

CHEMISTRY

BOOKS - NCERT CHEMISTRY (ENGLISH)

ALCOHOLS, PHENOLS AND ETHERS

Mcqs

1. Chlorination of toluene in the presence of light and heat followed by treatment with aqueous NaOH gives

A. o-cresol

B. m-cresol

C. 2, 4-dihydroxytoluene

D. benzyl alcohol

Answer: D



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2. How many alcohols with molecular formula

$C_4H_{10}O$ are chiral in nature ?

A. 1

B. 2

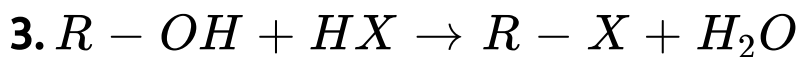
C. 3

D. 4

Answer: A



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In the above reaction the reactivity of different alcohols is

A. $1^\circ > 2^\circ > 3^\circ$

B. $1^\circ < 2^\circ > 3^\circ$

C. $3^\circ > 2^\circ > 1^\circ$

D. $3^\circ > 1^\circ > 2^\circ$

Answer: C



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4. 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 $KMnO_4$

Answer: C



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5. The process of converting alkyl halides into alcohols involves

A. addition reaction

B. substitution reaction

C. dehydrohalogenation reaction

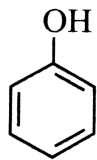
D. rearrangement reaction

Answer: B

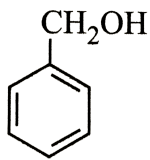


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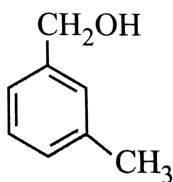
6. Which of the following compounds is aromatic alcohol?



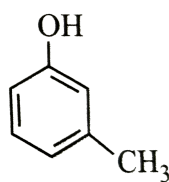
I



II



III



IV

A. A,B,C,D

B. A,D

C. B,C

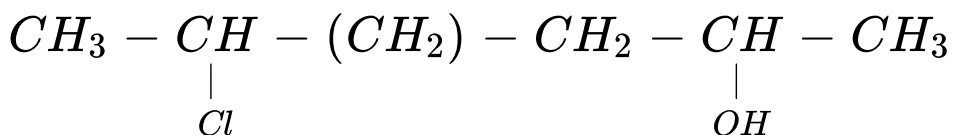
D. A

Answer: C



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7. Give IUPAC name of the compound given below.



- A. 2-chloro-5-hydroxyhexane
- B. 2-hydroxy-5-chloroxyhexane
- C. 5-chlorohexan-2-ol
- D. 5-chlorohexan-5-ol

Answer: C





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8. IUPAC name of m-cresol is..... .

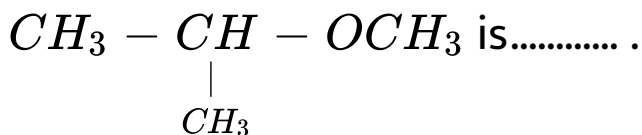
- A. 3-methylphenol
- B. 3-chlorophenol
- C. 3-methoxyphenol
- D. benzene-1, 3-diol

Answer: A



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9. IUPAC name of the compound



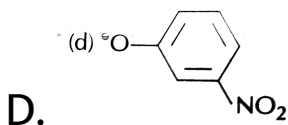
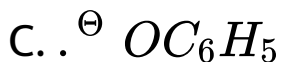
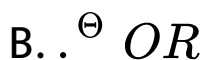
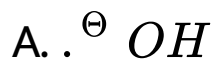
- A. 1-methoxy-1-methylethane
- B. 2-methoxy-2-methylethane
- C. 2-methoxypropane
- D. isopropylmethyl ether

Answer: C



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10. Which of the following species can act as the strongest base ?

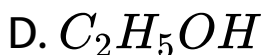
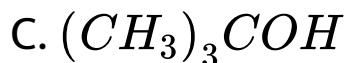
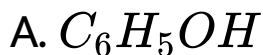


Answer: B



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11. Which of the following compounds will react with sodium hydroxide solution in water ?



Answer: A



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12. Phenol is less acidic than

A. ethanol

B. o-nitrophenol

C. o-methylphenol

D. o-methoxyphenol

Answer: B



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13. Which of the following is most acidic ?

A. Benzyl alcohol

B. Cyclohexanol

C. Phenol

D. m-chlorophenol

Answer: D



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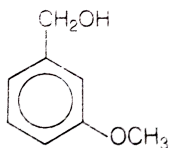
14. Mark the correct order of decreasing acid strength of the following compounds.



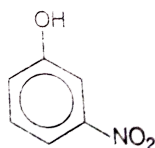
(I)



(II)



(III)



(IV)



(V)

A. $V > IV > II > I > III$

B. $II > IV > I > III > V$

C. $IV > V > III > II > I$

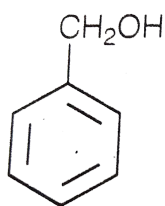
D. $V > IV > III > II > I$

Answer: B

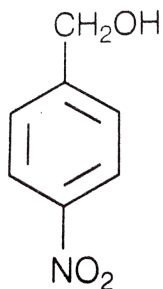


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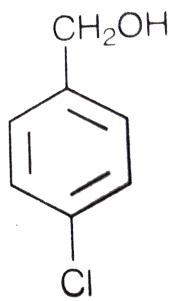
15. Mark the correct increasing order of reactivity of the following compounds with HBr/HCl.



(I)



(II)



(III)

A. $I < II < III$

B. $II < I < III$

C. $II < III < I$

D. $III < II < I$

Answer: C



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16. Arrange the following compounds in increasing order of boiling point :

Prpane-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

Answer: A



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**Multiple Choice Questions More Than One
Correct Options**

1. Which of the following are used to convert $RCHO$ into RCH_2OH ?

A. H_2 / Pd

B. $LiAlH_4$

C. $NaBH_4$

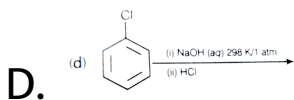
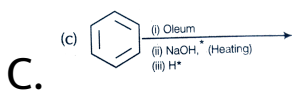
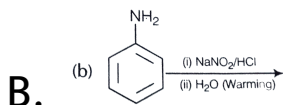
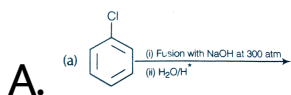
D. Reaction with $RMgX$ followed by hydrolysis

Answer: A::B::C



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2. Which of the following reactions will yield phenol ?



Answer: A::B::C



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3. 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 573 K

Answer: A::C::D



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4. Phenol can be distinguished from ethanol by the following reagents except

A. Br_2 / water

B. Na

C. Neutral $FeCl_3$

D. All of these

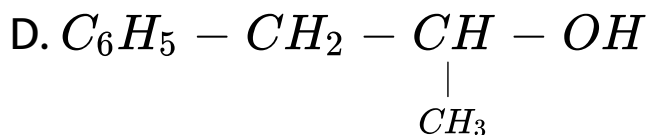
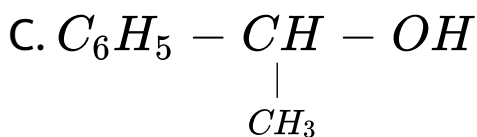
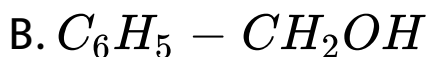
Answer: A::C



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5. Which of the following are benzylic alcohols

?



Answer: B::C



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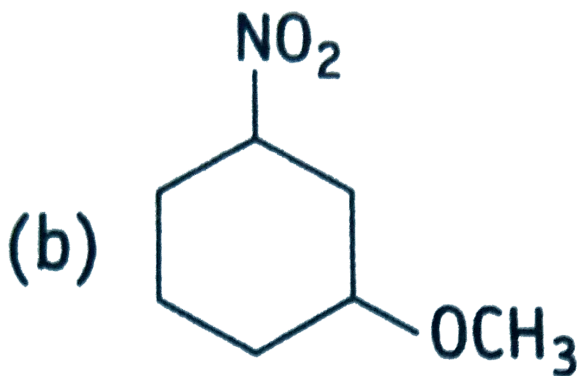
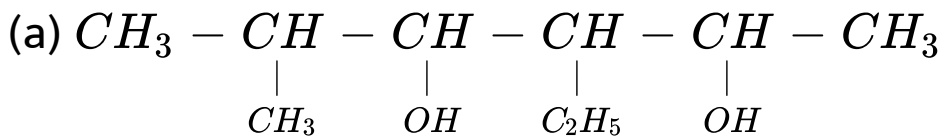
Short Answer Type Questions

1. What is the structure and IUPAC name of glycerol ?



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2. Write the IUPAC name of the following compounds.

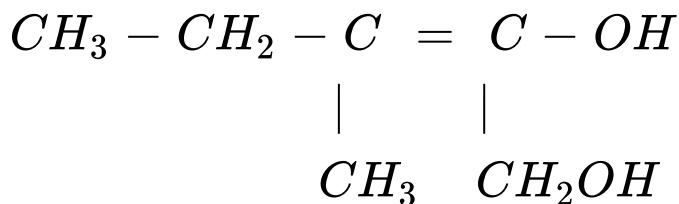


(b)



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





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4. Name the factors responsible for the solubility of alcohols in water.



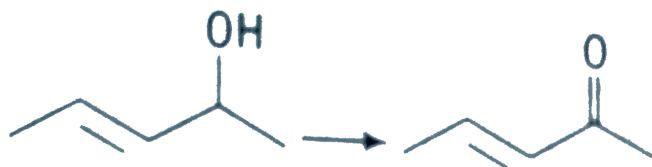
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5. What is denatured alcohol ?



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6. Suggest a reagent for the following conversion.



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

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



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



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



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



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



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13. What is the correct increasing order of acidic strength in the following :

(i) Phenol (ii) p-cresol (iii) p-nitrophenol (iv) o-nitrophenol ?





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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.



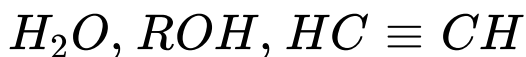
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15. What happens when benzene diazonium chloride is heated with water ?



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16. Arrange the following compounds in decreasing order of acidity.



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



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



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19. Write structural formula for all the isomeric alcohols having the molecular formula $C_4H_{10}O$.



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



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



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



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23. Explain why is $O=C=O$ non polar while $R-O-R$ is polar ?



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



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



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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 ?



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





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



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



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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?



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



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



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



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



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

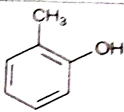
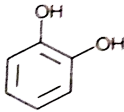
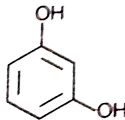

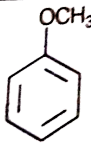
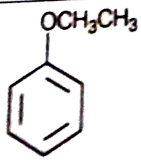


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[Match The Column](#)

1. Match the structures of the compounds given in Column I with the name of the

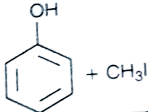
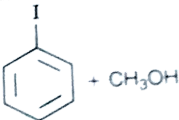

compounds given in Column II.

Column I	Column II
A. 	1. Hydroquinone
B. 	2. Phenetole
C. 	3. Catechol
D. 	4. o-cresol
E. 	5. Quinone
F. 	6. Resorcinol
	7. Anisole



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2. Match the starting material given in Column I with the products formed by these (Column II) in the reaction with HI.

Column I	Column II
A. $\text{CH}_3\text{---O---CH}_3$	1.  + CH_3I
B. $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{CH---O---CH}_3 \\ \diagup \\ \text{CH}_3 \end{array}$	2. $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3\text{---C---I} \\ \\ \text{CH}_3 \end{array}$ + CH_3OH
C. $\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_3\text{C---C---O---CH}_3 \\ \\ \text{CH}_3 \end{array}$	3.  + CH_3OH
D. 	4. $\text{CH}_3\text{---OH} + \text{CH}_3\text{I}$
	5. $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{CH---OH} \\ \diagup \\ \text{CH}_3 \end{array}$ + CH_3I
	6. $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{CH---I} \\ \diagup \\ \text{CH}_3 \end{array}$ + CH_3OH
	7. $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3\text{---C---OH} \\ \\ \text{CH}_3 \end{array}$ + CH_3I



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3. Match the items of Column I with items of Column II.

Column I	Column II
A Antifreeze used in car engine	1. Neutral ferric chloride
B Solvent used in perfumes	2. Glycerol
C Starting material for picric acid	3. Methanol
D Wood spirit	4. Phenol
E Reagent used for detection of phenolic group	5. Ethylene glycol
F By product of soap industry used in cosmetics	6. Ethanol



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4. Match the items of Column I with items of Column II.

Column I	Column II
A. Methanol	1. Conversion of phenol to o – hydroxysalicylic acid
B. Kolbe's reaction	2. Ethyl alcohol
C. Williamson's synthesis	3. Conversion of phenol to salicylaldehyde
D. Conversion of 2° alcohol to ketone	4. Wood spirit
E. Reimer-Tiemann reaction	5. Heated copper at 573K
F. Fermentation	6. Reaction of alkyl halide with sodium alkoxide



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Assertion And Reason

1. Assertion (A) Addition reaction of water to but-1-ene in acidic medium yields butan-1-ol.

Reason (R) Addition of water in acidic medium

proceeds through the formation of primary carbocation.

(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.

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.

Answer: b



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2. 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.

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.

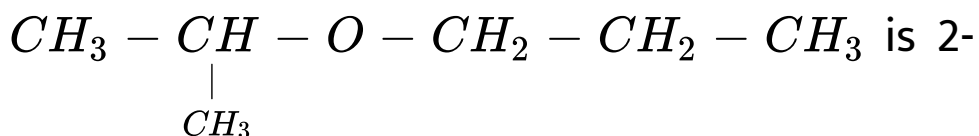
D. Assertion is wrong statement but reason is correct statement.

Answer: A



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3. Assertion (A) IUPAC name of the compound



ethoxy-2-methylethane

Reason (R) In IUPAC nomenclature, ether is regarded as hydrocarbon derivative in which a hydrogen atom is replaced by -OR and or -OAr group [where, R = alkyl group and Ar = aryl group].

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.

Answer: D



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4. Assertion (A) Bond angle in ethers is slightly less than tetrahedral angle.

Reason (R) There is a repulsion between the two bulky (-R) groups.

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.

Answer: D



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5. Assertion (A) Boiling points of alcohols and ethers are high.

Reason (R) They can form intermolecular hydrogen-bonding.

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.

Answer: B



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6. Assertion (A) Like bromination of benzene, bromination of phenol is also carried out in the presence of Lewis acid.

Reason (R) Lewis acid polarises the bromine molecule.

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.

Answer: D



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7. Assertion (A) o-nitrophenol is less soluble in water than the m and p-isomers.

Reason (R) m and p-nitrophenols exist as associated molecules.

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.

Answer: D



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8. Assertion (A) Ethanol is a weaker acid than phenol.

Reason (R) Sodium ethoxide may be prepared

by the reaction of ethanol with aqueous NaOH.

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.

Answer: C



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9. Assertion (A) Phenol forms 2, 4, 6-tribromophenol on treatment with Br_2 in carbon disulphide at 273K.

Reason (R) Bromine polarises in carbon disulphide.

(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.

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.

Answer: B



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10. Assertion (A) Phenols give o-and p-nitrophenol on nitration with conc. HNO_3 and H_2SO_4 mixture.

Reason (R) – OH group in phenol is o-,p-directing.

(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.

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.

Answer: D



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Long Answer Type Questions

1. Write the mechanism of the reaction of HI with methoxybenzene.



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2. (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 ?



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3. How can phenol be converted to aspirin ?



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



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