa$ on reaction with CH_3Br will give:
a) $(CH_3)_3COC(CH_3)_3$ b) CH_3OCH_3 c) $CH_3CH_2OCH_2CH_3$ d) $(CH_3)_3COCH_3$

89. Which one has highest boiling point?
a) Ethane b) Butane c) Butan-1-ol d) Pentane

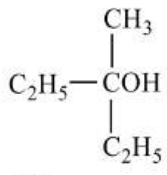
90. Glyoxal is:
a) $CH_2OH—CHO$ b) $CH_2=OH$ c) CHO—CHO d) $CH_2=CHCHO$

91. Methylated spirit is:
a) Methanol containing some pyridine
b) Ethanol containing some methanol
c) Pure methanol
d) 95% methanol

92. Dehydrogenation of 2-butanol gives:
a) 2-butene b) Butanone c) Butyraldehyde d) 1-butene

93. The density of glycerol is higher than propanol due to
a) Van der Waals' attraction b) Hydrogen bonding
c) Ionic bonding d) More number of covalent bonds

94. Ethyl acetate is treated with double the molar quantity of C_2H_5MgBr and the reaction mixture is hydrolysed with water. The product is:

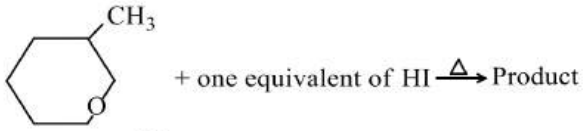
a) C_2H_5OH b) $(C_2H_5)_2CHOH$ c)  d) $CH_3COOC_2H_5$

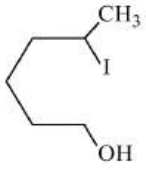
95. The correct order of decreasing acidity of nitrophenols will be
a) *m*-nitrophenol > *p*-nitrophenol > *o*-nitrophenol
b) *o*-nitrophenol > *m*-nitrophenol > *p*-nitrophenol
c) *p*-nitrophenol > *m*-nitrophenol > *o*-nitrophenol
d) *p*-nitrophenol > *o*-nitrophenol > *m*-nitrophenol

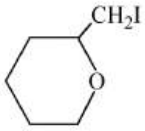
96. The reaction of $CH_3OC_2H_5$ with HI gives:

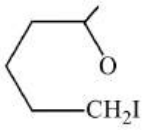
a) CH_3I only b) C_2H_5OH only c) $CH_3I + C_2H_5OH$ d) $C_2H_5I + CH_3OH$

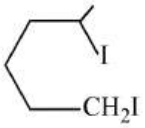
97. Glycerol has:
    a) 3 primary alcoholic groups
    b) 3 secondary alcoholic groups
    c) 1 primary alcoholic group and 2 secondary alcoholic groups
    d) 2 primary alcoholic groups and 1 secondary alcoholic group
98. An ether is more volatile than an alcohol having the same molecule formula. This is due to
    a) Intermolecular hydrogen bonding in alcohols
    b) Dipolar character of ethers
    c) Alcohols having resonance structures
    d) Intermolecular hydrogen bonding in ether
99. When phenol is heated with phthalic anhydride and H_2SO_4, it produces
    a) Phenol red b) Methyl orange c) Salicylic acid d) Phenolphthalein
100. When ethyl alcohol is dissolved in water, it is accompanied with:
    a) Absorption of heat and contraction in volume
    b) Evolution of heat and contraction in volume
    c) Absorption of heat and increase in volume
    d) Evolution of heat and increase in volume
101. The products obtained when benzyl phenyl ether is heated with HI in the mole ratio 1:1 are
    I. Phenol
    II. Benzyl alcohol
    III. Benzyl iodide
    IV. Iodobenzene
    a) 1 and 3 only b) 3 and 4 only c) 1 and 4 only d) 2 and 4 only
102. Which of the following is an example of elimination reaction?
    a) Chlorination of CH_4
    b) Dehydration of C_2H_5OH
    c) Nitration of benzene
    d) Hydroxylation of C_2H_4
103. Glycerol on oxidation with conc. HNO_3 mainly yields:
    a) Glyceric acid b) Tartronic acid c) Mesoxalic acid d) Both (a) and (b)
104. During fermentation little H_2SO_4 is added:
    a) To get acidic medium
    b) To hydrolyse the glucose solution
    c) To prevent the growth of undesirable bacteria
    d) Which acts as dehydrating agent
105. The principal organic product in the reaction is:



a) 

b) 

c) 

d) 

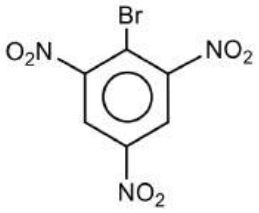
106. Dialkyl sulphides are known as:
    a) Sulphonal b) Mercaptan c) Thioethers d) Thioesters
107. Acrolein is obtained when glycerol is dehydrated with:
    a) $KHSO_4$ b) P_2O_5 c) Conc. H_2SO_4 d) All of these
108. In the following reaction, *X* and *Y* respectively are

$C_2H_5OH \xrightarrow{KMnO_4/H^+} X \xrightarrow[H_2SO_4/\Delta]{Y} CH_3CO_2C_2H_5$

a) CH_3OH, C_2H_5OH b) CH_3CHO, CH_3OH c) CH_3CO_2H, C_2H_5OH d) C_2H_4, CH_3CO_2H

109. The compound which gives turbidity immediately with Lucas reagent at room temperature is
a) Butan-1-ol b) Butan-2-ol
c) 2-methyl propan-2-ol d) 2-methyl propan-1-ol

110. Which of the following will not react with NaOH?

a) 

b) C_2H_5OH c) CH_3CONH_2 d) $CH(CN)_3$

111. The alcohol manufactured from water gas is
a) CH_3OH b) C_2H_5OH c) CH_3CH_2COOH d) $(CH_3)_2CHOH$

112. The – OH group of an alcohol or the – COOH group of a carboxylic acid can be replaced by – Cl using
a) Phosphorus pentachloride b) Hypochlorus acid
c) Chlorine d) Hydrochloric acid

113. Methanol cannot be dried with anhydrous $CaCl_2$ because
a) $CaCl_2$ dissolves in it b) It is not good dehydrating agent
c) It forms a solid $CaCl_2.4CH_3OH$ d) It reacts with CH_3OH

114. Sodium ethoxide has reacted with ethyanoyl chloride. The compound that is produced in the above reaction is:
a) Diethyl ether b) 2-Butanone c) Ethyl chloride d) Ethyl ethanoate

115. Which method is employed to convert alkyl halide into alcohol?
a) Substitution b) Addition c) Dehydration d) Rearrangement

116. Lucas test is associated with
a) Aldehydes b) Phenols c) Carboxylic acids d) Alcohols

117. $C_2H_6 \xrightarrow[350\ K]{H_2SO_4} A \xrightarrow[Fusion]{Alkali} B \xrightarrow[H_2O]{Br} C$
In the above sequence, C is
a) *o*-bromophenol b) *p*-bromophenol
c) *m*-bromophenol d) 2, 4, 6-tribromophenol

118. The boiling points of thio-ethers are...than those of ether.
a) Lesser b) Equal c) Higher d) None of these

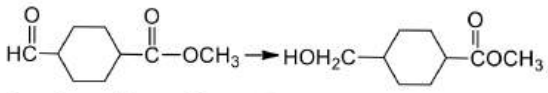
119. $B \xleftarrow{PCl_5} C_2H_5OH \xrightarrow{Na} A$
$A + B \rightarrow C$
$C \xrightarrow[BF_3]{CO} D$

In the above sequence D is
a) $CH_3COOC_2H_5$ b) CH_3COOCH_3 c) $C_2H_5COOC_2H_5$ d) $(C_2H_5)_2O \rightarrow BF_3$

120. The toxicity order for CH_3OH, C_2H_5OH and C_3H_7OH is:
a) $C_2H_5OH < CH_3OH < C_3H_7OH$
b) $C_3H_7OH < C_2H_5OH < CH_3OH$
c) $C_2H_5OH < C_3H_7OH < CH_3OH$
d) $CH_3OH < C_2H_5OH < C_3H_7OH$

121. The alcohol that forms fats with fatty acids is:
a) Glycerol b) Ethanol c) Methanol d) Glycol

122. The reduction,



Can be achieved by using

a) $NaBH_4$ b) $LiAlH_4$

c) $CuO \cdot CuCN_2O_4$ d) None of these

123. Williamson's synthesis is used for the preparation of

a) Acid b) Ester c) Ether d) Alcohol

124. Fermentation of starch solution to ethyl alcohol does not require:

a) Diastase b) Invertase c) Maltase d) Zymase

125. Wood spirit is:

a) CH_3OH b) C_2H_5OH c) $CH_3CH_2CH_2OH$ d) None of these

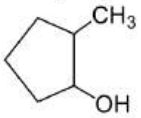
126. Which of the following reagents can convert acetic acid into ethanol?

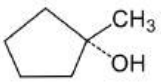
a) Sn + HCl b) H_2 + Pt c) $LiAlH_4$ +ether d) Na + alcohol

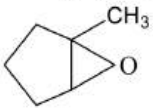
127. By heating phenol with chloroform in alkali, it is converted into

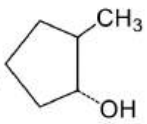
a) Salicylic acid b) Salicyladehyde c) Anisole d) Phenyl benzoate

128. The major product during hydroboration-oxidation of 1-methylcyclopentene is

a) 

b) 

c) 

d) 

129. Carbinol is the trivial name for:

a) $(CH_3)_3COH$ b) C_2H_5OH c) CH_3OH d) $CH_3CH_2CHOHCH_3$

130. When acetamide is treated with $LiAlH_4$.....is formed.

a) Ethanol b) Acetic acid c) Formic acid d) Methanol

131. Which of the following is used as antiseptic?

a) C_2H_5OH b) Iodoform c) Both (a) and (b) d) None of these

132. Proof spirit contains about:

a) 48% alcohol by weight

b) 10% alcohol by weight

c) 5% alcohol by weight

d) 90% alcohol by weight

133. A simple method to remove peroxides from ethes is to treat them with an aqueous solution of

a) KI b) KCNS c) $Na_2S_2O_3$ d) Br_2

134. Isopropyl alcohol and n-propyl alcohol are:

a) Position isomers b) Chain isomers c) Functional isomers d) None of these

135. Which one of the following is not the characteristics of the alcohols?

a) Their boiling points rise fairly uniformly with a rise in molecular weight

b) Lower members have a pleasant smell but burning taste and the higher ones are odourless and tasteless

c) There are lighter than water

d) Lower members are insoluble in water and organic solvents but the solubility goes on increasing with the rise of molecular weight

136. Primary amine on treatment with $NaNO_2$ and HCl yields:

a) Nitro compound b) Ammonia c) Secondary alcohol d) Primary alcohol

137. Diethyl ether on treatment with Cl_2 in presence of sunlight gives:

a) Trichlorodiethyl ether

b) Perchlorodiethyl ether

c) Trichloroacetaldehyde

d) 1,1-dichlorodiethyl ether

138. $CH_3 - CH_2 - O - CH_2 - CH_3$ reacts with hot and excess HI, then formed product is

a) $CH_3 - CH_2 - I$ and CH_3CH_2OH b) $CH_3 - CH_2 - OH$

c) $CH_3 - CH_2 - I$ d) None of the above

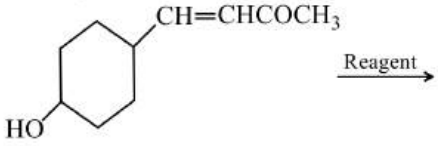
139. A mixture of alcohol and ether is called:
a) Natalite b) Power alcohol c) Peroxide d) None of these

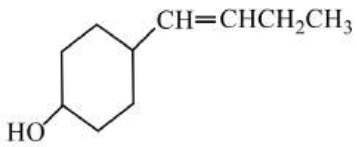
140. Phenol $\xrightarrow[2.CO_2/140°C]{1.NaOH} A \xrightarrow{H^+/H_2O} B \xrightarrow{Ac_2O} C$
In this reaction, the end product C is
a) Salicylaldehyde b) Salicylic acid c) Phenyl acetate d) Aspirin

141. In fermentation by zymase, alcohol and CO_2 are obtained from
a) Invert sugar b) Glucose c) Fructose d) All of these

142. Oxidation of allyl alcohol, (CH_2=CH—CH_2OH) gives a mixture of oxalic acid and formic acid. If this oxidation is done in presence of bromine. One would expect only:
a) Oxalic acid b) Formic acid c) Succinic acid d) Acrylic acid

143. In the given transformation, which of the following is the most appropriate reagent?





a) $Zn - Hg/HCl$ b) $\overset{Na,\ Liq.\ NH_3}{(v)}$ c) $NaBH_4$ d) NH_2NH_2, OH

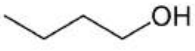
144. Glycerol is highly viscous. It is due to the fact that:
a) It is highly polar
b) It forms extensive H-bonding
c) It shows intramolecular H-bonding
d) It has high b.p.

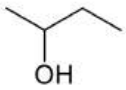
145. The best method to prepare cyclohexene from cyclohexanol is by using
a) Conc. $HCl + ZnCl_2$ b) Conc. H_3PO_4 c) HBr d) Conc. HCl

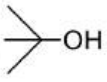
146. Phenol on treatment with diethyl sulphate in presence of NaOH gives
a) Phenetole b) Anisole c) Diphenyl ether d) Diethyl ether

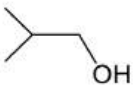
147. Vapours of an alcohol were passed over hot reduced copper. It gave an olefin. The alcohol is:
a) Primary b) Secondary c) Tertiary d) None of these

148. Propane, $CH_3 — CH = CH_2$ can be converted into 1-propanol by oxidation. Which set of reagents among the following is ideal to effect the conversion?
a) H_2O b) B_2H_6, H_2O_2 c) H_2SO_4 d) None of these

149. $C_4H_{10}O$ gives white precipitate within 5 min with concentrated hydrochloric acid in the presence of amhydrous zinc chloride.
Alcohol can be
a) 

b) 

c) 

d) 

150. Propan-2-ol on reacting with Cl_2 produces:
a) Trichloroethanal b) Trichloroacetone c) Acetone d) None of these

151. Which of the following compounds is resistant to nucleophilic attack by hydroxyl ions?
a) Acetamide b) Methyl acetate c) Diethyl ether d) Acetonitrile

152. Ethers are quite stable towards:
a) Oxidizing agents b) Reducing agents c) Na metal d) All of these

153. The function of $ZnCl_2$ in Lucas test for alcohols is

a) To act as acid catalyst and react with HCl to form H_2ZnCl_4
b) To act as base catalyst and react with NaOH to form $Na_2Zn(OH)_4$
c) To act as amphoteric catalyst
d) To act as neutral catalyst

154. When ethyl alcohol is heated with conc.H_2SO_4, the product obtained is
a) $CH_3COOC_2H_5$ b) C_2H_2 c) C_2H_6 d) C_2H_4

155. Phenol is heated with phthalic anhydride in presence of conc H_2SO_4. The product gives pink colour with alkali. The product is
a) Phenolphthalein b) Bakelite c) Salicylic acid d) Fluorescein

156. The action of halogen acids on an ether, has the following order of reactivity:
a) HCl > HBr > HI b) HI > HCl > HBr c) HI > HBr > HCl d) HCl > HI > HBr

157. Rectified spirit contains:
a) 75.0 % alcohol b) 85.5% alcohol c) 95.6% alcohol d) 100.0% alcohol

158. Phenyl magnesium bromide reacts with methanol to give a mixture of:
a) Anisole and Mg(OH)Br
b) Benzene and Mg(OMe)Br
c) Toluene and Mg(OH)Br
d) Phenol and Mg(Me)Br

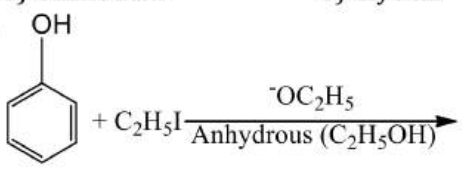
159. $\text{Phenol} \xrightarrow{NaNO_2/H_2SO_4} B \xrightarrow{H_2O} C \xrightarrow{NaOH} D$
Name of the reaction is
a) Liebermann's reaction b) Phthalein fusion test
c) Reimer-Tiemann reaction d) Schotten-Baumann reaction

160. The commonly used dehydrating agent in the preparation of an ester is:
a) P_2O_5 b) Anhydride $CaCl_2$ c) Anhydride $AlCl_3$ d) Conc. H_2SO_4

161. Nobel's oil is:
a) Fire extinguisher b) Insecticide c) Explosive d) Detergent

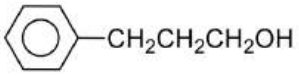
162. Phenol, *p*-methylphenol, *m*-nitrophenol and *p*-nitrophenol follows order of increasing strength as
a) Phenol, *p*-methylphenol, *p*-nitrophenol, *m*-nitrophenol
b) *p*-methylphenol, pheol, *m*-nitrophenol, *p*-nitrophenol
c) *p*-methylphenol, *m*-nitrophenol, phenol, *p*-nitrophenol
d) *m*-nitrophenol, *p*-nitrophenol, phenol, *p*-methylphenol

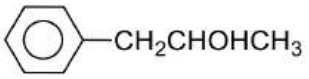
163. Ethylene glycol on oxidation with per-iodic acid gives:
a) Oxalic acid b) Glyoxal c) Formaldehyde d) Glycollic acid

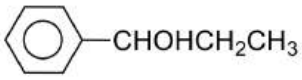
164. 

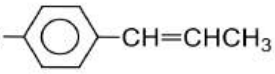
a) $C_6H_5OC_2H_5$ b) $C_2H_5OC_2H_5$ c) $C_6H_5OC_6H_5$ d) C_6H_5I

165. The major product of the following reaction,
$C_6H_5CH = CHCH_3 \xrightarrow[(ii)NaBH_4]{(i)Hg(OA)_2,THF-H_2O}$ is

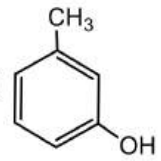
a) 

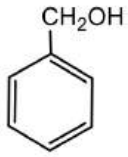
b) 

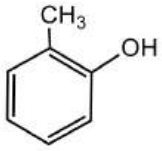
c) 

d) 

166. The structure of the compound that gives a tribromo derivative on treatment with bromine water is

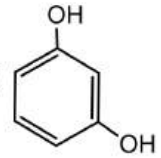
a) 

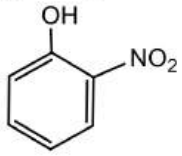
b) 

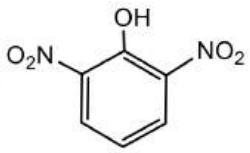
c) 

d) 

167. Which of the following reagents may be used to distinguish between phenol and benzoic acid?
a) Aqueous NaOH b) Tollen's reagent c) Molisch reagent d) Neutral $FeCl_3$

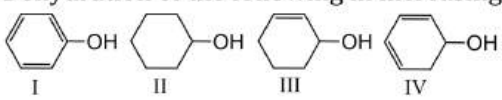
168. Which is obtained on treating phenol, with dilute HNO_3?
a) 

b) 

c) 

d) None of these

169. Consider the following reaction,
$C_2H_5OH + H_2SO_4 \rightarrow$ Product
Among the following, which one cannot be formed as a product under any conditions?
a) Ethyl hydrogen sulphate b) Ethylene
c) Acetylene d) Diethyl ether

170. Dehydration of the following in increasing order is


a) I < II < III < IV b) II < III < IV < I c) I < II < III < IV d) I < IV < II < III

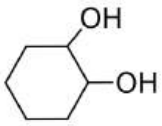
171. Excess of glycol when dehydrated gives:
a) Ethylene oxide b) Ethanol c) Acrolein d) 1,4-dioxan

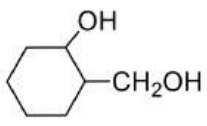
172. In the reduction,
$R—CHO + H_2 \longrightarrow RCH_2OH$
The catalyst used is:
a) Ni b) Pd c) Pt d) All of these

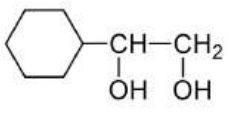
173. Action of HNO_2 on CH_3NH_2 gives:
a) CH_3OH b) $CH_3 \cdot O \cdot CH_3$ c) $CH_3O—N=O$ d) Both (b) and (c)

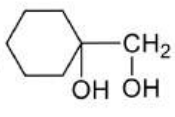
174. Primary and secondary alcohols on action of reduced copper give:
a) Aldehydes and ketones respectively
b) Ketones and aldehydes respectively
c) Only aldehydes
d) Only ketones

175. Diethyl ether absorbs oxygen to form:
a) Red coloured sweet smelling compound
b) Acetic acid
c) Ether suboxide
d) Ether peroxide

176. $(A) \xrightarrow{HIO_4}$ cyclohexanone + HCHO. What is (A)?
a) 

b) 

c) 

d) 

177. Which of the following undergoes dehydration most readily?
a) 1-phenyl-1-butanol b) 1-phenyl-2-butanol c) 2-phenyl-2-butanol d) 2-phenyl-1-butanol

178. Ether in contract with air for a long time form peroxides. The presence of peroxide in ether can be tested by adding Fe^{+2} ion in it and then adding:
a) KCNS b) $SnCl_2$ c) $HgCl_2$ d) KI

179. Cyclohexanol is a:
a) Phenol b) Primary alcohol c) Sec. alcohol d) *tert*. Alcohol

180. Glycerol on oxidation with dil. HNO_3 gives:
a) Tartronic acid b) Mesoxalic acid c) Oxalic acid d) Glyceric acid

181. Butan-2-ol is:
a) Primary alcohol b) Secondary alcohol c) Tertiary alcohol d) None of these

182. Pepperment can be extracted from plant sources by using solvents like:
a) NH_3 b) H_2O c) CH_3COOH d) C_2H_5OH

183. Chlorine reacts with ethanol to give:
a) Ethyl chloride b) Chloroform c) Acetaldehyde d) Chloral

184. Molasses contains:
a) 70 % sugar b) 50% sugar c) 60% sugar d) 10% sugar

185. Which of the following are known as mercaptans?
a) Thio-alcohols b) Thio-ethers c) Thio-aldehydes d) Thio-acids

186. Which forms most stable hydrate?
a) CH_3CHO b) C_6H_5CHO c) CCl_3CHO d) CH_3COCH_3

187. An organic compound dissolved in dry benzene evolved hydrogen on treatment with sodium. It is:
a) A ketone b) An aldehyde c) A tertiary amine d) An alcohol

188. Sodium ethoxide is obtained by the reaction of ethyl alcohol with:
a) NaOH b) Na c) NaCl d) $NaHCO_3$

189. Which one of the following compounds will not react with CH_3MgBr?
a) Ethyl acetate b) Acetone c) Dimethyl ether d) Ethanol

190. The major organic product in the reaction,
$CH_3—O—CH(CH_3)_2 + HI \longrightarrow$ Product is:
a) $CH_3O\underset{\overset{|}{I}}{C}(CH_3)_2$ b) $CH_3I + (CH_3)_2CHOH$ c) $CH_3OH + (CH_3)_2CHI$ d) $ICH_2OCH(CH_3)_2$

191. Structure of diethyl ether can be confirmed by:
a) Kolbe's synthesis
b) Frankland's synthesis
c) Wurtz's synthesis
d) Williamson's synthesis

192. Glycerol on oxidation with bismuth nitrate mainly gives:
a) Glyceric acid b) Tartronic acid c) Mesoxalic acid d) Oxalic acid

193. The end product of the following sequence is:

$$CH_3Br \xrightarrow{KCN(alc.)} (A) \xrightarrow{H_3O^+} (B) \xrightarrow[Ether]{LiAH_4} (C)$$

a) CH_3CHO b) CH_3CH_2OH c) CH_3COCH_3 d) CH_4

194. Saponification means hydrolysis of an ester with:
a) Enzyme b) CH_3COOH c) H_2SO_4 d) NaOH

195. Which of the following can work as dehydrating agent for alcohols?
a) H_2SO_4 b) Al_2O_3 c) H_3PO_4 d) All of these

196. In CH_3CH_2OH the bond which most readily undergoes heterolytic cleavage during its reaction with CH_3COOH/H_2SO_4 is:
a) C—C b) C—O c) O—H d) C—H

197. When ethyl alcohol vapours mixed with air, are passed over heated platinized asbestos, the compound formed is:
a) Acetaldehyde b) Diethyl ether c) Acetone d) None of these

198. Which of the following reactions will not yield *p*-tert butylphenol?
a) CH_3
b) Phenol $+(CH_3)_3COH \xrightarrow{H^+}$

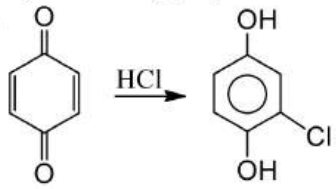
$$\text{Phenol} + CH_3 - \underset{|}{C} = CH_2 \xrightarrow{H^+}$$

c) $\text{Phenol} + (CH_3)_3C.Cl \xrightarrow{AlCl_3}$ d) $\text{Phenol} + CHCl_3 \xrightarrow{NaOH}$

199. One mole of an organic compound A with the formula C_3H_8O reacts completely with two moles of HI to form X and Y. When Y is boiled with aqueous alkali it forms Z. Z answers the iodoform test. The compound A is
a) Propan-2-ol b) Propan-1-ol c) Ethoxyethane d) Methoxyethane

200. Which one of the following alcohol is used as an antifreeze reagent for making explosives?
a) Glycerol b) Glycol c) Ethanol d) Phenol

201. The IUPAC name of $CH_3OCH(CH_3)_2$ is:
a) 1-methoxy propane
b) 3-methoxy propane
c) Methyl-isopropylether
d) 2-methoxy propane

202. 

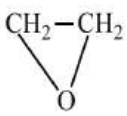
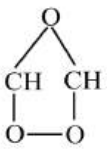
is an example of
a) 1, 2-addition of HCl followed by tautomerism b) 1, 2-addition followed by reduction
c) 1, 4-addition followed by tautomerism d) 1, 4-addition followed by oxidation

203. Absolute ethanol cannot be obtained by simple fractionation of a solution of ethanol and water because:
a) Their boiling points are very near
b) Ethanol remains dissolved in water
c) They form a constant boiling mixture
d) Ethanol molecules are solvated

204. Etherates are
a) Ethers b) Solution in ether
c) Complexes of ethers with Lewis acid d) Complexes of ethers with Lewis base

205. Glycerol is not used in:
a) Cosmetics b) Matches c) Explosives d) Soaps

206. Which will not form a yellow precipitate on heating with an alkaline solution of iodine?
a) $CH_3CHOHCH_3$ b) $CH_3CH_2CHOHCH_3$ c) CH_3OH d) CH_3CH_2OH

207. Which of the following is an alkoxide?
a)  b) $CH_3CH_2CH_2CH_2ONa$ c) $CH_2OH \cdot CH_2OH$ d) 

208. The acidic character of $1°, 2°, 3°$ alcohols, H_2O and $RC \equiv CH$ is of the order
a) $H_2O > 1° > 2° > 3° > RC \equiv CH$ b) $RC \equiv CH > 3° > 2° > 1° > H_2O$
c) $1° > 2° > 3° > H_2O > RC \equiv CH$ d) $3° > 2° > 1° > H_2O > RC \equiv CH$

209. The enzyme which can catalyse the conversion of glucose to ethanol is:
a) Zymase b) Diastase c) Maltase d) Invertase

210. Oxygen atom of ether is:
a) Very active b) Replaceable c) Active d) Comparatively inert

211. Argol, a brown crust, formed during the fermentation of grape juice contains
a) CO_2 b) Fused oil
c) Potassium hydrogen tartarate d) lye

212. Benzoylation of phenol in alkaline medium is known is known as
a) Friedel-Crafts reaction
b) Wurtz-Fittig reaction
c) Schotten-Baumann reaction
d)

213. The prospective fuel 'gashol' is a mixture of:
a) Gaseous hydrocarbons and heavy water
b) Petrol and phenol
c) Petrol and ethanol
d) Radioactive substances

214. Identify the product/s in the following reaction.

$3CH_3CH = CH_2 \xrightarrow{BH_3} X \xrightarrow{H_2O_2/OH^-}$

Products $+H_3BO_3$

a) $CH_3CH_2CH_2OH$ b) $CH_3CHOHCH_3$ c) CH_3CH_2CHO d) $CH_3CH_2OH + CH_3OH$

215. A fruity smell is obtained by the reaction of ethanol with
a) CH_3COCH_3 b) PCl_5 c) CH_3COOH d) CH_3CHO

216. Which of the following reactions does not yield an ether?
a) Sodium methoxide reacts with dimethyl sulphate
b) Sodium ethoxide reacts with ethyl bromide
c) Sodium ethoxide reacts with bromocyclopropane
d) Ethanol reacts with CH_2N_2 in presence of HBF_4

217. An alcohol on alk. $KMnO_4$ oxidation gives first acetone and on further oxidation acetic acid. It is:
a) Ethyl alcohol
b) Isopropyl alcohol
c) Primary alcohol
d) None of these

218. Which is not the intermediate stage of following conversion?

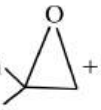
$(CH_3)_2 - C(OH) - C(OH) - (CH_3)_2 \xrightarrow[\Delta]{Dil.H_2SO_4} CH_3COC(CH_3)_3$

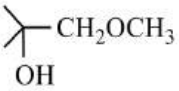
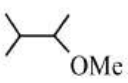
a) $(CH_3)_2C(\overset{\oplus}{O}H_2)-C(\overset{\oplus}{O}H_2)(CH_3)_2$

b) $(CH_3)_2C(OH)-\overset{\oplus}{C}(CH_3)_2$

c) $CH_3-\overset{\oplus}{C}(OH)-C(CH_3)_3$

d) $CH_3-C(=\overset{\oplus}{O}H)-C(CH_3)_3$

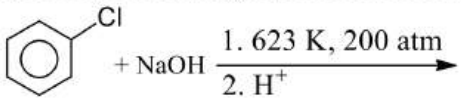
219. In the reaction  $+ CH_3OH \xrightarrow{CH_3ONa}$ Product

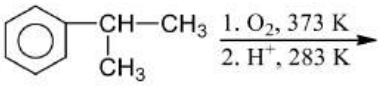
a)  b)  c)  d) 

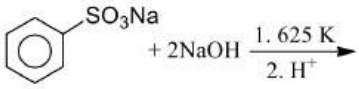
220. When diethyl ether is heated with an excess of PCl_5, it yields
a) Ethyl chloride
b) Diethyl ether peroxide

c) Ethanoyl chloride
d) Perchlorodiethy ether

221. Which of the following represents the Dow process for the manufacture of phenol?

a) 

b) 

c) 

d) None of the above

222. The organic compound present in tincture of iodine is:
a) Alcohol
b) CCl_4
c) Acetone
d) CS_2

223. Phenol on heating with $CCI_4$and aqueous KOH gives salicylic acid. This reaction is
a) Friedel-Craft reaction
b) Diels-Alder reaction
c) Reimer-Tiemann reaction
d) Wittig reaction

224. The—OH group of methyl alcohol cannot be replaced by chlorine by the action of:
a) Chlorine
b) HCl
c) PCl_3
d) PCl_5

225. The following substance can be used as a raw material for obtaining alcohol:
a) Potatoes
b) Molasses
c) Maize
d) All of these

226. On oxidation, an alcohol gives an aldehyde having the same number of carbon atoms as that of alcohol. The alcohol is:
a) 1° alcohol
b) 2° alcohol
c) 3° alcohol
d) None of these

227. The end product of which of the following reaction is isomer of alcohols?

a) $C_2H_4 \xrightarrow{B_2H_6} A \xrightarrow[NaOH]{H_2O_2} B$

b) $CHI_3 \xrightarrow[\Delta]{Ag} A \xrightarrow[Hg^{2+}]{Dil\ H_2SO_4} B \xrightarrow{Reduction} C$

c) $C_2H_4 \xrightarrow{HI} A \xrightarrow{Aqueous\ KOH} B \xrightarrow[140°C]{Conc.H_2SO_4} C$

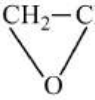
d) $CH_3MgBr \xrightarrow{CH_2O} A \xrightarrow{H_2O} C$

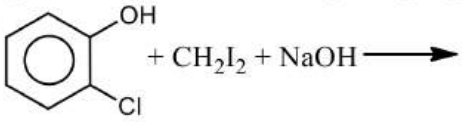
228. From amongst the following alcohols the one that would react fastest with conc. HCI and anhydrous $ZnCI_2$is
a) 2-butanol
b) 2-methyl propan-2-ol
c) 2-methylpropanol
d) 1 butanol

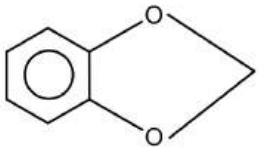
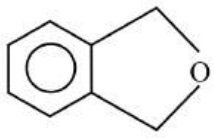
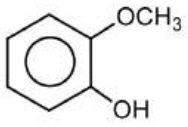
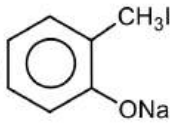
229. Which of the following is least soluble in water?
a) C_2H_5OH
b) C_3H_7OH
c) C_4H_9OH
d) $C_5H_{11}OH$

230. The reaction given below is called:
$C_2H_5OH + SOCl_2 \longrightarrow C_2H_5Cl + SO_2 + HCl$
a) Kharasch effect
b) Wurtz reaction
c) Darzen's reaction
d) Hunsdicker reaction

231. The compound with formula $C_4H_{10}O$ yields a compound C_4H_8O on oxidation. The compound $C_4H_{10}O$ is:
a) An aldehyde
b) An alcohol
c) A ketone
d) An anhydride

232. Reaction of  with RMgX followed with hydrolysis produces :
a) $RCHOHR$
b) RCH_2CH_2OH
c) $RCHOHCH_3$
d) $RCH{=}CHOH$

233. 
The product is

a)  b)  c)  d) 

234. C_2H_5OH cannot be dried by anhydrous $CaCl_2$, because:
   a) C_2H_5OH is soluble in water
   b) Explosion takes place
   c) C_2H_5OH reacts with $CaCl_2$
   d) None of the above
235. Denatured spirit is mainly used as a:
   a) Good fuel
   b) Drug
   c) Solvent in preparing varnishes
   d) Material in the preparation of oil
236. The dehydration of 2-methyl butanol with conc. H_2SO_4 gives
   a) 2-methyl butane as major product
   b) Pentene
   c) 2-methyl but-2-ene as major product
   d) 2-methyl pent-2-ene
237. Ethers are not distilled to dryness for fear of explosion. This is due to formation of:
   a) Oxides
   b) Alcohol
   c) Ketones
   d) Peroxides
238. Tertiary alcohols (3°) having at least four carbon atoms upon drastic oxidation yield carboxylic acid with
   a) One carbon atom less
   b) Two carbon atoms less
   c) Three carbon atoms less
   d) All the above three options are correct
239. Lucas reagent is
   a) Anhydrous $AlCl_3$ with concentrated HCl
   b) Anhydrous $ZnCl_2$ and concentrated H_2SO_4
   c) Anhydrous $ZnCl_2$ and concentrated HCl
   d) Anhydrous $CaCl_2$ and concentrated HCl
240. The cleavage of an aryl-alkyl ether with cold HI gives
   a) Alkyl iodide and water
   b) Aryl iodide and water
   c) Alkyl iodide, aryl iodide and water
   d) Phenol and alkyl iodine
241. Phenol is heated with a solution of mixture of KBr and $KBrO_3$. The major product obtained in the above reaction is
   a) 2-bromophenol
   b) 3-bromophenol
   c) 4-bromophenol
   d) 2, 4, 6-tribromophenol
242. For the preparation ter-butylmethylether by Williamson's method the correct choice of reagents is:
   a) Methoxide and ter-butylbromide
   b) Methanol and 2-bromobutane
   c) 2-butanol and methylbromide
   d) Ter-butoxide and methylbromide
243. Consider the following reactions,

$$X + HCl \xrightarrow[\text{(addition)}]{\text{Anhydrous } AlCl_3} C_2H_5Cl \xleftarrow[\text{(substitution)}]{\text{anhydrous } ZnCl_2/HCl} Y$$

   Y can be converted to X on heating with... at .... temperature.
   a) $Al_2O_3, 350°C$
   b) $Cu, 300°C$
   c) $Ca(OH)_2 + CaOCl_2, 60°C$
   d) $NaOH/I_2, 60°C$
244. Which of the following methods cannot be used for the preparation of an ester?
   a) $RCOOH + R'OH + OH^-$
   b) $RCOCl + R'OH +$ Pyridine
   c) $RCOOH + R'OH + H^+$
   d) $(RCO)_2O + R'OH +$ Pyridine
245. Oxygen containing organic compound upon oxidation forms a carboxylic acid as the only organic product with its molecular mass higher by 14 units. The organic compound is

a) An aldehyde b) A primary alcohol c) A secondary alcohol d) A ketone

246. A compound X with molecular formula C_3H_8O can be oxidised to a compound Y with the molecular formula $C_3H_6O_2$. X is most likely to be:
a) Primary alcohol b) Secondary alcohol c) Aldehyde d) Ketone

247. $HOH_2C \cdot CH_2OH$ on heating with periodic acid gives:
a) $2\ \begin{matrix} H \\ H \end{matrix} \!\!>\!C{=}O$ b) $2\ CO_2$ c) $2\ HCOOH$ d) $\begin{matrix} CHO \\ | \\ CHO \end{matrix}$

248. Reaction of tertiary butyl alcohol with hot Cu at 350°C produces
a) Butanol b) Butanal c) 2-butene d) Methylpropene

249. Ethyl chloride is converted into diethyl ether by
a) Perkins reaction b) Grignard reagent
c) Wurtz reaction d) Williamson's synthesis

250. The product obtained by heating diethyl ether with HI is
a) C_2H_5I b) C_2H_5OH c) $C_2H_5OH + C_2H_5I$ d) $C_2H_5 - C_2H_5$

251. The reaction,
$C_2H_5ONa + C_2H_5I \rightarrow C_2H_5OC_2H_5 + NaI$ is known as
a) Kolbe's synthesis b) Wurtz's synthesis
c) Williamson's synthesis d) Grignard's synthesis

252. Which one can differentiate between C_2H_5OH and CH_3OH?
a) H_2O b) $Na_2CO_3 + I_2$ c) NH_3 d) HCl

253. Ethylene oxide when, treated with Grignard reagent yields:
a) Cyclopropyl alcohol b) Primary alcohol c) Secondary alcohol d) Tertiary alcohol

254. Among the following compounds which can be dehydrated very easily?
a) $CH_3CH_2CH_2CH_2CH_2OH$
b) $CH_3CH_2CH_2\underset{}{\overset{OH}{\overset{|}{C}}}HCH_3$
c) $CH_3CH_2\overset{CH_3}{\overset{|}{\underset{OH}{\underset{|}{C}}}}CH_2CH_3$
d) $CH_3CH_2\underset{CH_3}{\underset{|}{C}}HCH_2CH_2OH$

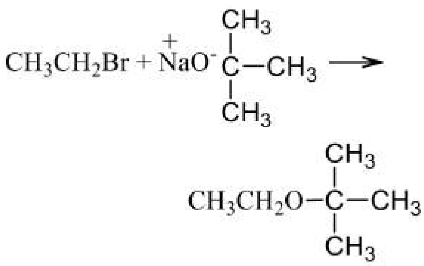
255. Catalytic dehydrogenation of a primary alcohol gives a
a) Secondary alcohol b) Aldehyde c) Ketone d) Ester

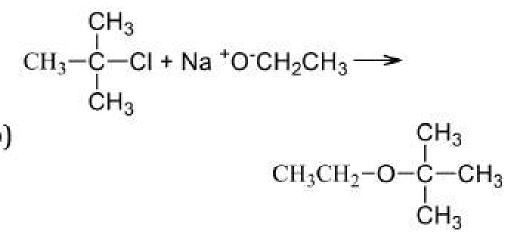
256. Action of nitrous acid on ethyl amine gives:
a) C_2H_6 b) C_2H_5OH c) NH_3 d) nitromethane

257. Which of the following compounds is most acidic?
a) CH_4 b) C_2H_6 c) $CH \equiv CH$ d) C_2H_5OH

258. 2-propanol $+ NaBr \xrightarrow{\text{Reflux}} X$. What is X?
a) 2-bromopropane
b) Propane
c) Propene
d) Propanone

259. Which of the following reaction is/are feasible?

a) 

b) 

c) Both (a) and (b)

d) None of the above

260. Alcohols are neutral in character whereas thio-alcohols are .....in character.

a) Strongly acidic b) Weakly acidic c) Basic d) Neutral

261. On boiling with concentrated hydrobromic acid, phenyl ethyl ether yields

a) Phenol and ethane

b) Phenol and ethyl bromide

c) Bromobenzene and ethanol

d) Bromobenzene and ethane

262. General formula of primary alcohol is:

a) $\rightarrow$COH b) $>$CHOH c) $-CH_2OH$ d) All of these

263. The compound B formed in the following sequence of reactions,

$CH_3CH_2CH_2OH \xrightarrow{PCl_5} A \xrightarrow{\text{Alc.NaOH}} B$ will be:

a) Propyne b) Propene c) Propanal d) Propane

264. Formation of diethyl ether form ethanol is based on a

a) Dehydration reaction

b) Dehydrogenation reaction

c) Hydrogenation reaction

d) Homolytic fission reaction

265. Two aromatic compounds having foemula C_7H_8O which are easily identifiable by $FeCl_3$ solution test (violet colouration) are

a) *o*-cresol and benzyl alcohol

b) *m*-cresol and *p*-cresol

c) *o*-cresol and *p*-cresol

d) Methyl phenyl ether and benzyl alcohol

266. In the reaction,

$CH_3OH \xrightarrow{\text{Oxidation}} A \xrightarrow{NH_3} B$; A and B are

a) HCHO, $HCOONH_4$ b) HCOOH, $HCOONH_4$ c) HCOOH, $HCONH_2$ d) HCHO, $HCONH_2$

267. Acetic acid and methanol are obtained on a large scale by destructive distillation of:

a) Wood b) Coal c) Turpentine oil d) CH_3COOH

268. Which of the following statement is incorrect?

a) Enzymes are in colloidal state

b) Enzymes are catalyst

c) Enzymes can catalyse any reaction

d) Urease is an enzyme

269. In the following sequence the product (C) is:

$CH_3CHO \xrightarrow[Pd]{H_2} (A) \xrightarrow{Na} (B) \xrightarrow{CH_3I} (C)$

a) Alcohol b) Ether c) Alkene d) None of these

270. In the reaction, the products formed are:

$(CH_3)_2CH_2 \cdot CH_2 \cdot O \cdot CH_2CH_3 + HI \xrightarrow{\text{Heated}}$

a) $(CH_3)_2CHCH_3 + CH_3CH_2OH$

b) $(CH_3)_2CH \cdot CH_2OH + C_2H_6$

c) $(CH_3)_2CHCH_2OH + C_2H_5I$

d) $(CH_3)_2CH \cdot CH_2I + CH_3CH_2OH$

271. When glycerol is treated with a mixture of excess of conc. HNO_3 and H_2SO_4, the compound formed is:

a) Glycerol mononitrate b) Glycerol dinitrate c) Glycerol trinitrate d) acrolein

272. Identify Z in the following series,

$$CH_3-CH_2-CH_2OH \xrightarrow[160\text{-}180^oC]{Conc.H_2SO_4} X \xrightarrow{Br_2} Y \xrightarrow[2.\ NaNH_2]{1.Alc.KOH} Z:$$

a) $CH_3-\underset{NH_2}{\underset{|}{CH}}-\underset{NH_2}{\underset{|}{CH_2}}$ b) $CH_3-\underset{OH}{\underset{|}{CH}}-\underset{OH}{\underset{|}{CH_2}}$ c) $CH_3-\underset{OH}{\underset{|}{C}}=CH_2$ d) $CH_3—C\equiv CH$

273. 2 mole of ethanol are burnt. The amount of CO_2 obtained will be:

a) 132 g b) 44 g c) 176 g d) 88 g

274. In which case, methyl *t*-butyl ether is formed?

a) $(C_2H_5)_3CONa + CH_3Cl$ b) $(CH_3)_3CONa + CH_3Cl$

c) $(CH_3)_3CONa + C_2H_5Cl$ d) $(CH_3)_2CHONa + CH_3Cl$

275. Grignard reagent reacts with HCHO to produce

a) Secondary alcohol

b) Anhydride

c) Acid

d) Primary alcohol

276. Alcohol is not used in making:

a) Chloral b) Chloroform c) Benzene d) Acetaldehyde

277. Among the alkenes which one produces tertiary butyl alcohol on acid hydration?

a) $CH_3CH_2CH = CH_2$ b) $CH_3CH = CH - CH_3$ c) $(CH_3)_2C = CH_2$ d) $CH_3 - CH = CH_2$

278. Diethyl ether is soluble in:

a) Water b) Dilute HCl c) Conc. H_2SO_4 d) Conc. KOH

279. Salicyl aldehyde is obtained when phenol is heated with $CHCl_3$ and aqueous NaOH. This reaction is known by which name?

a) Carbyl amine reaction b) Hofmann's reaction

c) Reimer-Tiemann reaction d) Kolbe-Schmidt reaction

280. The conversion of *m*-nitrophenol to resorcinol involves respectively

a) Hydrolysis, diazotization and reduction b) Diazotization, reduction and hydrolysis

c) Hydrolysis, reduction and diazotization d) Reduction, diazotization and hydrolysis

281. In Williamson's synthesis

a) An alkyl halide is treated with sodium alkoxide b) An alkyl halide is treated with sodium

c) An alcohol is heated with conc. H_2SO_4 at 130°C d) None of the above

282. C – O – C angle would be maximum in

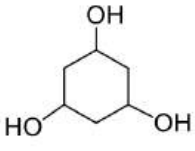
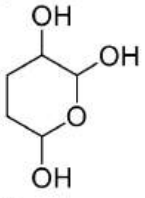
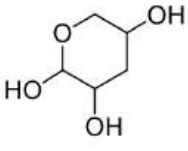
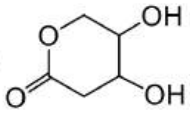
a) $CH_3 - O - CH_3$ b) $CH_3 - O - C_2H_5$

c) $C_2H_5 - O - C_2H_5$ d) $(CH_3)_2CH - O - CH(CH_3)_2$

283. Ethers are very good solvent for which type of compounds?

a) Lewis base b) Acids c) Lewis acid d) None of these

284. In which molecule, cleavage by HIO_4 is not observed?

a)  b)  c)  d) 

285. The products formed in the following reaction,

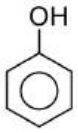
$C_6H_5—O—CH_3 + HI \xrightarrow{Heat}$ are:

a) C_6H_5OH and CH_3I b) C_6H_5I and CH_3OH c) $C_6H_5CH_3$ and HOI d) C_6H_6 and CH_3OI

286. Acid catalysed hydration of alkenes except ethene leads to the formation of
a) Mixture of secondary and tertiary alcohols
b) Mixture of primary and secondary alcohols
c) Secondary or tertiary alcohol
d) Primary alcohol

287. Which of the following compounds when heated with CO at 150°C and 500 atm pressure in presence of BF_3 forms ethyl propionate?
a) C_2H_5OH b) CH_3OCH_3 c) $C_2H_5OC_2H_5$ d) $CH_3OC_2H_5$

288. Which among the following compounds will give a secondary alcohol on reacting with Grignard reagent followed by acid hydrolysis?
I. HCHO
II. C_2H_5CHO
III. CH_3COCH_3
IV. $HCOOC_2H_5$
Select the correct answer using the codes given below.
a) II only b) III only c) I and IV d) II and IV

289. When phenolic ether is heated with HI, it yields
a) Alkyl halide + aryl halide + water
b) alkyl halide + 

c) Alcohol +aryl halide
d) None of the above

290. The red coloured compound formed during Victor-meyer's test for ethanol is:
a) $CH_3CHNO_2-Na^+$ with NOH
b) CH_3CH_2NOH
c) CH_3CH-NO_2 with $N-O^-Na^+$
d) None of these

291. Picric acid is a stronger acid than acetic acid and benzoic acid. It contains
a) $-SO_3H$ group
b) Two – COOH groups
c) Phenolic group
d)

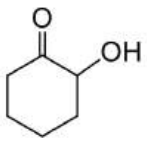
292. Which will not form yellow precipitate on heating with an alkaline solution of iodine?
a) $CH_3CH_2CHOHCH_3$ b) $CH_3CH_2CHOHCH_3$ c) CH_3CH_2OH d) CH_3OH

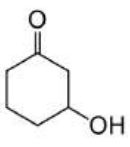
293. The cleavage of an aryl-alkyl ether with hydrogen halide will give:
a) A molecule each of an alkyl halide and water
b) A molecule each of an aryl halide and water
c) A molecule each of an alkyl halide, aryl halide and water
d) A molecule each of phenol and an alkyl halide

294. HBr reacts with $CH_2=CH-OCH_3$ under anhydrous conditions at room temperature to give:
a) CH_3CHO and CH_3Br
b) $BrCH_2CHO$ and CH_3OH
c) $BrCH_2-CH_2-OCH_3$
d) $H_3C-CHBr-OCH_3$

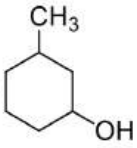
295. In ether the active group is:
a) Oxygen b) C_2H_5 c) Hydroxyl d) None of these

296. The correct order of solubility of 1°, 2° and 3° alcohol in water is:
a) $3^\circ > 2^\circ > 1^\circ$ b) $1^\circ > 2^\circ > 3^\circ$ c) $3^\circ > 1^\circ > 2^\circ$ d) None of these

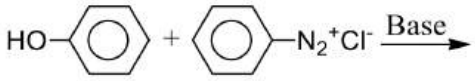
297. Maximum dehydration takes place in that of
a) 

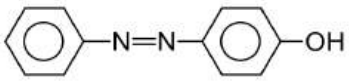
b) 

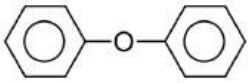
c) 

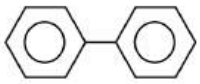
d) 

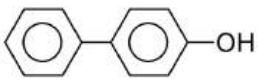
298. The dehydration of butane-1-ol gives
a) 1-butene as the main product
b) 2-butene as the main product
c) Equal amounts of 1-butene and 2-butene
d) 2-methyl propene

299. 

a) 

b) 

c) 

d) 

300. When an ether is treated with P_2S_5 we get:
a) Thio-alcohol
b) Thio-ester
c) Thio-ether
d) Thio-aldehyde

301. Order of reactivity of halogen acids towards an alcohol is
a) HCl > HBr > HI
b) HBr > HI > HCl
c) HI > HBr > HCl
d) HI > HCl > HBr

302. In which of the following reactions the product is an ether?
a) $C_6H_6 + CH_3COCl$/anhydrous $AlCl_3$
b) C_2H_5Cl + aq. KOH
c) $C_6H_6 + C_6H_5COCl$/anhydrous $AlCl_3$
d) $C_2H_5Cl + C_2H_5ONa$

303. The b.p. of alcohols are....than corresponding thiols.
a) More
b) Less
c) Same
d) Either of these

304. Oxidation of 2-propanol by $K_2Cr_2O_7$ and dilute H_2SO_4 leads to the formation of:
a) Propanal
b) Propanoic acid
c) Methanoic acid
d) Propanone

305. When phenol is treated with excess of bromine water, it gives
a) *m*-bromophenol
b) *o*-and *p*-bromophenols
c) 2, 4-dibromophenol
d) 2, 4, 6-tribromophenol

306. An aqueous solution of ethyl alcohol:
a) Turns blue litmus red
b) Turns red litmus blue
c) Does not affect the litmus colour
d) Decolourises litmus

307. Enzymes are:
a) Living organisms
b) Dead organisms
c) Complex nitrogenous substances produced from living cells
d) None of the above

308. Which of the following is used as anaesthetic?
a) $CHCl_3$
b) C_2H_5OH
c) $C_2H_5OC_2H_5$
d) $CHCl_3$ and $C_2H_5OC_2H_5$

309. Picric acid is
a) 2, 4, 6-tribromophenol
b) *Sym*-trinitrophenol
c) trinitrophenol
d) 2, 4, 6-trinitrotoluene

310. The correct order of reactivity of hydrogen halides with ethyl alcohol is
a) HF > HCl > HBr > HI
b) HCl > HBr > HF > HI
c) HBr > HCl > HI >HF
d) HI > HBr > HCl > HF

311. Denatured alcohol is
a) Ethanol + methanol
b) Rectified spirit + methanol + naphtha
c) Undistilled ethanol
d) Rectified spirit

312. Which of the following reacts with water?

a) $CHCl_3$ b) CCl_4 c) CCl_3CHO d) CH_2ClCH_2Cl

313. Formic acid is obtained when:

a) $(CH_3COO)_2Ca$ is heated with conc. H_2SO_4

b) Calcium formate is heated with calcium acetate

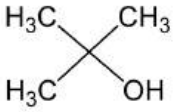
c) Glycerol is heated with oxalic acid

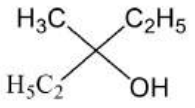
d) Acetaldehyde is oxidized with $K_2Cr_2O_7$ and conc. H_2SO_4

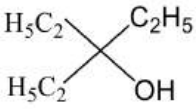
314. Primary, secondary and tetiary alcohols are distinguished from one another by

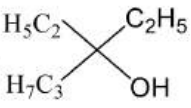
a) Ninhydrin test b) Tollen's reagent c) Lucas test d) Wittig reaction

315. Ethyl ester $\xrightarrow[\text{excess}]{CH_3MgBr}$ *P*. The product *P* will be

a) 

b) 

c) 

d) 

316. Metal alkoxides contain:

a) Metal-carbon bond b) Metal-oxygen bond c) Metal-methyl bond d) None of these

317. 3-methyl-2-butanol on treatment with HCl gives predominantly:

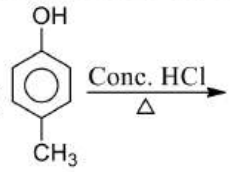
a) 2-chloro-2-methylbutane

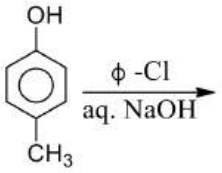
b) 2-chloro-3-methylbutane

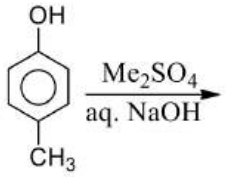
c) 2,2-dimethylpentane

d) None of the above

318. Which reaction will occurs?

a) 

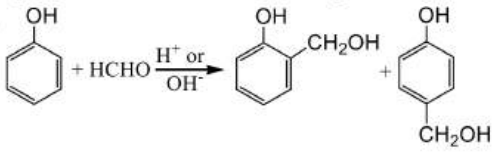
b) 

c) 

d) None of these

319. No reacts rapidly with:

a) 1° alcohol b) 2 °alcohol c) 3° alcohol d) None of these

320. 

This reaction is called

a) Reimer- Tiemann reaction b) Lederer-Manasse reaction

c) Sandmeyer reaction d) Kolbe's reaction

321. By which of the following procedures can ethyl *n*-propyl ether be obtained?

a) $C_2H_5OH \xrightarrow{HBr} I \xrightarrow[\text{ether}]{Mg} II \xrightarrow{H_2O} III \xrightarrow[CH_3CH_2Br]{Na}$

b) $C_2H_5OH \xrightarrow{HBr} I \xrightarrow[\text{ether}]{Mg} II \xrightarrow[2.\ H_3^+O]{1.\ CH_2O} III \xrightarrow[CH_3CH_2Br]{Na}$

c) $C_2H_5OH + H_2SO_4 \xrightarrow{140°C}$

d) $C_2H_5OH + \text{Conc. } H_2SO_4 \xrightarrow{180°C} I \xrightarrow{CH_3CH_2CH_2Br}$

322. Which of the following statements is wrong in case of ethoxyethane?

a) It is used as anaesthetic

b) It is inflammable

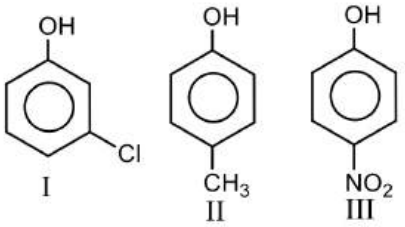
c) Its dipole moment is zero

d) It is soluble in conc. H_2SO_4

323. Which of the following alcohols is made by fermentation?

a) Methanol b) Ethanol c) Glycerol d) Propanol

324. Correct acidic order of the following compounds is



a) I > II > III b) III > I > II c) II > III > I d) I > III > II

325. How many isomers of $C_5H_{11}OH$ will be primary alcohols?

a) 5 b) 4 c) 2 d) 3

326. Glycerol is oxidised by bismuth nitrate to produce

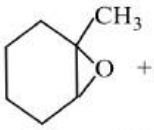
a) Oxalic acid b) Mesooxalic acid c) Glyceric acid d) Glyoxalic acid

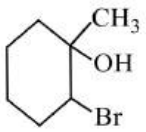
327. The alcohol that produces turbidity immediately with $ZnCl_2$/conc. HCl at room temperature

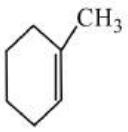
a) 1-hydroxy butane
b) 2-hydroxy butane
c) 2-hydroxy-2-methyl propane
d) 1-hydroxy-2-methyl propane

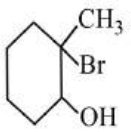
328. The formula for allyl alcohol is:

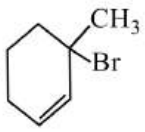
a) $CH_3—CH=CHCl$ b) $CH_2=CHCH_2OH$ c) $CH_2ClCH_2CH_3$ d) None of these

329. The product of the reaction  + HBr is :

a) 

b) 

c) 

d) 

330. The compound that will react most readily with NaOH to form methanol is:

a) $(CH_3)_4N^+I^-$ b) CH_3OCH_3 c) $(CH_3)_3S^+I^-$ d) $(CH_3)_3C \cdot Cl$

331. Ethylene reacts with 1% cold alkaline $KMnO_4$ to give:

a) Oxalic acid b) Acetone c) Formaldehyde d) Glycol

332. In the Lucas test of alcohols, appearance of cloudiness is due to the formation of

a) Aldehydes b) Ketones c) Acid chlorides d) Alkyl chlorides

333. Tertiary alcohol is obtained when Grignard reagent reacts with:

a) Acetone b) Butanone c) Propanone d) All of these

334. On conversion into the Grignard reagent followed by treatment with absolute ethanol, how many isomeric alkyl chlorides would yield 2-methylbutane?

a) 2
b) 3
c) 4
d) 5

335. Ether on reacting with P_2S_5 form

a) Diethyl sulphide b) Thioalcohol c) Thioether d) Thioaldehyde

336. The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is:

a) Acidic $KMnO_4$
b) Alkaline $K_2Cr_2O_7$
c) Chromium anhydride in glacial acetic acid
d) Pyridinium chlorochromate

337. For one mole of glycerol, how many mole of acetyl chloride are required for complete acetylation?

a) One b) Two c) Three d) Four

338. In the reaction involving C— OH bond, in alcohols the order of reactivity is:

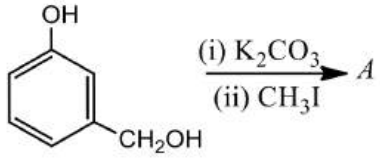
a) $1^\circ > 2^\circ > 3^\circ$ b) $3^\circ > 2^\circ > 1^\circ$ c) $2^\circ > 3^\circ > 1^\circ$ d) None of these

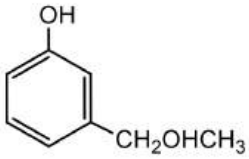
339. Which is not correct?

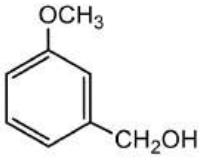
a) Phenol is more acidic than acetic acid.
b) Ethanol is less acidic than phenol.
c) Ethanol has higher boiling point than ethane.
d) Ethane is non-linear molecule.

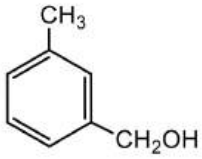
340. Under drastic conditions all the alcohols can be oxidized to carboxylic acids but the following alcohols give carboxylic acids having same number of carbon atoms:
a) Primary
b) Secondary
c) Tertiary
d) None of these

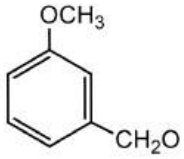
341. The product A is



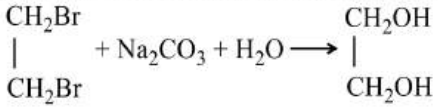
a) 

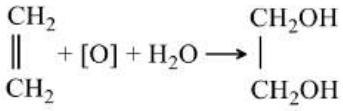
b) 

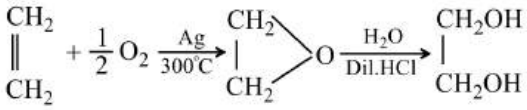
c) 

d) 

342. Glycol is prepared industrially by the following reactions:

a) 

b) 

c) 

d) None of the above

343. Scientific aspect of fermentation was first studied by:
a) Pasteur
b) Brot
c) Buchner
d) Liebig

344. Ethyl alcohol is also known as:
a) Spirit of wine
b) Methyl carbinol
c) Grain alcohol
d) All of these

345. Decreasing order of boiling points of n-pentanol (A), n-pentane (B), 3-pentanol (C) and 2,2-dimethyl propanol (D) is :
a) A, C, D, B
b) B, D, C, A
c) C, A, D, B
d) None of these

346. CH_3COOH reacts rapidly with:
a) CH_3CH_2OH
b) $(CH_3)_2CHOH$
c) $(CH_3)_3COH$
d) All of these

347. Reaction of t-butyl bromide with sodium methoxide produces:
a) Isobutane
b) Isobutylene
c) Sodium t-butoxide
d) t-butyl methyl ether

348. Which of the following reactions can be used for the preparation of tert. butylmethyl ether?
a) $CH_3Br + (CH_3)_3CO^-Na^+ \rightarrow$
b) $(CH_3)_3CCl + CH_3O^-Na^+ \rightarrow$
c) $(CH_3)_3OH + CH_3Cl \rightarrow$
d) $(CH_3)_3CCl + CH_3OH \rightarrow$

349. Alcohols cannot be prepared from

a) $C_2H_5Br + \text{aq. KOH} \rightarrow$
b) $(CH_3)_2C=O \xrightarrow{LiAlH_4}$
c) $CH_3-\overset{\overset{O}{\|}}{C}-OCH_3 \xrightarrow{Na/EtOH}$
d) $CH_3CH_2Cl \xrightarrow{H_2O}$

350. Alcohols of low molecular weight are:
a) Soluble in water
b) Soluble in water on heating
c) Insoluble in all solvents
d) Soluble in all solvents

351. $CH_3CH = CH - \underset{\displaystyle OH}{\underset{|}{CH}} - CH_3 \xrightarrow[\text{reagent}]{\text{Jones}}$? product is

a) $CH_3 - CH_2 - CH_2 - \underset{\displaystyle O}{\underset{||}{C}} - CH_3$

b) $CH_3 - CH = CH - \underset{\displaystyle O}{\underset{||}{C}} - CH_3$

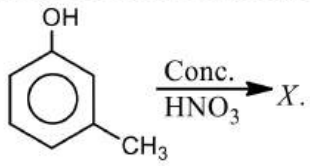
c) $CH_3 - CH_2 - CH_2 - \underset{\displaystyle OH}{\underset{|}{CH}} - CH_3$

d) $CH_3 - CH_2 - COOH$

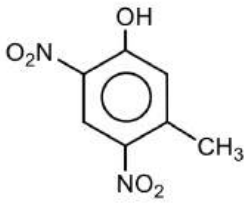
352. 23 g of sodium react with CH_3OH to give:

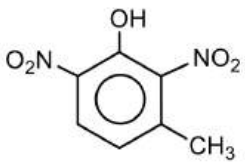
a) 1 mole of O_2 b) 1/2 mole of H_2 c) 1 mole of H_2 d) None of these

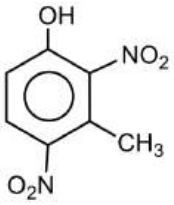
353. In the reaction for dinitration

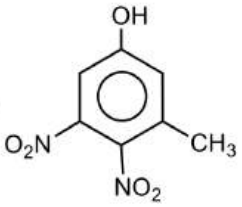


The major dinitrated product X is

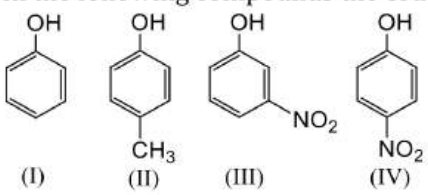
a) 

b) 

c) 

d) 

354. In the following compounds the order of acidic strength is



a) III > IV > I > II b) I > IV > III > II c) II > I > III > IV d) IV > III > I > II

355. Diethyl ether may behave as:

a) Lewis acid b) Lewis base c) Oxidising agent d) Reducing agent

356. For drying ether sodium metal can be used, but it cannot be used for drying ethyl alcohol because:

a) Na is very reactive
b) Ether reacts easily with Na
c) Ethyl alcohol reacts with sodium metal
d) None of the above

357. Saccharification is the process of conversion of:

a) Sugar solution into alcohol
b) Alcohol into starch
c) Starch into alcohol
d) Starch into alcohol

358. $R— CH = CH_2$ reacts with B_2H_6 in presence of H_2O_2 to give:

a) $RCOCH_3$ b) $RCHOHCH_2OH$ c) RCH_2CH_2OH d) RCH_2CHO

359. Sodium phenoxide reacts with CO_2 at 400 K and 4.7 atm pressure to give
a) Catechol b) Salicylaldehyde c) Sodium salicylate d) Benzoic acid

360. The reaction of *iso*-propylbenzene with oxygen in the presence of a catalytic amount of HBr followed by treatment with an acid gives phenol. The reaction proceeds through the intermediate formation of
a) $HO\dot{O}$ b) $C_6H_5-\overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{C^{\bullet}}}}}$ c) $C_6H_5-\overset{CH_3}{\overset{|}{C}}-O-O^{\bullet}$ (CH$_3$ below) d) All of these

361. Product formed when HCHO is heated with KOH (aq):
a) CH_4 b) CH_3CHO c) CH_3OH d) C_2H_2

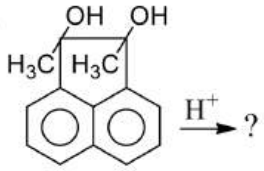
362. Diacetone alcohol is obtained by the reaction of:
a) Acetone and ethanol
b) Acetone and conc. H_2SO_4
c) Acetone and $Ba(OH)_2$
d) Acetone and $Al(OH)_3$

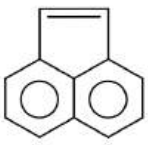
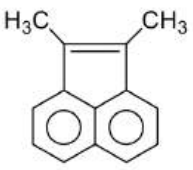
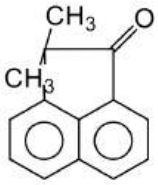
363. The general formula of ether is:
a) R—CHO b) R—CO—R' c) R—O—R' d) R—COOR'

364. The enzyme pepsin hydrolyses:
a) Proteins to amino acids
b) Fats to fatty acids
c) Glucose to ethyl alcohol
d) Polysaccharides to monosaccharides

365. CH_3CH_2OH convert into CH_3CHO in the presence of
a) $Na_2Cr_2O_7$ and NaOH b) $Na_2Cr_2O_7$and dil. H_2SO_4
c) NaOH d) Fe in presence of NaOH

366. Which of the following combinations can be used to synthesise ethanol?
a) CH_3MgI and CH_3COCH_3 b) CH_3MgI and C_2H_5OH
c) CH_3MgI and $CH_3COOC_2H_5$ d) CH_3MgI and HCHO

367. 

Product is
a)  b)  c)  d) 

368. The boiling point of ethyl alcohol is much higher than that of dimethyl ether and C_2H_5SH , though both have the same molecular weight. The reason for this is:
a) Ether is insoluble in water
b) Methyl groups are attached to oxygen in ether
c) Dipole moment of ethyl alcohol is less
d) Ethyl alcohol shows hydrogen bonding

369. Acetylene and formaldehyde interact in the presence of copper acetylide as a catalyst to furnish the compound:
a) Butyne-1, 4-diol b) Butyne-2 c) Ethylene-1, 4-diol d) None of these

370. An unknown compound '*D*' first oxidised to aldehyde and then acetic acid by a dilute solution of $K_2Cr_2O_7$ and H_2SO_4. The compound '*D*' is

a) CH_3OH b) C_2H_5OH c) CH_3CH_2COOH d) CH_3CH_2CHO

371. Glycerol on oxidation with Fenton's reagent produces:

a) Glyceraldehyde
b) Dihydroxy acetone
c) Tartonic acid
d) Glyceraldehyde and dihydroxy acetone

372. An organic compound C_3H_6O neither gives precipitate with semicarbazide nor reacts with sodium. It could be

a) CH_3CH_2CHO b) CH_3COCH_3 c) $CH_2 = CHCH_2OH$ d) $CH_2 = CHOCH_3$

373. Which one among the following is Williamson's synthesis?

a) $\begin{matrix} CH_3 \\ CH_3 \end{matrix}\!\!>\!C=O \xrightarrow[\text{Conc. HCl}]{Zn-Hg} CH_3-CH_2-CH_3$

b) $CH_3-CHO \xrightarrow[-H_2O]{\text{Dil. NaOH}} CH_3-CH=CH-CHO$

c) $C_2H_5I + C_2H_5ONa \longrightarrow C_2H_5 \cdot O \cdot C_2H_5 + NaI$

d) $HCHO \xrightarrow{NaOH} HCOONa + CH_3OH$

374. Which compound is capable of strong hydrogen bonding?

a) C_4H_9OH b) C_3H_7OH c) C_2H_5OH d) $C_5H_{11}OH$

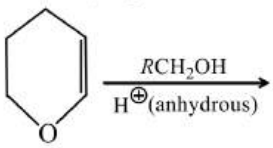
375. $CH{\equiv}CH \xrightarrow{O_3/NaOH} X \xrightarrow{Zn/CH_3COOH} Y$ is:

a) $CH_2OH—CH_2OH$ b) CH_3CH_2OH c) CH_3COOH d) CH_3OH

376. Which of the following statements is not correct?

a) All alcohols are miscible with water
b) Only lower alcohols are miscible with water
c) All alcohols are not poisonous
d) Methanol is not poisonous

377. The major product of the following reaction is:



a) A hemiacetal
b) An acetal
c) An ether
d) An ester

378. Widespread deaths due to liquor poisoning occurs due to presence of:

a) Lead compounds in liquor
b) Methyl alcohol in liquor
c) Ethyl alcohol in liquor
d) Carbonic acid in liquor

379. An alcohol produced during the manufacture of soap is:

a) Butanol b) Glycerol c) Ethanol d) Ethylene glycol

380. Which of the following reactions gives an dialkyl oxonium salt?

a) Ethyl alcohol + sodium metal
b) Diethyl ether + hydrochloric acid
c) Tertiary amine + alkyl halide
d) Nitromethane + sodium metal

381. The reaction of *neo*-pentyl alcohol with concentrated HCl gives

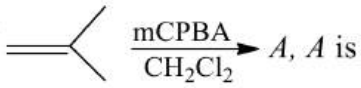
a) *neo*-pentyl chloride b) 2-chloro-2-methylbutane

c) 2-methyl-2-butene

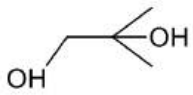
d) A mixture of *neo*-pentyl chloride and 2-methyl-2-butene

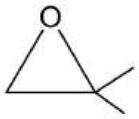
382. RCH_2CH_2OH can be converted to RCH_2CH_2COOH by the following sequence of steps

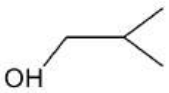
a) PBr_3, KCN, H_3O^+ b) $PBr_3, KCN, H_2/P^+$ c) KCN, H_3O^+ d) HCN, PBr_3, H_3O^+

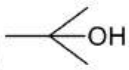
383. 

A, A is

a) 

b) 

c) 

d) 

384. When phenyl magnesium bromide reacts with *t*-butanol, the product would be

a) Benzene b) Phenol c) *t*-butyl benzene d) *t*-butyl phenyl ether

385. Which of the following is not cleaved by HIO_4?

A. Glycerol *B*. Glycol

C. Propan-1,3-diol *D*. Methoxy-2-propanol

a) *A*, *B*, *C*, *D* b) *A*, *B* c) *B*, *C* d) *C*, *D*

386. Ethyl propanoate on reduction with $LiAlH_4$ yeilds:

a) Methanol

b) Ethanol and propanol

c) Propane

d) Mixture of ethanol and methanol

387. When acetyl chloride is reduced with $LiAlH_4$, the product formed is:

a) Methyl alcohol b) Ethyl alcohol c) Acetaldehyde d) Acetone

388. The correct order of acid strength of the following compounds is

V. Phenol

VI. *p*-cresol

VII. *m*-nitrophenol

VIII. *p*-nitrophenol

a) III > II > I > IV b) IV > III > I > II c) II > IV > I > III d) I > II > IV > III

389. Alkyd resins, made of glycerol are used:

a) As substitute for white chalk

b) Instead of alkanes

c) For paints and coatings

d) For making alcohol

390. Which reagent is more effective to convert but-2-enal to but-2-enol?

a) $KMnO_4$

b) $NaBH_4$

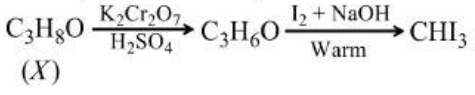
c) H_2/Pt

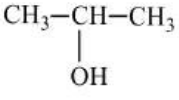
d) $K_2Cr_2O_7/H_2SO_4$

391. An organic compound *A* containing C, H and O has a pleasant odour with boiling point of 78°C. On boiling *A* with concentrated H_2SO_4, a colourless gas is produced which decolourises bromine water and alkaline $KMnO_4$. The organic liquid *A* is

a) C_2H_5Cl b) $C_2H_5COOCH_3$ c) C_2H_5OH d) C_2H_6

392. Identify (*X*) in the sequence:



a) $CH_3—CH_2—CH_2OH$ b) 

c) $CH_3—O—CH_2—CH_3$ d) $CH_3—CH_2—CHO$

393. Phenol on reaction with $CHCl_3$ and NaOH give benzaldehyde. Intermediate of this reaction is
a) Carbocation b) Carbanion c) Radical d) Carbene

394. Increasing order of acid strength among *tert*. butanol, isopropanol and ethanol is:
a) Ethanol, isopropanol, *tert*. butanol
b) *tert*. butanol, isopropanol, ethanol
c) Isopropanol, *tert*. butanol, ethanol
d) *tert*. butanol, ethanol, isopropanol

395. A neutral compound gives colour with ceric ammonium nitrate. It suggests that the compound has:
a) Alcohol gp. b) Aldehyde gp. c) Ether gp. d) Ketone gp.

396. $CH_3OH \xrightarrow{CH_2=C=O} A \xrightarrow{\text{Rearrangement}} CH_3-\underset{\underset{O}{\|}}{C}-OCH_3$

In the above reaction *A* is

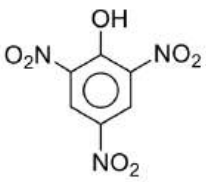
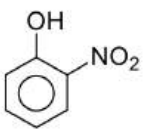
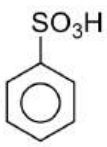
a) $CH_3-\underset{\underset{OH}{|}}{C}=CH_2$ b) $CH_2=\underset{\underset{OH}{|}}{C}-OCH_3$ c) $CH_2 = CHOH$ d) None of these

397. Which compound will have highest boiling point?
a) CH_4 b) CH_3OH c) C_2H_5OH d) HCHO

398. What is formed when glycerol reacts with excess of HI?

a) $\begin{matrix}CH_2OH\\|\\CHI\\|\\CH_2OH\end{matrix}$ b) $\begin{matrix}CH_2\\\|\\CH\\|\\CH_2I\end{matrix}$ c) $\begin{matrix}CH_3\\|\\CHI\\|\\CH_3\end{matrix}$ d) $\begin{matrix}CH_2OH\\|\\C=O\\|\\CH_3\end{matrix}$

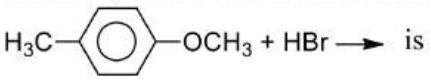
399. Which of the following is not soluble in $NaHCO_3$ solution?

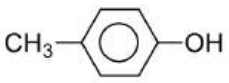
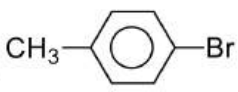
a)  b)  c)  d) 

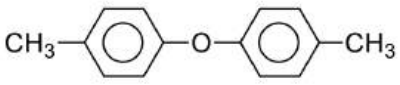
400. Pyroligneous acid doesn't contain
a) Acetic acid b) C_2H_5OH c) CH_3OH d) CH_3COCH_3

401. Power alcohol is a mixture of petrol and alcohol in the ratio:
a) 4 : 1 b) 1 : 4 c) 2 : 1 d) 1 : 2

402. The final product obtained in the reaction,

 is

a)  b) 

c)  d) None of the above

403. Which one of the following gases is liberated when ethyl alcohol is heated with methyl magnesium iodide?
a) Methane b) Ethane c) Carbon dioxide d) Propane

404. Phenol $\xrightarrow{X}$ forms a tribromo derivative "*X*" is
a) Bromine in benzene b) Bromine in water
c) Potassium bromide solution d) Bromine in carbon tetrachloride at 0°C

405. Phenol is more acidic than alcohol because
a) Phenol is more soluble in polar solvents b) Alcohol does not lose hydrogen atom

c) Phenoxide ion is stabilised by resonance
d) Phenoxide ion doesn't exhibit resonance

406. Which of the following is the best method for making *iso*-propylmethyl ether?
a) $CH_3I + (CH_3)_2CHOH \rightarrow$
b) $CH_3I + (CH_3)_2CHO^- \rightarrow$
c) $(CH_3)_2CHI + CH_3O^- \rightarrow$
d) $(CH_3)_2CHCl + CH_3OH \rightarrow$

407. If the boiling point of ethanol (molecular weight=46) is 78°C, what is the boiling point of diethyl ether? (molecular weight=74)
a) 100°C
b) 78°C
c) 86°C
d) 34°C

408. An organic compound *A* reacts with PCl_5 to give*B*. The compound *B* with sodium metal gives *n*-butane. Thus, *A* and *B* are:
a) C_2H_5OH and C_2H_5Cl
b) C_2H_5Cl and C_2H_5ONa
c) C_3H_7OH and $CH_3CH_2CH_2OCl$
d) C_4H_9OH and C_4H_9OCl

409. Acetic acid is obtained from ethyl alcohol by the process of:
a) Distillation
b) Reduction
c) Fermentation
d) Dehydration

410. Intermolecular dehydration of alcohols gives:
a) Alkenes
b) Ketones
c) Alkynes
d) Ethers

411. Glycerol on warming with excess of HI:
a) 2-iodopropane
b) 1-iodopropane
c) 1,2,3-tri-iodopropane
d) None of these

412. Cumene process is the most important commercial method for the manufacture of phenol. Cumene is
a) 1-methyl ethyl benzene
b) Ethyl benzene
c) Vinyl benzene
d) Propyl benzene

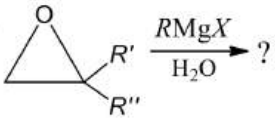
413. Which of the following alcohols cannot be oxidized by potassium dichromate in the presence of sulphuric acid?

a) CH_3CH_2OH
b) C_6H_5OH
c) $C_6H_5CHOHCH_3$
d) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-OH$

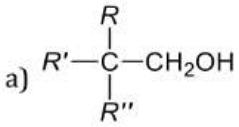
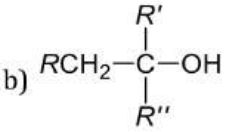
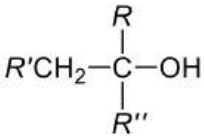
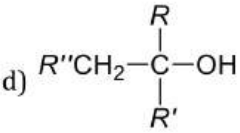
414. Which of the following is stable compound?
a) $CCl_3CH(OH)_2$
b) $CH_2=CHOH$
c) $CH_3—CH(OH)_2$
d) $HC(OH)_3$

415. $(CH_3)_2\underset{\displaystyle CH_3}{\overset{|}{C}}HCHOH \xrightarrow[-H_2O]{\text{Acid}} X$

The major product obtained in this reaction is
a) $(CH_3)_2CHCH = CH_2$
b) $(CH_3)_2C = CH - CH_3$
c) 1 : 1 mixture of (a) and (b)
d) None of the above

416. 

Product obtained is

a) 
b) 
c) 
d) 

417. The reaction involved in the oil of winter green test is salicylic acid $\xrightarrow[\text{Conc.}H_2SO_4]{\Delta}$ product. The product is treated with Na_2CO_3 solution. The missing reagent in the above reaction is
a) Phenol b) NaOH c) Ethanol d) Methanol

418. An example of a compound with functional group —O— is:
a) Acetic acid b) Methyl alcohol c) Diethyl ether d) Acetone

419. Phenol gives characteristic colouration with
a) Iodine solution
b) Bromine water
c) Aqueous $FeCl_3$ solution
d) Ammonium hydroxide

420. The correct order of the ease with which primary, secondary and tertiary alcohols can be dehydrated using concentrated $H_2SO_4$is :
a) Tertiary > secondary > primary
b) Primary > secondary > tertiary
c) Secondary > tertiary > primary
d) Secondary > primary > tertiary

421. Which are explosives?
a) Wood pulp (dynamite)
b) Cellulose nitrate (blasting gelatin)
c) Gun cotton or cellulose nitrate and Vaseline (cordite)
d) All of the above

422. Some time explosion occurs while distilling ethers. It is due to the presence of
a) Oxide b) Ketones c) Aldehyde d) Peroxides

423. Acidity of phenol is due to
a) Hydrogen bonding
b) Phenolic group
c) Benzene ring
d) Resonance stabilisation of its anion

424. Glycerol on reacting with sodium gives:
a) Disodium glycerollate
b) Monosodium glycerollate
c) Trisodium glycerollate
d) None of the above

425. The compound which reacts fastest with Lucas reagent at room temperature is
a) 1-butanol b) 2-butanol c) 2-methylpropanol d) 2-methylpropan-2-ol

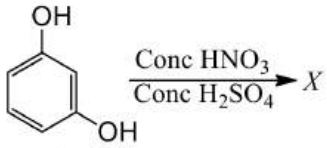
426. Mild oxidation of glycerol with $H_2O_2/FeSO_4$ gives
a) Glyceraldehyde
b) Dihydroxy acetone
c) Both (a) and (b)
d) None of the above

427. To prepare 2-propanol from CH_3MgI, the other chemical required is:
a) HCHO b) CH_3CHO c) C_2H_5OH d) CO_2

428. The first oxidation product of primary alcohol is:
a) A ketone b) An ester c) An aldehydes d) A hydrocarbon

429. Phenol is soluble in water because
a) Of weak hydrogen bonding between phenol and water molecules
b) Of intermolecular hydrogen bonding between phenol molecules
c) If has a higher boiling point than that of water
d) None of the above

430. Consider the following reaction,



product *X* is

a) Picric acid b) Styphnic acid c) Salicylic acid d) Benzoic acid

431. Glycerol on treatment with oxalic acid at 110°C forms:
a) Formic acid b) CO_2 and CO c) Allyl alcohol d) glycol

432. At 530 K, glycerol reacts with oxalic acid to produce
a) Allyl alcohol b) Formic acid c) Glyceraldehydes d) Formaldehyde

433. Absolute alcohol is prepared from rectified spirit by:
a) Fractional distillation
b) Steam distillation
c) Azeotropic distillation
d) Vacuum distillation

434. Williamson's synthesis is used to prepare
a) Diethyl ether b) Acetone c) PVC d) Bakelite

435. Anisole can be prepared by the action of methyl iodide on sodium phenate. The reaction is called
a) Wurtz's reaction b) Williamson's reaction
c) Fittig's reaction d) Etard's reaction

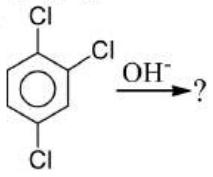
436. When *o*-or *p*-phenol sulphonic acid is treated with bromine water, the product formed is
a) 2, 4-dibromophenol b) 2, 4, 6-tribromophenol
c) 3-bromophenol boric acid d) 3, 5-dibromophenol

437. Esterification of alcohols involves:
a) H of alcohol and OH of acid
b) OH of alcohol and H of acid
c) OH of alcohol and OH of acid
d) H of alcohol and H of acid

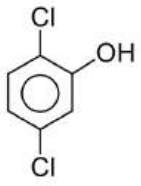
438. An organic liquid *A* containing C, H and O has a pleasant odour with a b.p. of 78°C. On boiling *A* with conc. H_2SO_4 a colourless gas is produced which decolourises bromine water and alkaline $KMnO_4$. One mole of this gas also takes one mole of H_2. The organic liquid *A* is:
a) C_2H_5Cl b) C_2H_5CHO c) C_2H_6 d) C_2H_5OH

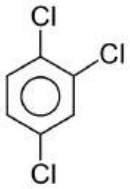
439. In the presence of an acid catalyst, two alcohol molecules will undergo dehydration to give:
a) Ester
b) Anhydride
c) Ether
d) Unsaturated hydrocarbon

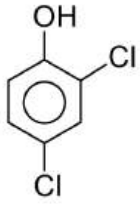
440. Complete combustion of ether gives:
a) C_2H_5OH b) CO_2 and H_2O c) C_2H_4 d) C_2H_2

441. 

Product is

a) 

b) 

c) 

d) Both (a) and (b)

442. $CH_3CH_2OH \xrightarrow[\text{step}-1]{Cl_2} CH_3CHO \xrightarrow[\text{step}-2]{3Cl_2} Cl_3CCHO$

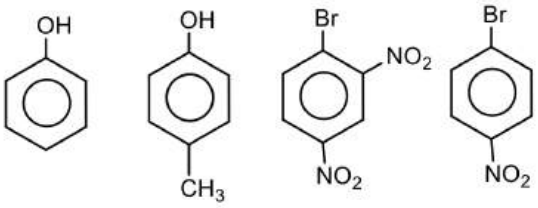
In above reactions the role of Cl_2 in step-1 and step-2 respectively is

a) Oxidation, chlorination
b) Reduction, chlorination
c) Oxidation, addition
d) Reduction, substitution

443. An enzyme which brings about the conversion of starch into maltose is known as:

a) Maltase
b) Zymase
c) Invertase
d) Diastase

444. Strength of acidity is in order



(I) (II) (III) (IV)

a) II > I > III > IV
b) III > IV > I > II
c) I > IV > III > II
d) IV > III > I > II

445. Ethyl alcohol is denatured by:

a) Methanol and formic acid
b) KCN
c) CH_3OH and C_6H_6
d) CH_3OH and pyridine

446. For the sequence of reaction,

$A \xrightarrow{C_2H_5MgI} B \xrightarrow{H_2O/H^+} tert-$ pentyl alcohol.

The compound A in the sequence is

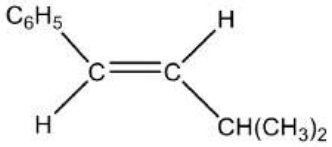
a) 2-butanone
b) Acetaldehyde
c) Acetone
d) Propanal

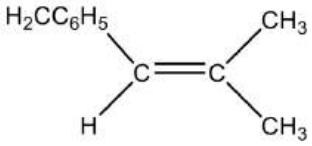
447. A compound with molecular formula $C_4H_{10}O_3$ is converted by the action of acetyl chloride to a compound with molecular weight 190. The original compound has:

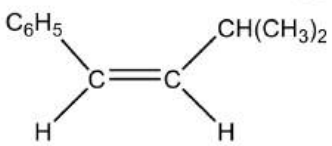
a) One OH group
b) Two OH groups
c) Three OH groups
d) No OH group

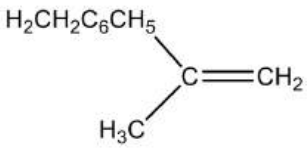
448. The main product of the following reaction is

$C_6H_5CH_2CH(OH)CH(CH_3)_2 \xrightarrow{Conc.H_2SO_4} ?$

a) 

b) 

c) 

d) 

449. Which of the following compound is oxidised to prepare methyl ethyl ketone?

a) 2-propanol
b) 1-butanol
c) 2-butanol
d) Ter-butyl alcohol

450. The value of C—O—C angle in ether molecule is:

a) 180°
b) 150°
c) 90°
d) 110°

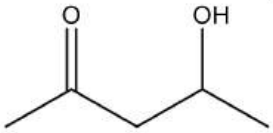
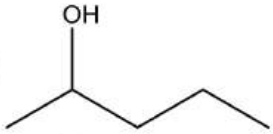
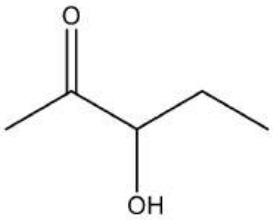
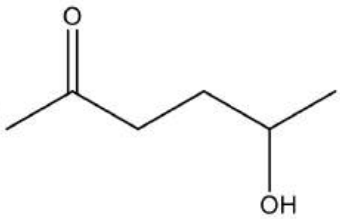
451. What amount of bromine will be required to convert 2 g of phenol into 2, 4, 6-tribromo phenol?
a) 4.00 b) 6.00 c) 10.22 d) 20.44

452. Chlorex which is a good solvent for aromatic impurities is:
a) Dichloro dimethyl ether
b) Dichlorodiethyl ether
c) Mono chloro ether
d) Diethyl ether

453. The characteristic group of secondary alcohol is:
a) $-CH_2OH$
b) $>CHOH$
c) $-\!\!<\!\!COH$
d) $-COOH$

454. The compound on dehydrogenation gives a ketone. The original compound is
a) Primary alcohol b) Secondary alcohol c) Tertiary alcohol d) Carboxylic acid

455. 1-phenyl ethanol can be prepared from benzaldehyde by the action of:
a) CH_3Br b) CH_3Br and $AlBr_3$ c) CH_3I, Mg and HOH d) C_2H_5I and Mg

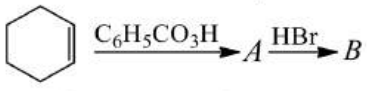
456. Which one of the following will most readily be dehydrated in acidic conditions?
a) 
b) 
c) 
d) 

457. On reduction with $LiAlH_4$, a ketone yields:
a) Primary alcohol b) Secondary alcohol c) Tertiary alcohol d) All of these

458. The decreasing order of boiling points of 1°, 2°, 3° alcohol is:
a) 1° > 2° > 3° b) 3° >2° > 1° c) 2° >1° > 3° d) None of these

459. The formula for vinyl alcohol is:
a) $CH_2=CHCH_2OH$ b) $C_6H_5CHOHCH_3$ c) $CH_2=COHCH_3$ d) $CH_2=CHOH$

460. Consider the reaction,



A and *B* respectively are
a) 1, 2-epoxycyclohexane, *trans*-2-bromocyclohexanol
b) 1, 2-epoxycyclohexane, *cis*-2- bromocyclohexanol
c) *trans*-2 bromocyclohexanol 1,2-epoxyethane
d) *cis*-2- bromocyclohexanol 1,2-epoxyethane

461. Alcoholic fermentation of sugar gives 3% glycerol. The yield can be increased to 25% if fermentation is made in presence of:
a) Na_2SO_4 b) Na_3PO_4 c) Na_2S d) None of these

462. The reaction,

$$CH_3COOH + HOC_2H_5 \xrightarrow[HCl]{Dry} CH_3COOC_2H_5 + H_2O$$

is called :
a) Fischer-Speier esterification

b) Clemmensen condensation
c) Claisen condensation
d) None of the above

463. When isopropyl alcohol vapours are passed over heated copper it gives:
a) Acetone b) Ethyl alcohol c) Methyl alcohol d) Acetaldehyde

464. Glycol on oxidation with....gives oxalic acid.
a) Acidic $KMnO_4$ b) Acidic $K_2Cr_2O_7$ c) Nitric acid d) HIO_4

465. When compound X is oxidised by acidified potassium dichromate, compound Y is formed. Compound Y on reduction with $LiAlH_4$ gives X. X and Y respectively are
a) C_2H_5OH, CH_3COOH
b) CH_3COCH_3, CH_3COOH
c) C_2H_5OH, CH_3COCH_3
d) CH_3CHO, CH_3COCH_3

466. The reaction of ethanol with H_2SO_4 does not give:
a) C_2H_4 b) $C_2H_5OC_2H_5$ c) C_2H_2 d) $C_2H_5HSO_4$

467. Lucas reagent produces cloudiness immediately with:
a) n-butanol b) Isopropanol c) n-propanol d) Tertiary butanol

468. Primary alcohols can be obtained from the reaction of the RMgX with:
a) HCHO b) H_2O c) CO_2 d) CH_3CHO

469. The major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide is
a) Benzoic acid b) Salicyladehyde c) Salicylic acid d) Phthalic acid

470. Chlorobenzene $\xrightarrow[X]{\text{Reaction}}$ Phonel $\xrightarrow[Y]{\text{Reaction}}$
Salicyladehyde X and Y reactions are respectively.....
a) Fires rearrangement and Kolbe-Schmidt b) Cumene and Reimer-Tiemann
c) Dow and Reimer-Tiemann d) Dow and Friedel-Craft

471. Phenol $\xrightarrow{NaNO_2/H_2SO_4} B \xrightarrow{H_2O} C \xrightarrow{NaOH} D$
Name of the above reaction is
a) Liebermann's reaction b) Phthalein fusion test
c) Reimer-Tiemann reaction d) Schotten-Baumann reaction

472. Vinyl carbinol is:
a) $HOH_2C—CH=CH_2$ b) $CH_3C(OH)=CH_2$ c) $CH_3—CH=CH—OH$ d) $CH_3—\underset{\displaystyle CH_3OH}{\overset{\displaystyle |}{C}}=CH_2$

473. Choose the incorrect statement
a) Ordinary ethyl alcohol is known as rectified spirit
b) The alcohol sold in the market for polishing etc, is known as methylated spirit
c) Absolute alcohol is 100% ethanol
d) Power alcohol is 100% ethanol

474. The reaction of ethanol with concentrated H_2SO_4 at room temperature gives
a) $CH_3CH_2OH_2^+HSO_4^-$ b) $CH_3CH_2OSO_2OH$
c) $CH_3CH_2OCH_2CH_3$ d) $H_2C=CH_2$

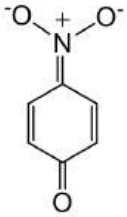
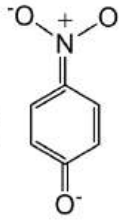
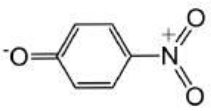
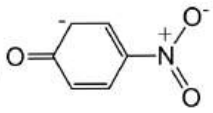
475. H_2C—CH_2 (O) $\xrightarrow[(ii)\ H_2O]{(i)\ CH_3MgCl} X \xrightarrow[(ii)H_2O]{(i)CH_3MgCl} X$
The product obtained in this reaction is
a) CH_3CH_2OH b) $(CH_3)_2CHOH$
c) $CH_3CH_2CH_2OH$ d) $HO-CH_2-CH_2-CH_2-CH_2-OH$

476. When ethylene glycol is heated with a mixture of concentrated HNO_3 and concentrated H_2SO_4, it produces
a) COOH b) $CO_2 + H_2$ c) CH_2ONO_2 d) CH_2ONO_2

$COOH$	CH_2ONO_2	CH_2OH

477. Cyclohexanol on reaction with PBr_3 in presence of pyridine gives
a) Bromocyclohexane b) Bromocyclohexane c) 1-bromocyclohexanol d) None of these

478. On treatment with a concentrated solution of zinc chloride in concentrated HCl at room temperature, an alcohol immediately gives, an oily product. The alcohol can be
a) $C_6H_5CH_2OH$
b) $CH_3CHOHCH_3$
c) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-OH$
d) Any of these

479. The most unlikely representation of resonance structures of *p*-nitrophenoxide ion is
a) 
b) 
c) 
d) 

480. Ethylene glycol gives oxalic acid on oxidation with
a) Acidified $K_2Cr_2O_7$ b) Acidified $KMnO_4$ c) Alkaline $KMnO_4$ d) Periodic acid

481. In the reaction,
$$CH_3-\underset{\displaystyle OH}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2 \xrightarrow{Conc.H_2SO_4} A$$ the product *A* is
a) $CH_3-\overset{\displaystyle CH_3}{\overset{|}{C}}=CH_2$ b) $CH_3-\overset{\displaystyle H}{\overset{|}{C}}=\overset{\displaystyle H}{\overset{|}{C}}-CH_3$ c) $CH_3-CH_2-\overset{\displaystyle CH_3}{\overset{|}{C}}=O$ d) $CH_3-\overset{\displaystyle CH_3}{\overset{|}{CH}}-CHO$

482. Diethyl ether may be regarded as anhydride of:
a) C_2H_5COOH b) C_2H_5OH c) C_2H_5CHO d) $C_2H_5COOC_2H_5$

483. Glycol reacts withPCl_3 and gives ethylene dichloride. What will be the product, if it reacts with $P + I_2$?
a) Ethylene iodide b) Ethylene iodohydrin c) Ethylene d) None of these

484. Methyl alcohol reacts with phosphorus trichloride to form:
a) Methane b) Methyl chloride c) Acetyl chloride d) Dimethyl ether

485. Arrange the following in order of decreasing acidic strength. *p*-nitrophenol (I), *p*-cresol (II), *m*-cresol (III), phenol (IV)
a) I > II > III > IV b) IV > III > II > I c) I > III > II > IV d) III > II > I > IV

486. A diazonium chloride reacts with ϕOH to give an azodye. The reaction is called
a) Diazotisation b) Condensation c) Coupling d) Reduction

487. Which alcohol is most acidic?
a) Methanol b) Ethanol c) Isopropyl alcohol d) t-butyl alcohol

488. Which reagent can distinguish C_2H_5OH and ϕ OH?
a) $SOCl_2$ b) CH_3COCl c) $(CH_3CO)_2O$ d) CH_3COOH

489. *Iso*-butyl alcohol $\xrightarrow{P/I_2}\xrightarrow{AgNO_2}\xrightarrow{HNO_2}\xrightarrow{NaOH} A$
True statement about *A* is

a) Blue coloured solution
b) Blue precipitate
c) Red precipitate
d) Red coloured solution

490. Acetone on reduction gives:
a) CH_3COOH b) CH_3CHO c) C_2H_5OH d) $(CH_3)_2CHOH$

491. Sodium ethoxide and ethyl chloride on heating will give:
a) Ether b) Ethyl alcohol c) Acetaldehyde d) Acetic acid

492. Pinacol is
a) 3-methylbutan-2-ol
b) 2, 3-dimethyl-2, 3-butanediol
c) 2, 3-dimethyl-2-propanone
d) None of the above

493. The product in the reaction is:

$$C_2H_5OH \xrightarrow{P + I_2} A \xrightarrow[Ether]{Mg} B \xrightarrow{HCHO} C \xrightarrow{H_2O} D$$

a) Propanal b) Butanal c) n-butanol d) n-propanol

494. In esterification of an acid, the other reagent is:
a) Aldehyde b) Alcohol c) Amine d) Water

495. C_2H_5OH and C_2H_5OH can be distinguished by
a) $Br_2 + H_2O$ b) $FeCl_3$ c) $I_2 + NaOH$ d) Both (b) and (c)

496. Identify (Z) in the series:

$$CH_2{=}CH_2 \xrightarrow{HBr} (X) \xrightarrow{Hydrolysis} (Y) \xrightarrow[I_2\ (excess)]{NaOH} (Z)$$

a) C_2H_5I b) C_2H_5OH c) CHI_3 d) CH_3CHO

497. Phenol can be converted to o-hydroxybenzaldehyde by
a) Kolbe's reaction
b) Reimer-Tiemann reaction
c) Wurtz reaction
d) Cannizaro reaction

498. An organic compound 'X' with molecular formula, C_7H_8O is insoluble in aqueous $NaHCO_3$ but dissolves in NaOH. When treated with bromine water 'X' rapidly gives 'Y' $C_7H_5OBr_3$.
The compounds 'X' and 'Y' respectively, are
a) Benzyl alcohol and 2, 4, 6-tribromo-3-methoxy benzene
b) Benzyl alcohol and 2, 4, 6-tribromo-3-methyl phenol
c) o-cresol and 3, 4, 5-tribromo-2-methyl phenol
d) Methoxybenzene and 2, 4, 6-tribromo-3-methoxy benzene

499. Which of the following compound would not evolve CO_2 when treated with $NaHCO_3$ solution?
a) Salicylic acid b) Phenol c) Benzoic acid d) 4-nitrobenzoic acid

500. For which pair iodoform test cannot be used as distinction test?
a) Propanol-1 and propanol-2
b) Butanol-2 and 2-methyl propan-2-ol
c) Butanol-1 and butanol-2
d) Pentanol-1 and pentanol-3

501. Tonics usually contain small amount of:
a) Formalin b) Vinegar c) Alcohol d) Ether

502. Primary, secondary and tertiary alcohols can be distinguished by performing
a) Beilstein's test b) Victor Meyer's test c) Fehling's solution test d) Hofmann's test

503. Ethanol reacts with thionyl chloride to give ethyl chloride and:
a) S, SO_2 b) SO_2, HCl c) Cl_2, SO_3 d) SO_3, HCl

504. The product C in the following sequence of reaction,

$$C_2H_5Br \xrightarrow{NaOH\ (aq)} A \xrightarrow{Na} B \xrightarrow{CH_3I} C \text{ is:}$$

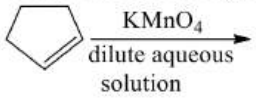
a) Butane b) Ethane c) Methyl ethyl ether d) propane

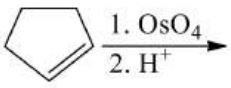
505. Which of the following is an anaesthetic?
a) Ether b) Thiobarburates c) Trichloromethane d) All of these

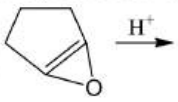
506. In the reaction,

$C_2H_5OH \xrightarrow[300°C]{Cu} X$
(vapour)
The molecular formula of X is
a) C_4H_6O b) $C_4H_{10}O$ c) C_2H_4O d) C_2H_6

507. In which of the following bond angles on sp^3-hybridized are not contracted due to lone pair of electron?
a) OF_2 b) H_2O c) CH_3OCH_3 d) CH_3OH

508. By which the following reactions can *trans*-cyclopentane-1, 2-diol be obtained?
a) 

b) 

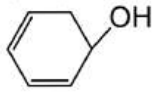
c) 

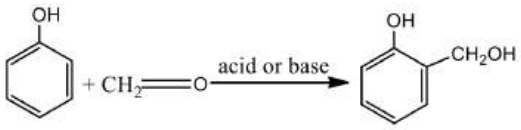
d) None of these

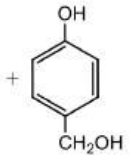
509. A compound X, when boiled with Na_2CO_3 solution gives glycol as the product. What is X ?
a) Ethylene
b) Ethylene oxide
c) Ethyl bromide
d) Ethyl hydrogen sulphate

510. Glycerol is present as a triester in:
a) Petroleum b) Kerosene oil c) Vegetable oil and fats d) Naphtha

511. To prepare $\phi - \underset{\underset{OH}{|}}{\overset{\overset{C_2H_5}{|}}{C}} - C_2H_5$ by $RMgX$ which is the incorrect pair?
a) $\phi\ MgBr + (C_2H_5)_2CO \xrightarrow[H_2O]{}$
b) $C_2H_5MgBr + \begin{matrix}\phi \\ H_5C_2\end{matrix}\!\!>\!C{=}O \xrightarrow[H_2O]{}$
c) $C_2H_5MgBr + \phi COCH_2CH_3 \xrightarrow[H_2O]{}$
d) $\phi MgBr + C_2H_5COCH_3 \xrightarrow[H_2O]{}$

512. Which alcohol cannot be oxidized by MnO_2?
a) $CH_2 = CH - CH_2CH_2OH$
b) $CH_3 - CH = CH - CH_2OH$
c) ϕCH_2OH
d) 

513. The reaction,




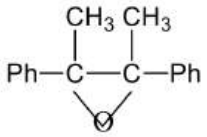
Is called
a) Laderer Mannasse reaction b) Claisen condensation

c) Benzoin condensation d) Etard reaction

514. An alcohol is not oxidised in alkaline or neutral solution but in acidic solution it is turned first to acetone and then to acetic acid. It is a:

a) Primary alcohol b) Secondary alcohol c) Tertiary alcohol d) None of these

515. In the reaction $Ph-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-Ph \xrightarrow{Conc.H_2SO_4} A$ The product A is

a) $Ph-\overset{\overset{CH_3}{|}}{C}=\overset{\overset{CH_3}{|}}{C}-Ph$ b)  c) $Ph-\underset{\underset{Ph}{|}}{\overset{\overset{CH_3}{|}}{C}}-\overset{\overset{O}{||}}{C}-CH_3$ d) $Ph-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3O}{|}}{C}}-\overset{\overset{O}{||}}{C}-Ph$

516. Which reagent will convert propionic acid to propanol-1?

a) $KMnO_4$ b) $LiAlH_4$ c) Cr_2O_3 d) MnO_2

517. Which of the following is a gas?

a) Methane thiol b) Ethane thiol c) Isobutyl thiol d) Propyl thiol

518. Alcohols may behave as:

a) Bronsted acid b) Lewis base c) Neutral d) All of these

519. The reaction;

$RCOOH \xrightarrow{C_2H_5OH+Na} RCH_2OH$ is called:

a) Corey House reaction
b) Bonveault-Blanc reaction
c) Clemmensen reduction
d) None of the above

520. Absolute alcohol is prepared by

a) Vacuum distillation b) Azeotropic distillation
c) Steam distillation d) None of the above

521. On heating glycerol with conc. H_2SO_4, a compound is obtained which has bad odour. The compound is:

a) Acrolein b) Formic acid c) Allyl alcohol d) Methyl isocyanide

522. Pyroligneous acid contains:

a) CH_3COOH (10 %), CH_3Ob) C_2H_5OH (10 %), CH_3OHc) CH_3COCH_3 (10%), C_2H_5d) None of the above

523. Ethyl alcohol reacts with HCl but not with HCN because:

a) C_2H_5OH is weak base and HCN is weak base
b) C_2H_5OH is strong acid and HCN is weak acid
c) HCl is strong acid and C_2H_5OH is weak base
d) None of the above

524. When wine is put in air it becomes sour due to:

a) Oxidation of C_2H_5OH into CH_3COOH
b) Bacteria
c) Virus
d) Formic acid formation

525. Dunstan' s test is used for identification of

a) Acetone b) Ethanol c) Glycerol d) Glycol

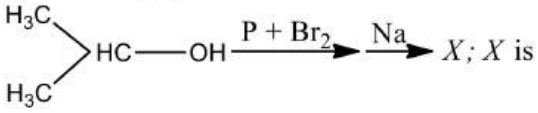
526. An alcohol on oxidation is found to give CH_3COOH and CH_3CH_2COOH. The alcohol is:

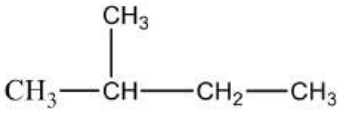
a) $CH_3CH_2CH_2OH$ b) $(CH_3)_2C(OH)CH_2CH_3$ c) $CH_3(CH_2)_2CHOH$ d) $CH_3CH(OH)CH_2CH_2CH_3$

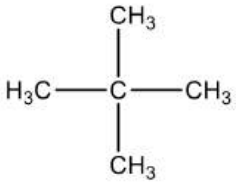
527. The enzymes which are used to convert starch into ethyl alcohol are

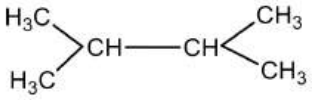
a) Maltase, diastase b) Diastase, maltase, zymase

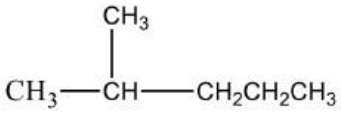
c) Invertase, zymase
d) Invertase, diastase, maltase

528. 

a) 

b) 

c) 

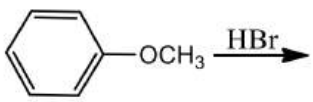
d) 

529. Ethyl alcohol can be prepared from Grignard reagent by the reaction of
a) HCHO b) R_2CO c) RCN d) $RCOCl$

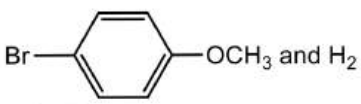
530. The correct order of the solubility of different alcohols in water is
a) Ethanol > n-propanol > n-butyl alcohol
b) n-propyl alcohol > ethyl alcohol > n-butyl alcohol
c) ethyl alcohol > n-butyl alcohol > n-propyl alcohol
d) n-butyl alcohol > n-propyl alcohol > ethyl alcohol

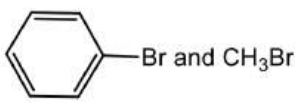
531. Germinated Barley (an enzyme) is a source of enzyme:
a) Zymase b) Diastase c) Maltase d) Invertase

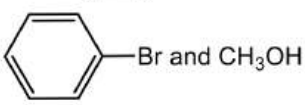
532. In the reaction,

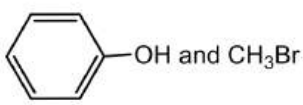


The products are

a) 

b) 

c) 

d) 

533. Methylphenyl ether can be obtained by reacting
a) Phenolate ions and methyl iodide
b) Methoxide ions and bromobenzene
c) Methanol and phenol
d) Bromobenzene and methyl bromide

534. $C_6H_5 - CH = CHCHO \xrightarrow{X} C_6H_5CH = CHCH_2OH$
In the above sequence X can be
a) H_2/Ni
b) $NaBH_4$
c) $K_2Cr_2O_7/H^+$
d) Both (a) and (b)

535. To distinguish between salicylic acid and phenol one can use
a) $NaHCO_3$ solution b) 5% NaOH solution c) Neutral $FeCl_3$ d) Bromine water

536. Diethyl ether finds its use in medicine as:
a) Pain killer b) Hypnotic c) Antiseptic d) Anaesthetic

537. Ethyl chloride reacts with sodium ethoxide to form a compound A. Which of the following reactions also yields A?

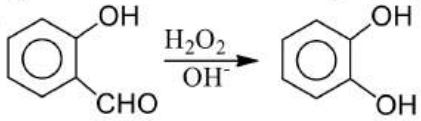
a) C_2H_5Cl, KOH (alc.), Δ
b) $2C_2H_5OH$, conc. H_2SO_4, 140°C
c) C_2H_5Cl, Mg(dry ether)
d) C_2H_2, dil H_2SO_4, $HgSO_4$

538. 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

a) Butanal
b) *n*-butyl alcohol
c) *n*-propyl alcohol
d) Propanal

539. 

This reaction is called

a) Reimer-Tiemann reaction
b) Liebermann's nitroso reaction
c) Dakin reaction
d) Lederer -Manasse reaction

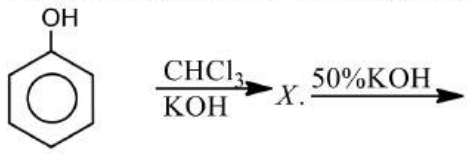
540. Carbocation is not the intermediate in

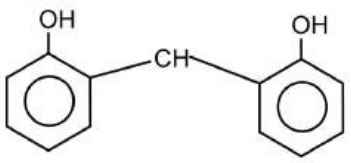
a) Hydroboration-oxidation of an alkene
b) Oxymercuration-demercuration of an alkene
c) Reation of HCl with CH_3CH_2OH
d) All of the above

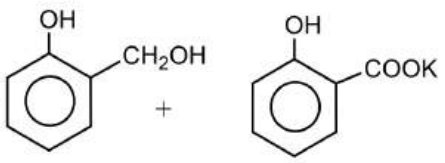
541. The number of isomeric alcohols of formula $C_4H_{10}O$ is:

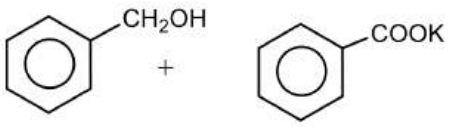
a) 2
b) 4
c) 7
d) 8

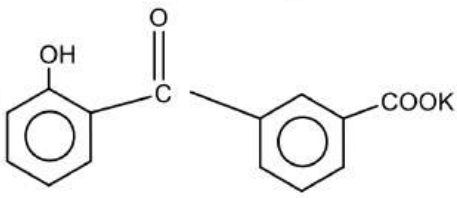
542. The final product of the following reaction is/are



a) 

b) 

c) 

d) 

543. Anisole is the product obtained from phenol by the reaction known as

a) Coupling
b) Etherification
c) Oxidation
d) Esterification

544. Propan-1-ol can be prepared from propane by

a) H_2O/H_2SO_4
b) $Hg(OAc)_2H_2O$ followed by $NaBH_4$
c) B_2H_6 followed by H_2O_2
d) CH_3CO_2H/H_2SO_4

545. Lubricant used in watch is:

a) Coconut oil
b) Pine oil
c) Animal oil
d) Glycerol

546. Methyl alcohol on oxidation with acidified $K_2Cr_2O_7$ gives:

a) CH_3COCH_3
b) CH_3CHO
c) HCOOH
d) CH_3COOH

547. Lucas reagent is a mixture of:

a) Conc. HCl + anhydrous $ZnCl_2$
b) Conc. HCl + hydrous $ZnCl_2$
c) Conc. HNO_3 + hydrous $ZnCl_2$
d) Conc. HNO_3 + anhydrous $ZnCl_2$

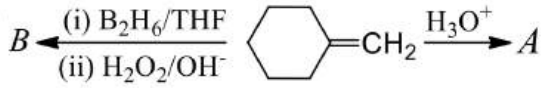
548. If methanol vapour is passed over heated copper at 300°C, it forms formaldehyde by:

a) Hydrogenation b) Dehydrogenation c) Dehydration d) Oxidation

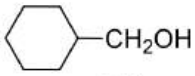
549. Terylene is formed by the reaction of one of the following alcohols:
a) 2-chloroethanol b) 1,2,3-propanetriol c) Ethanediol d) Phenol

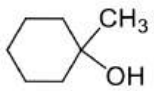
550. Alcoholic fermentation by starch or sugar is brought about by:
a) CO_2 b) Sodium bicarbonate c) Yeast d) phosphates

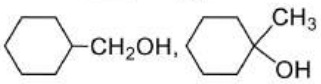
551. General formula for alcohols is:
a) $\rangle COH$ b) $\rangle CHOH$ c) $-CH_2OH$ d) All of these

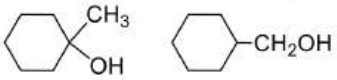
552. 

A and *B* respectively are

a) Both 

b) Both 

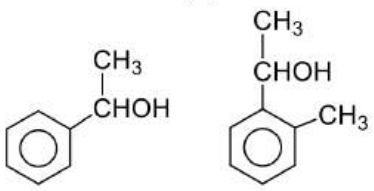
c) 

d) 

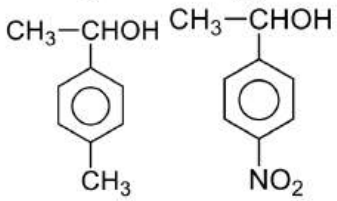
553. When phenol reacts with phthalic anhydride in presence of H_2SO_4 and heated and hot reaction mixture is poured in NaOH solution, then product formed is
a) Alizarin b) Methyl orange c) Fluorescein d) Phenolphthalein

554. Correct order of dehydration of

IX. (b)

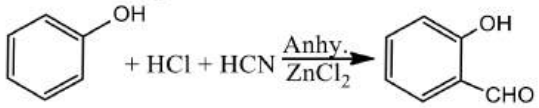


(c) (d)



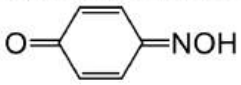
a) $A > B > C > D$ b) $B > C > A > D$ c) $D > A > C > A$ d) $D > A > B > C$

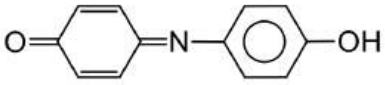
555. The following reaction is known as

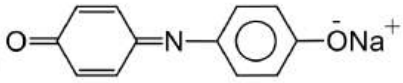


a) Perkin reaction b) Gattermann reaction
c) Kolbe reaction d) Gattermann-aldehyde reaction

556. In the Liebermann test for phenols, the blue or green colour produced is due to the formation of

a)  b) 

c) 

d) 

557. Four hydroxy compounds have functional groups as shown

$(A) - CH_2OH(B) - \underset{|}{CHOH}(C)\phi - OH\ (D)\phi - \underset{|}{CHOH}$

The purple colour with $FeCl_3$ will be given by

a) A only b) A and B c) C only d) A, B, C and D

558. Ether in contact with air for a long time form peroxides. The presence of peroxide in either can be tested by adding Fe^{2+} ion and then adding

a) KCN b) $SnCl_2$ c) $HgCl_2$ d) KCNS

559. Fermentation is:

a) Exothermic b) Endothermic c) Reversible d) None of these

560. Which could not be obtained from wood?

a) CH_3OH b) C_2H_5OH c) Wood tar d) Wood charcoal

561. Methanol and ethanol can be distinguished by the following:

a) By reaction with metallic sodium

b) By reaction with caustic soda

c) By heating with iodine and washing soda

d) By heating with zinc and inorganic mineral acid

562. Acetic anhydride reacts with diethyl ether in the presence of anhydrous $AlCl_3$ to give

a) CH_3CH_2COOH b) $CH_3CH_2COOCH_2CH_3$ c) CH_3COOCH_3 d) $CH_3COOC_2H_5$

563. Which of the following is insoluble in alcohol?

a) Resins and varnishes b) Soaps and varnishes c) Rubbers and plastics d) Dyes and drugs

564. 1-propanol and 2-propanol can be distinguished by

a) Oxidation with alkaline $KMnO_4$ followed by reaction with Fehling solution

b) Oxidation with acidic dichromate followed by reaction with Fehling solution

c) Oxidation by heating with copper followed by reaction with Fehling solution

d) Oxidation with concentrated H_2SO_4 followed by reaction with Fehling solution

565. Which of the following does not react with sodium metal?

a) $(CH_3)_2O$ b) CH_3CH_2OH c) CH_3COOH d) C_6H_5OH

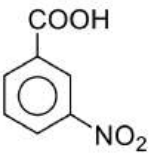
566. Purity of ether before using it as anaesthetic agent is tested by:

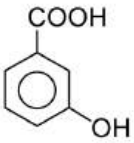
a) KI + starch b) $CuSO_4$ c) H_2SO_4 d) None of these

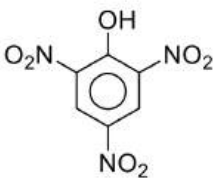
567. Alcoholic beverages contain

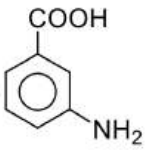
a) Isopropyl alcohol b) n-propyl alcohol c) Ethyl alcohol d) Methyl alcohol

568. Picric acid is

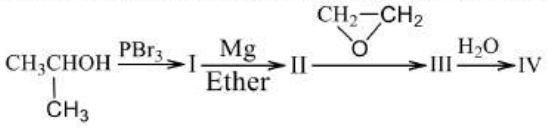
a) 

b) 

c) 

d) 

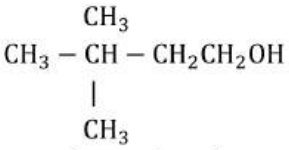
569. The final product (IV) in the sequence of reactions

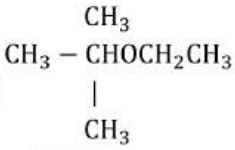


is

a) $CH_3 - \underset{|}{CHOCH_2CH_2OH}$

b) $CH_3 - \underset{|}{CHCH_2CH_2Br}$

c) 

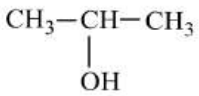
d) 

570. The products of combustion of an aliphatic thiol (RSH) at 298 K are
a) $CO_2(g), H_2O(g)$ and $SO_2(g)$ b) $CO_2(g), H_2O(l)$ and $SO_2(g)$
c) $CO_2(l), H_2O(l)$ and $SO_2(g)$ d) $CO_2(g), H_2O(l)$ and $SO_2(l)$

571. During alcoholic fermentation inorganic salts like ammonium sulphate or ammonium phosphate are added:
a) To decreases the freezing point of solution
b) Which act as food for ferment cells
c) Which prevent the growth of undesirable bacteria
d) Which produce desirable enzymes

572. To obtain unsaturated alcohols from unsaturated aldehydes the following reagent is used for reduction:
a) Na amalgam/H_2O b) Dil. H_2SO_4 c) Zn/HCl d) $LiAlH_4$

573. Hydroboration oxidation of 4-methyl octene would give
a) 4-methyl octanol b) 2-methyl decane
c) 4-methyl heptanol d) 4-methyl-2-actanone

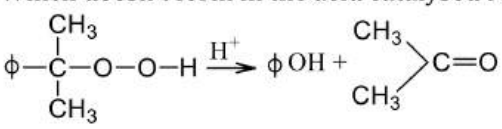
574. $Z \xrightarrow{PCl_5} X \xrightarrow{\text{Alc.KOH}} Y \xrightarrow[2.\ H_2O;\ \text{boil}]{1.\ \text{Conc. } H_2SO_4} Z$ is :
a) $CH_3—CH_2—CH_2—OH$ b)  c) $(C_2H_5)_3\,C—OH$ d) $CH_3—CH=CH_2$

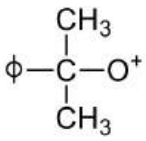
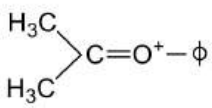
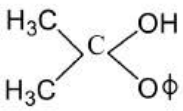
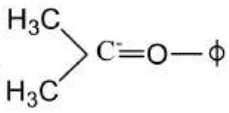
575. The general molecular formula, which represents the homologous series of alkanols is:
a) $C_nH_{2n+1}O$ b) $C_nH_{2n+2}O$ c) $C_nH_{2n}O_2$ d) $C_nH_{2n}O$

576. On reacting with neutral ferric chloride, phenol gives
a) Red colour b) Blue colour c) Violet colour d) Green colour

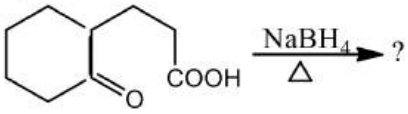
577. There are four alcohols P, Q, R and S which have 3, 2, 1 and zero alpha hydrogen atom(s). Which one of the following will not respond to Viktor-Meyer's test?
a) P b) Q c) R d) S

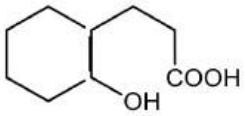
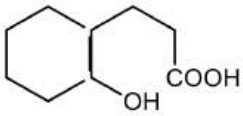
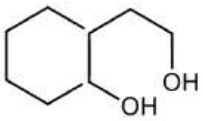
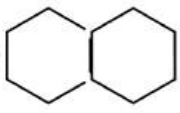
578. Which doesn't form in the acid catalysed rearrangement of cumene hydroperoxide?



a)  b)  c)  d) 

579. Ethanol is more soluble in water but ether is less soluble because:
a) Ethanol forms strong hydrogen bonds in water whereas ether forms weaker hydrogen bonding
b) Ether is more volatile than ethanol
c) The molecular weight of ether is more than that of ethanol
d) None of the above

580. 

a)  b)  c)  d) 

ALCOHOLS, PHENOLS AND ETHERS

: ANSWER KEY :

1)	a	2)	c	3)	b	4)	d	165)	c	166)	a	167)	d	168)	c
5)	b	6)	c	7)	a	8)	b	169)	c	170)	a	171)	d	172)	d
9)	a	10)	b	11)	d	12)	d	173)	d	174)	a	175)	d	176)	d
13)	c	14)	d	15)	a	16)	c	177)	c	178)	a	179)	c	180)	d
17)	c	18)	d	19)	b	20)	c	181)	b	182)	d	183)	d	184)	b
21)	b	22)	a	23)	b	24)	a	185)	a	186)	c	187)	d	188)	b
25)	a	26)	b	27)	c	28)	c	189)	c	190)	b	191)	d	192)	c
29)	b	30)	b	31)	a	32)	d	193)	b	194)	d	195)	d	196)	c
33)	a	34)	b	35)	b	36)	c	197)	d	198)	d	199)	d	200)	a
37)	b	38)	b	39)	b	40)	d	201)	d	202)	c	203)	c	204)	c
41)	d	42)	a	43)	c	44)	b	205)	b	206)	c	207)	b	208)	a
45)	a	46)	b	47)	d	48)	b	209)	a	210)	d	211)	c	212)	d
49)	b	50)	c	51)	b	52)	b	213)	c	214)	a	215)	c	216)	c
53)	d	54)	c	55)	b	56)	a	217)	b	218)	a	219)	b	220)	a
57)	d	58)	b	59)	d	60)	a	221)	a	222)	a	223)	c	224)	a
61)	c	62)	d	63)	d	64)	b	225)	d	226)	a	227)	c	228)	b
65)	a	66)	a	67)	d	68)	d	229)	d	230)	c	231)	b	232)	b
69)	a	70)	a	71)	c	72)	a	233)	a	234)	c	235)	c	236)	a
73)	d	74)	d	75)	b	76)	c	237)	d	238)	b	239)	c	240)	d
77)	c	78)	d	79)	a	80)	c	241)	d	242)	d	243)	a	244)	a
81)	c	82)	b	83)	d	84)	a	245)	b	246)	a	247)	a	248)	d
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89)	c	90)	c	91)	b	92)	b	253)	b	254)	c	255)	b	256)	b
93)	b	94)	c	95)	d	96)	c	257)	d	258)	a	259)	a	260)	b
97)	d	98)	a	99)	d	100)	c	261)	b	262)	c	263)	b	264)	a
101)	a	102)	b	103)	d	104)	c	265)	a	266)	b	267)	a	268)	c
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117)	d	118)	c	119)	c	120)	c	281)	a	282)	d	283)	c	284)	a
121)	a	122)	a	123)	c	124)	b	285)	a	286)	c	287)	c	288)	d
125)	a	126)	c	127)	b	128)	d	289)	b	290)	c	291)	d	292)	c
129)	c	130)	a	131)	c	132)	a	293)	d	294)	d	295)	d	296)	b
133)	a	134)	a	135)	d	136)	d	297)	b	298)	b	299)	a	300)	c
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141)	b	142)	d	143)	d	144)	b	305)	d	306)	c	307)	c	308)	d
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149)	b	150)	b	151)	c	152)	d	313)	c	314)	c	315)	a	316)	b
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157)	c	158)	b	159)	a	160)	d	321)	b	322)	c	323)	b	324)	b
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329)	c	330)	a	331)	d	332)	d	461)	c	462)	a	463)	a	464)	c
333)	d	334)	c	335)	c	336)	d	465)	a	466)	c	467)	d	468)	a
337)	c	338)	b	339)	a	340)	a	469)	c	470)	c	471)	a	472)	a
341)	b	342)	c	343)	c	344)	d	473)	d	474)	b	475)	c	476)	c
345)	a	346)	a	347)	b	348)	a	477)	a	478)	c	479)	c	480)	c
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397)	c	398)	c	399)	c	400)	b	529)	a	530)	a	531)	b	532)	d
401)	a	402)	a	403)	a	404)	b	533)	a	534)	b	535)	a	536)	d
405)	c	406)	b	407)	d	408)	a	537)	b	538)	c	539)	c	540)	d
409)	c	410)	d	411)	a	412)	a	541)	b	542)	b	543)	b	544)	c
413)	d	414)	a	415)	b	416)	b	545)	d	546)	c	547)	a	548)	b
417)	d	418)	c	419)	c	420)	a	549)	c	550)	c	551)	d	552)	d
421)	d	422)	d	423)	d	424)	a	553)	d	554)	b	555)	d	556)	d
425)	d	426)	c	427)	b	428)	c	557)	c	558)	d	559)	a	560)	b
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433)	c	434)	a	435)	b	436)	b	565)	a	566)	a	567)	c	568)	c
437)	a	438)	d	439)	c	440)	b	569)	c	570)	b	571)	b	572)	d
441)	c	442)	a	443)	d	444)	b	573)	a	574)	b	575)	b	576)	c
445)	d	446)	c	447)	b	448)	a	577)	d	578)	d	579)	a	580)	a
449)	c	450)	d	451)	c	452)	b								
453)	b	454)	b	455)	c	456)	a								
457)	b	458)	a	459)	d	460)	a								

ALCOHOLS, PHENOLS AND ETHERS

: HINTS AND SOLUTIONS :

1 **(a)**

$$C_2H_5OH + [O] \xrightarrow[\text{in } CH_2Cl_2]{PCC} CH_3CHO$$

(X) (Y)

$$CH_3CHO + 4NaOH + 3I_2 \rightarrow CHI_3 + HCOONa + 3H_2O + 3NaI$$

(Y)

(yellow ppt tri-iodomethane)

2 **(c)**

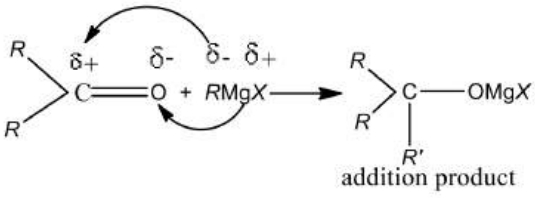
$$C_2H_4 + H_2SO_4 \longrightarrow C_2H_5HSO_4 \xrightarrow{HOH} C_2H_5OH$$

5 **(b)**

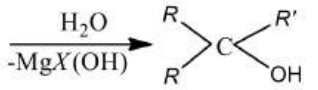
Tertiary alcohols show replacement of —OH gp. more readily.

6 **(c)**

Ketones give an addition product having more number of carbon atoms with Grignard reagent, which on hydrolysis gives an alcohol (3°).



addition product



tertiary alcohol

Formaldehyde gives primary alcohol with Grignard reagent while any other aldehyde except formaldehyde give secondary alcohol.

7 **(a)**

$$CH_3OH \xrightarrow{HI} CH_3I$$

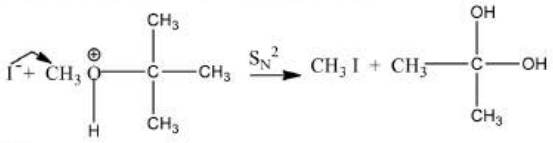
8 **(b)**

Perspex rubber is polymethyl methyl acrylate (PMMA) is obtained by methyl acrylate obtained as:

$$CH_2{=}\underset{\displaystyle CH_3}{\underset{|}{C}}COOH + HOCH_3 \longrightarrow CH_2{=}\underset{\displaystyle CH_3}{\underset{|}{C}}COOH$$

10 **(b)**

Here, ether is the solvent. Being less polar, it favours S_N2 reaction and the nucleophile I^- attacks the 1^0 carbon of CH_3.



11 **(d)**

$$C_2H_5OC_2H_5 + HI \xrightarrow{\Delta} 2C_2H_5I + H_2O$$

14 **(d)**

Due to more sites available for H-bonding.

15 **(a)**

The fermented liquid is technically called wash containing 6-10% ethanol, 3-5% glycerol, higher alcohols (fusel oils), acetaldehyde, etc.

16 **(c)**

$$CH_3COOH + C_2H_5OH \xrightarrow{H_2SO_4} \underset{\text{Fruity smell}}{CH_3COOC_2H_5} + H_2O$$

17 **(c)**

$C_2H_5OH + HOOCCH_3 \longrightarrow C_2H_5OOCCH_3$ Ester possess fruity smell.

18 **(d)**

Phenol (C_6H_5OH) is carbolic acid.

21 **(b)**

$$CH_3CH_2ONa + C_2H_5Br \xrightarrow[\text{synthesis}]{\text{Williamson's}} CH_3CH_2OCH_2CH_3 + NaBr$$

Sodiumethoxide bromo ethane ethoxyethane

22 **(a)**

Reactivity order of alcohols towards $ZnCl_2$ and conc. HCl is *ter.* alcohol > *sec* alcohol > *pri* alcohol

Trimethyl carbinol is $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}(CH_3)-OH$

It is tertiary alcohol.

23 **(b)**

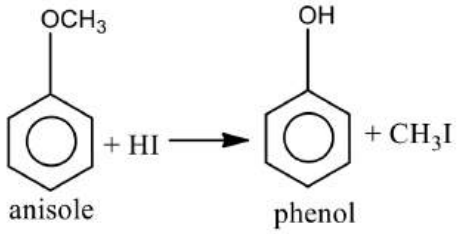
Peroxides are decomposed on heating with H_2SO_4

24 **(a)**

Glycerol is not reduced because of extensive H-bonding.

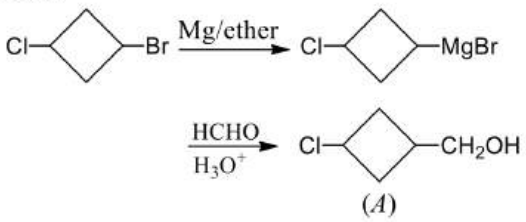
25 **(a)**

When an alkyl aryl ether is heated with HI, halogen goes with alkyl group. Therefore, heating anisole (methyl phenyl ether) with HI phenol and methyl iodide are obtained.



26 **(b)**

C – Br bond is weaker as compared to C – Cl bond

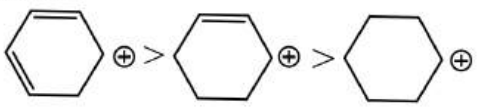


29 **(b)**

Higher concentration of substrate less easily undergoes fermentation; (a), (c), (d) favours fermentation.

30 **(b)**

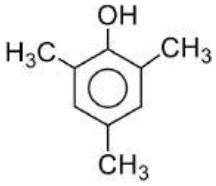
The correct order of stability of carbocation is as follows



31 **(a)**

Alcohols with same molecular weight are expected to have almost same boiling point however two more factors other than molecular weight are important, they are namely H-boiling and surface area of molecule. Both these factors are least in 3° alcohols and maximum in 1° alcohols. Hence, 3° alcohols have least boiling point while 1°alcohols have maximum boliling point.

32 **(d)**



will not with ϕNNCl to give dye

33 **(a)**

Phenol cannot be distinguished from ethanol by sodium because both evolve hydrogen with sodium.

$2C_6H_5OH + 2Na \rightarrow 2C_6H_5ONa + H_2 \uparrow$

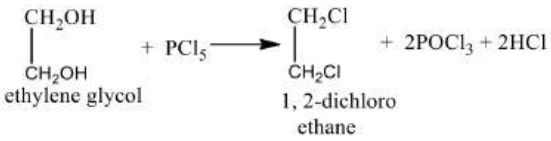
$2C_2H_5OH + 2Na \rightarrow 2C_2H_5ONa + H_2 \uparrow$

34 **(b)**

Ethers do not contain acidic H-atom.

35 **(b)**

Ethylene glycol reacts with excess of PCl_5 to give ethylene chloride.

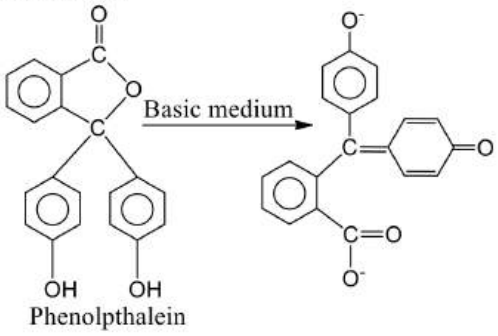


36 **(c)**

Due to low f.p. and mobile nature.

37 **(b)**

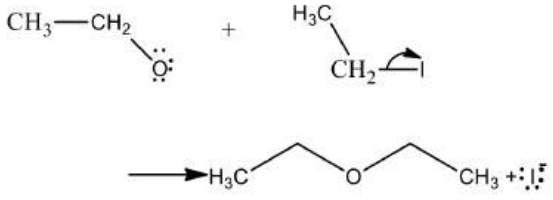
Structure of phenolphthalein in basic medium is as follows.



Phenolpthalein

38 **(b)**

$C_2H_5O^-$ will attract the proton from phenol converting the later into phenoxide ion. This would then make nucleophilic attack on the methylene carbon of alkyl iodide, but $C_2H_5O^-$ is in excess $C_2H_5O^-$ is better nucleophile than $C_6H_5O^-$(phenoxide) ion since while in the former the negative charge is localised over oxygen and in the later it is delocalised over the whole molecular frame work. So, it is $C_2H_5O^-$ ion that would make nucleophilic attack at ethyl iodide to give diethyl ether (Williamson's synthesis).

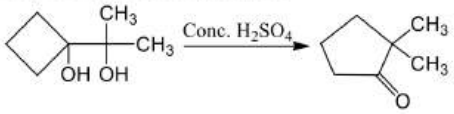


40 **(d)**

−OH gp. directly attached to benzene nucleus represents for phenolic gp.

41 **(d)**

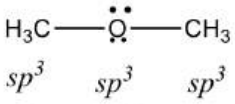
The pinacol-pinacolone rearrangement involves dehydration of diols through the formation of carbocation intermediate which rearranges to more stable compound.



42 **(a)**

Oxidation of glycerol by $KMnO_4$ is violent.

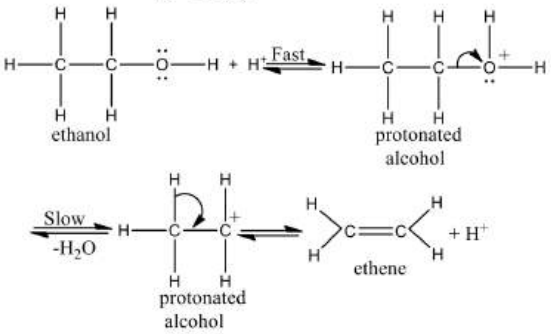
44 **(b)**



sp^3 and sp^3-hybridisations of carbon and oxygen in electronic structure of ether.

45 **(a)**

Protonation of –OH is first step. Conversion of poor leaving group (-OH) into good leaving group $(-\overset{+}{O}H_2)$.



46 **(b)**

It contains $(R)_3COH$.

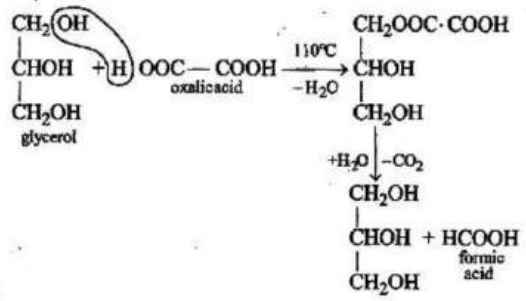
48 **(b)**

When an electron attracting group (like $-NO_2$, −Cl) is attached to the phenol ring, it stabilises the negative charge on the oxygen of phenoxide ion. Due to this reason acidic character of phenol increases. But when an electron donating group (like $-CH_3$) is attached to the phenol ring, it destabilises the ring and hence, acidic character of phenol decreases. Thus, the correct order of acidic character is

p- nitrophenol > *p*-chlorophenol > phenol > *o*-cresol.

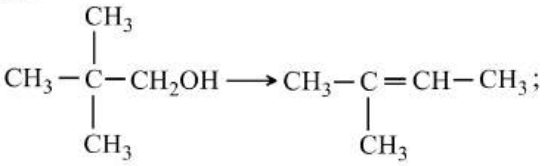
49 **(b)**

Glycerol react with oxalic acid at 110°C temperature, it gives methanoic acid (formic acid).



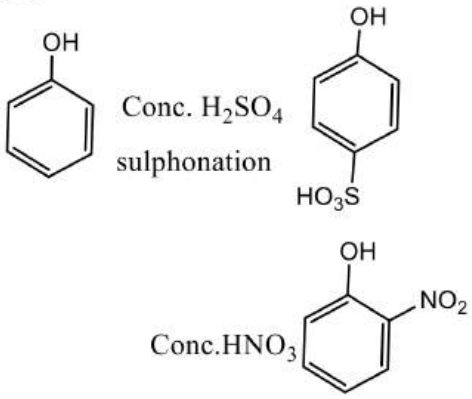
s

50 **(c)**



due to rearrangement of carbocation following alkyl shift.

51 **(b)**



First sulphonation is the means to block *para* position and to reduce the reactivity of phenolic ring against strong oxidising agent HNO_3. (The use of conc. HNO_3 over phenol cause the oxidation of ring mainly). The strong acidic medium in second step cause desulphonation (ipso mechanism) also.

52 **(b)**

Glycols are dihydric alcohols (having two hydroxyl groups). Ethylene glycol is the first member of this series.

CH_2OH

|

CH_2OH

ethylene glycol

53 **(d)**

Absolute alcohol is 100% alcohol.

54 **(c)**

The order of reactivity depends upon the stability of the carbocation formed

ie, $FCH_2\overset{+}{C}HCH_3, FCH_2CH_2\overset{+}{C}HCH_3, CH_3\overset{+}{C}HCH_3$ and $Ph\overset{+}{C}H_2$. The stability order of carbocations is $Ph\overset{+}{C}H_2 > CH_3\overset{+}{C}HCH_3 > FCH_2CH_2\overset{+}{C}HCH_3 > FCH_2\overset{+}{C}HCH_3$. Thus, the order of reactivity follows the order IV > III > II> I

55 **(b)**

Glycerol trinitrate adsorbed on Kieselguhr is called dynamite; an explosive.

57 **(d)**

4 alcohols (butan-1-ol; butan-2-ol; 2-methyl butan-1-ol; 2-methyl butan-2-ol) and 3 ethers (diethyl ether, methyl-propyl ether and methyl isopropyl ether).

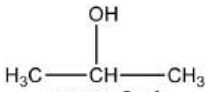
59 **(d)**

$ROH + HBr \rightarrow R - Br + H_2O$

The rate of reaction is fastest for 3° alcohol.

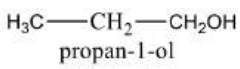
The rate of reaction decreases as fallows

3° > 2° > 1°



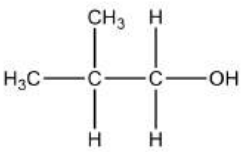
propan-2-ol

(2° alcohol)



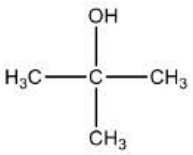
propan-1-ol

(1° alcohol)



2-methyl propan-1-ol

(1° alcohol)



2-methyl propan-2-ol

(3° alcohol)

fastest reaction

60 **(a)**

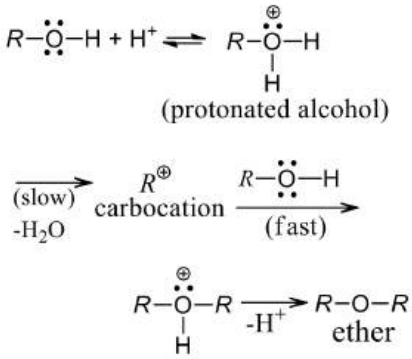
Alcohols (*R*OH) are hydroxy derivatives of alkane or alkyl derivative of water.

61 **(c)**

Presence of two isopropyl groups on oxygen atom of ether shows more powerful inductive effect.

63 **(d)**

Alcohol is initially protonated by the acid to form protonated alcohol or oxonium ion. It is then attacked by a second molecule of alcohol which acts as nucleophile



(protonated alcohol)

64 **(b)**

$2C_2H_5I + \underset{\text{Ether}}{Ag_2O} \rightarrow C_2H_5OC_2H_5$

65 **(a)**

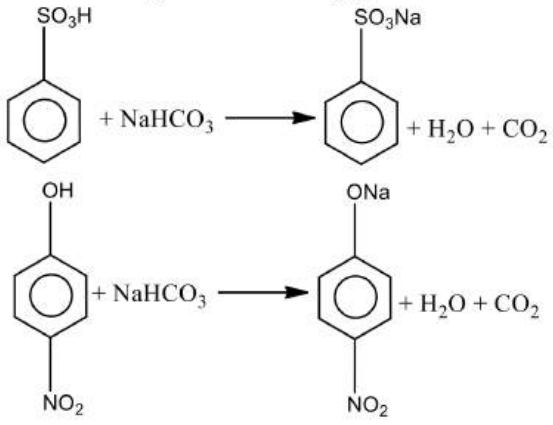
Electron withdrawing groups (like $-NO_2$) increase the acidity of phenols by stabilising corresponding phenoxide ion. The effect of $-NO_2$ group will be minimum at *m*-position due to lack of increased delocalisation of electrons in it. Hence, *m*-nitrophenol is the weakest acid among these.

66 **(a)**

Fusel oil is a mixture of pentanol and butanol with other organic substances.

67 **(d)**

Benzene sulphonic acid and *p*-nitro phenol react with $NaHCO_3$ and evolve CO_2 gas.



Because benzene sulphonic acid *p*-nitrophenol are stronger acids, so they are capable to evolve CO_2 with $NaHCO_3$.

$HCO_3^- + H^+ \rightarrow H_2O + CO_2 \uparrow$

acid

68 **(d)**

Secondary alcohols give blue colour in Victor Meyer test

69 **(a)**

Conc. HCl+ anhydrous $ZnCl_2$ is called as Lucas reagent. It is used to distinguish primary, secondary and tertiary alcohol.

70 **(a)**

$CH_3CHO \xrightarrow{\text{Reduction}} CH_3CH_2OH$

71 **(c)**

$CH_3CHOHCH_3 \xrightarrow[H_2SO_4]{K_2Cr_2O_7} CH_3COCH_3 \xrightarrow[\text{oxidation}]{} CH_3COOH$

2-propanol acetone acetic acid

73 **(d)**

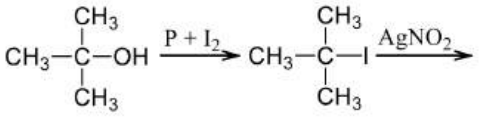
Phenol reacts with PCl_5 to form chlorobenzene. Halogenation of phenol does not take place with H*X*

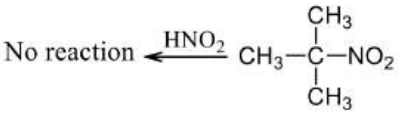
74 **(d)**

Alcohol has polar H which makes intermolecular H-bonding possible. Ether is non-polar hence no H-bonding. Lack of H-bonding in ether makes it more volatile than alcohol.

76 **(c)**

In the given sequence of reaction, the alcohol is tertiary.





77 **(c)**

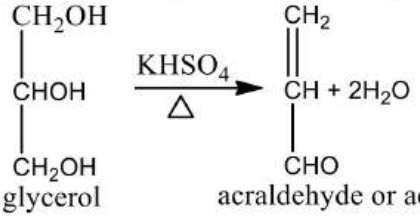
It is better to call nitroglycerine as glycerol trinitrate an inorganic ester of HNO_3 and glycerol.

78 **(d)**

Br is replaced by OH gp.

80 **(c)**

Glycerol is dehydrated on heating with $KHSO_4$.



glycerol acraldehyde or acrolein

81 **(c)**

1° alkyl halides on treatment with an alkoxide ion tend to undergo substitution to form ethers. So sodium tert butoxide and ethyl bromide reagent is used

82 **(b)**

A mixture of $H_2O_2 + FeSO_4$ is called Fenton's reagent used as oxidant.

83 **(d)**

A simple ether is one which possesses same alkyl groups on O atom, . *e.*, *ROR*.

84 **(a)**

$CH_3OC_2H_5 + HI \longrightarrow CH_3I + C_2H_5OH$

$CH_3I + AgNO_3 \longrightarrow AgI + CH_3NO_3$

85 **(a)**

$C_2H_5OH + NH_3 \xrightarrow{Al_2O_3} C_2H_5NH_2 + H_2O$

86 **(c)**

Presence of two or more OHgp. on a carbon atom makes it unstable and compound loses H_2O molecule.

87 **(d)**

A mixture of conc. HCl+ anhy $ZnCl_2$ is called Lucas reagent. In Lucas test tertiary alcohols immediately give turbidity while secondary alcohols give turbidity after 5 min. Primary alcohols give no reaction with Lucas reagent at room temperature.

$CH_3OH/CH_3CH_2OH \xrightarrow{\text{Conc.HCl+anhy } ZnCl_2} \text{No reaction}$

Primary alcohol

and hence, no white cloudiness on turbidity at room temperature.

$(CH_3)_2CHOH \xrightarrow{\text{Conc.HCl+anhy } ZnCl_2}$

Secondary alcohol

White cloudiness or turbidity appears within about 5 min.

$(CH_3)_3COH \xrightarrow{\text{Conc.HCl+anhy } ZnCl_2} \text{White cloudiness}$

Tertiary alcohol

Or turbidity appears immediately.

88 **(d)**

To have tertiary alkyl-alkyl ether one needs sod. Tertiary alkoxide and alkyl halide.

89 **(c)**

Due to H-bonding.

90 **(c)**

Glyoxal is a trivial name for ethane-1-2-dial.

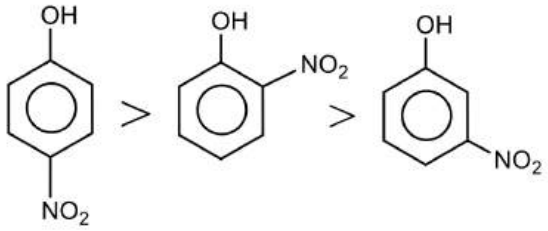
91 **(b)**

Ethyl alcohol is mixed with methyl alcohol to denaturate it in order to prevent its use for drinking purposes.

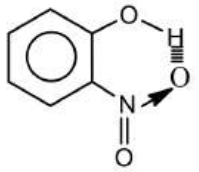
93 **(b)**

The density of glycerol is higher than propanol due to extensive intermolecular hydrogen bonding. Glycerol contains three – OH groups while propanol contains only one ■– OH group.

95 **(d)**



Due to $-I$ and $-R$ influence, NO_2 in *ortho*-position should have raised the acidity to the maximum extent. But it is due to intramolecular H-bonding, *ortho*-nitrophenol is less acidic than *para*-nitrophenol.



96 **(c)**

$CH_3OC_2H_5 + HI \longrightarrow CH_3I + C_2H_5OH$;
O-atom goes with higher alkyl gp.

97 **(d)**

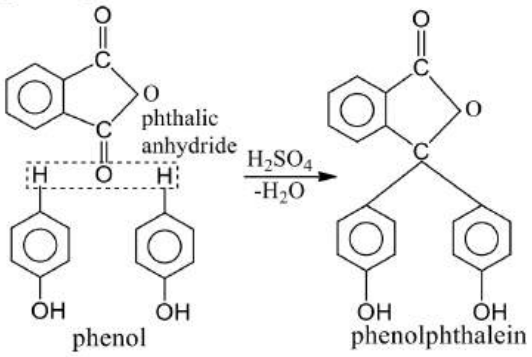
Glycerol is $CH_2OHCHOHCH_2OH$

98 **(a)**

Due to intermolecular hydrogen bonding, alcohols are less volatile than ether

99 **(d)**

In the presence of conc. H_2SO_4, two molecules of phenol condense with phthalic anhydride to form phenolphthalein



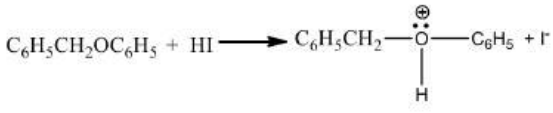
100 **(c)**

The mixture shows positive deviations from Raoult's law; *i.e.*, $\Delta H_{mix} > 0, \Delta V_{mix} > 0$.

101 **(a)**

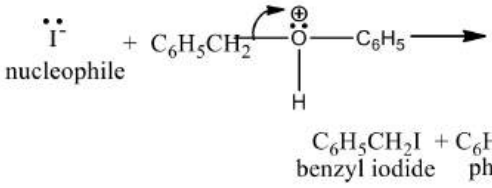
Benzyl phenyl ether is an unsymmetrical ether so halide ion of HI attached to the simple alkyl group and reaction takes place by following mechanism.

1. Protonation of ether



Benzyl phenyl ether

2. Nucleophilic attack



benzyl iodide phenol

102 **(b)**

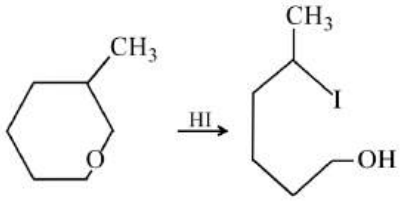
$CH_3OH \xrightarrow[170^\circ C]{H_2SO_4} C_2H_4 + H_2O$; Removal of H_2O from substrate molecule is called dehydration.

It is classified as elimination reaction.

104 **(c)**

The acid H_2SO_4 is added to adjust pH in between 4 to 4.5 which is favourable for the growth of yeast and unfavourable for the growth of undesired bacteria.

105 **(a)**



This is acid catalysed cleavage of cyclic ether where nucleophile attacks the more substituted carbon.

106 **(c)**

R—S—R or R—SR' are thioethers.

107 **(d)**

All are dehydrating agents.

108 **(c)**

$C_2H_5OH + [O] \xrightarrow{KMnO_4/H_4} CH_3COOH \xrightarrow[H_2SO_4/\Delta]{C_2H_5OH(Y)} CH_3COOC_2H_5$

ethanol (X) (esterification)
ethyl ethanoate
ethanoic acid

Hence, $X = CH_3COOH$
$Y = C_2H_5OH$

109 **(c)**

In case of 3° alcohols (tertiary alcohols) turbidity appears immediately at room temperature.

110 **(b)**

C_2H_5OH (Ethanol) is a very weak acid, hence it does not react with NaOH. However, it reacts with metallic sodium.

111 **(a)**

Methyl alcohol (CH_3OH) is prepared by passing H_2 in water gas in presence of catalyst.

$$CO + H_2 + H_2 \xrightarrow[300-400°C]{Cr_2O_3-ZnO} CH_3OH$$

Water gas methyl alcohol

112 **(a)**

The –OH group of alcohol or the –COOH group of a carboxylic acid is replaced by –Cl using phosphorus pentachloride ($i.e.$, PCl_5)

$ROH + PCl_5 \rightarrow RCl + POCl_3 + HCl$

alcohol

$RCOOH + PCl_5 \rightarrow RCOCl + POCl_3 + HCl$

acid

113 **(c)**

Methanol cannot dried with anhydrous $CaCl_2$ because it forms a solid $CaCl_2.4CH_3OH$(addition compound).

115 **(a)**

$R—X \xrightarrow{HOH} R—OH$; It is substitution.

116 **(d)**

Lucas test is used to distinguish primary, secondary and tertiary alcohols.

118 **(c)**

Mol. wt. of thioethers are more than ether.

120 **(c)**

Methanol possesses maximum toxicity order; Ethanol has minimum.

123 **(c)**

Williamson's synthesis is used for the preparation of ethers.

$$RCl + NaOR' \xrightarrow[\text{synthesis}]{\text{Williamson's}} R-O-R' + NaCl$$

ether

124 **(b)**

Starch $\xrightarrow{\text{Diastase}}$ Maltose $\xrightarrow{\text{Maltase}}$ Glucose $\xrightarrow{\text{Zymase}}$ Alcohol

125 **(a)**

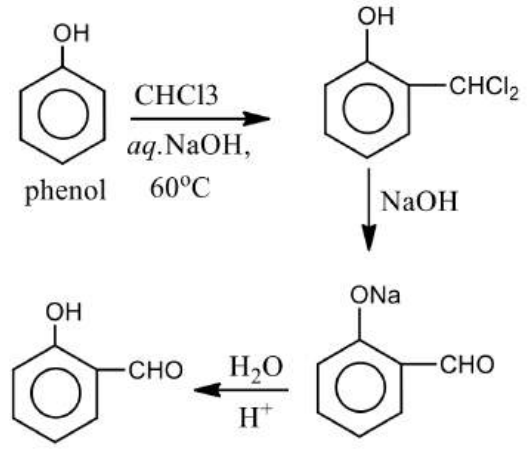
Destructive distillation of wood gives Pyroligneous acid from which CH_3OH is obtained by fractional distillation.

126 **(c)**

$—COOH \xrightarrow{LiAlH_4} —CH_2OH$

127 **(b)**

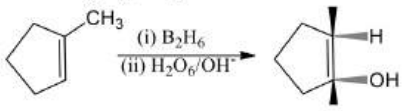
Reimer-Tiemann Reaction In this reaction phenol reacts with chloroform and alkali to form salicyladehyde.



salicyladehyde

128 **(d)**

During hydroboration-oxidation, addition of H_2O across the double bond occurs anti to Markownikoff's rule and since the stereochemistry of addition *cis*, therefore *trans*-2-methylcyclopentanol is formed



trans-2-methyl cyclopentanol

129 **(c)**

CH_3OH is carbinol; CH_3CH_2OH is methyl carbinol and so on.

131 **(c)**

Both possess antiseptic nature.

132 **(a)**

The percentage of alcohol is expressed as proof spirit for tax lavy. It contains 57.1 % (by vol.) or 48% (by wt.) of alcohol.

133 **(a)**

Ether peroxide oxidises KI into I_2 and itself gets reduced to ether. Therefore, KI is added to remove peroxides from ethers.

$2I^- \rightarrow I_2 + 2e^-$

Ether peroxide$+2e^- \rightarrow$ ether $+ O_2$

134 **(a)**

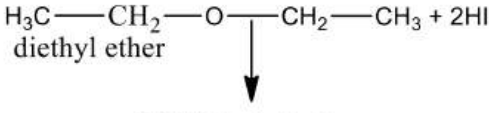
$CH_3CH_2CH_2OH$ and $CH_3CHOHCH_3$

135 **(d)**

Lower members are soluble in water due to H-bonding and solubility decreases with increasing hydrophobic character.

138 **(c)**

Ether on reaction with excess of HI produce two molecules of alkyl halide.



$2C_2H_5I + H_2O$
etyl iodide

Ethyl iodine

When equimolar quantities of ether and HI are present, then one molecule of alkyl halide and one molecule of alcohol are formed.

139 **(a)**
It is a substitute of petrol.

141 **(b)**
Zymase enzyme act on glucose and give ethyl alcohol and carbon dioxide.

$$C_6H_{12}O_6 \xrightarrow{\text{Zymase}} \underset{\text{ethyl alcohol}}{2C_2H_5OH} + 2CO_2 \uparrow$$

142 **(d)**
Only CH_2OH group is oxidized to —COOH; Double bond is not affected.

143 **(d)**
Both Zn-Hg/HCl and NH_2NH_2, OH^- reduce CO to CH_2, but acid sensitive reagents are not reduced by Zn-Hg/HCl.

144 **(b)**
Glycerol has 3 —OH groups and thus shows extensive H-bonding.

145 **(b)**
The best method to prepare cyclohexene from cyclohexanol is by conc. H_3PO_4 because in given options dehydrating agent is conc. H_3PO_4.

146 **(a)**
Diethyl sulphate in the presence of NaOH acts as alkylating agent, it causes alkylation of phenol to give ethyl phenyl ether which is also called phenetole.

$$C_6H_5OH + NaOH \rightarrow C_6H_5O^-Na^+ + H_2O$$

$$C_6H_5O^-Na^+ + (C_2H_5)_2SO_4 \rightarrow \underset{\text{phenetole}}{C_6H_5OC_2H_5ph} + \underset{\text{diethyl sulphate}}{C_2H_5NaSO_4}$$

147 **(c)**
Tertiary alcohols are dehydrated on passing over heated Cu; Primary and secondary are dehydrogenated.

148 **(b)**
The process is called hydroboration.

149 **(b)**
Secondary alcohols give turbidity within 5 min with Lucas reagent

151 **(c)**
Diethyl ether itself being a Lewis base is not attacked by nucleophiles, *ie*, OH^- ion. All others contain an electrophilic carbon and are readily attacked by nucleophile

152 **(d)**
Ethers acts as Lewis base only towards strong acids.

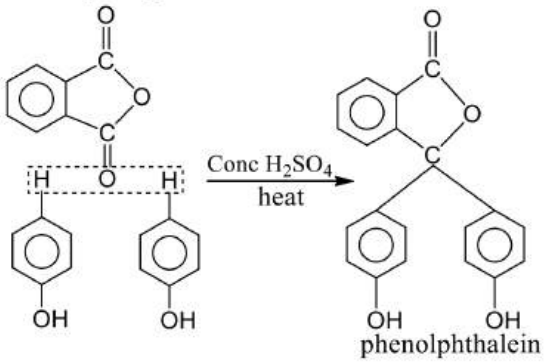
154 **(d)**
When ethyl alcohol is heated with conc. H_2SO_4 at $160° - 170°C$, the product obtained is ethylene (C_2H_4).

$$CH_3 - CH_2OH + H_2SO_4 \rightarrow \underset{\text{ethyl hydrogen sulphate}}{CH_3CH_2HSO_4} + H_2O$$

$$CH_3 - CH_2HSO_4 \xrightarrow[\Delta]{160-170°C} \underset{\text{ethylene}}{CH_2 = CH_2} + H_2SO_4$$

But at lower temperature ether is formed.

155 **(a)**
Phenol is heated with phthalic anhydride in presence of conc H_2SO_4 to given phenolphthalein which gives pink colour with alkali



phenolphthalein

156 **(c)**
Large is H—*X* bond length, more is acidic nature of halogen acid.

157 **(c)**
Rectified spirit is C_2H_5OH + water mixture obtained after distillation of fermented liquid. On further careful fractional distillation (rectification) gives II fraction as 93 to 95% ethyl alcohol (rectified spirit).

158 **(b)**

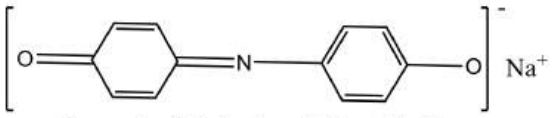
$$C_6H_5MgBr + HOCH_3 \longrightarrow C_6H_6 + Mg(Br)OCH_3$$

159 **(a)**

$$\text{Phenol} \xrightarrow{NaNO_2/H_2SO_4} B \xrightarrow{H_2O} C \xrightarrow{NaOH} D$$

This is Liebermann's nitroso reaction of phenol. When phenol is warmed with sodium nitrite and 1 cc. conc.H_2SO_4, blue colour is obtained which on

adding water, becomes red. This again turns to blue on adding NaOH. Deep blue colour is due to the formation of sodium salt of indophenol.



sodium salt of indophenol (deep blue)

160 **(d)**

H_2SO_4 acts as catalyst as well as dehydrating agent for the reaction,

$$CH_3COOH + HOC_2H_5 \xrightarrow{H_2SO_4} CH_3COOC_2H_5$$

161 **(c)**

Dynamite is known as nobel's oil.

162 **(b)**

The order of increasing acidic strength is *p*-methyl phenol < phenol < *m*-nitrophenol < *p*-nitrophenol

164 **(a)**

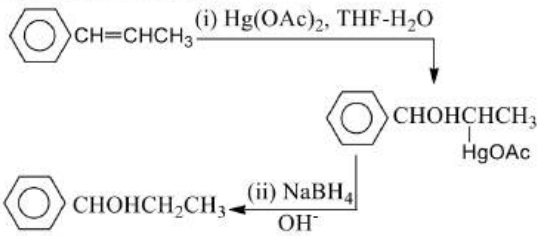
$C_6H_5O^-$ is a weaker nucleophile than $C_2H_5O^-$. Therefore, the better nucleophile, *ie*, $C_2H_5O^-$ will attack C_6H_5I to form diethyl ether.

$$\underset{\text{stronger nucleophile}}{C_6H_5OH + C_2H_5O^-} \longrightarrow \underset{\text{Weak nucleophile}}{C_6H_5O^- + C_2H_5OH}$$

$$C_2H_5O^- + CH_3\overset{+\delta}{C}H_2\text{—}\overset{-\delta}{I} \longrightarrow \underset{\text{diethyl ether}}{CH_3CH_2\text{—}O\text{—}CH_2CH_3} + I^-$$

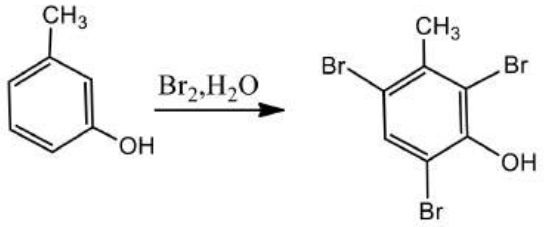
165 **(c)**

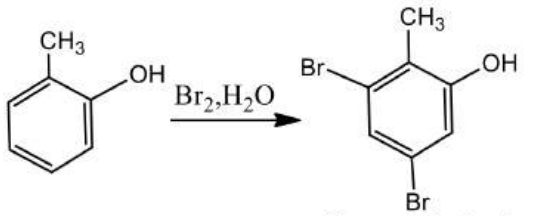
Oxymercuration-demercuration occurs by a more stable carbocation.



166 **(a)**

m-cresol due to phenoxide ion in H_2O solvent, gives tribromoderivative at all *ortho* and *para* positions.





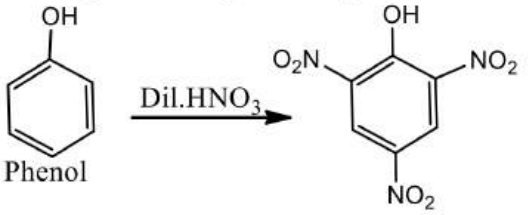
dibromo derivative

167 **(d)**

	Reagent	Phenol	Benzoic acid	Conclusion
A	Aqueous NaOH	Salt formation	Salt formation	No specific colour change
B	Neutural $FeCl_3$	Violet colour	Buff-coloured precipitate	Thus, $FeCl_3$ can be used to make distinction

168 **(c)**

$-OH$ group is an activating group, hence increase electron density on *o*-and *p*-position in benzene ring. Thus, phenol very easily undergoes nitration (electrophilic substitution and give trinitrophenol, *i.e.*, picric acid).



Phenol

2,4,6-trinitrophenol (picric acid)

169 **(c)**

$$C_2H_5OH + H_2SO_4 \xrightarrow{\text{Room temp.}} C_2H_5HSO_4$$

ethyl hydrogen sulphate

$$\xrightarrow[C_2H_5OH]{140^\circ} C_2H_5OC_2H_5$$

diethyl ether

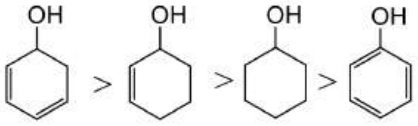
$$\xrightarrow[-H_2SO_4]{170^\circ} CH_2{=}{=}CH_2$$

ethylene

(a), (b), (d) may be formed but (c) is never formed Hence, correct choice→(c).

170 **(a)**

Greater the conjugation, greater the stability due to resonance and easier the dehydration. Thus, the correct order of dehydration is



172 **(d)**

Reduction by H_2 is favoured by catalyst.

173 **(d)**

$CH_3NH_2 + HNO_2 \longrightarrow CH_3ONO$ and CH_3OCH_3

$R—NH_2 + HNO_2 \longrightarrow R—OH + N_2$

(R is not CH_3)

174 **(a)**

Tertiary alcohols give alkene.

177 **(c)**

Tertiary alcohols are easily dehydrated.

178 **(a)**

Peroxide oxidizes Fe^{2+} to Fe^{3+} which gives red colour with KCNS.

182 **(d)**

Pepperment is soluble in alcohol.

183 **(d)**

$CH_3CH_2OH \xrightarrow{Cl_2} CH_3CHO \xrightarrow{Cl_2} CCl_3CHO$

184 **(b)**

Molasses, the brown syruppy liquid left after crystallization contains about 50% sugar.

185 **(a)**

R—SH are thiols or mercaptans.

186 **(c)**

Chloral hydrate $[CCl_3CH(OH)_2]$ is stable due to H-bonding

188 **(b)**

$$ROH + Na \longrightarrow RONa + \frac{1}{2}H_2$$

189 **(c)**

Grignard reagent (RMgX) reacts with only those compounds which contains acidic hydrogen or which contains carbonyl group.

Dimethyl ether (CH_3OCH_3) due to absence of both acidic hydrogen and carbonyl group does not react with Grignard reagent.

190 **(b)**

$CH_3—O—CH(CH_3)_2 + HI \longrightarrow CH_3I + (CH_3)_2CHOH$

Halogen goes with simpler alkyl gp.

191 **(d)**

$C_2H_5ONa + C_2H_5X \longrightarrow C_2H_5OC_2H_5$

193 **(b)**

$(A)\ CH_3CN$; $(B)CH_3COOH$; $(C)C_2H_5OH$.

194 **(d)**

Ester + NaOH ⟶ Sodium salt of acid + Alcohol.

195 **(d)**

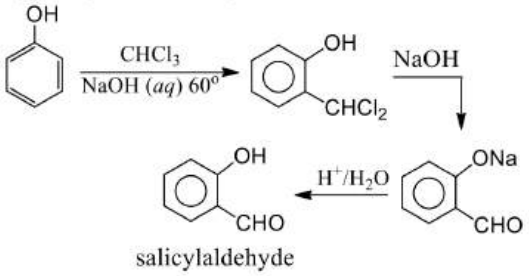
All are dehydrating agents.

197 **(d)**

Alcohol $\underset{(p,s)}{\xrightarrow{[O]}}$ Aldehyde or ketones with same carbon atoms.

198 **(d)**

Phenol, on refluxing with chloroform and sodium hydroxide followed by hydrolysis yields o-hydroxy benzaldehyde



salicylaldehyde

199 **(d)**

Molecular formula $C_3H_8O(C_nH_{2n+2}O)$suggests that the organic compound is either alcohol or ether.

Since, the compound on reaction with HI gives two different compounds, It must be an unsymmetrical ether, and its formula must be $CH_3OC_2H_5$(methoxyethane).

$CH_3OC_2H_5 + 2HI \rightarrow CH_3I + C_2H_5OH$

Methoxyethane $\quad X \quad Y$

$C_2H_5OH + 6NaOH + 4I_2$

$\rightarrow CHI_3 + HCOONa + 5H_2O + 5NaI$

Aqueous iodoform

200 **(a)**

Glycerol is generally used as an antifreeze reagent for making explosives.

201 **(d)**

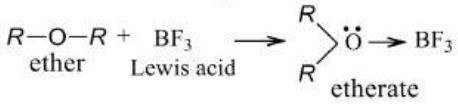
Follow IUPAC rules.

203 **(c)**

Alcohol forms a azeotropic mixture with water and absolute alcohol is obtained by this mixture (rectified spirit) by adding benzene and then carrying out fractional distillation.

204 **(c)**

Etherates are complexes of ethers with Lewis acid



205 **(b)**

Glycerol has no use in match boxes.

207 **(b)**

Alkoxide has metal-oxygen bond.

208 **(a)**

Alcohols are more acidic than alkynes but less acidic than water thus, the correct order of acidity is

$H_2O > 1° > 2° > 3° > RC \equiv CH$

209 **(a)**

$$\underset{\text{Maltose}}{C_{12}H_{22}O_{11}} \xrightarrow{\text{Maltase}} C_6H_{12}O_6 \xrightarrow{\text{Zymase}} C_2H_5OH$$

210 **(d)**

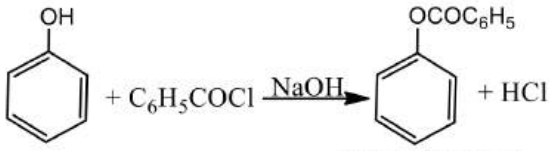
Ethers are relatively less active due to the absence of functional group.

211 **(c)**

During germentation of grape juice, a brown crust is formed at the top which is called argol. This contains potassium hydrogen tartrate and is used for preparation of tartaric acid and Rochelle salt.

212 **(d)**

The process of benzoylation of compounds containing active hydrogen such as phenol, aniline, alcohol etc, with benzoyl chloride in the presence of aqueous NaOH is called Schotten-Baumann reaction.



phenyl benzoate

213 **(c)**

Gashol or power alcohol (ethanol + petrol) a fuel for generating power.

215 **(c)**

Alcohol + Acid $\rightleftharpoons$ Ester(fruity smelling)

ROH *RCOOH* *RCOOR*

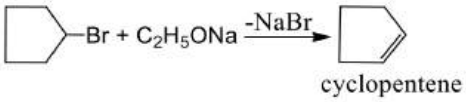
Alcohol (C_2H_5OH) when react with acid they produce ester and esters have fruity smell.

$$C_2H_5OH + CH_3COOH \rightarrow C_2H_5COOCH_3 + H_2O$$

ethyl alcohol acetic acid fruity smell of ester

216 **(c)**

2° alkyl halides tend to undergo elimination. Thus bromocyclopentane on treatment with sodium ethoxide gives cyclopentane rather than cyclophenyl ethyl ether



cyclopentene

217 **(b)**

$$\underset{1°}{CH_3CH_2OH} \xrightarrow{[O]} CH_3CHO \xrightarrow{[O]} CH_3COOH$$

(Aldehyde and acid of same carbon atoms)

$$\underset{2°}{CH_3CHOHCH_3} \xrightarrow{[O]} CH_3COCH_3 \xrightarrow{[O]} CH_3COOH + HCOOH$$

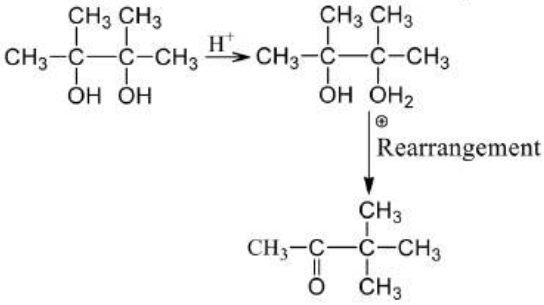
(Acid of less carbon atom)

$$\underset{3°}{(CH_3)_3COH} \xrightarrow[\text{Only in acidic medium}]{[O]} CH_3COCH_3 \xrightarrow{[O]} CH_3COOH + HCOOH$$

(Both of less carbon atoms)

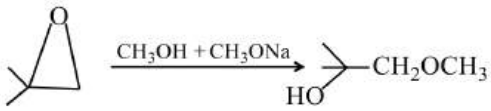
218 **(a)**

Pinacol $(CH_3)_2 - C(OH)C(OH)(CH_3)_2$ with dil H_2SO_4 or HCl undergoes dehydration and rearranges to form ketones (pinacolon)



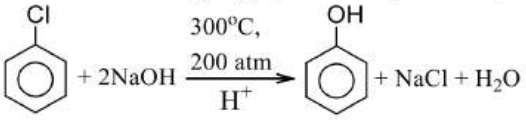
219 **(b)**

This is base catalysed cleavage of cyclic ethers where nucleophile attacks least substituted carbon.



221 **(a)**

By Dow process large quantities of phenol are formed by heating chlorobenzene with a 10% solution of caustic soda or sodium carbonate at 300°C under very high pressure (200 atm)

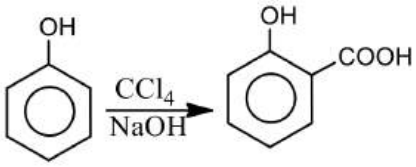


222 **(a)**

Tincture of iodine is a solution of I_2 in alcohol.

223 **(c)**

Phenol on heating with CCl_4 and aqueous KOH gives salicylic acid. This reaction is Reimer-Tiemann reaction.



224 **(a)**

Cl_2 in absence of moisture has no action over CH_3OH. In presence of moisture it oxidizes CH_3OH to HCHO.

226 **(a)**

$$\underset{1^\circ}{CH_3CH_2OH} \xrightarrow{[O]} CH_3CHO \xrightarrow{[O]} CH_3COOH$$

(Aldehyde and acid of same carbon atoms)

$$\underset{2^\circ}{CH_3CHOHCH_3} \xrightarrow{[O]} CH_3COCH_3 \xrightarrow{[O]} CH_3COOH + HCOOH$$

(Acid of less carbon atom)

$$\underset{3^\circ}{(CH_3)_3COH} \xrightarrow[\text{Only in acidic medium}]{[O]} CH_3COCH_3 \xrightarrow{[O]} CH_3COOH + HCOOH$$

(Both of less carbon atoms)

227 **(c)**

$$\underset{}{CH_2=CH_2} \xrightarrow{HI} \underset{(A)}{CH_3-CH_2I} \xrightarrow{\text{aq. KOH}} \underset{(B)}{CH_3-CH_2OH} \xrightarrow[140^\circ C]{\text{Conc. } H_2SO_4} \underset{(C)}{C_2H_5-O-C_2H_5}$$

Note: Ethers are functional isomers of alcohols

228 **(b)**

The reaction of alcohol with conc. HCl and anhydrous $ZnCl_2$ following S_N1 pathway, so greater the stability of carbocation formed, faster is the reaction.

2-methyl propan-2-ol gives 3° carbocation. Hence, it reacts rapidly with conc. HCl and anhydrous $ZnCl_2$ (Lucas reagent).

229 **(d)**

Solubility of alcohols decreases with increasing mol. wt. because of increasing hydrophobic nature of alkyl gp.

230 **(c)**

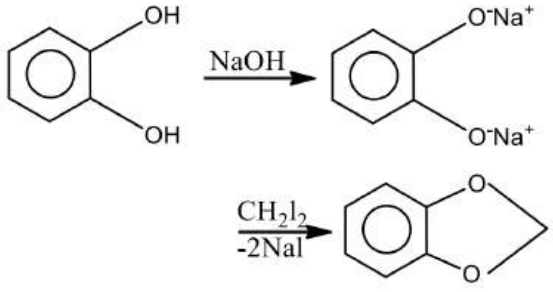
It is name reaction.

231 **(b)**

$$\underset{(p,s)}{\text{Alcohol}} \xrightarrow{[O]} \text{aldehyde or ketones with same carbon atoms.}$$

233 **(a)**

Catechol is most acidic out of all dihydric phenols.



The reaction is Williamson's synthesis type reaction.

234 **(c)**

$$CaCl_2 + 4C_2H_5OH \longrightarrow CaCl_2 \cdot 4C_2H_5OH$$

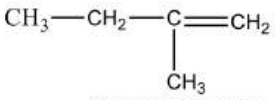
235 **(c)**

Alcohol is very good solvent for many species.

236 **(a)**

The reaction follows Saytzeff rule which says that during dehydration reaction hydrogen is taken preferably from carbon atom having lesser hydrogen atoms.

2-methyl butanol



2-methyl butene

237 **(d)**

Peroxides decompose violently on heating.

238 **(b)**

3°alcohols are resistant to oxidation under drastic condition. They first form ketone and then acid by loosing one carbon at each step.

$$\underset{(4C)}{3^\circ \text{ alcohol}} \xrightarrow[[O]]{\text{Drastic condition}} \underset{(3C)}{\text{ketone}} \xrightarrow{[O]} \underset{(2C)}{\text{acid}}$$

∴Acid having 2C is formed when 3° alcohol is oxidised under drastic conditions.

240 **(d)**

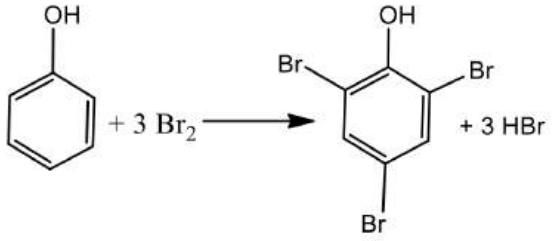
$$\underset{\text{Aryl-alkyl ether}}{C_6H_5O-R} \xrightarrow{\text{Cold HI}} \underset{\text{phenol}}{C_6H_5OH} + \underset{\text{alkyl iodide}}{RI}$$

241 **(d)**

Br_2 is formed by a redox reaction :

$$5Br^- + BrO_3^- + 6H^+ \rightarrow 3Br_2 + 3H_2O$$

-OH group is the activating group and there is S_E at *o*-and *p*-positions giving yellowish white precipitate of 2, 4, 6-tribromophenol :



242 **(d)**
Tertiary halides do not undergo Williamson's synthesis. To get *t*-alkyl-alkyl ether, *t*-alkoxide and alkyl halide should be used.

244 **(a)**

$$RCOOH + HOR' \xrightarrow{H^+} \underset{\text{Ester}}{RCOOR'}$$

$$RCOCl + HOR' \xrightarrow{\text{Pyridine}} RCOOR' + HCl$$

$$(RCO)_2O + 2HOR' \xrightarrow{\text{Pyridine}} RCOOR' + H_2O$$

The esterification by $RCOOH$ and $R'OH$ does not take place in alkaline medium.

245 **(b)**
Because the difference in mass between $-CH_2OH$ group and $-COOH$ group is 14, thus the compound which undergoes oxidation is a primary alcohol. ($-CH_2OH$ is the functional group of primary alcohols).

$$\underset{(R+31)}{RCH_2OH} \rightarrow \underset{(R+45)}{RCOOH}$$

Primary alcohol acid

246 **(a)**
The formula represents for alcohol. Also secondary alcohol gives acid with less no. of carbon atoms.

247 **(a)**

$$\begin{matrix} CH_2OH \\ | \\ CH_2OH \end{matrix} \xrightarrow{HIO_4} 2HCHO$$

HIO_4 oxidises $—CH_2OH$ to HCHO and breaks the C—C bond of terminal CH_2OH gps.

249 **(d)**
By Williamson's synthesis, alkyl halide on reaction with sodium alkoxide gives ether.

$$\underset{\text{ethyl chloride}}{C_2H_5Cl} + \underset{\text{sodium ethoxide}}{C_2H_5ONa} \longrightarrow \underset{\text{diethyl ether}}{C_2H_5OC_2H_5} + \underset{\text{sodium chloride}}{NaCl}$$

250 **(c)**

$$C_2H_5OC_2H_5 + HI \rightarrow C_2H_5OH + C_2H_5I$$

251 **(c)**
Williamson's synthesis It involves the heating of alkyl halide with sodium or potassium alkoxides. This reaction is used for the preparation of ethers *e.g.,*

$$C_2H_5ONa + C_2H_5I \rightarrow C_2H_5 - OC_2H_5 + NaI$$

252 **(b)**
CH_3OH and C_2H_5OH can be differentiated by using Na_2CO_3 and I_2. C_2H_5OH gives yellow precipitate of CHI_3 whereas CH_3OH does not react with it.

$$C_2H_5OH + 4I_2 + Na_2CO_3 \rightarrow \underset{\text{(iodoform Yellow ppt)}}{CHI_3} + 5NaI + HCOONa + 3CO_2 + H_2O$$

254 **(c)**
Dehydration of alcohol is in order
$1° < 2° < 3°$
Thus, (C), a 3° alcohol is dehydrated very easily.

255 **(b)**
Primary alcohols get dehydrogenated with reduced copper at 573 K, to give corresponding aldehydes.

$$\underset{\text{primary alcohol}}{R - CH_2OH} \xrightarrow{Cu,573\ K} \underset{\text{aldehyde}}{R - CHO} + H_2$$

256 **(b)**

$$C_2H_5NH_2 + HO—N=O \longrightarrow C_2H_5OH + N_2 + H_2O$$

257 **(d)**
Proton donors are acids. Among given choices C_2H_5OH can give proton (H^+) most easily.
$\therefore$ C_2H_5OH is most acidic among C_2H_6, CH_4, $CH \equiv CH$ and C_2H_5OH

258 **(a)**

$$\underset{\text{2-propanol}}{CH_3 - \underset{\underset{OH}{|}}{CH} - CH_3} + NaBr \xrightarrow[\Delta]{\text{Reflux}} \underset{\text{2-bromopropane}}{CH_3 - \underset{\underset{Br}{|}}{CH} - CH_3} + H_2O$$

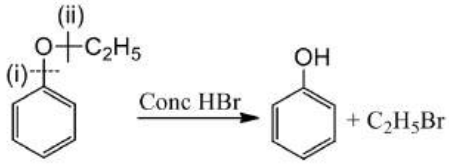
259 **(a)**
The reactivity of primary halides is in the order, $CH_3 > CH_3CH_2 > CH_3CH_2CH_2$ and the tendency of alkyl halides to undergo elimination is $3° > 2° > 1°$. Hence, for better yield, the alkyl halide should be primary and alkoxide should be secondary or tertiary.

$$CH_3CH_2Br + Na^+O—\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}—CH_3 \xrightarrow{\text{Heat}} CH_3CH_2O—\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}—CH_3$$

260 **(b)**

Alcohols are alkyl derivative of neutral H_2O; Thiols are derivative of weak acidic H_2S.

261 **(b)**



Breaking bond (i) is difficult as this bond has a partial double bond character due to resonance

263 **(b)**

A is $CH_3CH_2CH_2Cl$; B is $CH_3 \cdot CH{=}CH_2$

264 **(a)**

Ethanol on dehydration in presence of conc. H_2SO_4 at 140°C, gives diethyl ether.

$$2C_2H_5OH \xrightarrow[140^\circ C]{Conc.H_2SO_4} C_2H_5 - O - C_2H_5 + H_2O$$

Diethyl ether

265 **(a)**

o-cresol contains phenolic group, thus it gives violet colouration with $FeCl_3$ where as benzyl alcohol donot contains phenolic group, hence no colouration with $FeCl_3$. Hence, identifiable.

266 **(b)**

$$CH_3OH \xrightarrow{Oxidation} \underset{(A)}{HCOOH} \xrightarrow{NH_3} \underset{(B)}{HCOONH_4}$$

267 **(a)**

Pyroligneous acid obtained during destructive distillation of wood contains mainly acetic acid (9-10%) methyl alcohol (2-2.5%) and acetone about 0.5%; the other distillation products are wood gas, wood charcoal, wood tar.

268 **(c)**

Enzymes are highly specific in catalysing action.

269 **(b)**

$(A)CH_3CH_2OH$; $(B)CH_3CH_2ONa$; $(C)CH_3CH_2$

270 **(c)**

I^- attacks on lower alkyl gp. due to stearic hindrance on larger gp.

272 **(d)**

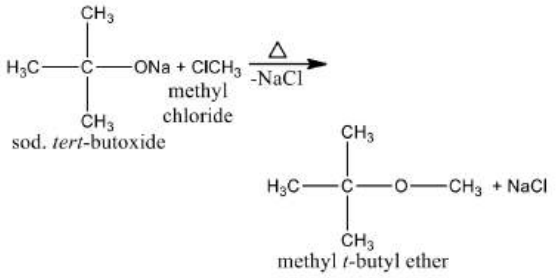
(X) is $CH_3CH = CH_2$; $(Y)$is $CH_3CHBrCH_2Br$; (Z) is alkyne.

273 **(c)**

$$2C_2H_5OH + 6O_2 \longrightarrow 4CO_2 + 6H_2O$$

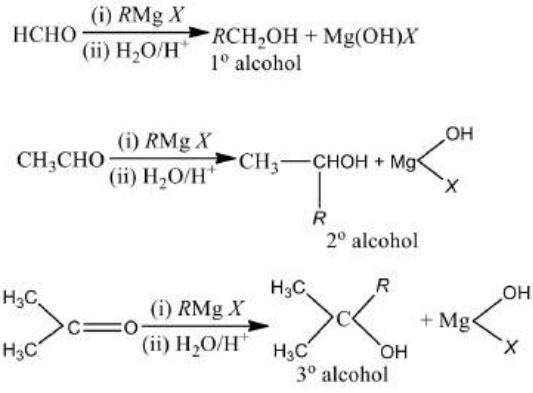
274 **(b)**

When, sod. *tert*-butoxide is reacted with methyl chloride, methyl *t*-butyl ether is formed.



275 **(d)**

Aldehydes and ketones on reaction with $RMgX$ followed by subsequent hydrolysis in acidic gives alcohol. *e.g.;*



276 **(c)**

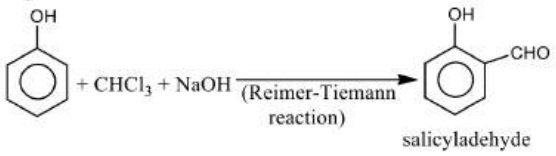
Alcohol can be directly converted to chloral, chloroform or ethanol.

278 **(c)**

Soluble in strong acids ethers are Lewis base.

279 **(c)**

In Reimer-Tiemann reaction Salicyladehyde is obtained when phenol is heated with $CHCl_3$ and aq NaOH.



281 **(a)**

Williamson's synthesis It is the best method for the laboratory preparation of both simple and mixed ethers and involves the action of sodium alkoxide on a suitable alkyl halide.

$$C_2H_5 - Br + C_2H_5ONa \rightarrow C_2H_5 - O - C_2H_5 + NaBr$$

Ethyl bromide — diethyl ether

$$C_2H_5 - Cl + C_6H_5 - ONa \rightarrow C_6H_5 - O - C_2H_5 + NaCl$$

Ethyl phenyl ether

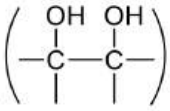
282 **(d)**

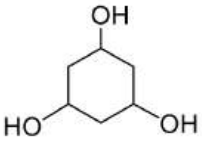
Bulkier the alkyl groups in the ether, greater is the $C - O - C$ bond angle due to steric factor

283 **(c)**

Ethers are Lewis base and forms complex compounds with Lewis acids.

284 **(a)**

All those compounds which have  groups are oxidised by periodic acid (HIO_4). Thus is not oxidised.

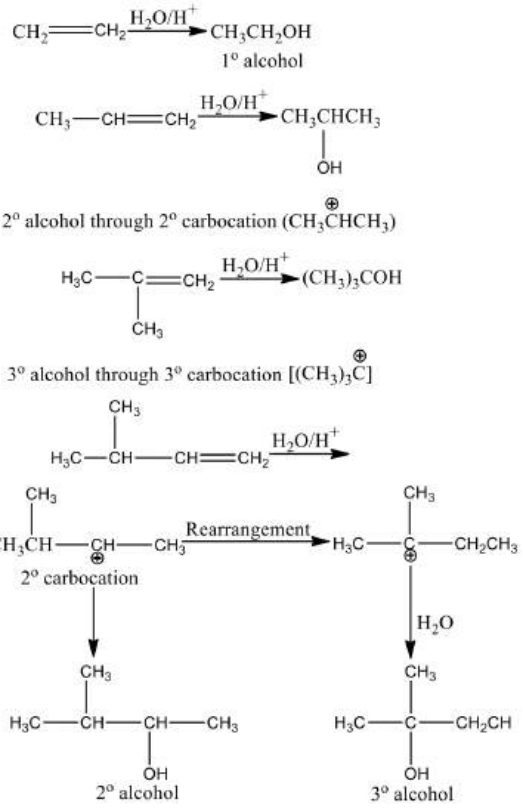


285 **(a)**

$C_6H_5OCH_3 + HI \longrightarrow C_6H_5OH + CH_3I$

Phenol shows stabilization due to resonance.

286 **(c)**



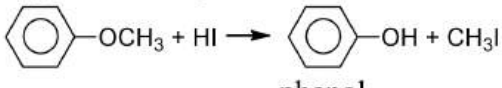
Thus, best alternate is (c)

287 **(c)**

Diethyl ether when hated with CO at 150°C and 500 atm pressure in presence of BF_3 forms ethyl propionate.

289 **(b)**

When phenolic ether is heated with HI, it gives alkyl halide and phenol



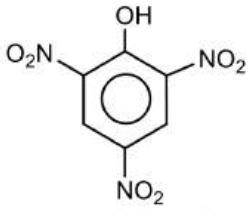
phenol

290 **(c)**

The red colour is due to anion of nitrolic acid.

291 **(d)**

Picric acid is 2, 4, 6-trinitrophenol. It is due to presence of three $-I$ showing $-NO_2$ groups, is more acidic than acetic acid and benzoic acid.



2,4,6-trinitrophenol
(picric acid)

292 **(c)**

CH_3OH does not contain $CH_3—CHOH—$ unit.

293 **(d)**

$C_6H_5OR \xrightarrow{HBr} C_6H_5OH + C_2H_5Br$

294 **(d)**

$H_3C—CHBr—OCH_3$

295 **(d)**

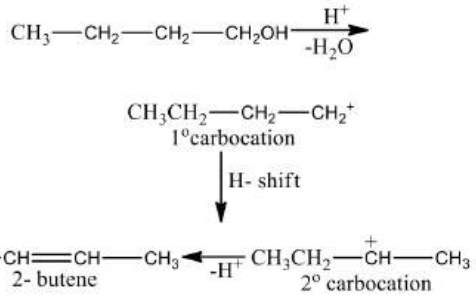
Ethers are supposed to have no functional group.

296 **(b)**

More is the branching in molecule, lesser is surface area and weaker are intermolecular forces.

298 **(b)**

The dehydration of 1-butanol gives 2-butene as the main product because 2-carbocation is stabler than1°.



300 **(c)**

$5R—OR + P_2S_5 \longrightarrow 5RSR + P_2O_5$

301 **(c)**

Longer the bond length, lesser will be dissociation energy and hence, more reactivity.

Among halogen acids bond length increases from HCl to HI.

∴ Order of reactivity of halogen acids towards alcohol is

$HI > HBr > HCl$

302 **(d)**

Alkyl halides react with sodium alkoxide to give ether. This is called Williamson's synthesis of ether.

$$C_2H_5Cl + C_2H_5ONa \xrightarrow{\Delta} \underset{\text{ether}}{C_2H_5OC_2H_5} + NaCl$$

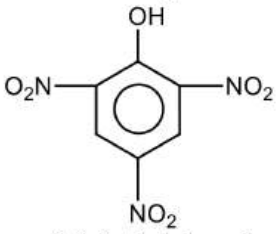
303 **(a)**
Alcohols although possess low mol. wt. than thiol but they show H-bonding.

306 **(c)**
Alcohols are neutral and do not influence pH.

307 **(c)**
Enzymes are protinous molecules derived from living organisms.

308 **(d)**
Both ether and chloroform are anaesthetic agents.

309 **(b)**
Picric acid is *sym*-trinitrophenol.



2,4,6-triniphenol

310 **(d)**
Among hydrogen halides, as the size of halide ion increases, its reactivity towards ethyl alcohol also increases. Thus, the order of reactivity of hydrogen halide is
$HI > HBr > HCl > HF$

312 **(c)**
Chloral forms chloral hydrate with water due to H-bonding.

$$CCl_3CHO \longrightarrow CCl_3CH(OH)_2$$

314 **(c)**
Primary, secondary and tertiary alcohols are distinguished by Lucas test. A mixture of anhydrous $ZnCl_2$ +conc HCl is called Lucas reagent.

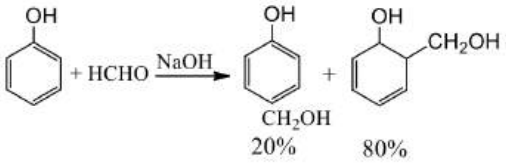
316 **(b)**
Sodium alkoxide is $R - \bar{O}\ Na^+$.

317 **(a)**
Due to the formation of stable tertiary carbon atom as an intermediate.

319 **(a)**
Reactivity order for H-atom of alcohol is,

$$\underset{\text{Primary} > \text{Secondary} > \text{Tertiary}}{C_2H_5O\overset{\delta+}{H} + \overset{\delta-}{HO}OCCH_3 \longrightarrow C_2H_5OOCCH_3}$$

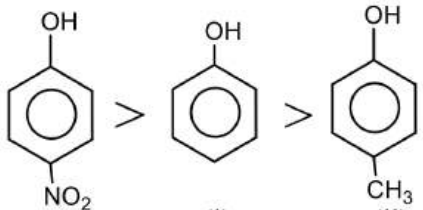
320 **(b)**
Phenol condenses with aliphatic and aromatic aldehydes in the *o*- and *p*-positions, the most important example being the condensation with formaldehyde. This is known as Leaderer-Manasse reaction



322 **(c)**
C—O—C angle is 100° and thus, ethers *R*—O—*R* have dipole moment.

323 **(b)**
It is a fact.

324 **(b)**
Presence of electron withdrawing group such as NO_2, CHO etc, on benzene nucleus, makes phenol more acidic by stabilising phenoxide ion while presence of electron releasing groups such as $-CH_3 - C_2H_5$ destabilises the phenoxide ion, thus makes the phenol less acidic. Hence, the order of acidity of given compound is

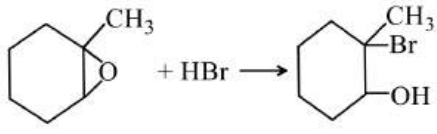


(iii) (i) (ii)

327 **(c)**
Mixture of anhydrous $ZnCl_2$ and conc. HCl is known as Lucas reagent. Lucas test is used for the distinction between primary, secondary and tertiary alcohols.
The tertiary alcohol reacts immediately with Lucas reagent producing turbidity.
The secondary alcohol gives turbidity within 5-10 min and primary alcohol doesn't give turbidity at all at room temperature. In the given alternates, 2-hydroxy-2-methyl propane is 3° alcohol, so it is more reactive.

328 **(b)**
—OH gp. is on allyl gp. (CH_2=CH—CH_2—)

329 **(c)**



This is acid catalysed cleavage of cyclic ether where nucleophile attacks most substituted carbon.

330 **(a)**

$$(CH_3)_4N^+I^- \xrightarrow{NaOH} (CH_3)_4N^+OH^- \xrightarrow{\Delta} (CH_3)_3N + CH_3OH$$

The reaction is more spontaneous for a better leaving group, *i. e.*, I^-. Also, methyl group with +N will disperse +ve charge on N-atom to release I^- easily.

332 **(d)**

The Lucas test cloudiness (turbidity) appears due to the formation of alkyl chloride

334 **(c)**

$$RMgX + C_2H_5OH \longrightarrow RH + Mg\begin{cases} OC_2H_5 \\ X \end{cases}$$

RH is $(CH_3)_2CH \cdot CH_2CH_3$

Thus, RX should be $(CH_3)_2CH \cdot CH_2 \cdot CH_2Cl$, $(CH_3)_2C(Cl)-CH_2 \cdot CH_3$, $CH_3-CH(CH_2Cl) \cdot CH_2 \cdot CH_3$

$(CH_3)_2CHCHCl.CH_3$. In each case the Grignard reagent formed will give 2-methyl butane on reaction with C_2H_5OH

335 **(c)**

Ether on reacting with P_2S_5 form thioether

$$\underset{\text{ether}}{5R-O-R} + P_2S_5 \rightarrow \underset{\text{thioether}}{5R-S-R} + P_2O_5$$

336 **(d)**

It oxidises only C—OH gp. to C=O and not to C=C.

337 **(c)**

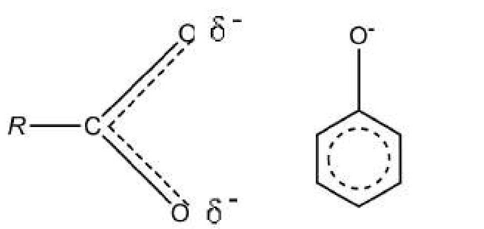
One mole of CH_3COCl reacts at one —OH gp. replacing H by CH_3CO gp.

338 **(b)**

Reactivity order of OH towards Lucas reagent is Tertiary > Secondary>Primary alcohol.

339 **(a)**

Phenol are less acidic than carboxylic acid, because carboxylate ion is relatively more stable as compared to phenoxide ion.



carboxylate ion   phenoxide ion

340 **(a)**

$CH_3 \cdot CH_2OH \longrightarrow CH_3COOH$; secondary and tertiary alcohols give acids of less carbon atoms.

342 **(c)**

This is industrial method of preparation of glycol.

343 **(c)**

Buchner studied fermentation.

344 **(d)**

C_2H_5OH is obtained from grains, used as wine and called methyl carbinol.

345 **(a)**

Boiling point of alcohols are more than alkane; also more is the surface area, more is b.p. of alcohol.

346 **(a)**

Reactivity order for H-atom of alcohol is,

Primary > Secondary > Tertiary

$$C_2H_5O\boxed{H + HO}OCCH_3 \longrightarrow C_2H_5OOCCH_3$$

347 **(b)**

Williamson's synthesis for mixed ethers cannot be used to prepare ditertiary ethers, because tertiary alkyl halides on heating with sod. alkoxide gives dehydrohalogenation.

$$(CH_3)_3C.Br \xrightarrow{CH_3ONa} (CH_3)_2.C = CH_2$$

349 **(d)**

Alkyl halides are hydrolysed to corresponding alcohols by moist silver oxide (AgOH) or by boiling with aqueous alkali solution

$$RX + AgOH \xrightarrow{Heat} ROH + AgX$$

350 **(a)**

Due to strong H-bonding and weaker hydrophobic character.

351 **(b)**

Jones reagent oxidises 1° alcohols to aldehydes and 2° alcohols to ketones without affecting C = C doubled bond.

$$CH_3CH{=}CH{-}\underset{\underset{OH}{|}}{CH}{-}CH_3 \xrightarrow[\text{reagent}]{\text{Jones}}$$

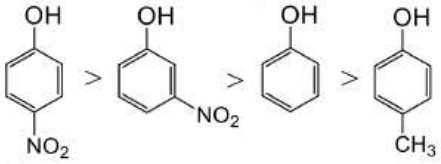
$$CH_3CH{=}CH{-}\underset{\underset{O}{\|}}{C}{-}CH_3$$

352 **(b)**

$$CH_3OH + Na \longrightarrow CH_3ONa + \frac{1}{2}H_2$$

354 **(d)**

$+R$ group present in phenol decreases the acidity while $-R$ group presents at *ortho* or at *para* position increases the acidity of phenols. Thus, the correct order of acidity is



355 **(b)**

Due to the presence of two lone pair of electrons on oxygen atom.

356 **(c)**

__do__

357 **(d)**

The enzyme catalysed conversion of starch into sugar.

358 **(c)**

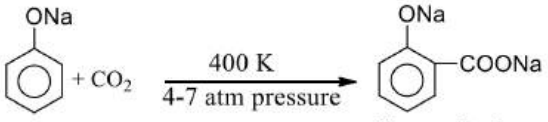
The process is called hydroboration and is used to convert terminal alkenes to 1-ol.

$$6RCH{=}CH_2 \xrightarrow{B_2H_6} 2(RCH_2CH_2)_3B$$

$$\xrightarrow{H_2O_2} RCH_2CH_2OH + H_2BO_3$$

359 **(c)**

Sodium phenoxide reacts with CO_2 at 400 K and 4 – 7 atm pressure to give sodium salicylate. This is called Kolbe's reaction



sodium salicylate

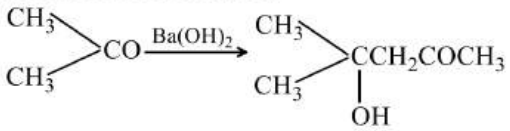
361 **(c)**

$2HCHO \xrightarrow{KOH} CH_3OH + HCOOK$;

Cannizzaro's reaction

362 **(c)**

It is aldol condensation.



363 **(c)**

Ethers have two alkyl groups on oxygen atom.

364 **(a)**

Pepsin hydrolyses — CONH— (peptide bonds) to — COOH and —NH_2.

365 **(b)**

1°alcohol are converted into aldehyde by reaction with $Na_2Cr_2O_7$ and H_2SO_4.

$$\underset{\text{ethyl alcohol}}{CH_3CH_2OH} + [O] \xrightarrow{Na_2Cr_2O_7+H_2SO_4} \underset{\text{ethanal}}{CH_3CHO} + H_2O$$

368 **(d)**

H-bonding in molecule gives rise to higher b.p.

369 **(a)**

$$CH{\equiv}CH + 2HCHO \xrightarrow{\text{Catalyst}} CH_2OHC{\equiv}C{-}CH_2OH$$

This reaction is ethinylation. The catalyst used are copper acetylide or sod. alkoxide.

370 **(b)**

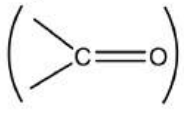
$$D \xrightarrow{\text{Oxidation}} \text{aldehyde} \xrightarrow[H_2SO_4]{K_2Cr_2O_7} \underset{\text{acetic acid}}{CH_3COOH}$$

1° alcohol on oxidation gives aldehyde having same number of carbon and aldehyde on oxidation gives acid having same number of carbon atoms.

It means, D will be alcohol having two carbon atoms that is C_2H_5OH(ethyl alcohol) and the alcohol on oxidation will give CH_3CHO (acetaldehyde)

$$\underset{(D)}{C_2H_5OH} \xrightarrow{[O]} CH_3CHO \xrightarrow{[O]} CH_3COOH$$

372 **(d)**

Alcohols (−OH) react with sodium and carbonyl compounds  give precipitate with semicarbazide.

Since, the compound with molecular formula, C_3H_6O does not give precipitate with simicarbazide and does react with sodium, it is neither a carbonyl compound nor an alcohol. Hence, it must be an ether, *i.e.*, $CH_2 = CHOCH_3$

373 **(c)**

Williamson's synthesis is used for the preparation of ethers, specially mixed ethers.

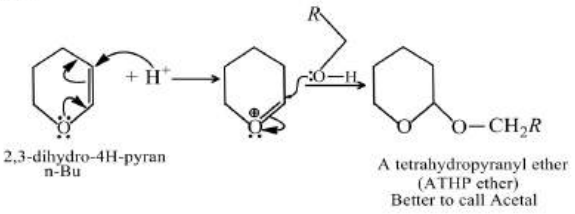
374 **(c)**

An increase in hydrophobic character decreases H-bonding.

375 **(a)**

X is $CHOCHO \xrightarrow{\text{Reduction}} CH_2OHCH_2OH$

377 **(b)**



Note : Because of its special structure, there are two ether oxygen attached to same carbon, making it acetal.

378 **(b)**

CH_3OH is toxic and injurious to health and therefore also used for denaturation of alcohol.

384 **(a)**

Phenyl magnesium bromide reacts with *t*-butanol to produce benzene because phenyl group (electronegative group) is associated with active hydrogen of alcohol, *i.e.*, $-H$ of $-OH$ group of alcohol.

$$C_6H_5MgBr + (CH_3)_3C - OH \rightarrow C_6H_5 + (CH_3)_3\,CO - MgBr$$

386 **(b)**

$$C_3H_5COOC_2H_5 \xrightarrow{LiAlH_4} C_2H_5CH_2OH + C_2H_5OH$$

387 **(b)**

$$CH_3COCl \xrightarrow{\text{Reduction}} CH_3CH_2OH$$

388 **(b)**

Phenols are acidic in nature due to resonance stabilisation of phenoxide ion. Presence of electrons releasing groups such as $-CH_3$ destabilises ion and decreases the acidic acidic nature of phenols. On the other hand presence of electron withdrawing group in the ring stabilise phenoxide ion and increases the acidic nature of phenols. Further more *meta*-isomer is less acidic. Then *para* because it is stabilised by inductive effect only. Thus, correct order is IV > III > I > II

389 **(c)**

Also known as glyptal resin; A class of synthetic resin obtained by the reaction of polyhydric alcohol with poly basic organic acids or anhydrides, e.g., Glycerol and phthalic anhydride, generally used for surface coating.

390 **(b)**

$NaBH_4$, $LiAlH_4$ has no action on C=C.

$$CH_3CH{\equiv}CHCHO \xrightarrow[LiAlH_4 \text{ or } NaBH_4]{[H]} CH_3CH{=}CHCH_2OH$$

391 **(c)**

The organic liquid A is C_2H_5OH

i. Ethyl alcohol is a colourless liquid with a characteristic pleasant smell, having boiling point 78.1°C.

ii. $C_2H_5OH \xrightarrow{Conc.H_2SO_4} CH_2 = CH_2$

(which decolourises Br_2 water and alk. $KMnO_4$)

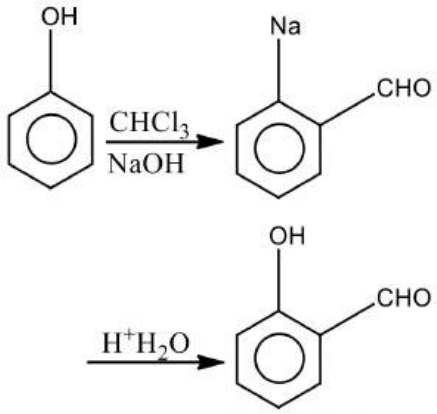
392 **(b)**

$$\underset{(X)}{CH_3CHOHCH_3} \xrightarrow{[O]} CH_3COCH_3$$

Which gives iodoform test.

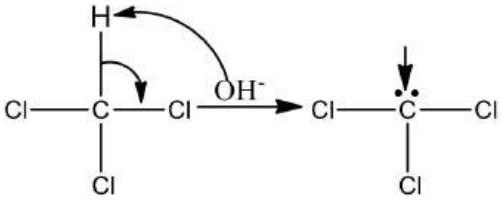
393 **(d)**

Reimer-Tiemann reaction this involves the treatment of phenol with chloroform in aqueous sodium hydroxide solution followed by acid hydrolysis. Salicyladehyde is formed.



salicyladehyde

In the above reaction, chloroform first reacts with sodium hydroxide to produce dichloro carbene which is the intermediate in this reaction.



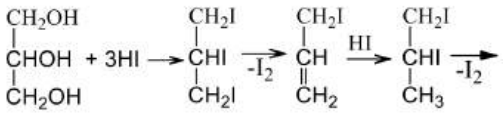
dichlorocarbene

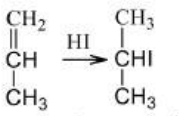
394 **(b)**
Reactions involving H-atom of alcohol show the order $1^{\circ}>2^{\circ}>3^{\circ}$.

395 **(a)**
A characteristic test for alcoholic gp.

397 **(c)**
The boiling point of alcohols is higher than the boiling points of corresponding alkanes and aldehydes due to H-bonding. As the molecule mass increases, boiling point increases.
Thus, C_2H_5OH has the higher boiling point among the given.

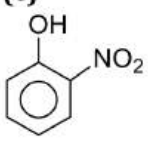
398 **(c)**
When glycerol reacts with HI, *iso*-propyl iodide is obtained





iso-propyl iodide

399 **(c)**

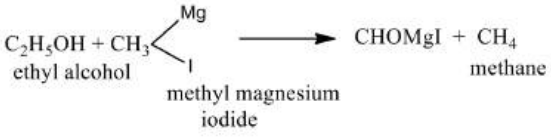


is not soluble in $NaHCO_3$

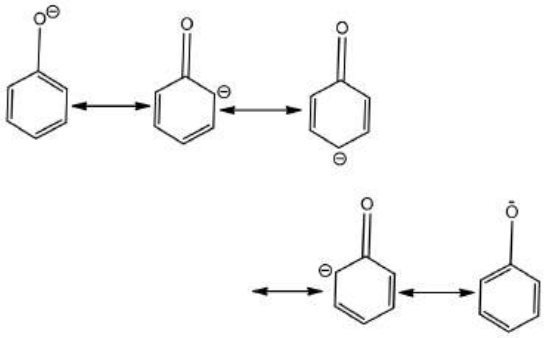
400 **(b)**
Pyroligneous acid is used for the preparation of acetic acid. It contains about 10% acetic acid, and was originally treated by neutralising with lime and then distilling off the volatile compounds like methanol and acetone

401 **(a)**
Power alcohol is used to generate power.

403 **(a)**
Ethyl alcohol reacts with methyl magnesium iodide as follows



405 **(c)**
Due to resonance the phenoxide ion is more stable whereas resonance is not possible in alkoxide ion.



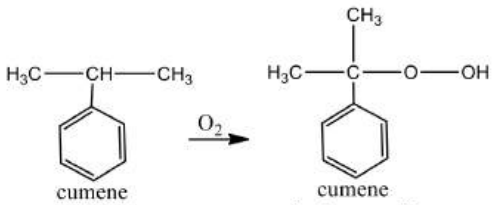
$R-O^{\ominus}$ no resonance is possible,
Since, phenoxide ion is better stabilized by resonance, the phenol has more tendency to form phenoxide ion by releasing H^+ ion. So, phenols are acidic in nature.

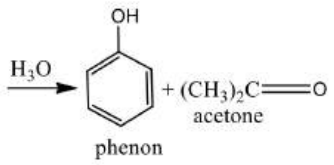
407 **(d)**
Molecular weight of diethyl ether is more than ethanol. Therefore, it should have higher boiling point than ethanol. But it is not so. It is due to intermolecular hydrogen bonding. Ethyl alcohol has intermolecular hydrogen bonding but diethyl ether has no hydrogen bonding. The compounds shows intermolecular hydrogen bonding has higher m.p. and b.p. than compounds having no hydrogen bonding. Therefore, the boiling point of diethyl ether will be less than ethanol (78°C).

409 **(c)**
$C_2H_5OH \xrightarrow{\text{Acetyl bacilli}} CH_3COOH$

410 **(d)**
$ROH + HOR \xrightarrow[-H_2O]{} ROR$

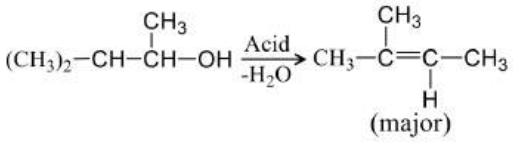
412 **(a)**
Cumene is iospropyl benzene (1-methyl ethyl benzene). It on oxidation gives phenol.

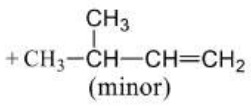




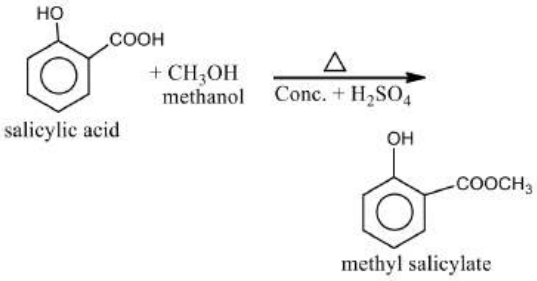
414 **(a)**
Due to H-bonding.

415 **(b)**
Many a time unexpected products result during dehydration of alcohols.





417 **(d)**
Methanol reacts with salicylic acid in the presence of a few drops of conc H_2SO_4 to give methyl salicylate having the smell of oil of winter green.



418 **(c)**
Ethers are R—O—R' or R—O—R.

419 **(c)**
Phenol gives characteristic colouration (violet) with aqueous $FeCl_3$ solution.

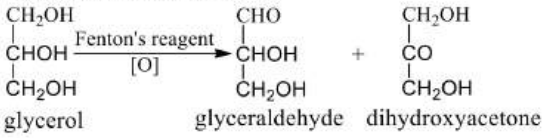
420 **(a)**
Reactivity of −OH gp. of alcohols (due to +ve IE of alkyl group).

421 **(d)**
Remember these.

422 **(d)**
In presence of air and light, ether form peroxides which cause explosion during distillation

423 **(d)**
All the reaction proceed by stable ions. After the lose of H^+ion, phenol forms phenoxide ion. The phenoxide ion is resonance stabilized, thus makes the phenol more acidic.

426 **(c)**
With mild oxidising agent like bromine water or H_2O_2 in the presence of $FeSO_4$ (Fenton's reagent), glycerol is oxidised to a mixture of glyceraldehyde and dihydroxy acetone



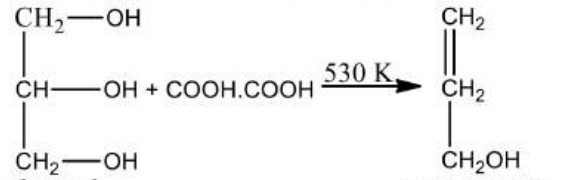
428 **(c)**

$$R—CH_2OH \xrightarrow{[O]} \underset{\text{I oxidation product}}{R-CHO} \xrightarrow{[O]} RCOOH$$

431 **(a)**

$$CH_2OHCHOHCH_2OH + H_2C_2O_4 \xrightarrow{110°C} HCOOH + CO_2 + \text{glycerol}$$

432 **(a)**
Oxalic acid on reaction with glycerol at 530K temperature furnish allyl alcohol.



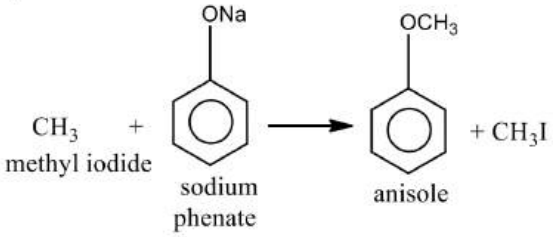
ol

433 **(c)**
Alcohol forms a azeotropic mixture with water and absolute alcohol is obtained by this mixture (rectified spirit) by adding benzene and then carrying out fractional distillation.

434 **(a)**

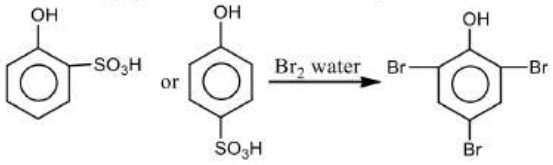
$$RONa + RX \longrightarrow R—OR + NaX$$

435 **(b)**
The reaction of alkyl halide with sodium alkoxide to give ether (alkoxy alkane) is known as Williamson's synthesis. In this reaction an ether (anisole) is prepared by the action of alkyl halide (methyl iodide) on sodium alkoxide (sodium phenate), so it is an example of Williamson's synthesis.



436 **(b)**

Like nitration, bromination of *o*-or *p*-phenolsulphonic acid occurs with simultaneous replacement of SO_3H group by Br atom to ultimately give 2, 4, 6-tribromophenol.



438 **(d)**

Boiling point of ethyl alcohol is 78°C.

440 **(b)**

$C_2H_5OC_2H_5 + 6O_2 \longrightarrow 4CO_2 + 5H_2O$

442 **(a)**

$CH_3CH_2OH \xrightarrow[\text{Step 1}]{Cl_2} CH_3CHO$

The above reaction is an example of oxidation. Due to oxidation – CH_2OH group is oxidised to – CHO group.

$CH_3CHO \xrightarrow[\text{Step 2}]{3Cl_2} Cl_3.C.CHO$

In the second step chlorination takes place. In chlorination hydrogen atom changes by chlorine.

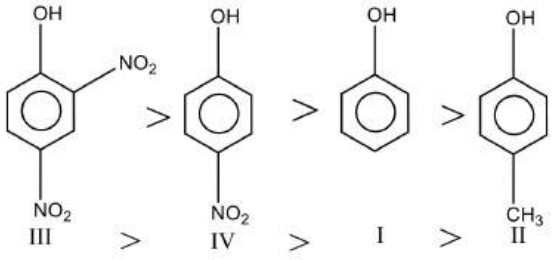
443 **(d)**

Starch $\xrightarrow{\text{Diastase}}$ Maltose.

444 **(b)**

Proton donors are acids. The acidity of phenol increases by presence of electron withdrawing groups (*e.g.*,$-NO_2$ group) because these groups weaken the O – H bond and stabilise the phenoxide by resonance. More the number of electron withdrawing group in compound more will be acidity. On the other hand electron donating group (*e.g.*, CH_3) decrease the acidity of phenol because they strengthen the O – H bond. Therefore, correct order of acidity is

III > IV > I > II



445 **(d)**

Denaturation is made by addition of pyridine, CH_3OH or naphtha.

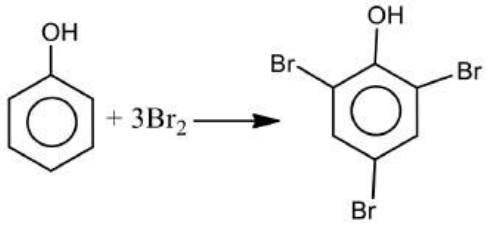
447 **(b)**

Mol. wt. Of $C_4H_{10}O_3$=106; on reaction with CH_3COCl; H-atom of OH gp. is replaced by $COCH_3$ gp. and thus showing an increase in mol. wt by 42 unit. Thus, if mol. wt. becomes 190, it means molecule has two—OH groups.

450 **(d)**

Bond angle is 110° due to steric hindrance of bulky alkyl gps.

451 **(c)**



Molecular weight of phenol= $12 \times 6 + 1 \times 6 + 16 = 94$

Molecular weight. Of $Br_2 = 3 \times 160 = 480$

$\because$ 94 g of phenol requires=480g of Br_2

$\therefore$ 2 g phenol requires=$\frac{480}{94} \times 2 = 10.22$ g

452 **(b)**

Chlorex is industrial name for dichlorodiethyl ether, *i. e.*, $CH_3CHClOCHClCH_3$

453 **(b)**

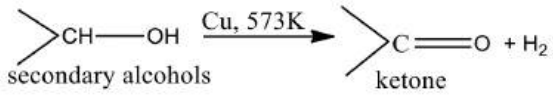
General formula for alcohols is $C_nH_{2n+1}OH$.

Primary alcohols have $-CH_2OH$ gp. Secondary alcohols have $>CHOH$ gp. and

tertiary alcohols have $\geqslant COH$ gp.

454 **(b)**

Secondary alcohols on dehydrogenation with Cu at 573 K give ketones.



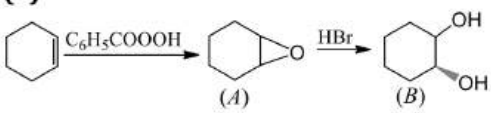
458 **(a)**

Branching give rise to decreases in surface area and thus intermolecular forces are lowered.

459 **(d)**

—OH gp. is on vinyl gp. (CH_2=CH—)

460 **(a)**



A = 1,2-epoxycyclohexane

B = *trans*-2-bromocyclohexanol

461 **(c)**

An experimental fact.

462 **(a)**

The reaction is called Fischer-Speier esterification.

465 **(a)**

When ethyl alcohol is oxidised by acidified potassium dichromate, $CH_3COOH(Y)$ is obtained as

$$\underset{X}{3C_2H_5OH} + 2K_2Cr_2O_7 + 8H_2SO_4 \rightarrow \underset{Y}{3CH_3COOH} + 2Cr_2(SO_4)_3 + 2K_2SO_4 + 11H_2O$$

Carboxylic acid undergoes reduction with $LiAlH_4$ to give primary alcohol as

$$H_3C-\overset{\overset{O}{\|}}{C}-OH \underset{(Ether)}{\xrightarrow{LiAlH_4}} CH_3CH_2OH$$
$$(Y) \qquad\qquad (X)$$

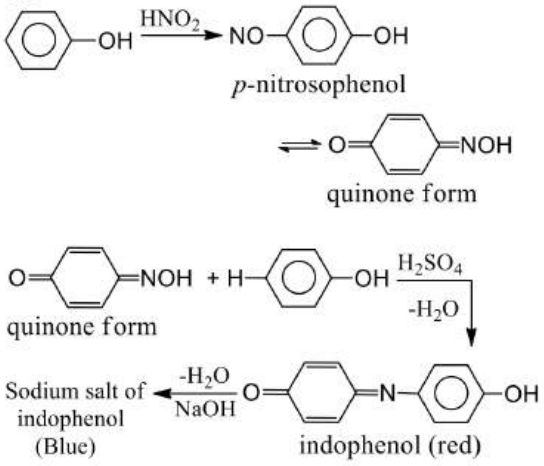
467 **(d)**

Reactivity order of OH towards Lucas reagent is, Tertiary>Secondary>Primary alcohol.

470 **(c)**

$$\text{Chloro benzene} \xrightarrow{\text{Dow's process}} \text{Phenol} \xrightarrow[\text{reaction}]{\text{Reimer–Tiemann}} \text{Salicylaldehyde}$$

471 **(a)**



This reaction is an example of coupling reaction

472 **(a)**

H of CH_3OH (carbinol) is replaced by vinyl gp.

473 **(d)**

Alcohols which are used for generating power is called power alcohol. A mixture of 20% ethanol and 80% gasoline is used in internal combustion engines to derive power

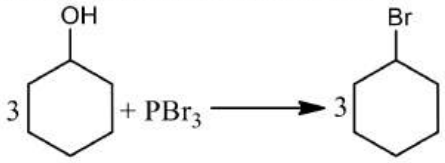
474 **(b)**

When one H_2SO_4 reacts with ethyl alcohol at room temperature, ethyl hydrogen sulphate is formed

$$CH_3CH_2OH + H_2SO_4 \underset{\text{Room temp}}{\longrightarrow} \underset{\text{Ethyl hydrogen sulphate}}{CH_3CH_2HSO_4} + H_2O$$

477 **(a)**

Cyclohexanol on reaction with PBr_3 in presence of pyridine gives bromocyclohexane.

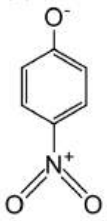


boromocyclohexane

478 **(c)**

In Lucas test, when alcohol is mixed with conc HCl and anhydrous $ZnCl_2$ at room temperature, if oily product is formed immediately, the alcohol can be tertiary

479 **(c)**

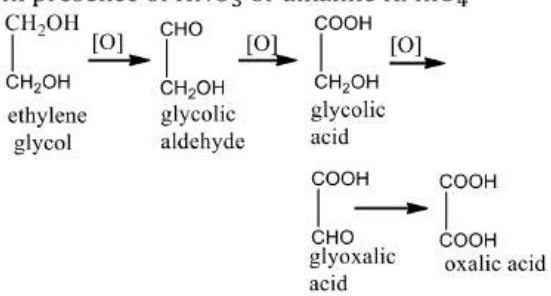


is not a resonating structure of *p*-nitrophenoxide

Since, N being an element of second period can't contain more than 10 electrons in its valence shell

480 **(c)**

In presence of HNO_3 or alkaline $KMnO_4$



484 **(b)**

PCl_5 replaces —OH group by —Cl.

486 **(c)**

Phenol forms azo dye, with benzene diazonium chloride. This reaction is called coupling reaction

487 **(a)**

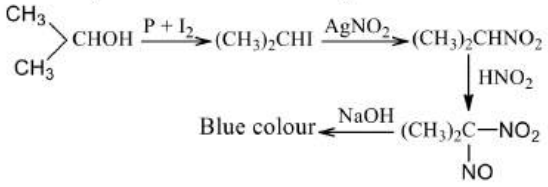
Reactivity of H-atom of alcohol, (due to + IE of alkyl gp.)

Primary > Secondary >Tertiary.

Also CH_3OH is more acidic than C_2H_5OH due to more +IE of $-C_2H_5$ gp.

489 **(a)**

Iso-butyl alcohol is secondary alcohol



490 (d)

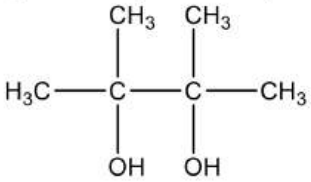
$CH_3COCH_3 \xrightarrow{\text{Reduction}} CH_3CH(OH)CH_3$

491 (a)

$RONa + RX \longrightarrow ROR + NaX.$

492 (b)

2, 3-dimethyl butane-2, 3-diol is known as pinacol



494 (b)

$RCOOH + HOR' \xrightarrow[-H_2O]{} RCOOR'$ ester.

495 (d)

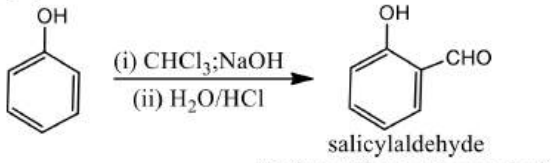
C_2H_5OH and C_6H_5OH can be distinguished by neutral $FeCl_3$ solution or I_2 +NaOH solution. C_2H_5OH gives iodoform test with I_2 + NaOH solution while phenol does not give yellow ppt. of iodoform.

$$C_2H_5OH + 4I_2 + 6NaOH \xrightarrow{\Delta} \underset{\text{iodoform}}{CHI_3} + HCOONa + 5NaI + 5H_2O$$

$C_6H_5OH + I_2 + NaOH \rightarrow$ No reaction

C_6H_5OH reacts with neutral $FeCl_3$solution to give purple colour while C_2H_5OH doesn't give any colour with neutral $FeCl_3$ solution.

497 (b)

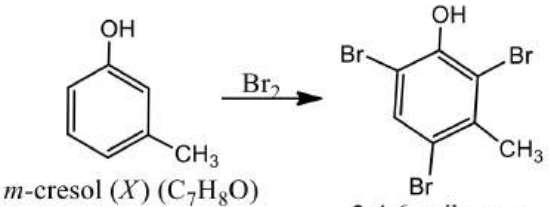


salicylaldehyde
(Reimer-Tiemann's reaction)

(Reimer-Tiemann's reaction)

498 (c)

Compound '*X*' (C_7H_8O) is insoluble in aqueous $NaHCO_3$ but soluble in NaOH, so it is a phenol. Since, the number of carbon atoms remains the same after bromination, the compound must be *meta cresol* and reactions takes place as follows



m-cresol (*X*) (C_7H_8O)

2,4,6,-tribromo
3-methyl phenol

499 (b)

Phenol doesn't decompose sodium carbonate or sodium bicarbonate, *i.e.*, CO_2 is not evolved because phenol is a weaker acid than carbonic acid.

500 (d)

The molecule should contain $CH_3-\underset{\underset{O}{\|}}{C}-$ or $CH_3-\underset{\underset{OH}{|}}{CH}$

Unit attached to C or H in it to shown iodoform reaction.

501 (c)

Alcohol is used as solvent for many drugs.

502 (b)

In Victors Meyer's test, 1° –alcohol gives red colour, 2°-alcohol gives blue colour while 3°-alcohol gives no colour.

503 (b)

$C_2H_5OH + SOCl_2 \longrightarrow C_2H_5Cl + SO_2 + HCl$

504 (c)

$$C_2H_5Br \xrightarrow{NaOH\ (aq)} C_2H_5OH \xrightarrow{Na} C_2H_5ONa \xrightarrow{CH_3I} C_2H_5OCH_3$$

505 (d)

All are anaesthetic agents.

506 (c)

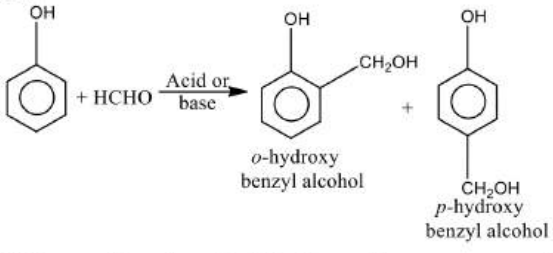
Alcohols are oxidised by not copper to give aldehydes.

$$C_2H_5OH \xrightarrow[300\ ^\circ C]{Cu} \underset{\text{acetaldehyde}}{CH_3CHO}\ \text{Or}\ C_2H_4O$$

507 (c)

Bond angle is 110° due to steric hindrance of bulky alkyl groups.

513 (a)



This reaction is called Laderer Mannasse reaction.

514 **(c)**

__do__

517 **(a)**

CH_3SH is gas with foul smell and thus, mixed with LPG to detect its leakage.

518 **(d)**

Alcohols are neutral as they do not influence the pH. Due to O—H bond, they possess Bronsted acid nature showing cleavage of O—H bond. Also due to the presence of lone pair of electron on oxygen atom, they act as Lewis base. The reactivity order is based on +IE of alkyl groups.

Lewis base order : $3^{\circ}>2^{\circ}>1^{\circ}$

Bronsted acid order : $1^{\circ}>2^{\circ}>3^{\circ}$

519 **(b)**

Reduction of acid and acid derivatives producing alcohol by $C_2H_5OH + Na$ is called Bonveault-Blanc reaction.

520 **(b)**

Absolute alcohol is 100% pure ethanol. The fractional distillation of aqueous solution of ethanol gives a constant boiling azeotropic mixture which contains 95% ethanol. To get 100% ethanol, a small amount of benzene is added with azeotropic mixture and then distilled. It is called azeotropic distillation.

522 **(a)**

Pyroligneous acid obtained during destructive distillation of wood contains mainly acetic acid (9-10 %), methyl alcohol (2-2.5%) and acetone about 0.5%; the other distillation products are wood gas, wood charcoal, wood tar.

523 **(c)**

Weak base reacts with strong acid.

525 **(c)**

Dunstan's test is used for identification of glycerol

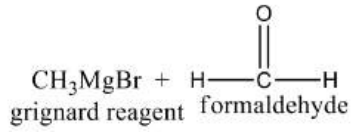
529 **(a)**

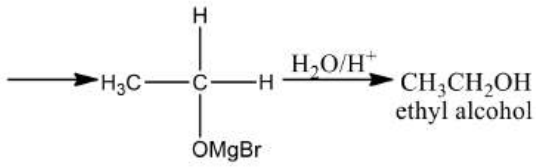
$(RMgX) + HCHO \rightarrow 1^{\circ}$alcohol

Grignard reagent

$(RMgX) + RCHO \rightarrow 2^{\circ}$alcohol

$(RMgX) + RCOR \rightarrow 3^{\circ}$alcohol





530 **(a)**

Solubility of alcohols in water decreases as the size of alkyl group increases because tendency to form hydrogen bonding decreases. So, the order of solubility is as

Ethanol > n-propanol > n-butyl alcohol

531 **(b)**

Germinated barley called malt contains diastase enzyme.

533 **(a)**

Methyl phenyl ether is obtained by the reaction of phenolate ions and methyl iodine.

$C_6H_5O^- + CH_3I \rightarrow C_6H_5OCH_3 + I^-$

Methyl phenyl ether

534 **(b)**

$NaBH_4$ and $LiAlH_4$ attacks only carbonyl group and reduce it into alcohol group. They do not attack on double bond.

$C_6H_5 - CH = CHCHO \xrightarrow{NaBH_4}$

cinnamic aldehyde

$C_6H_5 - CH = CH.CH_2OH$

cinnamic alcohol

535 **(a)**

Salicylic acid $+NaHCO_3 \rightarrow$effervescence of CO_2

Phenol $+NaHCO_3 \rightarrow$No reaction

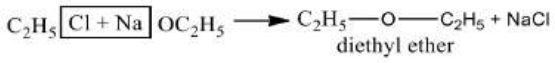
$\therefore$ $NaHCO_3$ is used to distinguish between phenol and salicylic acid.

536 **(d)**

Both ether and chloroform are anaesthetic agents.

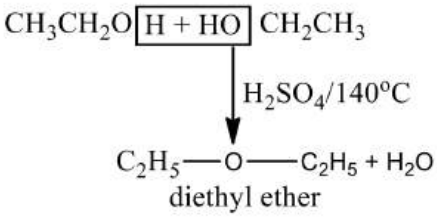
537 **(b)**

Ethyl chloride reacts with sodium ethoxide to form diethyl ether as



diethyl ether

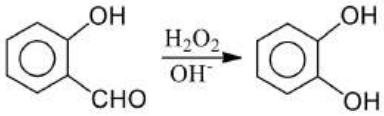
Diethyl ether is also obtained by reaction of ethyl alcohol with conc. H_2SO_4 at 140°C.



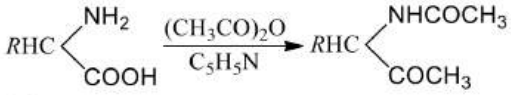
diethyl ether

539 **(c)**

Conversion of – CHO group present in phenol ring into – OH in the presence of H_2O_2 is called Darkin reaction.



Conversion of amino acids into methyl α-acetamide ketones, when heated with acetic anhydride in pyridine solution is often referred to as the Darkin west reaction.



540 **(d)**

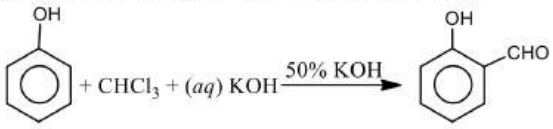
No one of the given reactions involve of formation of carbocation intermediate

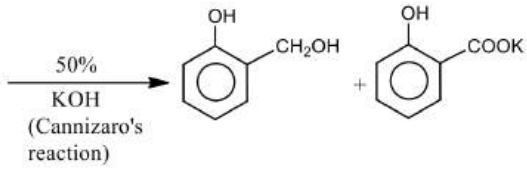
541 **(b)**

Butanol-1, butanol-2, 2-methylpropanol-1, 2-methylpropanol-2.

542 **(b)**

Phenol on reaction with chloroform and KOH gives salicyladehyde, which with 50% KOH solution undergoes Cannizaro's reaction.





543 **(b)**

In presence of NaOH or KOH, phenol reacts with alkyl halide and gives phenolic ether (C_6H_5OR).

$$C_6H_5OH + NaOH \xrightarrow[-H_2O]{} C_6H_5O - Na \xrightarrow[-NaX]{RX} C_6H_5 - O - R$$

Vapours of C_6H_5OH and CH_3OH, with red hot ThO_2 (thoria) give anisole (phenolic ether).

$$C_6H_5OH + CH_3OH \xrightarrow[\Delta]{ThO_2} C_6H_5OCH_3 + H_2O$$

anisole

544 **(c)**

Alkenes undergo addition reaction with diborane. The addition compounds on hydrolysis with H_2O_2/OH^- yield alcohols

$$CH_3 - CH = CH_2 \xrightarrow[H_2O_2]{B_2H_6} CH_3 - CH_2 - CH_2OH$$

545 **(d)**

Glycerol is used as lubricant in watches.

546 **(c)**

$$CH_3OH \xrightarrow{[O]} \underset{\text{Aldehyde}}{HCHO} \xrightarrow{[O]} HCOOH$$

547 **(a)**

Lucas reagent is anhyd. $ZnCl_2 + HCl$ (conc.) used to distinguish p, s and t alcohols.

548 **(b)**

$$CH_3OH \xrightarrow{Cu} HCHO + H_2$$

549 **(c)**

Terylene is formed by the action of glycol (CH_2OHCH_2OH) on dimethyl terephthalate. It is also called dacron.

550 **(c)**

Yeast contains maltase, invertase, zymase enzymes.

551 **(d)**

General formula for alcohols is $C_nH_{2n+1}OH$. Primary alcohols have $-CH_2OH$ gp. Secondary alcohols have $>CHOH$ gp. and tertiary alcohols have

553 **(d)**

When phenol reacts with phthalic anhydride in presence of conc. H_2SO_4 and heated, then mixture is poured in NaOH solution the product formed is phenolphthalein.

555 **(d)**

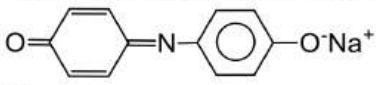
In the presence of anhydrous $ZnCl_2$, phenol form salicyladehyde. It is Gattermann-aldehyde reaction.

556 **(d)**

Phenol gives Libermann's nitroso reaction.

Phenol in Conc. $H_2SO_4 \xrightarrow[\text{excess of water}]{NaNO_2}$ Red colour $\xrightarrow[\text{(Excess)}]{NaOH}$ Blue colour

This blue colour is formed due to the formation of



557 **(c)**

Phenol gives violet colouration with ferric chloride solution due to the formation of a

coloured iron complex, which is a characteristic to the existence of keto-enol tautomerism in phenols

558 **(d)**

Peroxide will oxidise Fe^{2+} to Fe^{3+} which gives a blood red colour with KCNS.

$O_2^{2-} + 2Fe^{2+} + 4H^+ \rightarrow 2Fe^{3+} + 2H_2O$

$Fe^{3+} + 3KCNS \rightarrow \underset{\text{(blood red colour)}}{Fe(CNS)_3} + 3K^+$

559 **(a)**

Fermentation is always exothermic, *i. e.*, heat is given out during it.

560 **(b)**

Pyroligneous acid obtained during destructive distillation of wood contains mainly acetic acid (9-10 %), methyl alcohol (2-2.5%) and acetone about 0.5%; the other distillation products are wood gas, wood charcoal, wood tar.

561 **(c)**

C_2H_5OH gives iodoform test.

562 **(d)**

$\underset{\text{Ethyl ether}}{C_2H_5OC_2H_5} + \underset{\text{acetic anhydride}}{(CH_3CO)_2O} \xrightarrow{AlCl_3} \underset{\text{ethyl acetate}}{CH_3COOC_2H_5}$

563 **(c)**

Rubbers and plastics are insoluble in alcohol.

564 **(c)**

Catalytic dehydrogenation involves the passing of vapours of alcohol over reduced copper at 300°C and the product thus formed is identified.

Primary alcohols gives aldehyde while secondary alcohols give ketones

565 **(a)**

Only acidic compounds such as acetic acid, phenol and alcohol react with sodium metal. Ether is not acidic in nature, hence it does react with sodium metal.

$\underset{\text{Ethanol}}{2CH_3CH_2OH} + 2Na \rightarrow \underset{\text{sodium ethoxide}}{2CH_3CH_2ONa} + H_2$

$\underset{\text{Acetic acid}}{2CH_3COOH} + 2Na \rightarrow \underset{\text{sodium acetate}}{2CH_3COONa} + H_2$

$\underset{\text{Phenol}}{2C_6H_5OH} + 2Na \rightarrow \underset{\text{sodium phenoxide}}{2C_6H_5ONa} + H_2$

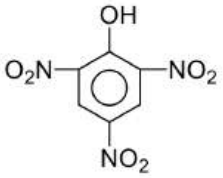
$CH_3 - O - CH_3 + Na \rightarrow$ No reaction

566 **(a)**

Impure ether, *i. e.*, if peroxide ether has formed due to oxidation, the peroxide bond will liberate I_2 from KI which will give blue colour with starch.

568 **(c)**

2, 4, 6-trinitrophenol is called picric acid



570 **(b)**

Aliphatic thiol on combustion give carbon dioxide, water and sulphur dioxide

571 **(b)**

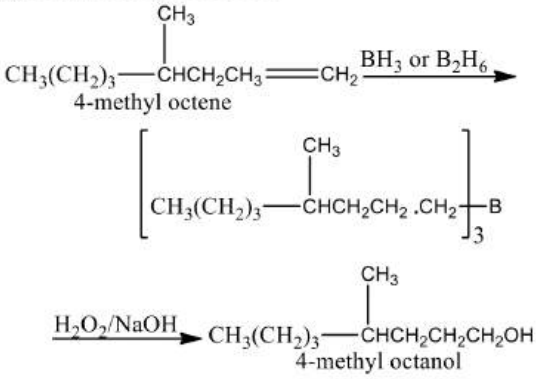
$(NH_4)_2SO_4$ or $(NH_4)_3PO_4$ acts as food for the yeast cells.

572 **(d)**

$LiAlH_4$ has no effect on C=C.

573 **(a)**

Terminal alkenes react rapidly with diborane to form primary trialkyl boranes which on oxidation gives primary alcohols.



(In general hydroboration oxidation involve the addition of water according to anti-Markownikoff's rule).

574 **(b)**

$\underset{(Z)}{CH_3CHOHCH_3} \xrightarrow{PCl_5} \underset{(X)}{CH_3CHClCH_3}$

$\xrightarrow{Alc.KOH} \underset{(Y)}{CH_3CH = CH_2} \xrightarrow{H_2O} \underset{(Z)}{CH_3CHOHCH_3}$

575 **(b)**

$C_nH_{2n+1}OH$ or $C_nH_{2n+2}O$ is general formula for alcohols.

576 **(c)**

Phenol reacts with neutral $FeCl_3$ solution to give violet colour complex which is soluble in water.

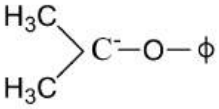
$6C_6H_5OH + FeCl_3 \rightarrow \underset{\text{violet colour complex}}{[Fe(OC_6H_5)_6]^{3-}} + 3H^+ + 3HCl$

577 **(d)**

Tertiary alcohols do not give Viktor Meyer's test.

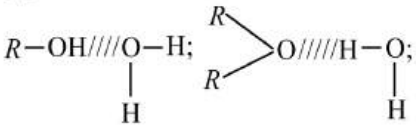
578 **(d)**

In rearrangement of cumene hydroperoxide



is not formed

579 **(a)**



Both shows H-bonding, however the increase in hydrophobic character (due to two alkyl groups in ether), the H-bonding weakens.

580 **(a)**

$NaBH_4$ reduces aldehyde to 1° alcohol.