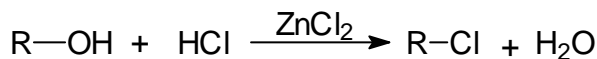


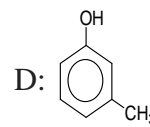
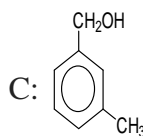
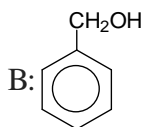
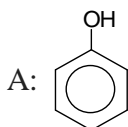
Assignment on Alcohols, Phenols and Ethers

MCQ-I (One option correct)

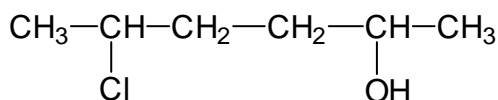
- Monochlorination of toluene in sunlight followed by hydrolysis with aq. NaOH yields.
(a) o-Cresol (b) m-Cresol (c) 2, 4-Dihydroxytoluene (d) Benzyl alcohol
- How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature?
(a) 1 (b) 2 (c) 3 (d) 4
- What is the correct order of reactivity of alcohols in the following reaction?



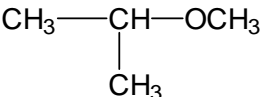
- (a) $1^\circ > 2^\circ > 3^\circ$ (b) $1^\circ < 2^\circ > 3^\circ$ (c) $1^\circ < 2^\circ < 3^\circ$ (d) $1^\circ = 2^\circ = 3^\circ$
- Ethyl alcohol can be converted to acetaldehyde by which of the following OAs?
(a) HNO_3 (b) Chromic acid in acetone
(c) pyridinium chlorochromate (d) $KMnO_4/H^+$.
- The process of converting alkyl halides into alcohols involves _____.
(a) addition reaction (b) substitution reaction
(c) dehydrohalogenation reaction (d) rearrangement reaction
- Which of the following compounds is aromatic alcohol?



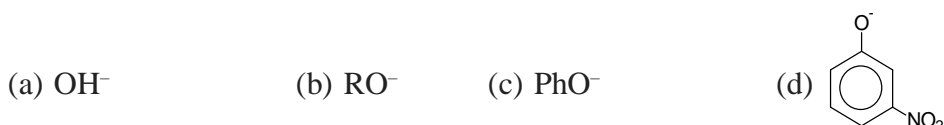
- (a) A, B, C, D (b) A, D (c) B, C (d) A
- Give IUPAC name of the compound given below.



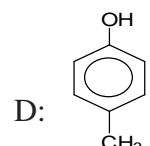
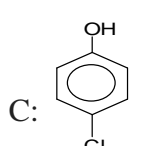
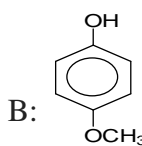
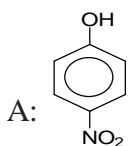
- (a) 2-Chloro-5-hydroxyhexane (b) 2-Hydroxy-5-chlorohexane
(c) 5-Chlorohexan-2-ol (d) 2-Chlorohexan-5-ol
- IUPAC name of m-cresol is _____.
(a) 3-hydroxytoluene (b) 2-methylphenol (c) 3-methylphenol (d) none

- The IUPAC name of the compound  is _____.

- (a) 1-methoxy-1-methylethane (b) 2-methoxy-2-methylethane
(c) 2-methoxypropane (d) isopropylmethyl ether
- Which of the following species can act as the strongest base?

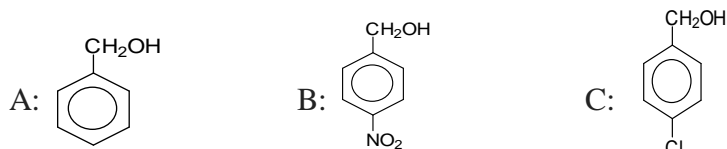


- Which of the following compounds will react with sodium hydroxide solution in water?
(a) C_6H_5OH (b) $C_6H_5CH_2OH$ (c) both a) & b) (d) $(CH_3)_3COH$
- Phenol is less acidic than _____.
(a) ethanol (b) o-nitrophenol (c) o-methylphenol (d) o-methoxyphenol
- Which of the following is most acidic?
(a)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



- (a) $A > C > D > B$ (b) $B > D > C > A$ (c) $A > B > C > D$ (d) none

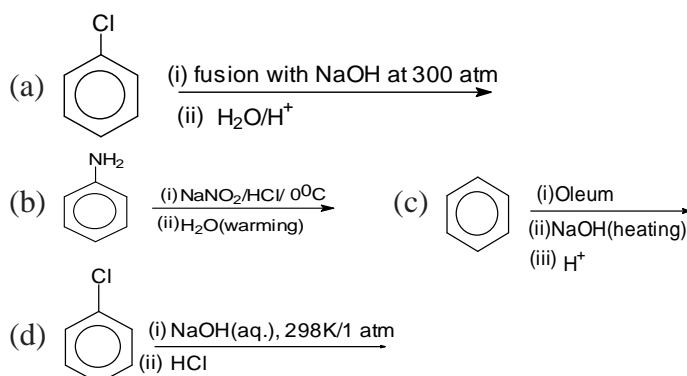
15. Give the correct reactivity order for the reaction of the following compounds with HCl or HBr.



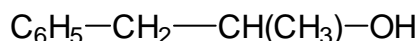
- (a) $A > C > B$ (b) $B > C > A$ (c) $A > B > C$ (d) $C > B > A$
16. Arrange the following compounds in increasing order of boiling point.
Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol
- (a) Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol
(b) Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol
(c) 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

MCQ-II (More than correct options correct)

1. Which of the following reactions will yield phenol ?



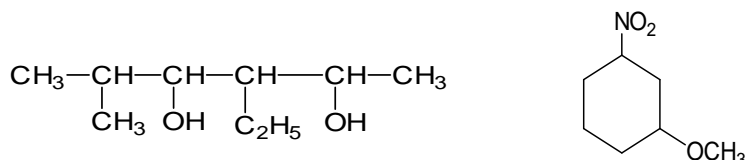
2. Which of the following reagents can be used to oxidise primary alcohols to aldehydes?
(a) CrO_3 in anhydrous medium. (b) KMnO_4 in acidic medium.
(c) Pyridinium chlorochromate (PCC) (d) Heat in the presence of Cu at 573K.
3. Phenol can be distinguished from ethanol by the reactions with _____.
(a) Br_2 /water (b) Na (c) Neutral FeCl_3 (d) All the above.
4. Which of the following names correctly represent the structure



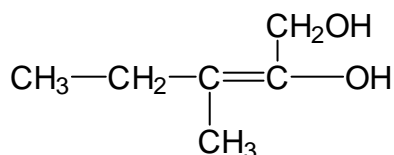
- (a) 3-phenylpropan-2-ol (b) 2-hydroxypropylbenzene
(c) 1-phenylpropan-2-ol (d) 1-benzylethanol

Short Answer Type Questions

1. What is the structure and IUPAC name of glycerol?
2. Write the IUPAC name of the following compounds.

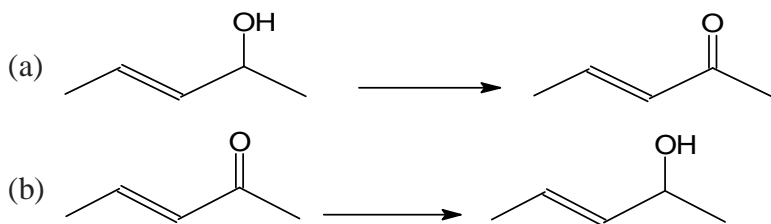


3. Write the IUPAC name of the compound given below.



4. Name the factors responsible for the solubility of alcohols in water.
5. What is denatured alcohol?

6. Suggest a reagent for the following conversion.



(Hint: (a) acetone/(i-PrO)₃ (Oppenauer oxidation)

(b) i-PrOH/(i-PrO)₃Al (Meerwin-Ponferf-Varley or MPV Reduction)

7. Out of 2-chloroethanol and ethanol which is more acidic and why?

8. Suggest a reagent for conversion of ethanol to ethanal.

9. Suggest a reagent for conversion of ethanol to ethanoic acid.

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

11. Out of o-nitrophenol and o-cresol which is more acidic?

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

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

14. 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.

15. What happens when benzene diazonium chloride is warmed with water?

16. Arrange the following compounds in decreasing order of acidity. H₂O, ROH, CH≡CH .

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

18. How can propan-2-one be converted into tert-butyl alcohol?

19. Write the structures of the isomers of alcohols with molecular formula C₄H₈O. Which of these exhibits optical activity?

20. Explain why is -OH group in phenols more strongly held as compared to -OH group in alcohols.

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

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

23. Explain why is O=C=O nonpolar while R—O—R is polar.

24. Why is the reactivity of all the three classes of alcohols with conc. HCl and ZnCl₂ (Lucas reagent) different?

25. Write steps to carry out the conversion of phenol to aspirin.

26. 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?

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

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

29. Ethers can be prepared by Williamson synthesis in which an alkyl halide is reacted with sodium alkoxide. Di-tert-butyl ether can't be prepared by this method. Explain.

30. 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?

31. Explain why low molecular mass alcohols are soluble in water.

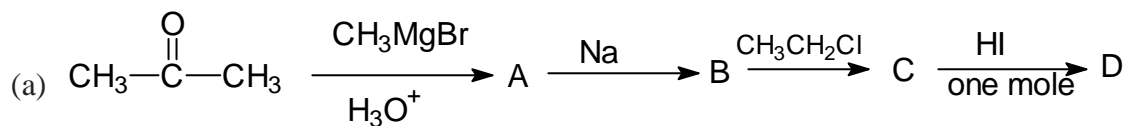
32. Explain why p-nitrophenol is more acidic than phenol.

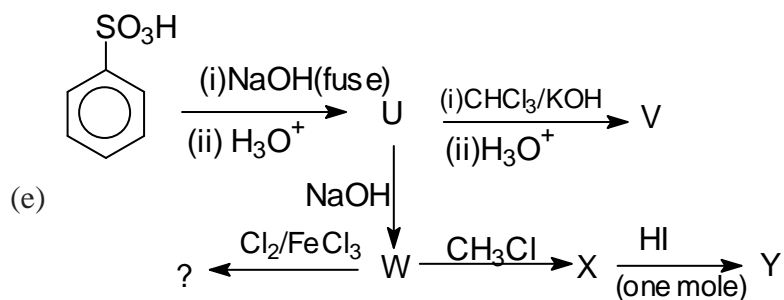
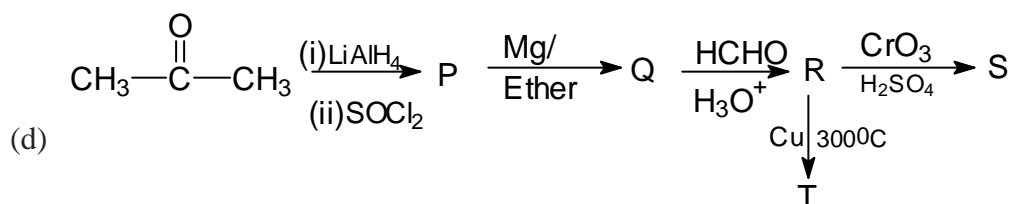
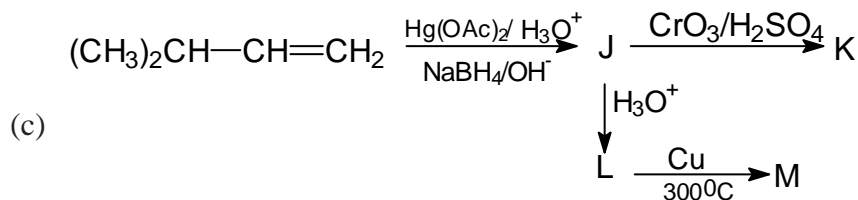
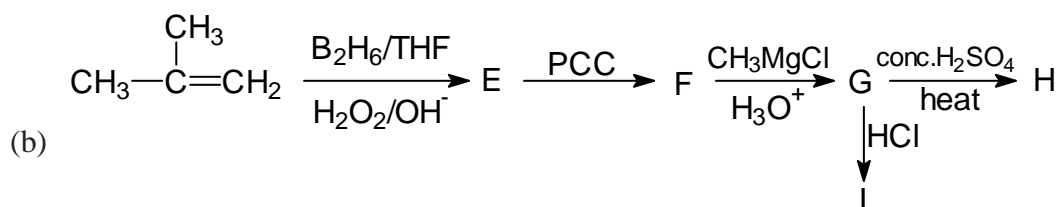
33. Explain why alcohols and ethers of comparable molecular mass have different boiling points?

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

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

Road Map Problems: Write the structures of the unknown compounds





Make the following Conversions:

- (a) Methanol to Ethanol (b) Ethanol to diethyl ether
 (c) Ethanol to Methanol (d) Phenol to Salicylic acid

Give a test to distinguish between the following.

- (a) Methanol and Ethanol (b) Ethanol and Isopropyl alcohol
 (c) Butan-1-ol and phenol (d) tert-butyl alcohol and sec-butyl alcohol

Long Answer Type Questions.

- Write the mechanism of the reaction of HI with methoxybenzene (anisole).
- (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?
- How can phenol be converted to aspirin?
- Explain a process in which a biocatalyst is used in industrial preparation of a compound known to you.
- Explain the industrial preparation of phenol from cumene.

Answer Keys to MCQ

MCQ-I

- 1.d 2.a 3.a 4.c 5.b 6.c 7.c 8.c 9.c 10.b
 11.a 12.b 13.d 14.a 15.a 16.a

MCQ-II : 1.a,b,c 2.c,d 3.a,c 4.a,b,c,d