Ravi Maths Tuition

7 Alcohols Phenols and Ethers

12th Standard

Chemistry

Multiple Choice Question 142 x 1 = 142

1) The general molecular formula which represents the homologous series of alkanols is

(a) $C_nH_{2n+2}O$ (b) $C_nH_{2n}O_2$ (c) $C_2H_{2n}O$ (d) $C_nH_{2n+1}O$

2) Which of the following will produce only one product on reduction with $LiAlH_4$?

(a) $CH_3OCOCH_2CH_3$ (b) $CH_3CH_2OCOCH_2CH_3$ (c) $CH_3CH_2OCOCH_3$ (d) $CH_3CH_2OCOCH_2CH_2CH_3$

3) Benzylamine reacts with nitrous acid to form.

(a) azobenzene (b) benzene (c) benzyl alcohol (d) phenol

4) Which of the following orders of acid strength is correct?

(a) CHOH > ROH > HOH > HC $\equiv$ CH (b) C_6H_5OH > HOH > ROH > HC $\equiv$ CH

(c) C_6H_5OH > HOH > HC $\equiv$ CH > ROH (d) C_6H_5OH > HC > $\equiv$ CH > HOH > ROH

5) The compound (C) in the following series of reactions is:

$$Aceton + CH_3MgBr \xrightarrow{Dry\ ether} A \xrightarrow{H_3O^+} B \xrightarrow[20]{363K} C + H_2O$$

(a) 2-Methylpropene (b) but-2-ene (c) but-1-ene (d) propene

6) The relative ease of dehydration of alcohols follows the following order :

(a) tertiary > secondary > primary (b) primary > secondary > tertiary (c) secondary > tertiary > primary

(d) tertiary > primary > secondary

7) Phenol reacts with bromine in CS_2 to give

(a) o-bromophenol (b) m-bromophenol (c) o-and p-bromophenol (d) 2, 4, 6-tribromophenol

8) 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

9) When ethanol is heated with HI and red phosphorus, it gives

(a) ethyl iodide (b) ethane (c) ethylene (d) ether

10) Products obtained when HI reacts with isopropyl methyl ether at 373 K are

(a) isopropyl iodide and methyl alcihol (b) isopropyl alcohol and methyl iodide (c) isopropyl iodide and water

(d) methyl iodide and water

11) An ether is more volatile than alcohol having the same molecular formula. This is due to

(a) intermolecular hydrogen bonding in alcohols (b) dipolar character of ethers

(c) alcohols having resonance structures (d) intermolecular hydrigen bonding in ethers.

12) $CH_3OC_2H_5$ and $(CH_3)_3$ $COCH_3$ are treated with hydriodic acid. The fragments after reactions obtaind are:

(a) $CH_3I+HOC_2H_5$; $(CH_3)_3C$-I+$HOCH_3$ (b) $CH_3HO+C_2H_5I$; $(CH_3)_3C$-I+$HOCH_3$

(c) $CH_3OH+C_2H_5I$; $(CH_3)_3C$-OH+CH_3I (d) $CH_3I+HOC_2H_5$; $CH_3I+(CH_3)_3C$-O H

13) Monochlorinaton of toluene in sunlight followied by hydrolysis with aq.NaOH yields.

(a) o-Cresol (b) m-Cresol (c) 2, 4-Dihydroxytoluene (d) Benzyl alcohol

14) How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature?

(a) 1 (b) 2 (c) 3 (d) 4

15) What is the correct order of reactivity of alcohols in the following reaction?

$R-OH+HCI \xrightarrow{ZnCl_2} R-Cl+H_2O$

(a) $1^\circ > 2^\circ > 3^\circ$ (b) $1^\circ < 2^\circ > 3^\circ$ (c) $3^\circ > 2^\circ > 1^\circ$ (d) $3^\circ > 1^\circ > 2^\circ$

16) Acid catalysed hydration of alkene is an example for

(a) free radical substitution (b) nucleophilic substitution (c) nucleophilic addition (d) electrophilic addition

(e) electrophilic substitution

17) Among the alkenes which one produces tertiary butyl alcohol on hydration?

(a) $CH_3CH_2CH = CH_2$ (b) $CH_3CH = CHCH_3$ (c) $(CH_3)_2C = CH_2$ (d) $CH_3CH = CH_2$

18) In the following sequence of reactions, $Z \xrightarrow{PCl_5} X \xrightarrow{Alc.KOH} Y \underset{(ii)H_2O,boil}{\overset{(i)conc.H_2SO_4}{\longrightarrow}} Z$ Z is

(a) $CH_3CH_2CH_2OH$ (b) $CH_3CHOHCH_3$ (c) $CH_3CH_2CH_2CH_2OH$ (d) $(CH_3)_3CCH_2OH$

19) Consider the following reaction, ethanol $\xrightarrow{PCl_5}$ X $\xrightarrow{alc.KOH}$ Y $\underset{(ii)H_2O,roomtemperature}{\overset{H_2SO_4}{\longrightarrow}}$ Z The product Z is:

(a) CH_3CH_2 - O - CH_2CH_3 (b) CH_3CH_2 - O-SO_3H (c) CH_3CH_2OH (d) $CH_2 = CH_2$

20) The product of acid -catalysed hydration of 2-phenylpropane is

(a) 3-phenyl-2-propanol (b) 1-phenyl-2-propanol (c) 2-phenyl-2-propanol (d) 2-phenyl-1-propanol

21) The order of reactivity of the alkenes,$(CH_3)_2C = CH_2$,$CH_3CH = CH_2$,$CH_2 = CH_2$

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

22) Acid-catalysed hydration of alkenes except ethane leads to the formation of

(a) primary alcohol (b) secondary or tertiary alcohol (c) mixture of primary and secondary alcohols

(d) mixture of secondary and tertiary alcohols

23) Propene on hydroboration-oxidation produces

(a) $CH_3CH_2CH_2OH$ (b) $CH_3CHOHCH_3$ (c) $CH_3CHOHCH_2OH$ (d) CH_3CH_2CHO

24) Which of the esters shown,after reduction with $LiAlH_4$ and aqueous work up, will yield two molecules of only a single alcohol?

(a) $C_6H_5COOC_6H_5$ (b) $CH_3CH_2COOCH_2CH_3$ (c) $C_6H_5COOCH_2C_6H_5$ (d) CH_3COOCH_3

25) In the following sequence of reactions, CH_3-Br $\xrightarrow{KCN}$ A $\xrightarrow{H_3O^+}$ B $\underset{ether}{\xrightarrow{LiAlH_4}}$ C the end product (c) is

(a) acetone (b) methane (c) acetaldehyde (d) ethyl alcohol

26) In the reaction, $CH_3COOH \xrightarrow{LiAlH_4}$ A $\xrightarrow{PCl_4}$ B $\xrightarrow{Alc.KOH}$ C, the product C is

(a) acetyl chloride (b) acetaldeyde (c) acetylene (d) ethylene

27) Which of the following Grignard reagent is suitable for the preparation of 3-methyl-2-butanol?

(a) 2-Butanone + methylmagnesium bromide (b) Acetone + ethylmagnesium bromide

(c) Acetaldehyde + isoproplmagnesium bromide (d) Ethyl propionate + methylmagnesium bromide

28) 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.$RCOOC_2H_5$
Select the correct answer using the code given below:
(a) Only II (b) Only III (c) II and IV (d) III and IV

29) Among the following compounds, strongest acid is
(a) $HC\equiv CH$ (b) C_6H_6 (c) C_2H_6 (d) CH_3OH

30) The correct order of basic strength is
(a) $H_2O< OH^-< CH_3O^-$ (b) $CH_3OH< H_2O< CH_3O^-< OH^-$ (c) $H_2O< CH_3OH< OH^-< CH_3O^-$
(d) $OH^-H_2O< CH_3O^-< CH_3OH$

31) Phenylmagnesium bromide reacts with methanol to give
(a) a mixture of anisole and Mg(OH)Br (b) a mixture of benzene and Mg(OMe)Br
(c) a mixture of toluene and Mh(OH)Br (d) a mixture of phenol and Mg(OH)Br

32) Among the following, the non-spontaneous reaction is
(a) $ROH + R'MgX \longrightarrow R'H + Mg\ c\ (or)\ X$ (b) $RONa + NH_3 \longrightarrow NaNH_2 + ROH$ (c) $RONa+H_2O \longrightarrow NaOH+ROH$
(d) $ROH + HC \equiv CNa \longrightarrow RONa+HC \equiv CH$

33) $HC \equiv CH \xrightarrow[H_2SO_4]{HgSO_4} \xrightarrow[(ii)H_2O]{(i)CH_3MgBr} \xrightarrow{PBr_3}$ gives
(a) $CH_3CHBrCH_3$ (b) $CH_3CH_2CH_2Br$ (c) CH_2=CH-Br (d) BrCH=CH-CH_3

34) Cyclohexene is best prepared from cyclohexanol by which of the following reagents:
(a) Conc.H_3PO_4 (b) Conc.HCl/$ZnCl_2$ (c) Conc.HCl (d) Conc.HBr

35) During dehydration of alcohols to alkenes by heating with Conc.H_2SO_4, the initial step is
(a) formation of an ester (b) protonation of alcohol molecule (c) formation of carbocation
(d) elimination of water

36) The most suitable reagent for the conversion of R-$CH_2OH \longrightarrow$ R-CHO is
(a) PCC(Pyridinium chlorochromate) (b) $KMnO_4$ (c) CrO_3 (d) $K_2Cr_2O_7$

37) Which of the following compounds can be used as antifreeze in automobile radiators?
(a) Methyl alcohol (b) Glycol (c) Nitrophenol (d) Ethyl alcohol

38) An organic compound A reacts with CH_3MgI to form an addition product which on hydrolysis forms the compound B. Compound B gives blue coloured salt in Victor -Meyer,s test. The compounds A and B respectively are
(a) Acetaldehyde, tertiary butyl alcohol (b) Acetaldehyde, ethyl alcohol (c) Acetaldehyde, isopropyl alcohol
(d) Acetone, isopropyl alcohol

39) From amongst the following alcohols, the one that would react fastest with Conc.HCl and anhydrous $ZnCl_2$, is
(a) 2-methylpropanol (b) 1-butanol (c) 2-butanol (d) 2-methylpropan-2-ol

40) Compound 'A' of molecular formula $C_4H_{10}O$ on treatment with Lucas reagent at room temperature give compound B. When compound 'B' is heated with alcoholic KOH, it gives isobutene. Compound 'A' and 'B' are respectively
(a) 2-methyl-2-propanol and 2-chloro-2-methyl-propane (b) 2-methyl-1-propanol and 1-chloro-2-methyl-propane
(c) 2-methyl-1-propanol and 2-chloro-2-methyl-propane (d) butan-2-ol and 2-chlorobutane
(e) butan-1-ol and 1-chlorobutane

41) An unknown alcohol is treated with the "Lucas reagent" to determine whether the alcohol is primary, secondary or tertiary. Which alcohol reacts fastest and what mechanism?

(a) tertiary alcohol by S_N2 (b) secondary alcohol by S_N1 (c) tertiary alcohol by S_N1

(d) secondary alcohol by S_N2

42) Iodoform can be prepared from all except

(a) isopropyl alcohol (b) 3-methyl-2-butanone (c) isobutyl alcohol (d) ethyl methyl ketone

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

(a) (i).(iii) and (iv) (b) only (ii) (c) (i), (ii) and (iii) (d) (i) and (ii)

44) Which one of the following is not expected to undergo iodoform reaction?

(a) Propan-2-ol (b) 1-Phenylethanol (c) 2-Butanol (d) Ethanol (e) Diphenylmethanol

45) An organic compound X on treatment with pyridinium chlorochromate in dichloromethane gives compound Y. Compound Y reacts with I_2 and alkali to form triiodomethane. The compound 'X' is

(a) CH_3CH_2OH (b) CH_3CHO (c) CH_3COCH_3 (d) CH_3COOH

46) Haloform reaction does not take place with

(a) acetone (b) 2-chloropane (c) ethanol (d) methanol

47) Isopropyl benzene is oxidised in the presence of air to compound 'A'. When compound 'A' is treated with dilute mineral acid,the aromatic product formed is

(a) phenol (b) benzene (c) benzaldehyde (d) acetophenone (e) toluene

48) The conversion of m-nitrophenol resorcinol involves respectively

(a) hydrolysis, diazotization and reduction (b) diazotisation, reduction and hydrolysis

(c) hydrolysis, reduction and diazotization (d) reduction, diazotization and hydrolysis

49) Which one of the following phenols has the highest pK^a value?

(a) o-Nitrophenol (b) Phenol (c) m-Nitrophenol (d) Picric acid (e) p-Cresol

50) 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

51) The correct order of acid strength of the following substituted phenol in water at 28^0C is

(a) p-nitrophenol < p-fluorophenol < p-chlorophenol (b) p-chlorophenol < p-fluorophenol < p-nitrophenol

(c) p-fluorophenoll < p-chlorophenol < p-nitrophenol (d) p-fluorophenoll < p-nitrophenol < p-chlorophenol

52) among the following four compound
(i) phenol
(ii) methylphenol
(iii) meta-nitrophenol
(iv) para-nitrophenol
The acidity order is

(a) (iv) > (iii) > (i) > (ii) (b) (iii) > (iv), (i) > (ii) (c) (i) > (iv) > (iii) > (ii) (d) (ii) > (i) > (iii) > (iv)

53) Arrange the following compounds in the increasing order of their acidic strength
(i) m-nitrophenol
(ii) m-cresol
(iii) phenol
(iv) m-chlorophenol

(a) ii < iv < iii < i (b) ii < iii (c) iii < ii < i > iv (d) ii < iii < iv < i

54) Strongest acid among the following is

(a) o-methoxy phenol (b) p-methoxy phenol (c) m-methoxy phenol (d) phenol

55) Given are cyclohexanol
(I) acetic acid
(II) 2,4,6-trinitrophenol
(III) and phenol
(IV) In these, the order of decreasing acidic character will be

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

56) Which of the following will not be soluble in sodium bicarbonate?

(a) 2, 4, 6-Trinitrophenol (b) Benzoic acid (c) o-Nitrophenol (d) Benzenesulphonic acid

57) Ortho-nitrophenol is less soluble in water than p-and m-nitrophenols because

(a) o-nitrophenol shows intramolecular H-bonding (b) o-nitrophenol shows intramolecular H-bonding

(c) melting point of o-nitrophenols is lower than those of m- and p-nitrophenol

(d) o-nitrophenol is more volatile in steam than those of m- and p-isomers

58) Phenol, when it first reacts with concentrated sulphuric acid and then with concentrated nitric acid, gives

(a) nitrobenzene (b) 2,4,6-trinitrobenzene (c) o-nitrophenol (d) p-nitrophenol

59) The major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide is

(a) salicylaldehyde (b) salicylic acid (c) phthalic acid (d) benzoic acid

60) The aromatic compounds having formula 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

61) Which of the following reagents may be used to distinguish between phenol and benzoic acid?

(a) Neutral $FeCl_3$ (b) Aqueous NaOH (c) Tollen's reagent (d) Molisch reagent

62) Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces which one of the following functional group?

(a) -COOH (b) $-CHCl_2$ (c) -CHO (d) $-CH_2Cl$

63) The molecular formula of ethers is:

(a) $C_nH_{2n}O$ (b) $C_nH_{2n+1}O$ (c) $C_nH_{2+1}O$ (d) $C_nH_{2n}OC_nH_{2n}$

64) Formation of methyl tertiary butyl ether by the reaction of sodium tertiary butoxide and methyl bromide involves

(a) elimination reaction (b) electrophilic (c) nucleophilic addition (d) nucleophilic substitution reaction

65) In Williamson's synthesis, ethoxyethane is prepared by

(a) heating sodium ethoxide with ethyl bromide (b) passing ethanol heated alumina

(c) treating ethyl alcohol with excess of cone.H_2SO_4 at 430-440K

66) Identify Z in the sequence of reactions: $CH_3CH_2CH = CH_2 \xrightarrow{HBr/H_2O_2} Y \xrightarrow{C_2H_5ONa} Z$.

(a) CH_3-$(CH_2)_3$-O-CH_2CH_3 (b) $(CH_3)_2$CH-O-CH_2CH_3 (c) CH_3-$(CH_2)_4$-O-CH_3 (d) CH_3CH_2-$CH(CH_3)$-O-CH_2CH_3

67) Among the following sets of reactants which one produces anisole?

(a) CH_3CHO; RMgX (b) C_6H_5OH; CH_3I (c) C_6H_5OH; neutral $FeCl_3$ (d) $C_6H_5CH_3$; CH_3COCl; $AlCl_3$

68) Decreasing order reactivity in Williamson's ether synthesis of the following is:
I.Me_3CCH_2Br
II.$CH_3CH_2CH_2Br$
III.CH_2=$CHCH_2Cl$
IV.$CH_3CH_2CH_2Cl$.

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

69) Among the following the one which reacts most readily with ethanol is

(a) p-nitrobenzyl (b) p-chlorobenzyl (c) p-methoxybenzyl bromide (d) p-methylbenzyl bromide

70) Which of the following cannot be made by using Williamson synthesis?

(a) Methoxybenzene (b) Benzyl p-nitrophenyl ether (c) tert-Butyl methyl ether (d) DI-tert-butyl ether

71) Consider the reactions:
(i) $(CH_3)_2CH\text{-}CH_2Br \xrightarrow{C_2H_5OH} (CH_3)_2CH\text{-}CH_2OC_2H_5+HBr$
(ii)$(CH_3)_2CH\text{-}CH_2Br \xrightarrow{C_2H_5O^-} (CH_3)_2CH\text{-}CH_2OC_2H_5+Br^-$
The mechanisms of reactions (i) and (ii) are respectively:

(a) S_N1 and S_N2 (b) S_N1 and S_N1 (c) S_N2 and S_N2 (d) S_N2 and S_N1

72) When CH_2=CH-O-CH_2CH_3 reacts with HI gives a mixture of

(a) ethane (b) ethanol (c) iodoethene (d) ethanal

73) tert-Butyl ether on heating with HI gives a mixture of

(a) tert-butyl alcohol and methyl iodide (b) tert-butyl iodide and methanol (c) isobutylene and methyl iodide
(d) isobutylene and methanol

74) $C_2H_5OC_2H_5$+4H $\xrightarrow{RedP+HI}$ zX + H_2O X is

(a) ethane (b) ethylene (c) butane (d) propane

75) What are products of the following reaction? $C_6H_5OH + BrCH_2CH_2Br \xrightarrow{excessHBr}$?

(a) $C_6H_5OCH + BrCH_2CH_2Br$ (b) $C_6H_5OH + HOCH_2CH_2OH$ (c) $C_6H_5Br + HOCH_2CH_2OH$
(d) $OCH + BrCH_2CH_2OH$

76) Which of the following compounds is resistant to nucleophilic attack y hydroxyl ions?

(a) Methyl acetate (b) Acetonitrile (c) Acetamide (d) Diethyl ether

77) The correct combination of names for isomeric alcohols with molecular formula $C_4H_{10}O$ is/are

(a) tert-butanol and 2-methylpropan-2-ol (b) tert-butanol and 1,1-dimethylethan-1-ol
(c) n-butanol and butan-1-ol (d) isobutyl alcohol and 2-methylpropan-1-ol

78) 2-Methyl-2-propanol may be prepared by reacting methylmagnesium iodide with

(a) propanone (b) ethyl ethanoate (c) ethanal (d) ethylene oxide

79) Correct statement(s) in case of n-butanol and t-butanol is (are)

(a) both are having equal solubility in water (b) t-butanol is more soluble in water than n-butanol
(c) boiling point of t-butanol is lower than n-butanol (d) boiling point of n-butanol is lower than t-butanol

80) Which of the following compounds will give a yellow precipitate with iodine and alkali?

(a) Acetophenone (b) Methyl acetate (c) Acetamide (d) 2-Hydroxypropane

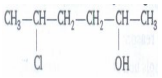
81) Dipole moment of diethyl ether is lower than that of

(a) CH_3OH (b) C_6H_5OH (c) CH_3-I (d) CH_3CHO

82) Which of the following alcohol contains C_{sp^3} - OH bond?

(a) Allylic alcohol (b) Vinylic alcohol (c) Phenols (d) None of these

83) Give IUPAC name of the compound given below.



(a) 2-chloro-5-hydroxyhexane (b) 2-hydroxy-5-chlorohexane (c) 5-chlorohexan-2-ol (d) 2-chlorohexan-5-ol

84) IUPAC name of m- cresol is_____.

(a) 3-methylphenol (b) 3-chlorophenol (c) 3-methoxyphenol (d) benzene-1,3-diol

85) The process of converting alkyl halides into alcohols involves_____.

(a) addition reaction (b) substitution reaction (c) dehydrohalogenation reaction (d) rearrangement reaction

86) Phenol is less acidic than _____.

(a) ethanol (b) o- nitrophenol (c) o-methylphenol (d) o-methoxyphenol

87) Which of the following method is used for the preparation of symmetrical and unsymmetrical ether?

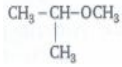
(a) Williamson's synthesis (b) Riemer-Tiemann reaction (c) Kolbe's reaction (d) None of the above

88) CH_3CH_2OH can be converted into CH_3CHO by

(a) catalytic hydrogenation (b) treatment with $LiAlH_4$ (c) treatment with pyridinium chlorochromate

(d) treatment with $KMnO_4$

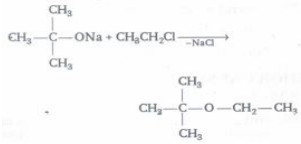
89) IUPAC name of the compound

 is _____.

(a) 1-methoxy-1-methylethane (b) 2-methoxy-2-methylethane (c) 2-methoxypropane

(d) isoptopylmethyl ether

90) The reaction,



is called

(a) Williamson synthesis (b) Williamson continuous etherification process (c) Etard reaction

(d) Gattermann-Koch reaction

91) Ethers have a net dipole moment because

(a) C-O bonds in ethers are non-polar (b) C-O bonds in ethers are polar (c) C-C bonds in ethers are polar

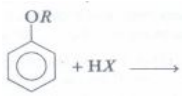
(d) C-C bonds in ethers are non-polar

92) The large difference in the boiling points of alcohols and ethers is due to the presence of

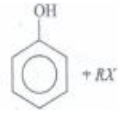
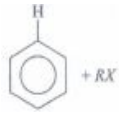
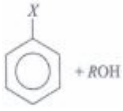
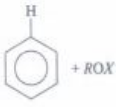
(a) van der Waals' forces in alcohols (b) dipole-dipole interactions in alcohols

(c) hydrogen bonding in alcohols (d) ion-ion interaction in alcohols

93) In the given reaction,



the product is/are

(a)  (b)  (c)  (d) 

94) Phenols show the cleavage of C-O bond with

(a) Na (b) K (c) Zn (d) Ca

95) Ethers are treated with an aqueous solution of A in order to remove peroxides from it. Identify the 'A' from the following options.

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

96) In ethers, the two bond pairs and two lone pairs of electrons on oxygen are arranged in a

(a) planar arrangement (b) tetrahedral arrangement (c) trigonal bipyramidal arrangement

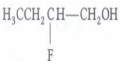
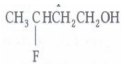
(d) linear arrangement

97) The reagent(s) used for the reduction of aldehydes and ketone into alcohols is/are

(a) fmely divided metals such as Pt/Pd/Ni (b) sodium borohydride (c) lithium aluminium hydride

(d) All of the above

98) Select the strongest acid among the following compounds.

(a) $FCH_2CH_2CH_2OH$ (b)  (c) $CH_3CH_2CF_2CH_2OH$ (d) 

99) Salicylic acid and phenol can be distinguished by the use of

(a) bromine water (b) neutral $FeCl_3$ (c) 5% NaOH solution (d) $NaHCO_3$ solution

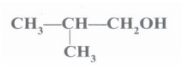
100) The electrophile used in Reimer-Tiemann reaction is

(a) $\overset{\oplus}{CCl_3}$ (b) CCl_2 (c) $\overset{\oplus}{Cl_3}$ (d) H_2O

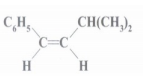
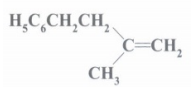
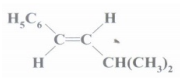
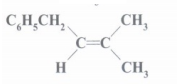
101) The heating of phenyl methyl ether with HI produces

(a) Iodobenzene (b) Phenol (c) Benzene (d) Ethyl chloride

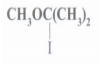
102) Which of the following gives positive iodoform test?

(a) $C_6H_5CH_2CH_2\,OH$ (b)  (c) $PhCHOHCH_3$ (d) $CH_3CH_2CH(OH)\,CH_2CH_3$

103) $C_6H_5CH_2CH(OH)CH(CH_3)_2 \xrightarrow{\text{Conc. } H_2SO_4}$ is

(a)  (b)  (c)  (d) 

104) CH3 -O-CH $(CH_3)_2$ + HI $\longrightarrow$ Products is/are

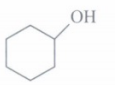
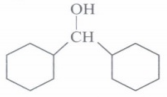
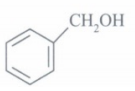
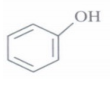
(a) $ICH_2\,OCH(CH_3)_2$ (b)  (c) $CH_3I + (CH_3)_2CHOH$ (d) $CH_3OH + (CH_3)_2$

105) $\text{Phenol} \xrightarrow{\text{Zn , dust}} \cdot X' \xrightarrow[\text{Anhy. } AlCl_3]{CH_3Cl} \cdot Y, \xrightarrow[KMnO_4]{\text{Alkaline}} , Z ,$

The product 'Z' is

(a) Benzaldehyde (b) Benzoic acid (c) Benzene (d) Toluene

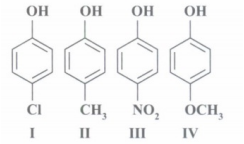
106) Which one of the following compounds has the most acid nature?

(a)  (b)  (c)  (d) 

107) THe electrophile involved in Riemer-Tiemann reaction of phenol with $CHCl_3$ in presence of NaOH is

(a) $:CCl_2$ (b) $\overset{\ominus}{C}\,C_3$ (c) $\overset{\oplus}{CHO}$ (d) $\overset{\oplus}{C}\,HCl_2$

108) Arrange the following in decreasing order of acidic character:

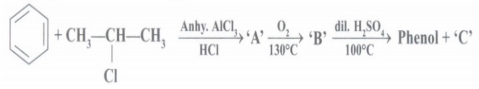


(a) IV > III > I > II (b) II > IV > I > III (c) I > II > III > IV (d) III > I > II > IV

109) $(CH_3)_3CONa + CH_3CH_2Cl \xrightarrow{-NaCl} (CH_3)_3COC_2H_5$ is called

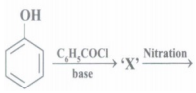
(a) Etard reaction (b) Gattermann Koch reaction (c) Williamson synthesis (d) Esterification

110) Identify 'C' in the following:

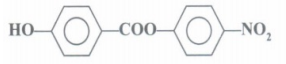
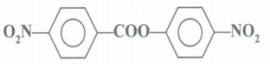


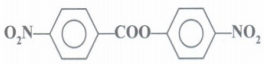
(a) Water (b) Ethanol (c) Propanone (d) Cumene hydroperoxide

111)

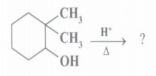


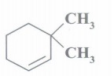
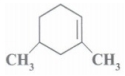
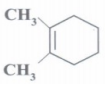
'Y' (Major product)

(a)  (b)  (c) 

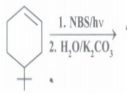
(d) 

112) Find the product of the given reaction:

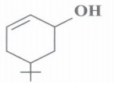
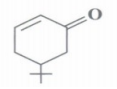
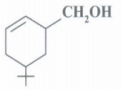


(a)  (b)  (c)  (d) 

113)



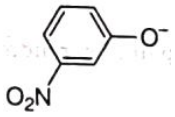
'X' is

(a)  (b)  (c)  (d) 

114) Monochlorination of toluene in sunlight followed by hydrolysis with aq. NaOH yields _____

(a) o-Cresol (b) m-Cresol (c) 2, 4-Dihydroxytoluene (d) benzyl alcohol

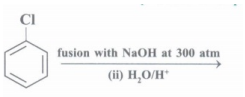
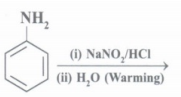
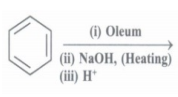
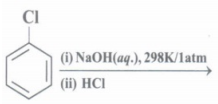
115) Which of the following species can act as the strongest base?

(a) OH^- (b) $C_6H_5O^-$ (c) RO^- (d) 

116) Which of the following are used to convert RCHO into RCH_2OH?

(a) H_2/Pd (b) $LiAlH_4$ (c) $NaBH_4$ (d) Reaction with RMgX followed by hydrolysis

117) Which of the following reactions will yield phenol?

(a)  (b)  (c)  (d) 

118) Which of the following reagents can be used to oxidise primary alcohols to aldehydes?

(a) CrO_3 in anhydrous medium. (b) $KMnO_4$ in acidic medium. (c) Pyridinium chlorochromate.

(d) Heat in the presence of Cu at 573K

119) Arrange the following compounds in increasing order of boiling point. Propan-1-ol, butan-1-ol, butan-1-ol, pentan-1-ol

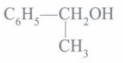
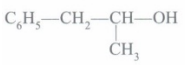
(a) Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol (b) Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

(c) Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol (d) Pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

120) Phenol can be distinguished from ethanol by the reactions with _____

(a) Br_2/water (b) Na (c) Neutral $FeCl_3$ (d) All the above

121) Which of the following are benzylic alcohols?

(a) C_6H_5 -CH_2 -CH_2OH (b) C_6H_5-CH_2OH (c)  (d) 

122) Salicylic acid on heating with acetic anhydride in basic medium gives

(a) Aspirin (b) Methyl salicylate (c) Phenyl salicylate (d) Acetyl salicylate

123) Phenol reacts with CO_2 at 3-7 atm, on heating in presence of NaOH followed by acidification to form

(a) Salicylic acid (b) Aspirin (c) Benzoic acid (d) Methyl benzoate

124) Salicylic acid on reaction with CH_3 OH in presence of Cone. H_2SO_4 gives

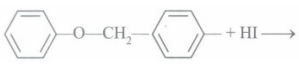
(a) Methyl salicylate (Iodex) (b) Benzoic acid (c) Methyl benzoate (d) Phenol

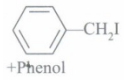
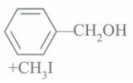
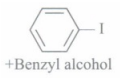
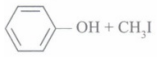
125) Salicylic acid reacts with Zinc dust on heating to give

(a) Benzene (b) Benzoic acid (c) Phenol (d) None of these

126) Which of the following compound would not react with Lucas reagent at room temperature?

(a) CH_2 = CH-CH_2OH (b) $C_6H_5CH_2OH$ (c) $CH_3CH_2CH_2OH$ (d) $(CH_3)_3$ COH

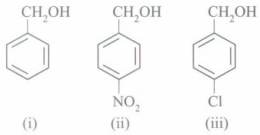
127) 

(a)  (b)  (c)  (d) 

128) Which of the following compounds will react with sodium hydroxide solution in water?

(a) C_6H_5OH (b) $C_6H_5CH_2OH$ (c) $(CH_3)_3$ COH (d) C_2H_5OH

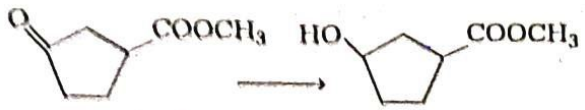
129) Mark the correct increasing order of reactivity of the following compounds with HBr/HCl.



(a) (i) < (ii) < (iii) (b) (ii) < (i) < (iii) (c) (ii) < (iii) < (i) (d) (iii) < (ii) < (i)

130) Vishal took 4 test-tubes namely A, B, C and D containing $CH_3CH = CH_2$, $CH_3CH_2CH = CH_2$, $CH_3CH = CH - CH_3$ and $(CH_3)_2C = CH_2$ respectively and tried to convert them into tert-butyl alcohol. He carried out acid catalysed hydration reaction on every alkene. Out of the four test-tubes, the one which will give desired result is

(a) A (b) B (c) C (d) D

131) 

Which of the following reagents should be used to carry out the above conversion?

(a) $LiAlH_4$ (b) $NaBH_4$ (c) Zn-Hg/HCl (d) $KMnO_4$

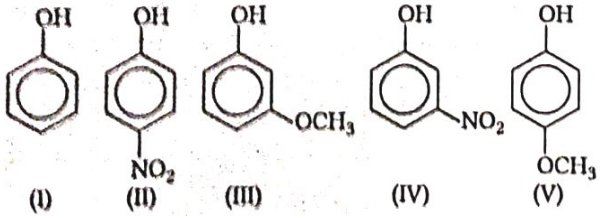
132) What would be the reactant and reagent used to obtain 2, 4-dimethyl pentan-3-ol?

(a) Propanal and propyl magneslum bromide (b) 3-methylbutanal and 2-methyl magnesium iodide

(c) 2-dimethylpropanone and methyl magnesium iodide

(d) 2-methylpropanal and iso-propyl magnesium iodide

133) Mark the correct order of decreasing acid strength of the following compounds.

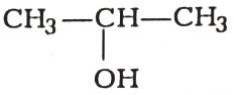


(a) V > IV > II > I > III (b) II > IV > I > III > V (c) IV > V > III > II > I (d) V > IV > III > II > I

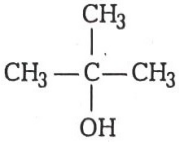
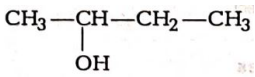
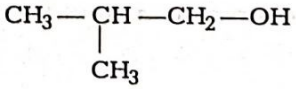
134) Whlch of the following reagents will not convert ethyl alcohol into ethyl chloride?

(a) PCl_5 (b) NaCl (c) $SOCl_2$ (d) HCl / $ZnCl_2$

135) A compond (X) with the molecular formula C_3H_8O can be oxidised to another compound (Y) whose molecular formula is $C_3H_6O_2$. The compound (X) may be

(a) CH_3CH_2 - O - CH_3 (b)  (c) CH_3 - CH_2 - CH_2 - OH (d) CH_3 - CH_2 - CHO

136) Lucas reagent produces cloudiness immediately with

(a)  (b)  (c) CH_3 - CH_2 - CH_2 - OH (d) 

137) Phenol does not undergo nucleophilic substitution reaction easily due to

(a) acidic nature of phenol (b) partial double bond character of C-OH bond

(c) partial double bond character of C-C bond (d) instability of phenoxide ion

138) Phenol on being heated witlh concentrated H_2SO_4 and then with concentrated HNO_3 gives

(a) o -nitrophenol (b) 2, 4, 6-trinitrophenol (c) p-nitrophenol (d) m-nitrophenol

139) The C-O-C bond angle in the ether molecule is

(a) 111° (b) 90° (c) 120° (d) 180°

140) Williamson's synthesis of preparing dimethyl ether is a/an

(a) S_N1 reaction (b) elimination reaction (c) S_N2 reaction (d) nucleophilic addition reaction

141) Which of the following alcohols will not undergo oxidation?

(a) Butanol (b) Butan-2-ol (c) 2-methylbutan-2-ol (d) 3-methylbutan-2-ol

142) When diethyl ether is heated with excess of HI, it produces

(a) ethanol (b) iodoform (c) methyl iodide (d) ethyl iodide

Fill up / 1 Marks 42 x 1 = 42

143) The alcohol whose IUPAC name is 3-rthylpentanol-3 has the structural formula.....

144) The IUPAC name of methlcarbinol is..... .

145) A.....diol has two hydroxyl groups on..... .

146) Alcohols exhibit functional isomerism with..... .

147) $C_4H_{10}O$ has.....metamers. One of them is diethyl ether while the others are..... and ..... .

148) The dipole moment of CH_3OH is.....than that of CH_3SH.

149) Tertiary alcohols are formed by reaction of Grignard reagent with.....or..... .

150) The reaction of sulphur powder with ohenylmagnesium followed by hydrolysis gives..... .

151) Formation of phenol from chlorobenzene is an example of.....aromatic substitution occurring through.....mechanism.

152) Lower alcohols are highly soluble in water due to..... .

153) A primary alcohol is a stronger acid than.....alcohol of the same molecular formula.

154) The acidity of phenol is due to the.....of its anion.

155) Phenol is acidic because of resonance stabilizatio of its conjugate base, namely..... .

156) Presence of electron donating groups at o- and p-positions.....while that of electron with drawing groups.....the acidity of phenols.

157) Amongst the three isomers of nitrophenols, the one that is least soluble in water is..... .

158) Sodium metal can be used for.....ethers but not for alcohols.

159) o-and p-Nitrophenols can be separated by..... .

160) When an organic acid reacts with.....in presence of a few drops of conc.H_2SO_4 , an ester is formed and the process is called..... .

161) Reaction of phenol waith.....in the presence of aq.NaOH is called Schotten Baumann reaction.

162) The halogen acid which is most reactive towards alcohols is..... .

163) Phenol on treatment with bromine water gives.....but with bromine in CS_2, it mainly gives..... .

164) The reaction of phenol with a diazonium salt in weakly alkaline medium is called..... .

165) In the formation of salicylic acid by Reimer Tiemann reaction, phenol is heated with..... in presence of sodium hydroxide.

166) A mixture of phenol and phthalic anhydride when heated with conc.H_2SO_4 forms.....which is used as an.....in acid--base titrations.

167) Phenol forms coloured complexes with neutral..... .

168) Benzyl alcohol and phenol can be distinguished by using.....reagent.

169) Primary, secondary and tertiary alcohols can be distinguished by.....test.

170) A primary alcohol on oxidation gives an.....which on further oxidation gives a.....both containing the same number of carbon atoms.

171) Tertiary alcohols when passed heated copper undergo.....to form..... .

172) An enzyme which can convert glucose into ethanol is..... .

173) Absolute alcohol can be prepared from rectified spirit by.....distillation.

174) Dehydration of alcohols with conc. H_2SO_4 at 413 K gives..... .

175) IUPAC name of methyl ethyl ether is..... .

176) Williamson's synthesis involves the reaction of an.....with an..... .

177) Ethers behave as weakly.....substances due to the presence of two lone pairs of electrons on the oxygen atom.

178) Aliphatic ethers are ppurified by shaking them with a solution of ferrous salt to remove.....which are formed on prolonged standing in contact with air.

179) .....is widely used as a solvent for the preparation of Grignard reagents.

180) Phenol reacts with Br_2 in CS_2 to give_____ as major product.

181) Phenol gives o and p-nitrophenol with _____

182) o-nitrophenol has_____ melting point than p-nitrophenol.

183) Ethanol is_____ acid than phenol.

184) Propene reacts with B_2H_6 followed by alkaline hydrolysis to give _____

True or False 5 x 1 = 5

185) Diethyl ether has dipole moment because they are bent molecule.

(a) True (b) False

186) Ethers have lower boiling point than alcohol

(a) True (b) False

187) Dettol contains phenolic compound.

(a) True (b) False

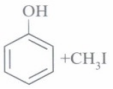
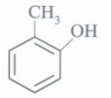
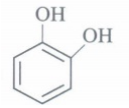
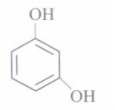
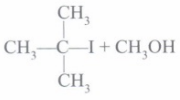
188) Pure phenols are colourless but turn pink due to oxidation.

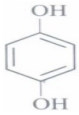
(a) True (b) False

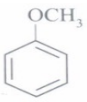
189) Phenol react with $K_2Cr_2O_7/H_2SO_4$ to form p-benzo quinone.

(a) True (b) False

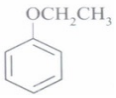
Match the following 22 x 1 = 22

190) Antifreeze used in car engine	(1) Catechol
191) Solvent used in perfumes	(2) Ethylene glycol
192) Starting material for picric acid	(3) Heated copper at 573 K
193) Wood spirit	(4) Resorcinol
194) Reagent used for detection of phenolic group	(5) Ethyl alcohol
195) By product of soap industry used in cosmetics	(6) Wood spirit
196) Methanol	(7) 
197) Kolbe's reaction	(8) Phenol
198) Williamson's synthesis	(9) CH_3 -OH + CH_3 -I
199) Conversion of 2° alcohol to ketone	(10) Phenetole
200) Reimer-Tiemann reaction	(11) Methanol
201) Fermentation	(12) Ethanol
202) 	(13) Hydroquinone
203) 	(14) o-Cresol
204) 	(15) Anisole
(16) 	

205) 

206) 

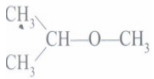
(17) Reaction of alkyl halide with sodium alkoxide

207) 

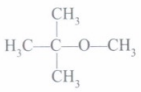
(18) Conversion of phenol to salicyaldehyde

208) $CH_3 - O - CH_3$

(19) Neutral ferric chloride

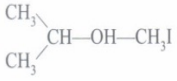
209) 

(20) Conversion of phenol to o-hydroxybenzoic acid

210) 

(21) Glycerol

211) 

(22) 

Assertion and reason 28 x 1 = 28

212) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Carbon oxygen bond length of phenol is slightly less than that of methanol.
Reason (R) There exist a partial double bond character and sp^2-hybridisation of carbon to which oxygen is attached in phenol.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

213) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) In alcohols, the boiling point decreases with decrease in branching of the carbon chain.
Reason (R) There is the decrease in van der Waals' forces between the number of carbon atoms with decrease in the surface area.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

214) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Alcohols and phenols are soluble in water.
Reason (R) There occurs a dipole-dipole interaction of OH group of alcohol and phenol with water molecules which is responsible for their solubility in water.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

215) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) o-nitrophenol is less volatile than p-nitrophenol.
Reason (R) There is intramolecular hydrogen bonding in o-nitrophenol and intermolecular hydrogen bonding in p-nitrophenol.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

216) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Bromination of phenol takes place even in the absence of Lewis acid.
Reason (R) In phenol, OH group attached to benzene ring has highly deactivating effect.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

217) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Addition reaction of water to but-1-ene in acidic medium yields butan-2-ol.
Reason (R) Addition of water in acidic medium proceeds through the formation of primary carbanion.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

218) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) p-nitrophenol is more acidic than phenol.
Reason (R) Nitro group helps in the stabilisation of the phenoxide ion by dispersal of negative charge due to resonance.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

219) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) The boiling point of diethyl ether is much less than that of ethanol.
Reason (R) In ethanol, the molecules are associated by the formation of intermolecular hydrogen bonding whereas in diethyl, it is not possible.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

220) **Assertion:**  bond angle is less than the normal tetrahedral bond angle.

Reason: Lone pair-lone pair repulsion decreases bond angle.

Codes:

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

221) **Assertion:** The ease of dehydration of alcohols follows the order: Primary > Secondary > Tertiary.

Reason: Dehydration proceeds through the formation of carbocations.

Codes:

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

222) **Assertion:** Boiling points of alcohols are lower than hydrocarbons.

Reason: Among isomeric alcohols, boiling point decreases in the order: 1° > 2° > 3°.

Codes:

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

223) **Assertion:** 2-Butanol on heating with H_2SO_4 gives 1-butene and 2-butene.

Reason: Dehydration of 2-butanol follows Saytzeffs rule.

Codes:

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

224) **Assertion:** o-Nitrophenol is more volatile than p-nitrophenol.

Reason: Intramolecular hydrogen bonding is present in o-nitrophenol while intermolecular H-bonding is in p-nitrophenol.

Codes:

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

225) **Assertion:** CH_3OCH_3 and C_2H_5OH has comparable molecular weight but boiling point of C_2H_5OH is more than dimethyl ether.

Reason: C_2H_5OH forms intermolecular H-bonding while CH_3OCH_3 forms intramolecular H-bonding.

Codes:

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

226) **Assertion:** Phenol is less acidic than p-nitropheol.

Reason: Phenolate ion is more stable than p-nitrophenolate ion.

Codes:

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

227) **Assertion:** p-Nitrophenol gives more electrophilic substituted compound than m - methoxyphenol.
Reason: Methoxy group shows both +R and -I-effect.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

228) **Assertion:** With Br_2-H_2O, phenol gives 2,4,6-tribromophenol but with Br_2-CS_2, it gives 4-bromophenol as the major product.
Reason: In water, ionisation of phenol is enhanced but in CS_2, it is greatly suppressed.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

229) **Assertion:** Phenol is more acidic than ethanol.
Reason: Phenoxide ion is resonance stabilised.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

230) **Assertion:** Solubility of alcohols decreases with increase in size of alkyl/aryl groups.
Reason: Alcohols form H-bonding with water to show soluble nature.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

231) **Assertion:** tert-Butyl alcohol undergoes acid catalysed dehydration readily than propanol.
Reason: 3° Alcohols do not give Vietor-Meyer's test.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

232) **Assertion:** Phenol decomposes $NaHCO_3$ solution to evolve CO_2 gas.
Reason: Picric acid is 2, 4, 6-trinitrophenol.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

233) **Assertion:** Reimer-Tiemann reaction of phenol with $CHCl_3$ in NaOH at 340 K gives salicylic acid as the major product.
Reason: The reaction occurs through intermediate formation of $^+CHCl_2$.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

234) **Assertion:** Primary and secondary alcohols can be distinguished by Victor-Meyers test.
Reason: Primary alcohols form nitrolic acid which dissolves in NaOH to form blood red colouration but secondary alcohols. form pseudonitrols which give blue colouration with NaOH.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

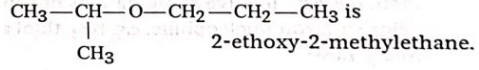
235) In the following question a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
Assertion: Bond angle in ethers is slightly less than the tetrahedral angle.
Reason: There is a repulsion between the two bulky (-R) groups.
Codes:
(a) Assertion and reason both are correct and reason is correct explanation of assertion.
(b) Assertion and reason both are wrong statements.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.
(e) Both assertion and reason are correct statements but reason is not correct explanation of assertion.

236) In the following question a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
Assertion: Like bromination of benzene, bromination of phenol is also carried out in the presence of Lewis acid.
Reason: Lewis acid polarises the bromine molecule.
Codes:
(a) Assertion and reason both are correct and reason is correct explanation of assertion.
(b) Assertiorsand reason both are wrong statements.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.
(e) Both assertion and reason are correct statements but reason is not correct explanation of assertion.

237) **Assertion (A)** p-methoxyphenol is a stronger acid than p-nitrophenol.
Reason (R) Methoxy group shows + I effect whereas nitro group shows -I effect.
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Asserton (A) is false, but Reason (R) is true.

238) **Assertion (A)** C_2H_5OH is a weaker base than phenol but is a stronger nucleophile than phenol.
Reason (R) In phenol the lone pair of electrons or oxygen is withdrawn towards the ring due to resonance.
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

239) **Assertion (A)** IUPAC name of the compound

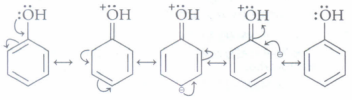


2-ethoxy-2-methylethane.

Reason (R) In IUPAC nomenclature, ether is regarded as hydrocarbon derivative in which a hydrogen atom is replaced by -OR or -OAr group [where, R = alkyl group and Ar = aryl group].
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

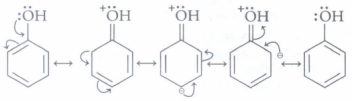
Passage Based Questions 10 x 1 = 10

240) Phenols undergo electrophilic aromatic substitution reaction readily because -OH group attached to the benzene ring activates the benzene ring towards electrophilic substitution reaction. Further, it directs the incoming group to ortho and para positions in the ring as these positions become electron rich due to the resonance effect.
The delocalisation of electrons (or resonance) can be represented as



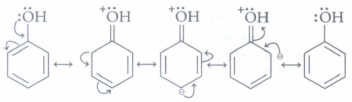
Common electrophilic aromatic substitution reactions taking place in phenol are nitration, sulphonation and halogenation.
Name the reagent used in the bromination of phenol to give 2, 4, 6-tribromophenol.

241) Phenols undergo electrophilic aromatic substitution reaction readily because -OH group attached to the benzene ring activates the benzene ring towards electrophilic substitution reaction. Further, it directs the incoming group to ortho and para positions in the ring as these positions become electron rich due to the resonance effect.
The delocalisation of electrons (or resonance) can be represented as

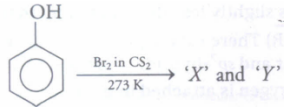


Common electrophilic aromatic substitution reactions taking place in phenol are nitration, sulphonation and halogenation.
What are the products obtained on reaction of phenol with dil. HNO_3?

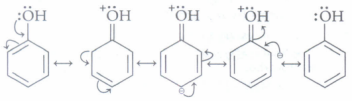
242) Phenols undergo electrophilic aromatic substitution reaction readily because -OH group attached to the benzene ring activates the benzene ring towards electrophilic substitution reaction. Further, it directs the incoming group to ortho and para positions in the ring as these positions become electron rich due to the resonance effect.
The delocalisation of electrons (or resonance) can be represented as



Common electrophilic aromatic substitution reactions taking place in phenol are nitration, sulphonation and halogenation.
Complete the reaction,

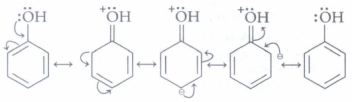


243) Phenols undergo electrophilic aromatic substitution reaction readily because -OH group attached to the benzene ring activates the benzene ring towards electrophilic substitution reaction. Further, it directs the incoming group to ortho and para positions in the ring as these positions become electron rich due to the resonance effect.
The delocalisation of electrons (or resonance) can be represented as



Common electrophilic aromatic substitution reactions taking place in phenol are nitration, sulphonation and halogenation.
Write the structure of picric acid.

244) Phenols undergo electrophilic aromatic substitution reaction readily because -OH group attached to the benzene ring activates the benzene ring towards electrophilic substitution reaction. Further, it directs the incoming group to ortho and para positions in the ring as these positions become electron rich due to the resonance effect.
The delocalisation of electrons (or resonance) can be represented as



Common electrophilic aromatic substitution reactions taking place in phenol are nitration, sulphonation and halogenation.
Among o-nitrophenol and p-nitrophenol, which will prefer to undergo intramolecular H-bonding?

245) In phenol, OH-group directly attached to sp^2 -hybridised carbon of benzene ring acts as a electron withdrawing group and is responsible for the acidic nature of phenol. Due to this, the lone pair of electrons of O-H are involved in resonance with C-atoms of benzene ring. As a result of resonance, the oxygen atom acquires a partial positive charge. This weakens the O-H bond and, thus facilitates the release of a proton.
As a result, phenols behave as Bronsted acids. The reaction of phenol with aqueous NaOH indicates that phenols are stronger acids than alcohols. The reactions of phenol with metals such as Na, Al and NaOH indicate its acidic nature.
Give the equation for the reaction of phenol with chloroform in presence of aqueous NaOH.

246) In phenol, OH-group directly attached to sp^2 -hybridised carbon of benzene ring acts as a electron withdrawing group and is responsible for the acidic nature of phenol. Due to this, the lone pair of electrons of O-H are involved in resonance with C-atoms of benzene ring. As a result of resonance, the oxygen atom acquires a partial positive charge. This weakens the O-H bond and, thus facilitates the release of a proton.
As a result, phenols behave as Bronsted acids. The reaction of phenol with aqueous NaOH indicates that phenols are stronger acids than alcohols. The reactions of phenol with metals such as Na, Al and NaOH indicate its acidic nature.
Which one is stronger acid, phenol or ethanol?

247) In phenol, OH-group directly attached to sp^2 -hybridised carbon of benzene ring acts as a electron withdrawing group and is responsible for the acidic nature of phenol. Due to this, the lone pair of electrons of O-H are involved in resonance with C-atoms of benzene ring. As a result of resonance, the oxygen atom acquires a partial positive charge. This weakens the O-H bond and, thus facilitates the release of a proton.
As a result, phenols behave as Bronsted acids. The reaction of phenol with aqueous NaOH indicates that phenols are stronger acids than alcohols. The reactions of phenol with metals such as Na, Al and NaOH indicate its acidic nature.
Give one reaction showing the acidic nature of phenol.

248) In phenol, OH-group directly attached to sp^2 -hybridised carbon of benzene ring acts as a electron withdrawing group and is responsible for the acidic nature of phenol. Due to this, the lone pair of electrons of O-H are involved in resonance with C-atoms of benzene ring. As a result of resonance, the oxygen atom acquires a partial positive charge. This weakens the O-H bond and, thus facilitates the release of a proton.
As a result, phenols behave as Bronsted acids. The reaction of phenol with aqueous NaOH indicates that phenols are stronger acids than alcohols. The reactions of phenol with metals such as Na, Al and NaOH indicate its acidic nature.
Write the name of the intermediate formed after the loss of H^+ ion from phenol.

249) In phenol, OH-group directly attached to sp^2 -hybridised carbon of benzene ring acts as a electron withdrawing group and is responsible for the acidic nature of phenol. Due to this, the lone pair of electrons of O-H are involved in resonance with C-atoms of benzene ring. As a result of resonance, the oxygen atom acquires a partial positive charge. This weakens the O-H bond and, thus facilitates the release of a proton.
As a result, phenols behave as Bronsted acids. The reaction of phenol with aqueous NaOH indicates that phenols are stronger acids than alcohols. The reactions of phenol with metals such as Na, Al and NaOH indicate its acidic nature.
Arrange o-nitrophenol, o-cresol and phenol in the increasing order of acidic strength.

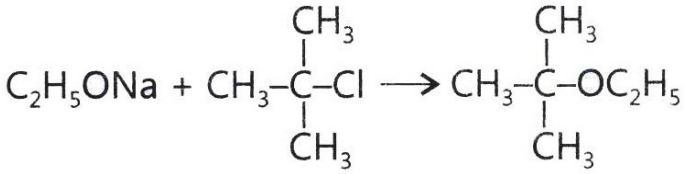
2 Marks 299 x 2 = 598

250) Explain the following with an example:
(i) Kolbe's reaction
(ii) Reimer-Tiemann reaction.
(iii) Williamson ether synthesis.
(iv) Unsymmetrical ether.

251) Arrange the following sets of compounds in order of their increasing boiling points,
(a) Pentan-1-ol, butan-1-ol, butan-2-ol, ethanol, propan-1-ol, methanol
(b) Pentan-1-ol, n-butane, pentanal, ethoxyethane.

252) Arrange the following sets of compounds in order of their increasing order of their acid strength:
Propan-1-ol, 2,4,6-trinitrophenol, 3-nitro-phenol, 3,5-dinitrophenol, phenol, 4-methyl-phenol.

253) The following is not an appropriate reaction for the preparation of t-butyl ethyl ether.



(i) What would be the major product of this reaction?
(ii) Write a suitable reaction for the preparation of i-butyl ethyl ether.

254) Alcohols are comparatively more soluble in water than hydrocarbons of compounds of comparable molecular masses. Explain this fact.

255) What is meant by hydroboration-oxidation reaction? Illustrate with an example.

256) Give the structures and IUPAC names of monohydric phenols of molecular formula C_7H_8O.

257) While separating a mixture of ortho-and para-nitrophenols by steam distillation, name the isomer which will be steam volatile? Give reasons.

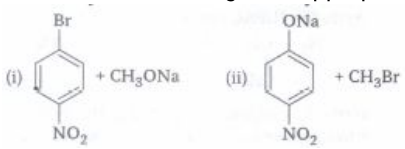
258) Give two reactions that show the acidic nature of phenol. Compare its acidity with that of ethanol.

259) Explain how does-OH group attached to a carbon of benzene ring activate it towards electrophilic substitution?

260) Give reason for the higher boiling point of ethanol in comparison to methoxy methane.

261) Write the mechanism of acid dehydration of ethanol to yield ethene.

262) Which of the following is an appropriate set of reactants for the preparation of 1-methoxy-d nitrobenzene and why?

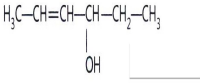


263) Identify allylic alcohols in the above examples.

264) Draw the structure of hex-1-en-3-ol compound.

265) Draw the structural formula of 2-methylpropan-2-ol molecule.

266) Write the IUPAC name of the following compound:



267) How would you convert ethanol to ethene?

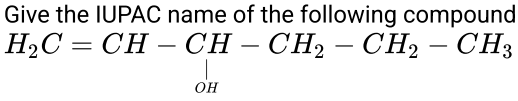
268) Draw the structure of 2,6-dimethylphenol.

269) Write the chemical equation for the preparation of phenol from benzene using oleum and sodium hydroxide.

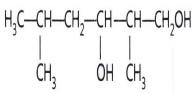
270) Write the structure of the molecule of a compound whose IUPAC name is 1-phenylpropan-2-ol.

271) Write the structure of the following compound:
2-methyl-2-ethoxypentane

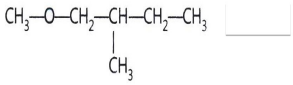
272) Give the IUPAC name of the following compound:



273) Write the IUPAC name of the following compound:

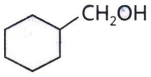


274) Write the IUPAC name of the following compound:

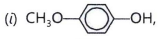


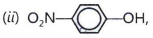
275) How is ethanol obtained from 2-butene?

276) Write IUPAC name of



277) Arrange the following in decreasing order of their acidic character:

(i) 

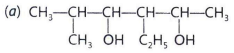
(ii) 

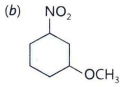
(iii) C_6H_5OH.

278) Name a compound which is used as antiseptic as well as disinfectant.

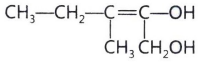
279) What is the structure and IUPAC name of glycerol?

280) Write the IUPAC name of the following compounds:

(a) 

(b) 

281) Write the IUPAC name of the compound given below.



282) Name the factors responsible for the solubility of alcohols in water.

283) What is denatured alcohol?

284) Suggest a reagent for the following conversion.

285) Suggest a reagent for conversion of ethanol to ethanal.

286) Suggest a reagent for conversion of ethanol to ethanoic acid.

287) Out of o-nitrophenol and o-cresol which is more acidic?

288) When phenol is treated with bromine water, white precipitate is obtained. Give the structure and the name of the compound formed.

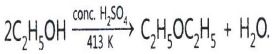
289) Alcohols react with active metals e.g. Na, K etc. to give corresponding alkoxides. Write down the decreasing order of reactivity of sodium metal towards primary, secondary and tertiary alcohols.

290) What happens when benzene diazonium chloride is heated with water?

291) Arrange the following compounds in decreasing order of acidity.
$H_2O, ROH, HC \equiv CH$

292) Explain why low molecular mass alcohols are soluble in water.

293) Explain the mechanism of following reaction:



294) How would you obtain
(i) Picric acid (2,4,6-trinitrophenol) from phenol,
(ii) 2-Methylpropene from 2-methylpropanol?

295) Give one chemical test each to distinguish between the following pairs of compounds:
(i) Phenol and Benoic acid
(ii) 1-Propanol and 2-Propanol

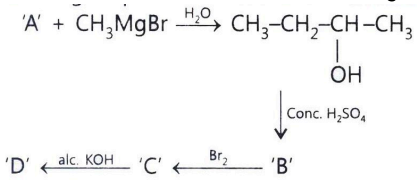
296) Describe the mechanism of alcohols reacting both as nucleophiles and as electrophiles in their reactions.

297) How are the following conversions carried out?
(i) Phenol to Toluene
(ii) Ethanol to 1,1-dichloroethane.

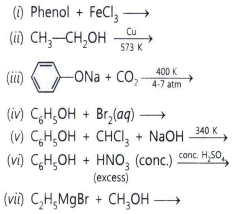
298) Write the reactions and the conditions involved in the conversion of :
(a) Propane to 1-Propanol
(b) Phenol to Salicylic acid

299) How are the following conversions carried out? (Write the reactions and conditions in each case):
(i) Ethanol to 2-propanol
(ii) Phenol to Acetophenone

300) Write the structural formula of the organic compounds 'A', 'B', 'C' and 'D' in the following sequence of reactions:

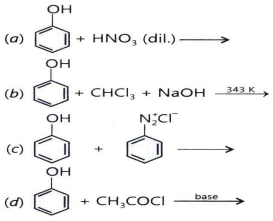


301) Complete the following equations and name of the products formed:



302) How will you distinguish between the following pairs by chemical reactions?
(i) CH_3OH and C_2H_5OH
(ii) Phenol and methanol
(iii) 1-Propanol and 2-methyl-2-propanol
(iv) Ethanol and 1-Propanol?

303) Complete the following:



304) Etherial solution of an organic compound 'A' when heated with magnesium gave 'B'. 'B' on treatment with ethanal followed by acid hydrolysis gave 2-propanol. Identify the compound 'A'. What is 'B' known as?

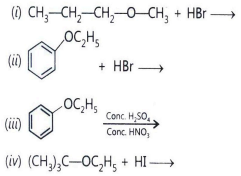
305) How are following conversions done?
(i) 1-Propanol to 1-Bromopropane
(ii) 1-Chloropropane to 1-propanol
(iii) 2-Methyl-1-pentene to 2-Methyl-2-pentanol
(iv) Phenol to Phenyl ethanoate.

306) Write the names of reagents and equations for the preparation of the following ethers by Williamson's synthesis:
(i) 1-Propoxypropanes
(ii) Ethoxybenzene
(iii) 2-Methoxy-2-methylpropane
(iv) 1-Methoxyethane.

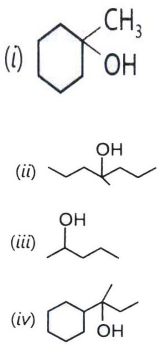
307) Illustrate with examples the limitations of Williamson's synthesis for the preparation of certain types of ethers.

308) How is 1-propoxypropane synthesised from propan-1-ol? Write mechanism of this reaction.

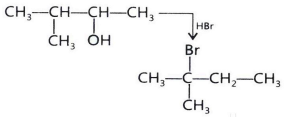
309) Predict the product of the reaction given below:



310) Show how would you synthesize the following alcohols from appropriate alkenes.



311) When 3-methylbutan-2-ol is treated with HBr following reaction takes place;



Give a mechanism for this reaction.
(Hint: The secondary carbocation formed in step II rearranges to a more stable tertiary carbocation by a hydride ion shift from 3rd carbon atom).

312) Out of 2-chloroethanol and ethanol, which one is more acidic and why?

313) Out of o-nitrophenol and p-nitrophenol, which is more volatile? Explain.

314) Arrange the following compounds in increasing order of acidity and give a suitable explanation.
Phenol, o-nitrophenol, o-cresol

315) Name the enzymes and write the reactions involved in the preparation of ethanol from sucrose by fermentation.

316) Explain why is OH group in phenols more strongly held as compared to O group in alcohols.

317) Why is the reactivity of all the three classes of alcohols with conc. HCl and $ZnCl_2$ (Lucas reagent) different?

318) Write steps to carry out the conversion of phenol to aspirin.

319) Nitration is an example of aromatic electrophilic substitution and its rate depends upon the group already present in the benzene ring. Out of benzene and phenol, which one is more easily nitrated and why?

320) In Kolbe's reaction, instead of phenol, phenoxide ion is treated with carbon dioxide. Why?

321) Dipole moment of phenol is smaller than that of methanol. Why?

322) Ethers can be prepared by Williamson synthesis in which sodium alkoxide. Di-tert-butyl ether can't be prepared by this method. Explain.

323) Why is the C--O--H bond angle in alcohols slightly less than the tetrahedral angle whereas the C--O--C bond angle in ether is slightly greater?

324) The carbon-oxygen bond in phenol is slightly shorter than that in methanol. Why?

325) Arrange water, ethanol and phenol in increasing order of acidity and give reason for your answer.

326) Explain a process in which a biocatalyst is used in industrial preparation of compound known to you.

327) Anhydrous $CaCl_2$ is not recommended as a drying agent for alcohols and amines.

328) What is the order of reactivity of HCl, HBr and HI with alcohols?

329) The relative ease of dehydration of alcohols is : tertiary > secondary > primary

330) Name one reagent which is used for the distinction of primary,secondary and tertiary alcohols

331) What is Lucas reagent?

332) What is rectified spirit?

333) What is absolute alcohol?

334) What is 'Power alcohol'?

335) An organic compound (A) reacts with PCl_5 to produce another compound (B). (B) reacts with magnesium metal in presence of ether to produce a Grignard reagent (C). (C) reacts with ethanal and the product is hydrolysed to produce propan-2-ol. Identify (A), (B) and (C) nad explain the reactions.

336) Arrange the following compounds in the increasing order of the property indicated agents each. Give reasons for your answer.
(i) CH_3CH_2OH, CF_3CH_2OH, $CCl_3CH_2O_2$-Acid strength
(ii) 2-methyl-2-propanol, 1-butanol and 2-butanol-Reactivity towards sodium.

337) Arrange the following in increasing order of basicity:
H_2O, OH^-, CH_3OH, CH_3O^-

338) Why$(CH_3)_3COH$ is less acidic that $(CH_3)_3$ SiOH although carbon is more electronegative than Si?

339) Draw the structure and name the product formed if the following alcohols are oxidised. Assume that an excess of oxidising agent is used.
(i) CHCHCHCHOH
(ii) 2-butenol
(iii) 2-methyl-1-propanol

340) Dehydration of alcohols to form alkenes is always carried out with conc.H_2SO_4 and not with conc. HCl or HNO_3. Explain why?

341) Acid-catalysed dehydration of t-butanol is faster than that of n-butanol. Give reasons in one or two sentences.

342) Give the structure of the compound, C (C_4H_8) which when treated with H_2O/H_2SO_4 gives $C_4H_{10}O$ which cannot be resolved into optical isomers.

343) 3, 3-D imethylbutan-2-ol loses a molecule of water in the presence of concentrated sulphuric acid to give tetramethylene as the major product. Suggest a suitable mechanism.

344) Predict the major product of the following reaction: $C_6H_6 + (CH_3)_2CHCH_2OH \overset{H_2SO_4}{\longrightarrow}$

345) Which is a stronger acid, phenol or cresol? Explain.

346) How do you account for the fact that unlike phenol, 2, 4- dinitrophenol and 2, 4, 6-trinitrophenol are soluble in aqueous sodium carbonate solution?

347) Unlike phenols, alcohols are easily protonated.

348) Haloakanes can easily be prepared from alcohols while aryl halides cannot be prepareds from phenol. Explain.

349) Which of the following is the correct method for synthesising methyl tert-butyl ether and why?
(i) $(CH_3)_3CBr$ + NaOMe$\longrightarrow$
(ii) CH_3Br + NaO - tert-Bu$\longrightarrow$

350) Ether are cleaved only by acids and not by bases.

351) Anisole is less reactive than phenol towards electrophilic substitution reactions. Justify yours answer with proper reasoning.

352) A little water is there on the inner surface of a conical flask. Can this water be removed by shaking with ether? Answer with reason.

353) Why are higher ethers insoluble in water?

354) Identify allyllic alcohols in the above examples.

355) Write the equations involved in the
Reimenn-Tiemann reaction.

356) (i) Draw the structures of all iosomeric alcohols of molecular formula $C_5H_{12}O$ and give their IUPAC names.
(ii) Classify th isomers of alcohols in questions 1
(a) as primary, secondary and tertiary alcohols.

357) Give the equations of reactions of preparation of phenol from cumene.

358) Write the mechanism of hydration of ethene to form ethene to form ethanol.

359) Name the reagents in the following reactions:
(i) Oxidation of a primary alcohol to a carboxylic acid
(ii) Oxidation of a primary alcohol to an aldehyde
(iii) Bromination of phenol to 2, 4, 6-tribromophenol
(iv) Benzyl alcohol to benzoic acid
(v) Dehydration of propane-2-ol to propene
(vi) Butan-2-one to butan-2-ol.

360) How is 1-propoxypropane synthesized from propane-1-ol ?

361) What is the structure abd IUPAC name of glycerol?

362) Name the factors responsible for the solubility of alcohols in water.

363) Suggest a reagent for conversion of ethanol to ethanal.

364) Suggest a reagent for conversion of ethanol to ethanoic acid.

365) Out of 0-nitrophenol and p-nitrophenol, which volatile? Explain.

366) Out of o-nitrophenol and o-cresol which is more acidic?

367) Arrange the following compounds in increasing order of acidity and give a suitable explanation. Phenol, o-nitrophenol, o-cresol.

368) Alcohols react with active metals, e.g., Na, K, ect. to give corresponding alkoxides. Write down the decreasing order of reactivity of sodium metal towards primary, secondary and tertiary alcohols.

369) What happens when benzenediazonium chloride is heated with water?

370) Arrange the following compounds in decreasing order of acidity.
$H_2O, ROH, HC \equiv CH$

371) Name the enzmes and write the reactions involved in the preparation of ethanol from sucrose by fermentation.

372) How can propan-2-one be converted into tert-butly alcohol?

373) Write the structures if the isomers of alcohols with molecular formula $C_4H_{10}O$. Which of these exhibits optical activity?

374) Explain why is OH group in phenols more strongly held as compound to OH group in alcohols.

375) Explain why nucleophilic substitution reactions are not very common in phenols.

376) Preparation of alcohols from alkenes involves the electrophilic attack on alkene carbon atom. Explain its mechanism.

377) Explain why is O = C = O nonpolar while R - O - R is polar.

378) Why is the reactivity of all ther three classes of alcoholes with conic.HCI and $ZnCl_2$ (Lucas reagent) different?

379) Write steps to cary out the conversion of phenol to aspirin.

380) Explain why alcohols do not react with NaBr but H_2SO_4 is added they form alkyl bromides.

381) Why is the C-O-H bond angle in alcohols slightly less than the tetrahedral angle where as the C-O-C bond angle in ether is slightly greater?

382) Explain why low molecular mass alcohols are soluble in water.

383) Explain why p-nitrophenol is more acidic than phenol.

384) The carbon-oxygen bond in phenol is slightly stronger than that in methanol. Why?

385) Arrange water, ethanol and phenol in increasing order of acidity and give reason for your answer.

386) Give the IUPAC name of $[(CH_3)_2CH]_3COH$

387) Suggest one method for carrying out anti-Markovinkov's addition of water indirectly to propylene

388) Haloalkanes can easily be prepared from alcohols with aryl halides cannot be prepared from phenol.Explain.

389) Write the mechanism of the following reaction. $CH_3CH_2OH \xrightarrow{HBr} CH_3CH_2Br + H_2O$

390) Write the mechanism of hydration of ethene to form ethanol.

391) Give the equations of reactions of preparation of phenol from cumene

392) Arrange the following compounds in increasing order of boiling point:
Propan-1-ol, ethanol, butan-2-ol methanol and pentan-1-ol.

393) Suggest a reagent for the conversion of ethanol into
(i) ethanal and
(ii) ethanoic acid.

394) An organic compound (A) reacts with PCl_5 to produce another compound (B).(B) reacts with magnesium metal in presence of ether to produce a Grignard reagent (C).(C) reacts with ethanal and the product is hydrolysed to produce propan-2-ol.Identify (A),(B) and (C) and explain the reactions.

395) Draw the structure and the product formed if the following alcohols are oxidised. Assume that an excess of oxidizing agent is used.
(i) $CH_3CH_2CH_2CH_2OH$
(ii) 2-butenol
(iii) 2-methyl-1-propanol

396) Give one test in each case to distinguish between the following:
(i) 1-Phenylethanol and 2-phenylethanol
(ii) Phenol and methanol.

397) One mole of an organic compound (A) having M.F. C_2H_6O reacts with MeMgI to liberate one mole of methane. (A)reacts with CH_3 COCl to yield a sweet smelting liquid (B). Identify (A) and (B).

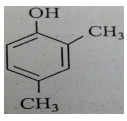
398) Name the phenol with molecular formula C_7H_8O which on treatment with Br_2 water readily gives a precipitate of $C_7H_5OBr_3$

399) Write steps to carry out the conversion of phenol to aspirin.

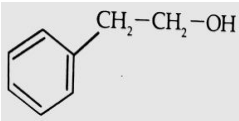
400) Out of phenol and benzene, which is more easily nitrated and why?

401) Which of the following isomers is more volatile:
o-nitrophenol or p-nitrophenol?

402) Write the IUPAC name of the given compound:



403) Write the IUPAC name of the given compound



404) Write the IUPAC name of the following:

$$CH_3 - \underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}} = C - CH_2OH$$

405) Write the IUPAC name of the following:

$$CH_3 - \underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}} - OH$$

406) How would you obtain ethane-1, 2-diol from ethanol?

407) Write IUPAC name of the following:

$$CH_3 - \underset{\underset{CH_3}{|}}{C} = \underset{\underset{Br}{|}}{C} - CH_2OH$$

408) Draw the structural formula of 2-methyl propan- 2-o1 molecule

409) Draw the structure of hex-I-en-3-ol compound.

410) Which of the following isomers is more volatile: o-nitrophenol or p-nitrophenol?

411) Write the chemical reaction to explain Kolbe's reaction.

412) Of the two hydroxy organic compounds, ROH and R'OH, the first one is basic and other one is acidic in behaviour. How is R different from R' ?

413) Give a chemical test to distinguish between 2-Pentanol and 3-Pentanol

414) How would you obtain phenol from benzene?

415) ortho-nitrophenol has lower boiling point than p-nitrophenol. Why ?

416) The C-O bond is much shorter in phenol than in ethanol. Give reason.

417) Out of CH_3OH and phenol which one is more acidic?

418) (i) Predict the major product of acid catalysed dehydration of I-Methylyc1ohexanol.
(ii) You are given benzene, cone. H_2SO_4 , NaOH and dil.HCL. Write the preparation of phenol using these reagents.
Draw the structures of any two isomeric alcohols (other than 1° alcohols) having molecular formula $C_2H_{12}O$ and give their IUPAC names.

419) Write the mechanism of the following reaction:
$CH_3CH_2OH \xrightarrow{HBr} CH_3CH_2Br+H_2O$

420) (i) Give chemical tests to distinguish between the following pairs of compounds:
Methanol and Phenol
(ii) o-nitro phenol is more acidic than o-methoxy phenol. Explain why.

421) Explain the mechanism of acid catalysed hydration of an alkene to form corresponding alcohol.

422) (a) Describe the mechanism of acid dehydration of ethanol to yield ethene.
(b) Describe a chemical test to distinguish between ethanol and phenol.

423) Explain the following behaviours :
(i) Alcohols are more soluble in water than the hydrocarbons of comparable molecular masses.
(ii) ortho-nitrophenol is more acidic than oriho-methoxyphenol.

424) Write the IUPAC name of the given compound:
$CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - O - CH_2 - CH_3$

425) Write the equation involved in the reaction Williamson's ether synthesis.

426) How would you obtain acetophenone from phenol?

427) An alkoxide is a stronger base than hydroxide ion Justify.

428) Given reasons of the following:
(i) Phenol is more acidic than methanol.
(ii) The C-O-H bond angle in alcohols in slightly less than the tetrahedral angle(109 ^{0}28 $^{'}$).

429) How many sigma bonds present in 4-methyl phenol?

430) Write the product formed when chlorobenzene reacts with dil. NaOH at 300 atm and 623 K.

431) Why is o-nitrophenol less soluble in water?

432) Write the IUPAC name of the product formed by the ctalytic reduction of Butanal.

433) What is the main product obtained when vapors of t-butyl alcohol are passed over copper at 300^{0}C?

434) Phenol has smaller dipole moment than methanol. Why?

435) Why are Grgnard reagents soluble in ether but not in benzene?

436) Di-tert butyl ether cannot be made by Williamson's synthesis. Why?

437) Alcohols acts as weak bases. Why?

438) Name the phenol with molecular formula C_7H_8O which on treatment with Br_2 water readily gives a ppt of $C_7H_5OBr_3$?

439) Phenol is acidic but does not react with $NaHCO_3$ solution?

440) Victor Meyer's test is carried out from an alcohol which gives blue Colouration identify type of this alcohol?

441) How many ether metamers are represented by $C_4H_{10}O$?

442) Arrange the following in increasing order of basicity H_2O, OH^-, CH_3OH, CH_3O^-

443) Predict the product when sodium ethoxide and ethyl bromide are heated?

444) Name the products obtain when anisole is treated with HI?

445) Diethyl ether does not react with sodium. Why?

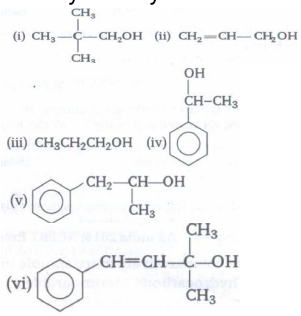
446) Suggest a reason for the large difference in the boiling points of butanol and butanal, although they have same solubility in water.

447) Explain the following
(a) Cyclohezanol is more soluble in water than 1-Hezanol
(b) Propane 1,3-diol is more soluble in the water than propan-1-ol

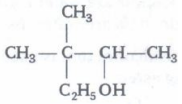
448) Arreange the following in order of increasing boiling. State reason
$CH_3CH_2CH_2OH$, $CH_3CH_2CH_2CH_3$, $CH_3CH_2OCH_2CH_3$, $CH_3CH_2CH2CHO$

449) Ethers are cleaved by acids not by bases. Why?

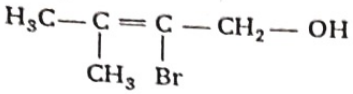
450) Identify the allylic alcohols in the following examples.



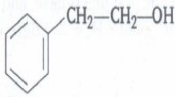
451) Write the IUPAC name of the following:



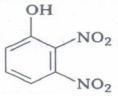
452) Write the IUPAC name of the following compound.



453) Write the IUPAC name of the given compound:

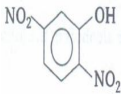


454) Write the IUPAC name of the following compounds

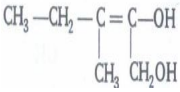


455) Give the structure of the molecule of a compound whose IUPAC name is 1-phenylpropan-2- ol.

456) Write the IUPAC name of the given compound.



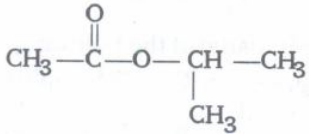
457) Write the IUPAC name of the compound given below:



458) o- nitrophenol has lower boiling point than p-nitrophenol. Explain

459) Lower alcohols are water soluble whereas, higher alcohols are water insoluble. Give reason.

460) Name the alcohol that is used to make the following ester:



461) Give the order of dehydration for primary, secondary and tertiary alcohols.

462) Why do phenols not give the protonation reaction readily?

463) Write the equation involved in the acetylation of salicylic acid.

464) How is toluene obtained from phenol?

465) Both methanol and phenol have an -OR group but the dipole moment of methanol (1.71D) is higher than that of phenol (1.54D). Why?

466) How will you convert
(i) propene to propan-1-ol?
(ii) ethanal to propan-2-ol?

467) How do you convert the following?
(i) Propan-2-ol to 2-methylpropan-2-ol
(ii) Aniline to phenol

468) Explain why p-nitrophenol is more acidic than phenol?

469) (i) Arrange the following compounds in the increasing order of their acidic..strength : p-cresol, p-nitrophenol, phenol
(ii) Write the mechanism (using curved arrow notation) of the following reaction.

$$CH_2 = CH_2 \xrightarrow{H_3O^+} CH_3 - \overset{+}{C}H_2 + H_2O$$

470) Write the mechanism of the following reaction:

$$CH_3CH_2OH \xrightarrow{HBr} CH_3CH_2Br + H_2O$$

471) Give equations of the following reactions.
(i) Oxidation of propan -1-ol with alkaline $KMnO_4$ solution.
(ii) Bromine in CS_2 with phenol.
(iii) Dilute HNO_3 with phenol.
(iv) Treating phenol with chloroform in the presence of aqueous NaOH.

472) How will you convert the following?
(i) Propan-2-ol to propanone
(ii) Phenol to 2, 4, 6-tribromophenol

473) Describe the chemical test to distinguish between ethanol and phenol.

474) Give reason: $(CH_3)_3C$-O-CH_3 on reaction with HI, gives $(CH_3)_3C$-I and CH_3-OH as the main products and not $(CH_3)_3C$-OH and CH_3-I.

475) How do you convert phenol to anisole?

476) Dimethyl ether is completely soluble in water but diethyl ether is soluble in water to small extent. Why?

477) Explain why O = C= O is non-polar while R-O-R is polar?

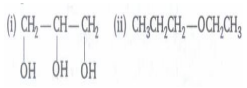
478) Draw the structures of the compounds whose IUPAC names are as follows:
(i)1-ethoxypropane
(ii) 2-ethoxy-3-methylpentane

479) Explain why alcohols and ethers of comparable molecular mass, have different boiling points?

480) Give the mechanism of preparation of ethoxy ethane from ethanol.

481) Convert propanol to 1-propoxy propane .

482) What is the IUPAC name of the following compounds?



483) Name the starting material used in the industrial preparation of phenol.

484) Give reason.
The boiling points of alcohols decreases with increase in branching of the alkyl chain.

485) Arrange the following compounds in the increasing order of acidity:

$$CH_3OH, H_2O, HC \equiv CH$$

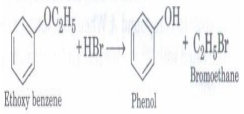
486) Name a reagent which converts 1°alcohols exclusively to corresponding aldehydes.

487) What is the order of reactivity of HCl,HBr and HI with alcohols?

488) How will you confirm that whether a given -OH group is alcoholic or phenolic?

489) Why aryl halides cannot be used for the formation of ethers?

490) A reaction is given below:



What is the name of this reaction?

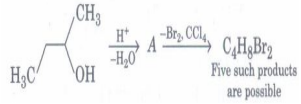
491) Name the products obtained when anisole is heated with HI.

492) Why are alcohols and phenols soluble in water? What happens to their solubility when bulky alkyl groups are present in them?

493) What is the main product obtained when vapours of t-butyl alcohol are passed over copper at 573 K? Give reaction also.

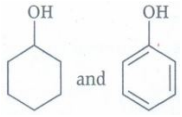
494) Name the compound with molecular formula C_7H_8O which on treatment with Br_2 water, readily gives a precipitate of $C_7H_5OBr_3$.

495) In the reaction,



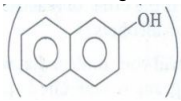
How many isomer(s) of A is/are possible?

496) How will you distinguish between the following compounds?



497) Name the alkyl halide and alkoxide ion used to prepare 2-(benzyloxy)propane. Write the equations involved.

498) Considering sodium acetate (NaOAc) and 2-naphthol



as solutes, explain which of the following solvent can dissolve these solutes?
(i) Diethyl ether
(ii)Water

499) What happens when anisole is heated with HI?

500) Iso-propyl benzene is oxidised in the presence of air to compound A When compound A is treated with dilute mineral acid, which aromatic compound is formed?

501) How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature?

502) Name the reagent used to convert CH_3CH_2OH to CH_3CHO.

503) Among H_2O, ROH and HC =CH. Which compound possess least acidity?

504) Name the test used to differentiate 3°-butyl alcohol and 2°-butyl alcohol.

505) Write the IUPAC name of $CH_3CH_2CH_2OCH_3$.

506) Name the reagent used in the oxidation of primary alcohol to carboxylic acid.

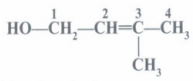
507) Name the reagent used to convert butan-2-one into butan-2-ol.

508) Name the alkyl halide used to synthesise tert-butyl ethyl ether.

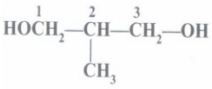
509) Which reagent is used in the dehydration of propan-2-ol to propene?

510) Arrange the following compounds in increasing order of their acid strength:
Propan-1-ol, 2,4,6-trinitrophenol, 3-nitrophenol, 3,5-dinitrophenol,phenol, 4-methylphenol.

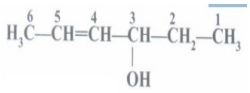
511) Write the IUPAC name of the given compound:



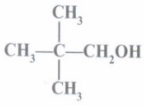
512) Write the IUPAC name of the given compound:



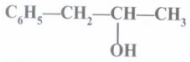
513) Write the IUPAC name of the following compound:



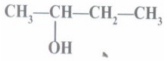
514) Write IUPAC name of the following:



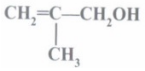
515) Write the IUPAC name of the following:



516) Write IUPAC name of the compound:



517) Write IUPAC name of the given compound:



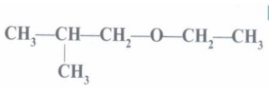
518) Draw the structural formula of 2-methylpropan-2-ol molecule.

519) Draw the structure of hex-1-en-3-ol compound

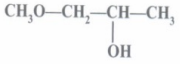
520) How is ethanol obtained from 2-butene?

521) Draw the structure of 2, 6-dimethylphenol.

522) Write the IUPAC name of the given compound



523) Write IUPAC name of the given compound:



524) Write the structure of the following compound:
2-ethoxy-2-methyl pentane

525) How is t-butyl alcohol obtained from acetone?

526) Why alcohols and phenols are soluble in water?

527) Which of the following isoiners is more volatile: o-nitrophenol or p-nitrophenol?

528) Illustrate with examples the limitations of Williamson's synthesis for the preparation of certain types of ethers.

529) What is the cause of large difference in boiling points of alcohols and ethers?

530) Convert anisole to p-bromoanisole.

531) Write the reactions and the conditions involved in the conversion of :
(a) Propene to 1-Propanol
(b) Phenol to Salicylic acid
(c) Propene to 1-Propanol

532) How are following conversions carried out?
(i) Propene to Propan-2-ol
(ii) Ethyl chloride to Ethanal

533) The carbon-oxygen bond in phenol is slightly shorter than that in methanol. Why?

534) Name the reagents used in the following reactions:
(i) Bromination of phenol to 2,4,6-tribromophenol
(ii) Butan-2-one to Butan-2-ol
(iii) Friedel-Crafts alkylation of anisole
(iv) Oxidation of primary alcohol to carboxylic acid

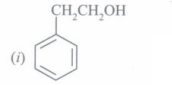
535) Write any two applications of dimethyl ether.

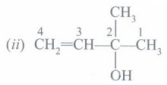
536) Write chemical equations when:
(i) chlorobenzene is treated with CH_3 COCl in presence of anhydrous $AlCl_3$.
(ii) ethyl chloride is treated with aqueous KOH

537) Give one chemical test each to distinguish between the following pairs of compounds:
(i) Phenol and Benzoic acid
(ii) 1-Propanol and 2-Propanol

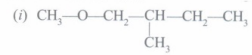
538) What is denatured alcohol?

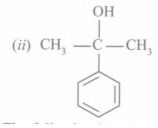
539) (a) Arrange the following compounds in decreasing order of acidity.
$H_2O, ROH, HC \equiv CH$
(b) Write IUPAC name of





540) Write the IUPAC name of the following compound:

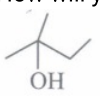




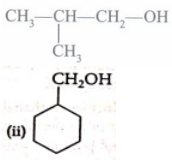
541) Arrange the following in the order of dehydration of alcohols:
Primary alcohols, Secondary alcohols, Tertiary alcohols.

542) Arrange the following in increasing order of their boiling point:
CH_3CH_2OH, CH_3CHO, CH_3 -O-CH_3

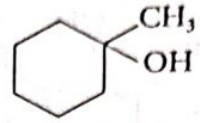
543) How will you synthesise the following from appropriate alkene?



544) Show how you will synthesise the following alcohol prepared by reaction of a suitable Grignard reagent on methanal?

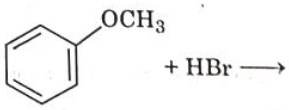


545) Show how you will synthesise?

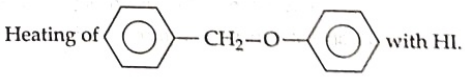


from a suitable alkene.

546) Write the products of the following reaction.



547) Give the structures of final products expected from the following



548) What happens when ethyl chloride reacts with $NaOC_2H_5$?

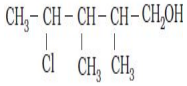
3 Marks 88 x 3 = 264

549) How are the following conversions carried out?
(i) Propene ⟶ Propan-2-ol
(ii) Ethyl magnesium chloride⟶ Benzyl alcohol
(iii) Ethyl magnesium chloride ⟶ Propan-1-ol.
(iv) Methyl magnesium bromide⟶ 2-Methylpropan-2-ol.

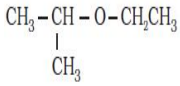
550) Give the equations of reaction for the preparation of phenol from cumene.

551) You are given benzene, conc. H_2SO_4 and NaOH. Write the equations for the preparation of phenol using these reagents.

552) Give IUPAC names of the following compounds:
(i)



(ii)



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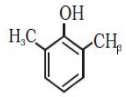

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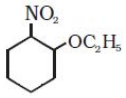
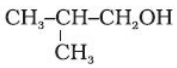
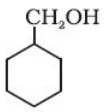


553) Show how are the following alcohols prepared by the reaction of a suitable Grignard reagent on methanal?
(i)



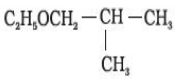
(ii)



554) Name the reagents used in the following reactions:
(i) Oxidation of a primary alcohol to carboxylic acid.
(ii) Oxidation of a primary alcohol to an aldehyde.
(iii) Bromination of phenol to 2,4,6-tribromophenol.
(iv) Benzyl alcohol to benzoic acid.
(v) Dehydration of propan-2-ol to propene.
(vi) Butan-2-one to butan-2-ol.

555) Predict the major product of acid catalysed dehydration of
(i) 1-methyl cyclohexanol, and
(ii) butan-1-ol

556) Give IUPAC names of the following ethers:
(i)



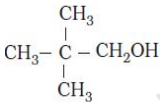
(ii) $CH_3OCH_2CH_2Cl$
(iii) $O_2\ N - C_6H_4 - OCH_3 (p)$
(iv) $CH_3CH_2CH_2OCH_3$
(v)

(vi)

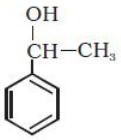
557) Write the equation of the reaction of hydrogen iodide with
(i) 1-Propoxy propane
(ii) methoxy benzene and
(iii) benzyl ethyl ether.

558) Explain the fact that in aryl alkyl ethers,
(i) the alkoxy group activites the benzene ring towards electrophilic substitution and
(ii) it directs the incoming substitutions to ortho and para positions in benzene ring.

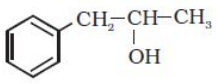
559) Classify the following as primary, secondary and tertiary alcohols:
(i)



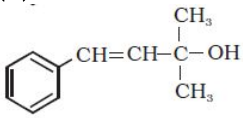
(ii) H_2C=CH-CH_2OH
(iii) CH_3-CH_2-CH_2-OH
(iv)



(v)

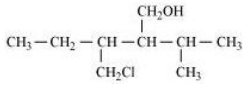


(vi)

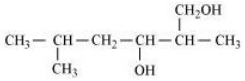


560) Name the following compounds according to IUPAC system.

(a)

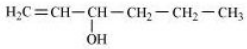


(b)

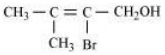


(c)

(d)



(e)



561) Give the structures and IUPAC names of the products expected from the following reactions:

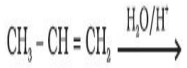
(a) Catalytic reduction of butanal.

(b) Hydration of propene in the presence of dilute sulphuric acid.

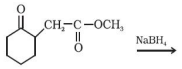
(c) Reaction of propanone with methyl-magnesium bromide followed by hydrolysis.

562) Write structures of the products of the following reactions:

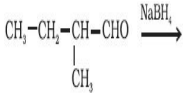
(i)



(ii)



(iii)



563) Write the structures of the major products expected from the following reactions:

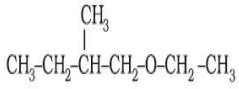
(a) Mononitration of 3-methylphenol

(b) Dinitration of 3-methylphenol

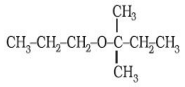
(c) Mononitration of phenyl methanoate.

564) Give the major products that are formed heating each of the following ethers.

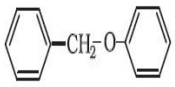
(i)



(ii)



(iii)



565) Show how will you synthesize

(i) 1-phenyl ethanol from a suitable alkene?

(ii) cyclohexyl methanol using an alkyl halide by an S_N2 mechanism?

(iii) pentan-1-ol using an alkyl halide?

566) Explain why propanol has higher boiling point than that of the hydrocarbon, butane?

567) Write the names of reagents and equations for the preparation of the following ethers by Williamson synthesis:
(i) 1-Propoxypropane
(ii) Ethoxybenzene
(iii) 2-Methyl-2-methoxypropane
(iv) 1-Methoxyethane

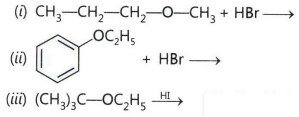
568) Write the mechanism of the reaction of HI with methoxy methane.

569) Write the mechanism of hydration of ethene to yield ethanol.

570) Write the equations involved in the following reactions:
(i) Reimer-Tiemann reaction
(ii) Williamson synthesis

571) Draw the structure and name the product formed if the following alcohols are oxidized. Assume that an excess of oxidizing agent is used.
(i) $CH_3CH_2CH_2CH_2OH$
(ii) 2-butenol
(iii) 2-methyl-1-propanol

572) State the products of the following reactions:



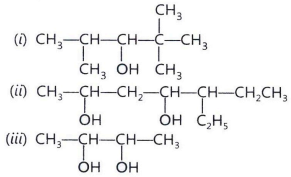
573) Account the following:
(i) The boiling point of ethanol is higher than that of methanol.
(ii) Phenol is a stronger acid than an alcohol.
(iii) The boiling points of ethers are lower than isomeric alcohols.

574) Account the following:
(i) The boiling points of alcohols decrease with increase in branching of the alkyl chain.
(ii) Phenol does not give protonation reaction readily.
(iii) Phenylmethyl ether reacts with HI to give Phenol and Methyl iodide and not Iodobenzene and Methyl alcohol.

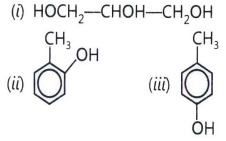
575) How would you convert the following:
(i) Phenol to benzoquinone
(ii) Propanone to 2-methylpropan-2-ol
(iii) Propene to propan-2-ol

576) Explain the following observations:
(i) The boiling point of ethanol is higher than that of methoxymetane .
(ii) Phenol is more acidic than ethanol.
(iii)o-and p-nitrophenols are more acidic than phenol.

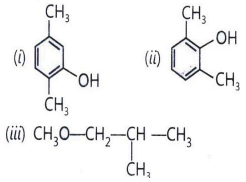
577) Write IUPAC name of the following compounds:



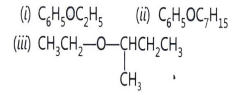
578) Write IUPAC names of the following compounds:



579) Write IUPAC names of the following compounds:



580) Write IUPAC names of the following compounds:



581) Write structures of the compounds whose IUPAC names are as follows:
(i) 2, 3 - Diethylphenol
(ii) 1 - Ethoxypropane
(iii) 2 - Ethoxy-3-methylpentane

582) Name the reagents used in the following reactions:
(i) Benzyl alcohol to benzoic acid.
(ii) Dehydration of propan-2-ol to propene.
(iii) Butan-2-one to butan-2-ol.

583) Write the structures of the isomers of alcohols with molecular formula $C_4H_{10}O$. Which of these exhibits optical activity?

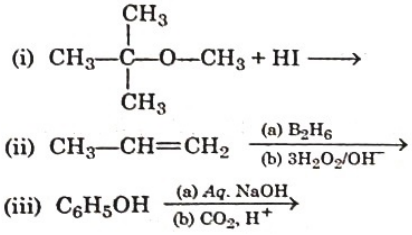
584) (a) Name the starting material used in the industrial preparation of phenol.
(b) Write complete reaction for the bromination of phenol in aqueous and non aqueous medium.
(c) Explain why Lewis acid is not required in bromination of phenol?

585) Give the structures and IUPAC names of products expected from the following reactions:
(i) Catalytic reduction of butanal
(ii) Hydration of propene in the presence of dilute sulphuric acid.
(iii) Reaction of propanone with methyl magnesium bromide followed by hydrolysis.

586) (a) Why di-tert-butyl ether cannot be prepared by Williamson's synthesis?
(b) HI is a better reagent than HBr for cleavage of ether. Explain.
(c) The boiling points of ethers are lower than their corresponding isomeric alcohols. Explain.

587) Give two chemical tests to distinguish between phenol and ethanol.

588) Write the main products(s) in each of the following reactions:



589) Write the final product(s) in each of the following reactions:

(i) $CH_3 - \underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}} - O - CH_3 + HI \longrightarrow$,

(ii) $CH_3 - CH_2 - \underset{OH}{\underset{|}{CH}} - CH_3 \overset{Cu/573k}{\longrightarrow}$,

(iii) $C_2H_6 - OH \underset{(ii)H^+}{\overset{(i)CHCl_3+aq.NaOH}{\longrightarrow}}$

590) How are the following conversions carried out?
(i) Propene to propane-2-o1
(ii) Benzyl chloride to Benzyl alcohol
(iii) Anisole to p-Bromoanisole

591) How are the following conversions carried out?
(i) Benzyl chloride to Benzyl alcohol
(ii) Ethyl magnesium chloride to Propan-l-ol
(iii) Propene to Propan-2-ol

592) Write the major products in the following equations:
(i) $CH_3CH_2OH \xrightarrow{PCl_5} ?$
(ii) $CH_3 - C1 + CH_3CH_2 - ONa \longrightarrow ?$

593) How do you convert the following:
(i) Phenol to anisole
(ii) Propan-2-ol to 2-methylpropan-2-o1
(iii) Aniline to phenol

594) (a) Write the mechanism of the following reaction:
$2CH_3CH_2OH \xrightarrow{H^+} CH_3CH_2\text{-}O\text{-}CH_2CH_3$
(b) Write the equations involved in the acetylation of Salicylic acid.

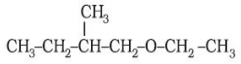
595) (i) Give mechanism of preparation of ethoxy ethane from ethanol.
(ii) How is toluene obtained from phenol?

596) An alcohol A ($C_4H_{10}O$) on oxidation with acidified $K_2Cr_2O_7$ givens a carboxylic acid B ($C_4H_{10}O_2$). Treatment of C with warm aq. H_2SO_4 gives D ($C_4H_{10}O$), an isomer of A. The compound D is resistant to oxidation. Identify compounds A, B, C and D. Write all reactions.

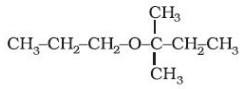
597) An organic compound (A) (C_6H_6O) gives a characteristic colour with aq.$FeCl_3$ solution. When CO_2 gas is passed through an alkaline solution of A at 400 K under pressure, compound (B) is obtained. Compound B on acidification gives (C) which reacts with acetyl chloride to form (D) which is a popular painkiller. Deduce the structure of A, B, C and D.

598) State the products of the following reactions:
(i) $CH_3\text{-}CH_2\text{-}CH_2\text{-}O\text{-}CH_3 + HBr \longrightarrow$
(ii) $(CH_3)_3C\text{-}OC_2H_5$

599) Give tha major products that are formed by heating each of following ethers with HI.
(i)



(ii)



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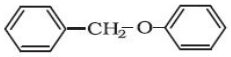


600) How is tert-butyl alcohol obtained from acetone?

601) (a) Why pcc cannot oxidise methanol to methanoic acid and while $KMnO_4$ can ?
(b) Why is reactions of alcohol/phenol and with acid chloride in the presence of pyridine?

602) Identify X,Y and Z

$$C3H7OH + ConcH2SO4 \xrightarrow[3]{430-450k} X \xrightarrow{Br_2} Y \xrightarrow[\text{Alc KOH}]{Excess} Z$$

603) a. R—Cl is hydrolysed to R—OH slowly but the reaction is rapid if a catalytic amount of KI is added to the reaction mixture.
b. What is formed if cylcopentanone is reduced with H2 /Pt . Give equation for the reaction.

604) The treatment of alkyl chlorides with aq KOH leads to the formation of alcohols but in presence of alcoholic KOH, alkenes are the major products. Explain.

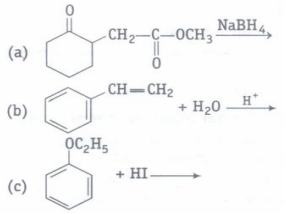
605) Explain the following with an example.
(i) Kolbes reaction.
(ii) Reimer-Tiemann reaction.
(iii) Williamson ether synthesis.
(iv) Unsymmetrical ether.

606) Synthesise the following.
(i) 1-chloropropane to propan-1-ol

607) Show how will you synthesise
(i) 1-phenyl ethanol from a suitable alkene?
(ii) cyclohexyl methanol using an alkyl halide by an S_N2 mechanism?
(iii) pentan-1-ol using an alkyl halide?

608) How may be the following transformation carried out (in not more than six steps)? Ethyl alcohol to vinyl acetate.

609) Write the structures of the main products in the following reactions:



610) (i) What happens when CH_3-O-CH_3 is heated with HI?
(ii) Explain mechanism for hydration of acid catalyzed ethene:

$$CH_2 = CH_2 + H_2O \xrightarrow{H^+} CH_3 - CH_2 - OH$$

611) Compound A having molecular formula $C_4H_{10}O$, is found to be soluble in concentrated sulphuric acid. It does not react with sodium metal or potassium permanganate. On heating with excess of HI, it gives a single alkyl halide. Deduce the structure of compound A and explain all the reactions.

612) The following is not an appropriate reaction for the preparation of tert-butyl methyl ether:

$$CH_3ONa + (CH_3)_3C - Cl \longrightarrow (CH_3)_3C - OCH_3$$

(i) What would be the major product of the given reaction?
(ii) Write a suitable reaction for the preparation of tert-butyl methyl ether, specifying the names of re agents used. Justify your answer in both cases.

613) (i) How will you distinguish between the following pair by suitable chemical tests? butan-1-ol and butan-2-ol
(ii) Complete the following reaction:

$$HOCH_2 - CHOH - CH_2OH \xrightarrow{HI}$$

614) Why 2,4,6-trinitrophenol is a strong acid? How is it prepared from phenol?

615) How does Lucas reagent help in the distinction of primary, secondary and tertiary alcohols? Discuss the reactions involved.

616) (i) How can diethyl ether be prepared from the following?
(a) Ethyl iodide (b) Ethyl alcohol
Write the chemical equation in each case.
(ii) Howis ethyl alcohol obtained from molasses?

617) Predict the products of the following reaction:

$$\text{(i) } CH_3 - CH = CH_2 \xrightarrow[\text{(ii) } 3H_2O_2/OH^-]{\text{(i) } B_2H_6} ?$$

$$\text{(ii) } C_6H_5 - OH \xrightarrow{Br_2(aq)} ?$$

$$\text{(iii) } CH_3CH_2OH \xrightarrow{Cu/573\ K} ?$$

618) Give reasons for the following:
(i) Why phenol undergoes electrophilic substitution more easily than benzene?
(ii) The C-O-H bond angle in alcohols is slightly less than the tetrahedral angle (109°28').
(iii) $(CH_3)_3C$-O-CH_3 on reaction' with HI gives $(CH_3)_3C$-I and CH_3 -OH as the main products and not $(CH_3)_3C$-OH and CH_3 -I.

619) (a) Write the mechanism of the following reaction:

$$CH_3CH_2OH \xrightarrow{HBr} CH_3CH_2Br + H_2O$$

(b) Write the equation involved in Reimer-Tiemann reaction.

620) What happens when:
(i) Ethanol is treated with Cu at 573 K.
(ii) Phenol is treated with CH_3COCl / anhydrous $AlCl_3$.
(iii) Ethyl chloride is treated with $NaOCH_3$?

621) How do you convert the following:
(i) Phenol to 2-hydroxy acetophenone
(ii) Ethyl chloride to methoxy ethane,
(iii) Acetone to 2-methyl propan-2-ol.

622) Give reasons:
(i) p-nitro phenol is more acidic than p-methyl phenol.
(ii) Bond length of C-O bond in phenol is shorter than that in CH_3OH.
(iii) $(CH_3)_3CBr$ on reaction with CH_3 O-Na^+ gives alkene as major product and not an ether.

623) Give the structure of the major product expected from the following reactions:
(a) Reaction of ethanal with methyl-magnesium bromide followed by hydrolysis.
(b) Hydration of but-1-ene in the presence of dilute sulphuric acid.
(c) Reaction of phenol with bromine water.

624) A compound 'X' with molecular formula C_3H_9N reacts with $C_6H_5SO_2Cl$ to give a solid, insoluble in alkali. Identify 'X' and give the IUPAC name of the product. Write the reaction involved.

625) Give the structure of the major product expected from the following reactions:
(a) Reaction of propanal with methyl magnesium bromide followed by hydrolysis.
(b) Reaction of phenol with Br_2 in CS_2.
(c) Reaction of propene with diborane followed by oxidation.

626) Write the structures of the compounds where IUPAC names are as follows
(i) Hex-1-en-3-ol
(ii) 2-methylpropan-2-ol
(iii) 2, 6-dimethylphenol

627) How ethyl chloride is converted to ethanal?

628) For the pair phenol and cyclohexanol, answer the following
(i) Why is phenol more acidic than cyclohexanol?
(ii) Give one chemical test to distinguish between the two.

629) Write the IUPAC names following of the compounds

(i) $CH_3-O-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3$

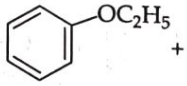
(ii) $C_6H_5-O-C_2H_5$

(iii) $C_6H_5-O-C_7H_{15}(n\text{-})$

(iv) $CH_3-CH_2-O-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2CH_3$

630) Predict the products of the following reactions

(i) $CH_3CH_2CH_2OCH_3 + HBr \rightarrow$

(ii)  $+ HBr \longrightarrow$

(iii) $(CH_3)_3C-OC_2H_5 \xrightarrow{HI}$

631) Write the mechanism of the following reaction.

$$2CH_3CH_2OH \xrightarrow[443K]{\text{Conc. } H_2SO_4} CH_3CH_2-O-CH_2-CH_3$$

632) What happens when

(i) salicylic acid is treated with $(CH_3CO)_2O/H^+$?

(ii) anisole is treated with CH_3Cl/ anhyd. $AlCl_3$?

Write chemical equation in support of your answer.

633) Arrange the following compounds in the increasing order of the property indicated.

(i) p-nitrophenol, ethanol, phenol (acidic character)

(ii) Propanol, propane, propanal (boiling point)

634) What happens when

(i) Anisole is treated with CH_3Cl/anhydrous $AlCl_3$?

(ii) Phenol is oxidised with $Na_2Cr_2O_7/H^+$?

(iii) $(CH_3)_3C$-OH is heated with Cu/573 K?

Write chemical equation in support of your answer.

635) (i) What happens when phenol reacts with

(a) conc. HNO_3 and

(b) $CHCl_3$ in presence of aqueous NaOH followed by acidification?

(ii) Why does the reaction of CH_3ONa with $(CH_3)_3C$ - Br gives 2-methylpropene and not $(CH_3)_3$ C - O-O-OCH_3?

636) (i) Why is the C-O bond length in phenols less than that in methanol?

(ii) Arrange the following in order of increasing boiling point :

Ethoxyethane, Butanal, Butanol, n-butane

(iii) How can phenol be prepared from anisole? Give reason.

Case Study Questions 14 x 4 = 56

637) **Read the passage given below and answer the following questions:**

Although chlorobenzene is inert to nucleophilic substitution, however it gives quantitative yield of phenol when heated with aq. NaOH at high temperature and under high pressure. As far as electrophilic substitution in phenol is concerned the - OH group is an activating group, hence, its presence enhances the electrophilic substitution at o- and p-positions.

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Conversion of chlorobenzene into phenol involves

(a) modified S_N1 mechanism **(b) modified S_N2 mechanism**

(c) both (a) and (b) **(d) elimination-addition mechanism.**

(ii) Phenol undergoes electrophilic substitution more readily than benzene because

(a) the intermediate carbo cation is a resonance hybrid of more resonating structures than that from benzene

(b) the intermediate is more stable as it has positive charge on oxygen, which can be better accommodated than on carbon

(c) in one of the canonical structures, every atom (except hydrogen) has complete octet

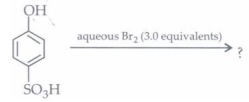
(d) the -OH group is o, p-directing which like all other o, p-directing group, is activating.

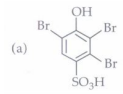
(iii) Phenol on treatment with excess of conc. HNO_3 gives

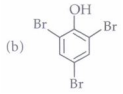
(a) o-nitrophenol **(b) p-nitrophenol**

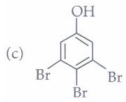
(c) o-and p-nitrophenol **(d) 2, 4, 6-trinitrophenol**

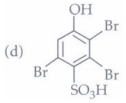
(iv) The major product of the following reaction is











638) **Read the passage given below and answer the following questions:**

A compound (X) containing C, Hand O is unreactive towards sodium. It also does not react with Schiff's reagent. On refluxing with an excess ofhydroiodic acid, (X) yields only one organic product (Y). On hydrolysis, (Y) yields a new compound (Z) which can be converted into (Y) by reaction with red phosphorus and iodine. The compound (Z) on oxidation with potassium permanganate gives a carboxylic acid. The equivalent weight of this acid is 60.

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) The compound (X) is an

(a) acid **(b) aldehyde** **(c) alcohol** **(d) ether**

(ii) The IUPAC name of the acid formed is

(a) methanoic acid **(b) ethanoic acid** **(c) propanoic acid** **(d) butanoic acid.**

(iii) Compound (Y) is

(a) ethyl iodide **(b) methyl iodide** **(c) propyl iodide** **(d) mixture of (a) and (b).**

(iv) Compound (X) on treatment with excess of Cl_2 in presence of light gives

(a) α - chlorodiethyl ether **(b) α, α' -dichlorodiethyl ether** **(c) perchlorodiethyl ether** **(d) none of these.**

639) **Read the passage given below and answer the following questions:**

Both alcohols and phenols are acidic in nature, but phenols are more acidic than alcohols. Acidic strength of alcohols mainly depends upon the inductive effect. Acidic strength of phenols depends upon a combination of both inductive effect and resonance effects of the substituent and its position on the benzene ring. Electron withdrawing groups increases the acidic strength of phenols whereas electron donating groups decreases the acidic strength of phenols. Phenol is a weaker acid than carboxylic acid.

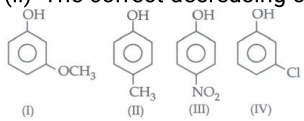
The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Phenols are highly acidic as compare to alcohols due to

(a) the higher molecular mass of phenols **(b) the stronger hydrogen bonds in phenols**

(c) alkoxide ion is a strong conjugate base **(d) phenoxide ion is resonance stabilised.**

(ii) The correct decreasing order of pK_a value is

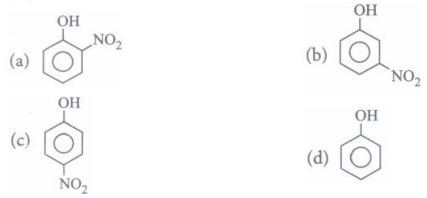


(a) II > IV > I > III **(b) IV > II > III > I** **(c) III > II > IV > I** **(d) IV > I > II > III**

(iii) The compound that does not liberate CO_2, on treatment with aqueous sodium bicarbonate solution is

(a) benzoic acid **(b) benzenesulphonic acid** **(c) salicylic acid** **(d) carbolic acid.**

(iv) Most acidic amongst the following is



640) **Read the passage given below and answer the following questions:**

Ethers are readily cleaved by HI or HBr at 373 K to form an alcohol and an alkyl halide.

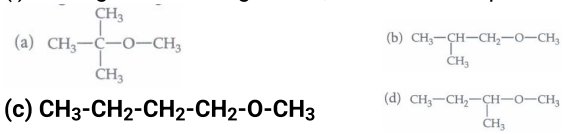
$$R - \mathrm{O} - R + \mathrm{HX} \xrightarrow{373\ \mathrm{K}} R - X + R - \mathrm{OH}$$

$$R - \mathrm{OH} + \mathrm{HX} \xrightarrow{373\ \mathrm{K}} R - X + \mathrm{H_2O}$$

Mixed ether, containing primary or secondary alkyl group, when heated with hydrogen halide, the lower alkyl group forms halide and higher will form an alcohol. Tertiary alkyl ether when heated with hydrogen halide gives tertiary alkyl halide.

The following questions are multiple choice questions. Choose the most appropriate answer :

(i) Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI?



(c) CH_3-CH_2-CH_2-CH_2-O-CH_3

(ii) When CH_2=CH-O-CH_2-CH_3 reacts with one mole of HI, one of the products formed is

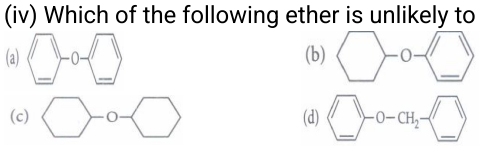
(a) ethane **(b) ethanol** **(c) iodoethene** **(d) ethanal**

(iii) $(CH_3)_3COCH_3$ and $CH_3OC_2H_5$ are treated with hydroiodic acid. The fragments obtained after reactions are respectively

(a) $(\mathrm{CH_3})_3\mathrm{CI} + \mathrm{CH_3OH};\ \mathrm{CH_3I} + \mathrm{C_2H_5OH}$ **(b)** $(\mathrm{CH_3})_3\mathrm{CI} + \mathrm{CH_3OH};\ \mathrm{CH_3OH} + \mathrm{C_2H_5I}$

(c) $(\mathrm{CH_3})_3\mathrm{COH} + \mathrm{CH_3I};\ \mathrm{CH_3OH} + \mathrm{C_2H_5I}$ **(d)** $\mathrm{CH_3I} + (\mathrm{CH_3})_3\mathrm{COH};\ \mathrm{CH_3I} + \mathrm{C_2H_5OH}$

(iv) Which of the following ether is unlikely to be cleaved by hot conc. HBr?



641) **Read the passage given below and answer the following questions:**

An organic compound (A) having molecular formula C_6H_6O gives a characteristic colour with aqueous $FeCl_3$ solution. (A) on treatment with CO_2 and NaOH at 400 K under pressure gives (B), which on acidification gives a compound (C). The compound (C) reacts with acetyl chloride to give (D) which is a popular pain killer.

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Compound (A) is

(a) 2-hexanol **(b) dimethyl ether** **(c) phenol** **(d) 2-methyl pentanol.**

(ii) Number of carbon atoms in compound (D) is

(a) 7 **(b) 6** **(c) 8** **(d) 9**

(iii) The conversion of compound (A) to (C) is known as

(a) Reimer- Tiemann reaction **(b) Kolbe's reaction** **(c) Schimdt reaction** **(d) Swarts reaction**

(iv) Compound (A) on heating with compound (C) in presence of $POCl_3$ gives a compound (D) which is used

(a) in perfumery as a flavouring agent **(b) as an antipyretic** **(c) as an analgesic** **(d) as an intestinal antiseptic.**

642) **Read the passage given below and answer the following questions:**

Reimer- Tiemann reaction introduces an aldehyde group, on aromatic ring of phenol, ortho to the hydroxyl group. This is a general method for the synthesis of substituted salicylaldehydes as depicted below.

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Reimer-Tiemann reaction is an example of

(a) nucleophilic substitution reaction **(b) electrophilic substitution reaction**
(c) nucleophilic addition reaction **(d) electrophilic addition reaction**

(ii) Which of the following reagents is used in the given reaction in steps I?

(a) aq. NaOH + CH_3Cl **(b) aq. NaOH + CH_2Cl_2** **(c) aq. NaOH + $CHCl_3$** **(d) aq. NaOH + CCl_4**

(iii) The structure of the intermediate [A] is

(iv) When phenol reacts with chloroform in presence of KOH, the product formed is

(a) salicylic acid **(b) salicylaldehyde** **(c) both (a) and (b)** **(d) none of these.**

643) **Read the passage given below and answer the following questions:**

Dehydration of alcohols can lead to the formation of either alkenes or ethers. This dehydration can be carried out either with protonic acids such as cone. H_2SO_4, H_3PO_4 or catalysts such as anhydrous $ZnCl_2$ or Al_2O_3. When primary alcohols are heated with cone. H_2SO_4 at 433-443 K, they undergo intramolecular dehydration to form alkenes. Secondary and tertiary alcohols undergo dehydration under milder conditions. The ease of dehydration of alcohols follows the order: 3° > 2° > 1°. The dehydration of alcohols always occurs in accordance with the Saytzeffs rule. Primary alcohols when heated with protic acid at 413 K, gives dialkyl ether.

$$CH_3CH_2OH \xrightarrow[433\text{-}443\ K]{\text{conc. } H_2SO_4} CH_2{=}CH_2 + H_2O$$

$$2CH_3CH_2OH \xrightarrow[413\ K]{\text{conc. } H_2SO_4} CH_3CH_2{-}O{-}CH_2CH_3 + H_2O$$

The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Which one of the following alcohols undergoes acid-catalysed dehydration to alkenes most readily?

(a)	**(b)**	**(c)**	**(d)**
$(CH_3)_2CHCH_2OH$	**$(CH_3)_3COH$**	**$CH_3CHOHCH_3$**	**$CH_3CH_2CH_2OH$**

(ii) Dehydration of alcohol is an example of which type of reaction?

(a) Substitution (b) Elimination (c) Addition (d) Rearrangement

(iii) The alcohol which does not give a stable compound on dehydration is

(a) ethyl alcohol	**(b) methyl alcohol**	**(c) n-propyl alcohol**	**(d) n-butyl alcohol**

(iv)  products.

The most stable product(s) is/are

(a)  (b)  **(c) both (a) and (b) (d) none of these.**

644) **Read the passage given below and answer the following questions:**

Williamson's synthesis is used for the preparation of symmetrical as well as unsymmerical ether. It is S_N2 reaction mechanism. In Williamson's synthesis, 1° alkyl halide are used for preparation of ethers because 2° and 3°alkyl halide give alkene: Ethers are cleaved by hydrogen halides to alcohol and alkyl halide where alkyl halide is corresponding to that alkyl which has less number of carbon atom (it is because ofless steric hindrance). In polar media unsymmetrical ether like tertiary butyl ethyl ether gives ethyl alcohol and tertiary butyl halide as reaction proceeds via carbocation.

In these questions (i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

(i) Assertion: Rate of reaction of alkyl halide in Williamson's synthesis reaction is 1°RX > 2°RX > 3°RX.

Reason: It is a type of bimolecular substitution reaction (S_N2).

(ii) Assertion: t-Butyl methyl ether is not prepared by the reaction of t-butyl bromide with sodium methoxide.

Reason: Sodium methoxide is a weak nucleophile.

(iii) Assertion: When isopropyl bromide is treated with sodium isopropoxide, di-isopropyl ether is obtained as a major product. .

Reason: With secondary alkyl halides, both substitution and elimination occur.

(iv) Assertion: Both symmetrical arid unsymmetrical ethers can be prepared by Williamson's synthesis.

Reason: Williamson's synthesis is an example of nucleophilic substitution reaction.

645) **Read the passage given below and answer the following questions:**

Due to intermolecular hydrogen bonding, the boiling points of alcohols and phenols are much higher than those of corresponding haloalkanes, haloarenes, aliphatic and aromatic hydrocarbons. Among isomeric alcohols, the boiling points follow the order : primary > secondary > tertiary. Boiling points of ethers are much lower than those of isomeric alcohols. The solubility of alcohols in water decreases as the molecular mass of alcohols increases. Amongst isomeric alcohols solubility increases with branching. The solubility of phenols in water is much lower than that of alcohols. Lower ethers such as dimethyl ether and ethyl methyl ether are soluble in water, but the solubility decreases as the molecular mass increases.

In these questions (i-iv) a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

(i) Assertion: Alcohols have higher boiling points than ethers of comparable molecular masses.

Reason: Alcohols and ethers are isomeric in nature.

(ii) Assertion: The solubility of phenols in water is much lower than that of alcohols.

Reason: Phenols do not form H-bonds with water.

(iii) Assertion : Among n-butane, ethoxyethane,1-propanol and 2-propanol, the increasing order of boiling points is,1-butanol < 1-propanol < ethoxyethane < n-butane.

Reason: Boiling point increases with increase in molecular mass.

(iv) Assertion: Dimethyl ether and diethylether are soluble in water.

Reason: As the molecular mass increases, solubility of ethers in water decreases.

646) **Read the passage given below and answer the following questions:**

Lucas test is a test to differentiate between primary, secondary and tertiary alcohols. This test consists of treating an alcohol with Lucas reagent, and turbidity, due to the formation of insoluble alkyl chloride, is observed. Lucas test is based on the difference in reacting of three classes of alcohols with hydrogen chloride via S_N1 reaction. The different reactivity reflects the differing ease of formation of the corresponding carbocations.

In these questions (i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

(i) Assertion: Equimolar mixture of conc. HCl and anhydrous $ZnCl_2$ is called Lucas' reagent.

Reason : Lucas' reagent can be used to distinguish between methanol and ethanol.

(ii) Assertion: 2-Methyl-2-butanol gives no turbidity with Lucas' reagent at room temperature.

Reason: It is a 3° alcohol

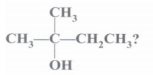
(iii) Assertion: Amongst the compounds, H_2C =$CHCH_2OH$ (I), C_6H_5OH (II), $CH_3CH_2CH_2OH$ (III) and $(CH_3)_3COH$ (IV), only (IV) reacts with Lucas' reagent at room temperature.

Reason : Tertiary alcohol gives turbidity immediately with Lucas' reagent.

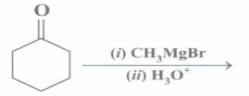
(iv) Assertion: Lucas test can be used to distinguish between 1-propanol and 2-propanol.

Reason : Lucas test is based upon the difference in reactivity of primary, secondary and tertiary alcohols with conc. HCl and anhyd. $ZnCl_2$.

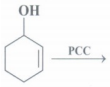
647) Alcohols and phenols are most important compounds used in our daily life. Alcohols are prepared by hydration of alkenes, fermentation of glucose, reduction of aldehydes, ketones, carboxylic acids and esters.
Alcohols are soluble in water. Boiling points increase with increase in molar mass and decrease with branching. Alcohols on dehydration gives alkene at 443K, follow carbocation mechanism. Excess of alcohol at 413K on dehydration with cone. H_2SO_4 also follow carbocation mechanism but gives diethyl ether. Alcohols- undergo nucleophilic substitution reactions, esterification with carboxylic acids and derivatives like amides, acid halides, acid anhydride.
Phenol is prepared from cumene, diazonium salts, anisole, chlorobenzene. Phenol is used to prepare salicylaldehyde, salicylic acid, aspirin, methyl salicylate, p-benzoquinone. Phenol undergoes electrephilic substitution reaction at o & p-position. Ethers are functional isomers of alcohols, have low boiling points. Ethers are used as solvents. Unsymmetrical ethers are prepared by Williamson synthesis. Ethers react with HI and undergo S_N1 or S_N2 mechanism depending upon stability of carbocation formed. Aromatic ethers like anisole undergoes electrophilic substitution at o & p-position.

(a) Write IUPAC name of 

(b) Out of tert, butyl alcohol and n-butanol, which will undergo dehydration faster and why?
(c) Convert phenol to p-benzoquinone
(d) Complete the chemical reaction:



(e) Why is C-OH bond length in CH_3OH longer than C-OH bond length in phenol?
(f) Identify the product:



(g) Why is  bond angle in alcohol less than tetrahedral bond angles?

648) Alcohols play very important role in our daily life. Ordinary sprit used as an antiseptic contains methanol. Ethanol is present in cough syrups, tonics, wine, beer and whisky, Sugar, starch, cellulose are carbohydrates which also contain large number -OH groups. Phenol is also an antiseptic in low concentration (0.2%) where as 2% solution of phenol is used as disinfectant. The fragrance of rose is due to citronellol (unsaturated alcohol). Phenol is used for preparation of many useful compounds like aspirin, methyl salicylate (Iodex) and phenyl salicylate (salol) used as intestinal antiseptic.
(a) How is phenol prepared from cumene? What is advantage of this method?
(b) How is phenol converted into salicylic acid?
(c) Convert phenol to picric acid
(d) Distinguish between phenol and benzyl alcohol?
(e) Why does phenol turn pink after long standing?

649) Observe the following table showing boiling points of alcohol, molar mass. Study the table and answer the questions based on table and related studied concept.

Alcohol	Boiling Point	Molar Mass
CH_3OH	64°C	32 g mol^{-1}
C_2H_5OH	78°C	46 g mol^{-1}
C_3H_7OH (n-propyl alcohol)	97°C	60 g mol^{-1}
Isopropyl alcohol	82.5°C	60 g mol^{-1}
n-butanol	118°C	74 g mol^{-1}
Isobutyl alcohol	108°C	74 g mol^{-1}
Butan-2-ol	100°C	74 g mol^{-1}
Tert. butyl alcohol	83°C	74 g mol^{-1}

(a) Why do alcohols have higher boiling points than haloalkanes, ethers, aldehydes and ketones?
(b) Why does tertiary butyl alcohol have lower boiling point than n-butyl alcohol?
(c) How does boiling point vary with increase in carbon chain?
(d) How is solubility of alcohol vary with increase in molar mass?
(e) Which alcohol is most acidic and why?

650) Table given below has compounds and their pKa values. Study the table and answer the questions based on table and related studied concepts.

Compound	pKa
Ethanol	15.9
Phenol	9.98
o-cresol	10.28
p-cresol	10.14
m-cresol	10.08
o-nitro phenol	7.23
p-nitro phenol	7.15
m-nitro phenol	8.40
2, 4-dinitro phenol	4.0
Picric acid	0.71
m-methoxy phenol	9.65
o-methoxy phenol	9.96
p-methoxy phenol	10.21
m-amino phenol	9.87

(a) Which phenolic compound is most acidic?
(b) What is relationship between pKa and acidic character?
(c) Why are cresols weaker acids than phenol?
(d) Which has more electron withdrawing effect (-I)-I effect $-OCH_3$ or $-NH_2$? Why?
(e) Why is o-fluoro phenol weakest acid than pand m-fluoro phenol?

5 Marks 35 x 5 = 175

651) Give equations of the following reactions:
(i) Oxidation of propan-1-ol with alkaline $KMnO_4$ solution.
(ii) Bromine in CS_2 with phenol.
(iii) Dilute HNO_3 with phenol.
(iv) Treating phenol with chloroform in presence of aqueous NaOH.

652) Write equations of the following reactions:
(i) Friedel-Crafts reaction - alkylation in anisole,
(ii) Nitration of anisole
(iii) Bromination of anisole in ethanoic acid medium,
(iv) Friedel- Crafts acetylation of anisole.

653) Ortho and para nitrophenols are more acidic than phenol. Draw the resonance structures of the corresponding phenoxide ions.

654) (a) Draw the structures of all isomeric alcohols of molecular formula $C_5H_{12}O$ and give their IUPAC names.
(b) Classify the isomers of alcohols in above part as primary, secondary and tertiary alcohols.

655) Write the reactions of Williamson synthesis of 2-ethoxy-3-methylpentane starting from ethanol and 3-methylpentan-2-ol.

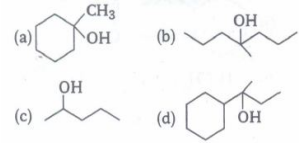
656) Explain why is ortho-nitrophenol more acidic than ortho-methoxyphenol?

657) Illustrate with examples the limitations of Williamson synthesis for the preparation of certain type of ethers.

658) Preparation of ethers by acid dehydration of secondary and tertiary alcohols is not a suitable method. Give reason.

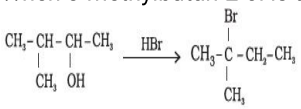
659) Give structures of the products you would expect when each of the following alcohol reacts with (a) $HCl - ZnCl_2$, (b) HBr and (c) $SOCl_2$.
(i) Butan-1-o1
(ii) 2-Methylbutan-2-o1

660) (i) Show how would you synthesise the following alcohols from alkenes?



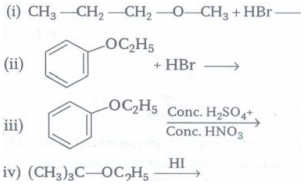
(ii) While separating a mixture of ortho and para nitro phenols by steam distillation, name the isomer which will be steam volatile. Give reason.

661) When 3-methylbutan-2-ol is treated with HBr, the following reaction takes place:



Give a mechanism for this reaction.
(Hint : The secondary carbocation formed in step II rearranges to a more stable tertiary carbocation by a hydride ion shift from 3rd carbon atom).

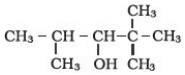
662) Predict the products of the following reactions:



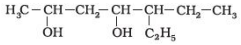
663) How is 1-propoxy propane synthesised from propan-1-ol ? Write the mechanism of this reaction.

664) Write IUPAC names of the following compounds:

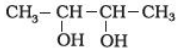
(i)



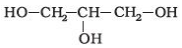
(ii)



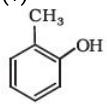
(iii)



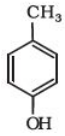
(iv)



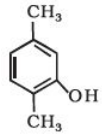
(v)



(vi)



(vii)



(viii)