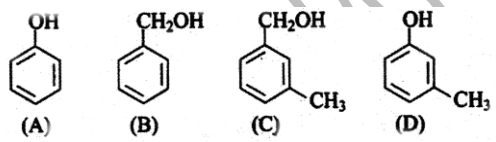
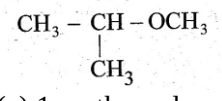
Alcohols, Phenols and Ethers

Multiple Choice Questions

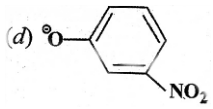
1. Monochlorination of toluene in sunlight followed by hydrolysis with aq. NaOH yields.
   (a) o-Cresol (b) w-Cresol
   (c) 2, 4-Dihydroxytoluene (d) Benzyl alcohol
2. How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature?
   (a) 1 (b) 2
   (c) 3 (d) 4
3. What is the correct order of reactivity of alcohols in the following reaction ?
   $R-OH+HCl \xrightarrow{ZnCl_2} R-CH+H_2O$
   (a) 1° > 2° > 3° (b) 1° < 2° > 3°
   (c) 3° > 2° > 1° (d) 3° > 1° > 2°
4. CH_3CH_2OH can be converted into CH_3CHO by .
   (a) catalytic hydrogenation
   (b) treatment with LiA1H4
   (c) treatment with pyridinium chlorochromate
   (d) treatment with $KMnO_4$
5. The process of converting alkyl halides into alcohols involves
   (a) addition reaction (b) substitution reaction
   (c) dehydrohalogenation reaction
   (d) rearrangement reaction
6. Which of the following compounds are/is aromatic alcohol?



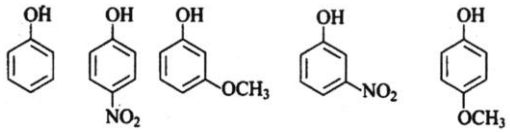
   (a) (A), (B), (C), (D) (b) (A), (D)
   (c) (B), (C) (d) (A)
7. Give IUPAC name of the compound given below.
   $CH_3-CH(Cl)-CH_2-CH_2-CH(OH)-CH_3$
   (a) 2-Chloro-5-hydroxyhexene
   (b) 2-Hydroxy-5-chlorohexane
   (c) 5-Chlorohexan-2-ol
   (d) 2-Chlorohexan-5-ol
8. IUPAC name of m-cresol is
   (a) 3-methylphenol (b) 3-chlorophenol
   (c) 3-methoxyphenol (d) benzene- 1,3-diol
9. IUPAC name of the compound



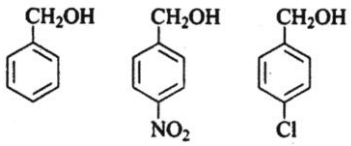
   (a) 1-methoxy-l-methylethane
   (b) 2-methoxy-2-methylethane
   (c) 2-methoxypropane
   (d) isopropylmethyl ether
10. Which of the following species can act as the strongest base?
    (a) $^{\ominus}OH$ (b) $^{\ominus}OR$
    (c) $^{\ominus}OC_6H_5$



11. Which of the following compounds will react with sodium hydroxide solution in water?
    (a) C_6H_5OH (b) $C_6H_5CH_2OH$
    (c) $(CH_3)_3COH$ (d) C_2H_5OH
12. Phenol is less acidic than
    (a) ethanol (b) o-nitrophenol
    (c) o-methylphenol (d) o-methoxyphenol
13. Which of the following is most acidic
    (a) Benzyl alcohol (b) Cyclohexanol
    (c) Phenol (d) m–Chlorophenol
14. Mark the correct order of decreasing acid strength of the following



    (a) (V) > (IV) > (II) > (I) > (III)
    (b) (II) > (IV)> (III) > (I) > (V)
    (c) (IV) > (V) > (III) > (II) > (I)
    (d) (V) > (IV) > (III) > (II) > (I)
15. 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)

16. Arrange the following compounds in increasing order of boiling point.
    Propan–1ol, butan–2–ol, pentan–1–ol
    (a) Propan-1 -ol, butan-2-ol,-butan-1 -ol, pentan-l-ol
    (b) Propap-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

17. Which of the following alcohols will have the highest boiling point ?,
(a) Methanol (b) Butan-2-ol
(c) Butan-1-ol (d) 2-Methylpropan-2-ol
18. Lucas test can be used to distinguish between :
(a) Phenol andp-cresol
(b) Butan-l-ol and 2-methylpropan-2-ol
(c) Propan-1 -ol and ethanol
(d) Ethanol and glycol
19. Which of the following is most acidic ?
(a) $(CH_3)_2CHOH$ (b) $(CH_3)_3OH$
(c) CH_3OH (d) CH_3CH_2OH
20. What is the nature of ethyl alcohol ?
(a) Acidic (b) Basic
(c) Neutral (d) None of these
21. Which of the following represents armatic alcohol
(a) Phenol (b) Cresol
(c) 2-Phenylethanol (d) Quinol
22. The hybrid state of carbon, to which phenolic group is attached in phenol is
(a) sp (b) sp^2
(c) sp^3 (d) $d\,sp^2$
23. The most acidic compound among the following is:
(a) phenol (b) *m*-cresol
(c) p-Nitrophenol (d) picric acid
24. When salicylic acid is heated with Zn dust. What is the main product ?
(a) Benzene (b) Phenol
(c) Toluene (d) Benzic acid
25. Which of the following compound contains intermolecular H-bonds ?
(a) Phenol
(b) p-Nitrophenol
(c) Ethanoic acid
(d) Resorcinol
26. How many isomeric alcohols with formula $C_4H_{10}O$ are possible
(a) five (b) four
(c) three (d) two
27. Cyclohexanol is a
(a) phenol (b) primary alcohol
(c) secondary alcohol (d) tertiary alcohol
28. An armatic compound has molecular formula C_7H_8O. The number of phenolic isomers for this compound is :
(a) four (b) three
(c) five (d) six
29. The order of reactivity of alcohols with sodium metal is
(a) 3°> 2°> 1° (b) 1°>2°>3°
(c) 2°> 3°> 1° (d) 3°> 2°> 1°
30. An aldehyde can be reduced to a alkane by :
(a) $NaBH_4$ (b) Ni/H_2
(c) Zn-Hg/HCl (d) $LiAlH_4$
31. Diethyl ether may be regarded as anhydride of :
(a) C_2H_5COOH (b) C_2H_5OH
(c) C_2H_5CHO (d) $C_2H_5COOC_2H_5$
32. Phenol on treatment with dil. HNO_3 give :
(a) o-Nitrophenol (b) p-Nitrophenol,
(c) mixture of o and p-nitrophenol
(d) 2, 4, 6-trinitrophenol
33. Which of the following cannot be made by using Williamsan's synthesis ?
(a) Methoxybenzene (b) tert-butyl methyl ether
(c) allyl methyl ether (d) Ditert-butyl ether
34. To prepare butan–2–ol using $CH_3Mg\,I$ what other chemical would you choose ?
(a) Propanal (b) Ethanol
(c) Ethanqj (d) Propan-2-ol
35. Primary alochol can best be changed to aldebyde by using the reagent :
(a) Pyridiniumchlorochromate
(b) Potassium dichromate
(c) Potassium permanganate,
(d) Hydrogen peroxide
36. Which of the following compounds on its oxidation gives methyl ethyl ketone ?
(a) propan-2-ol (b) butan-l-ol
(c) tert-butyl/alcohol (d) sec butyl alochol

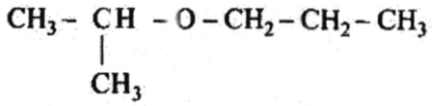
Assertion/Reason

In the following questions, a statement of Assertion (A) followed by a statement of Reason (R) is given. Choose the correct answer out of the following choices :

(a) Assertion and reason both are correct statements and reason is the correct explanation for Assertion.
(b) Assertion and reason both are correct statements but reason is not the correct explanation for Assertion.
(c) Assertion is correct statement but reason is wrong._
(d) Assertion and reason both are incorrect.
(e) Assertion is wrong but reason is correct.

1. **Assertion :** Addition reaction of water to but-l-ene in acidic medium yields-butan-l-ol.
Reason : Addition of water in acidic medium proceeds through the formation of primary carbocation.

2. **Assertion :** *p*-Nitrophenol is more acidic than phenol.
   Reason : Nitro group helps in the stabilisation of the phenoxide ion by dispersal of negative charge due to resonance.
3. Assertion: IUPAC name of the compound



   is 2–ethoxy–2–methylethane

   Reason : 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]
4. **Assertion :** Bond angle in ethers is slightly less than the tetrahedral angle.
   Reason : There is a repulsion between the two bulky (–R) groups.
5. Assertion: Boiling points of alcohols and ethers are high.
   Reason : They can form intermolecular hydrogen bonding.
6. **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.
7. **Assertion :** o-Nitrophenol is less soluble in water than the *m*- and *p*-isomers.
   Reason : *m*-Nitrophenol and *p*-Nitrophenol exists as associated molecules.
8. **Assertion :** Ethanol is a weaker acid than phenol. Reason Sodium ethoxide may be prepared by the reaction of ethanol with aqueous NaOH.
9. **Assertion :** Phenol forms 2,4, 6-tribromophenol on treatment with Br_2 in carbon disulphide at 273 K.
   Reason : Bromine polarises in carbon disulphide.
10. **Assertion :** Phenols give o-nitrophenol and p-nitrophenol on nitration with conc. HNO_3 and H_2SO_4 mixture.
    Reason : –OH group in Phenol is o–,p-directing.
11. Assertion Aldehydes are reduced to 1° alcohols by using $LiAlH_4$.
    Reason : $LiAlH_4$ a good reducing agent.
12. **Assertion :** Alcohols are soluble in water. Reason Alcohols form hydrogen bonds with water molecules.
13. **Assertion :** Alcohols react both as nucleophiles and electrophiles.
    Reason : The bond between O–H is broken when alcohols react as nucleophiles.
14. **Assertion :** Bond angle in ethers is slightly more than the tetrahedral angle.
    Reason : In ethers, there is a repulsion between the two bulky (–R) groups.
15. **Assertion :** Boiling points of ethers is high.
    Reason : Ethers can make intermolecular hydrogen bonding with water.
16. **Assertion :** Sec-Butyl alcohol give yellow ppt. of CHI_3 with N_2OH and I_2 .
    Reason : All 2° alcohols give positive iodoform test.
17. **Assertion :** Phenol is more acidic than ethanol.
    Reason : Phenoxide ion is more stable than ethoxide iodue to resonance.
18. **Assertion :** Ethanol reacts with aqueous NaOH to form sodium ethoxide and H_2O
    Reason : Ethanol is a weaker acid than phenol.
19. **Assertion :** The acidic strength of 1° alcohol is more than 2° alcohol.
    Reason : + I effect decreases the acidic character.
20. **Assertion :** Sodium metal can be kept in ethyl alcohol.
    Reason : Sodium metal can safely be kept in diethyl ether.
21. **Assertion :** Addition reaction of water to but-1-ene in acidic medium yields butan-1-ol.
    Reason : Addition of water in acidic medium proceeds through the formation of primary carbocation.
22. **Assertion :** Lucas reagent is $ZnC1_2$ anhydrous/conc. HCl.
    Reason : 1° alcohols gives red colour with Lucas reagent.
23. **Assertion :** Ethers is weaker acid than phenol
    Reason : Sodium ethoxide may be prepared by reaction of ethanol with aqueous NaOH.
24. **Assertion :** Alcohols follow S_N1, mechanism in the order 3° > 2° > 1°.
    Reason : 3° carbocation is most stable.
25. **Assertion :** p-nitrophenol is more acidic than phenol.
    Reason : NO_2 group stabiles the phonate ion by reducing of negative charge due to resonance.