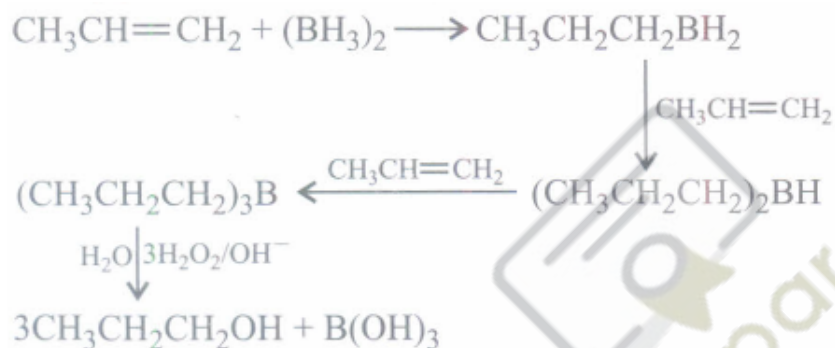


**Alcohols, Phenols and Ethers Important Questions With Answers**

**NEET Chemistry 2023**

1. Which of the following is not true in case of reaction with heated copper at 300°C?  
**a) Phenol** → Benzyl alcohol    b) Secondary alcohol → Ketone    c) Primary alcohol → Aldehyde  
 d) Tertiary alcohol → Olefin
2. An alkene  $\text{CH}_3\text{CH}=\text{CH}_2$  is treated with  $\text{B}_2\text{H}_6$  in presence of  $\text{H}_2\text{O}_2$ . The final product formed is  
 a)  $\text{CH}_3\text{CH}_2\text{CHO}$     b)  $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$     **c)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$**     d)  $(\text{CH}_3\text{CH}_2\text{CH}_2)_3\text{B}$

**Solution : -**



3. Following compounds are given:  
 (i)  $\text{CH}_3\text{CH}_2\text{OH}$  (ii)  $\text{CH}_3\text{COCH}_3$  (iii)  $\text{CH}_3-\underset{\text{CH}_3}{\text{CHOH}}$  (iv)  $\text{CH}_3\text{OH}$

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)

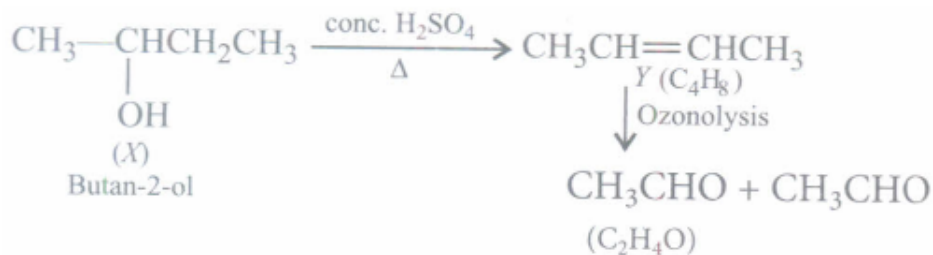
**Solution : -**

The iodoform test is exhibited by ethyl alcohol, acetaldehyde, acetone, methyl ketones, those alcohols which possess  $(\text{CH}_3\text{CH}-)$  group, acetophenone,  $\alpha$ -hydroxypropionic acid, keto acid, 2-aminoalkanes, etc.



4. An alcohol X when treated with hot conc.  $\text{H}_2\text{SO}_4$  gave an alkene Y with formula  $\text{C}_4\text{H}_8$ . This alkene on ozonolysis gives single product with molecular formula  $\text{C}_2\text{H}_4\text{O}$ . The alcohol is:  
 a) butan-1-ol    **b) butan-2-ol**    c) 2-methylpropan-1-ol    d) 2, 2-dimethylbutan -1-ol

**Solution : -**



5. Assertion: Alcohols react both as nucleophiles and electrophiles.

Reason: Alcohols react with active metals such as sodium, potassium and aluminium to yield corresponding alkoxides and hydrogen.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false. d) If both assertion and reason are false.

6. Match the column I with column II and mark the appropriate choice.

Column I	Column II
(A) Williamson's synthesis	(i) $C_6H_5OH + CH_3COCl$ in presence of pyridine
(B) ROR'	(ii) $C_2H_5ONa + C_2H_5Br$
(C) p- Nitrophenol	(iii) Unsymmetrical ether
(D) Acetylation	(iv) Intermolecular hydrogen bonding

a) (A) → (i), (B) → (iii), (C) → (ii), (D) → (iv) b) (A) → (iii), (B) → (i), (C) → (ii), (D) → (iv)

c) (A) → (ii), (B) → (iii), (C) → (iv), (D) → (i) d) (A) → (iv), (B) → (i), (C) → (ii), (D) → (iii)

7. Assertion: Ortho and para-nitrophenol can be separated by steam distillation.

Reason: Para-nitrophenol is steam volatile due to intramolecular hydrogen bonding.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false. d) If both assertion and reason are false.

**Solution :** -

o-Nitrophenol is steam volatile due to intramolecular hydrogen bonding while p-nitrophenol is less volatile due to intermolecular hydrogen bonding.

8. Assertion: The relative ease of dehydration of alcohols follow the following order:

Tertiary > Secondary > Primary

Reason: Formation of carbocation is the slowest step of the reaction

a) If both assertion and reason are true and reason is the correct explanation of assertion.

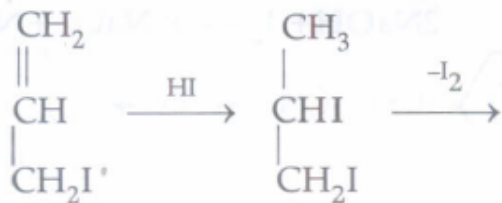
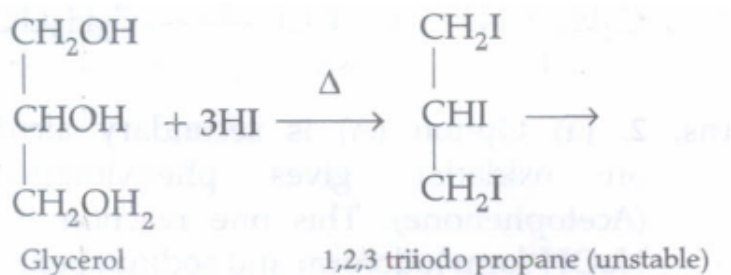
b) If both assertion and reason are true but reason is not the correct explanation of assertion.

c) If assertion is true but reason is false. d) If both assertion and reason are false.

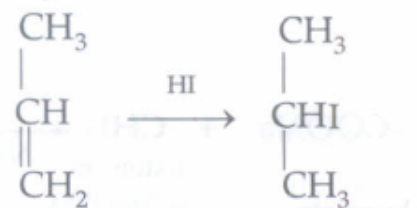
9. When glycerol is treated with excess of HI, it produces:

a) 2-iodopropane b) allyl iodide c) propene d) glycerol triiodide

**Solution :** -



Allyl iodide

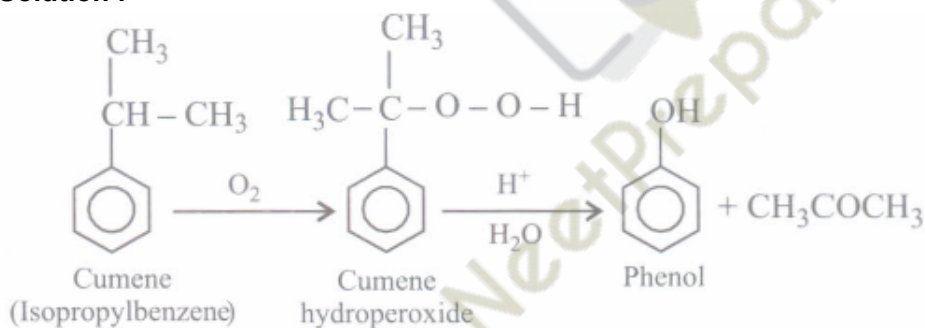


Propene

2-iodo propene

10. Cumene on reaction with oxygen followed by hydrolysis gives  
 a)  $\text{CH}_3\text{OH}$  and  $\text{C}_6\text{H}_5\text{COCH}_3$     b)  $\text{C}_6\text{H}_5\text{OH}$  and  $(\text{CH}_3)_2\text{O}$     c)  $\text{C}_6\text{H}_5\text{OCH}_3$  and  $\text{CH}_3\text{OH}$   
**d)  $\text{C}_6\text{H}_5\text{OH}$  and  $\text{CH}_3\text{COCH}_3$**

**Solution : -**



11. Which of the following compounds will react with sodium hydroxide solution in water?  
 a)  $\text{C}_6\text{H}_5\text{OH}$     **b)  $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$**     c)  $(\text{CH}_3)_3\text{COH}$     d)  $\text{C}_2\text{H}_5\text{OH}$

**Solution : -**

Phenol ( $\text{C}_6\text{H}_5\text{OH}$ ) will react with sodium hydroxide solution in water, as phenols are more acidic than alcohols.

12. The process of converting alkyl halides into alcohols involves  
 a) addition reaction    **b) substitution reaction**    c) dehydrohalogenation reaction  
 d) rearrangement reaction.

13. Phenol is less acidic than  
 a) ethanol    **b) o-nitrophenol**    c) o-methylphenol    d) o-methoxyphenol.

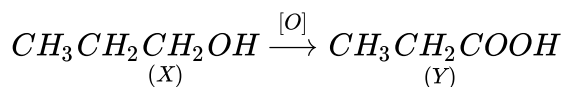
**Solution : -**

Phenol is less acidic than o-nitrophenol as electron withdrawing ( $-\text{NO}_2$ ) group increases the acidity of phenols while electron donating groups ( $-\text{CH}_3$ ,  $-\text{OCH}_3$ ) decrease the acidity of phenols. Phenols are more acidic than alcohols.

14. A compound X with the molecular formula, C<sub>3</sub>H<sub>8</sub>O can be oxidised to another compound Y whose molecular formula is C<sub>3</sub>H<sub>6</sub>O<sub>2</sub>. The compound X may be:

- a) CH<sub>3</sub>CH<sub>2</sub>OCH<sub>3</sub>   b) CH<sub>3</sub>CH<sub>2</sub>CHO   c) **CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH**   d) CH<sub>3</sub>CHOHCH<sub>3</sub>

**Solution :** -



15. Assertion: Ethanol is obtained commercially by fermentation of molasses.

Reason: Fermentation takes place in aerobic conditions

- a) If both assertion and reason are true and reason is the correct explanation of assertion.  
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.  
**c) If assertion is true but reason is false.**   d) If both assertion and reason are false.

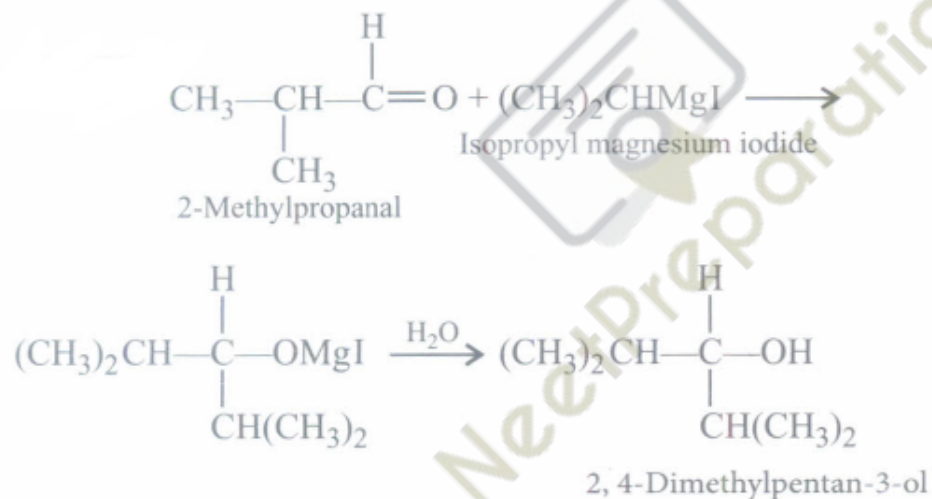
**Solution :** -

Fermentation takes place in anaerobic conditions.

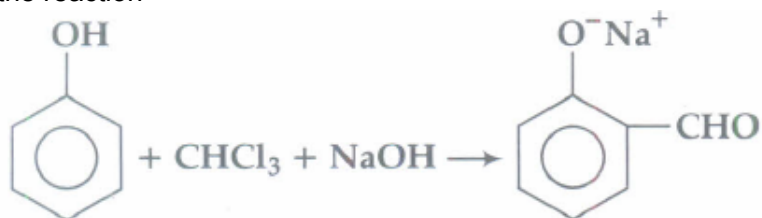
16. What would be the reactant and reagent used to obtain 2,4-dimethylpentan-3-ol ?

- a) Propanal and propyl magnesium bromide   b) 3-Methylbutanal and 2-methyl magnesium iodide  
 c) 2, 2-Dimethylpropanone and methyl magnesium iodide  
**d) 2-Methylpropanal and isopropyl magnesium iodide**

**Solution :** -



17. In the reaction

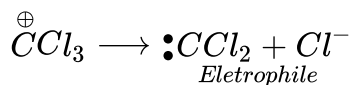
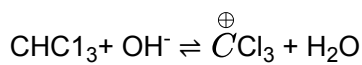


the electrophile involved is :

- a) dichloromethyl cation ( $\overset{\oplus}{\text{C}}\text{HCl}_2$ )   b) formyl cation ( $\overset{\oplus}{\text{C}}\text{HO}$ )   c) dichloromethyl anion ( $\overset{\oplus}{\text{C}}\text{HCl}_2$ )  
**d) dichlorocarbene (: CCl<sub>2</sub>)**

**Solution :** -

It is Reimer-Tiemann reaction. The electrophile formed is:  $\text{CCl}_2$  (Dichlorocarbene) according to the following reaction:



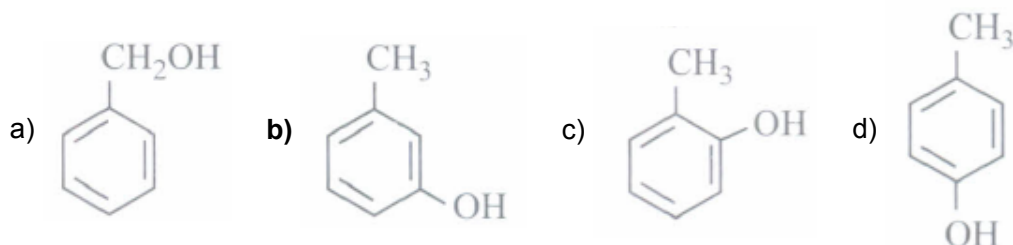
18. Assertion: When alkyl aryl ethers react with excess of hydrogen halides, phenol and alkyl halide are produced.  
Reason: Alkyl aryl ethers are cleaved at the alkyl-oxygen bond due to more stable aryl-oxygen bond.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) If both assertion and reason are true but reason is not the correct explanation of assertion.

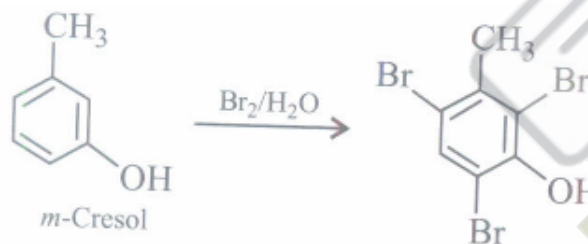
c) If assertion is true but reason is false. d) If both assertion and reason are false.

19. Which of the following compounds will give tribromo derivative on treatment with bromine water?



**Solution : -**

Only m-cresol has two ortho and one para positions free with respect to -OH group, hence it can form tribromo-derivative.



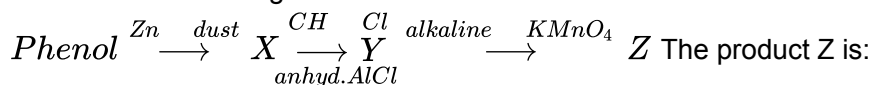
20. Which one of the following on oxidation gives a ketone?

a) Primary alcohol    b) **Secondary alcohol**    c) Tertiary alcohol    d) All of these

**Solution : -**

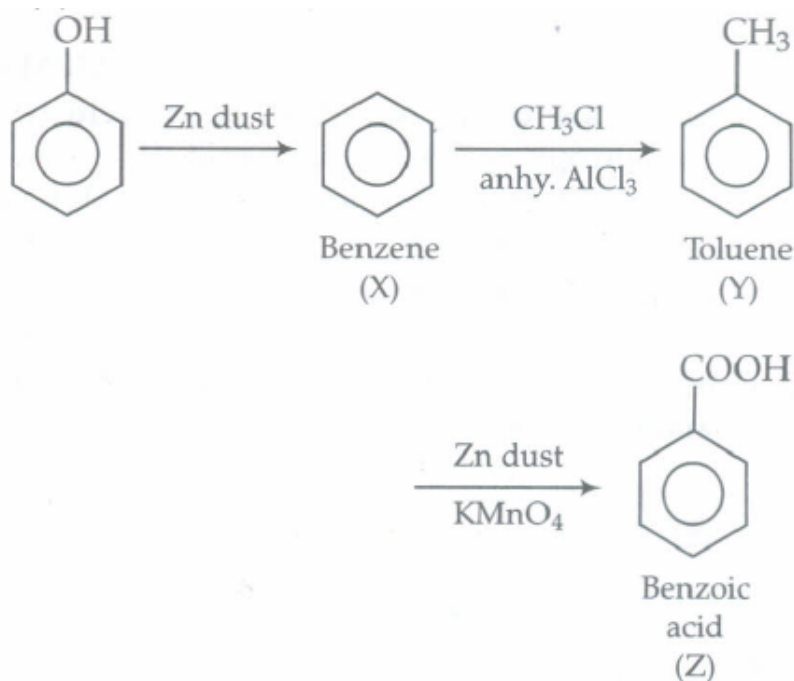
$2^\circ$  alcohols on oxidation gives ketones while  $1^\circ$  alcohol form aldehydes.

21. Consider the following reaction:



a) **benzaldehyde**    b) benzoic acid    c) benzene    d) toluene

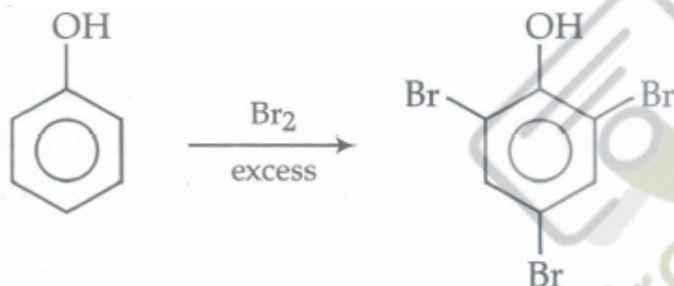
**Solution : -**



22. When phenol is treated with excess bromine water. It gives:

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

**Solution : -**



23. Assertion:  $pK_a$  value of phenol is 10.0 while that of ethanol is 15.9

Reason: Ethanol is stronger acid than phenol.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.  
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.  
**c) If assertion is true but reason is false.**    d) If assertion is true but reason is false.

**Solution : -**

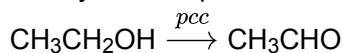
Greater the  $pK_a$  value, weaker is the acid. Hence, phenol is more acidic than ethanol.

24. CH\_3CH\_2OH can be converted into CH\_3CHO by

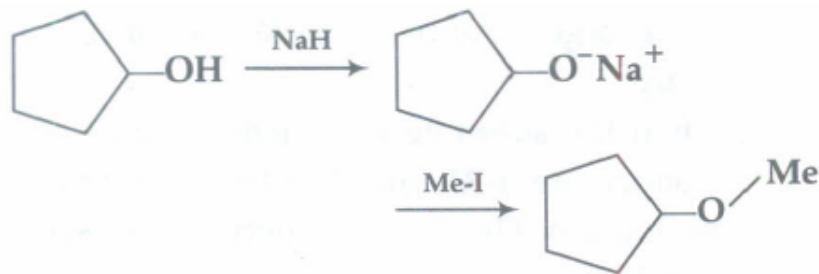
- a) catalytic hydrogenation    b) treatment with LiAlH\_4    **c) treatment with pyridinium chlorochromate**  
 d) treatment with KMnO\_4.

**Solution : -**

Pyridinium chlorochromate (PCC), a complex of chromium trioxide with pyridine and HCl gives good yield of aldehydes and prevents further oxidation to carboxylic acids.



25. The reaction



can be classified as :

- a) dehydration reaction    b) Williamson alcohol synthesis reaction    **c) Williamson ether synthesis reaction**  
d) alcohol formation reaction.

**Solution : -**

The treatment of sodium alkoxide with a suitable alkyl halide to form an ether is called as Williamson ether synthesis reaction.

26. Which one of the following will not form a yellow precipitate on heating with an alkaline solution of iodine?

- a)  $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$     b)  $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$     **c)  $\text{CH}_3\text{OH}$**     d)  $\text{CH}_3\text{CH}_2\text{OH}$

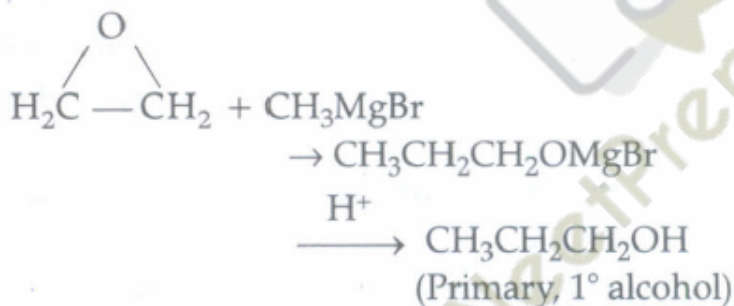
**Solution : -**

Iodoform test is exhibited by ethyl alcohol, acetaldehyde, acetone, methyl ketones and those alcohols which possess ( $\text{CH}_3 - \underset{\text{OH}}{\text{CH}}$ ) group.

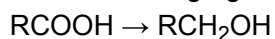
27. Ethylene oxide when treated with Grignard reagent yields:

- a) primary alcohol**    b) secondary alcohol    c) tertiary alcohol    d) cyclopropyl alcohol

**Solution : -**

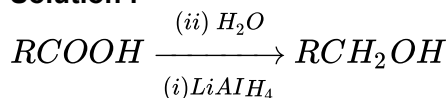


28. Which reducing agent is used for the following conversion?



- a)  $\text{LiAlH}_4$**     b)  $\text{NaBH}_4$     c)  $\text{K}_2\text{Cr}_2\text{O}_7$     d)  $\text{KMnO}_4$

**Solution : -**



29. Which one of the following compounds is resistant to nucleophilic attack by hydroxyl ions?

- a) Diethyl ether**    b) Acetonitrile    c) Acetamide    d) Methyl acetate

**Solution : -**

Diethyl ether is a saturated compound, so it is resistant to nucleophilic attack by a hydroxyl ion  $\text{OH}^-$ .

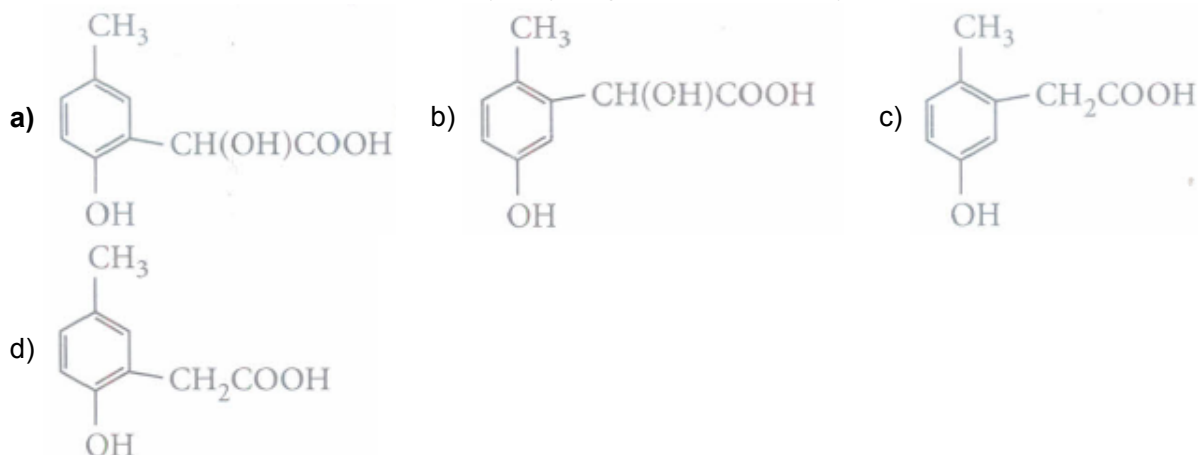
Others have unsaturated 'C' atoms which bears partial +ve charge, therefore they undergo easy nucleophilic attack by  $\text{OH}^-$  ion.

Diethyl ether  $\Rightarrow$   $C_2H_5O - C_2H_5$  (Saturated)

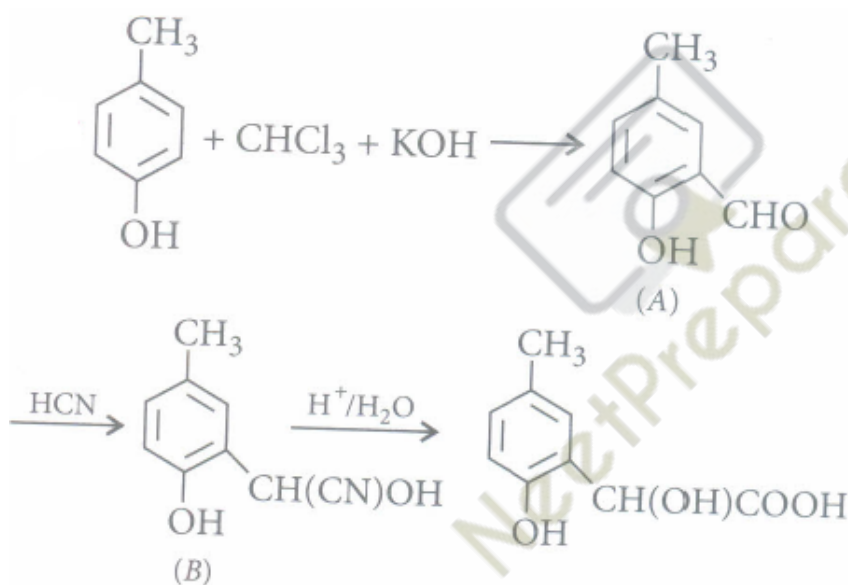
Acetonitrile  $\Rightarrow$   $CH_3 - C \equiv N$

Methyl acetate  $\Rightarrow$   $CH_3 - \overset{\overset{O}{\parallel}}{C} - NH_2$

30. p-Cresol reacts with chloroform in alkaline medium to give the compound A which adds hydrogen cyanide to form the compound B. The latter on acidic hydrolysis gives chiral carboxylic acid. The structure of the carboxylic acid is

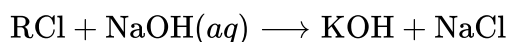


**Solution : -**



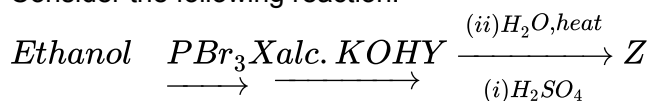
31. The alkyl halide is converted into an alcohol by \_\_\_\_\_ .  
 a) Addition    **b) Substitution**    c) Dehydrohalogenation    d) Elimination

**Solution : -**



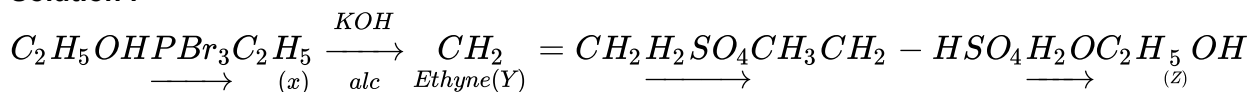
It is an example of nucleophilic substitution reaction.

32. Consider the following reaction:



- a)  $CH_3CH_2O - CH_2 - CH_3$     b)  $CH_3 - CH_2 - SO_3H$     **c)  $CH_3CH_2OH$**     d)  $CH_2 = CH_2$

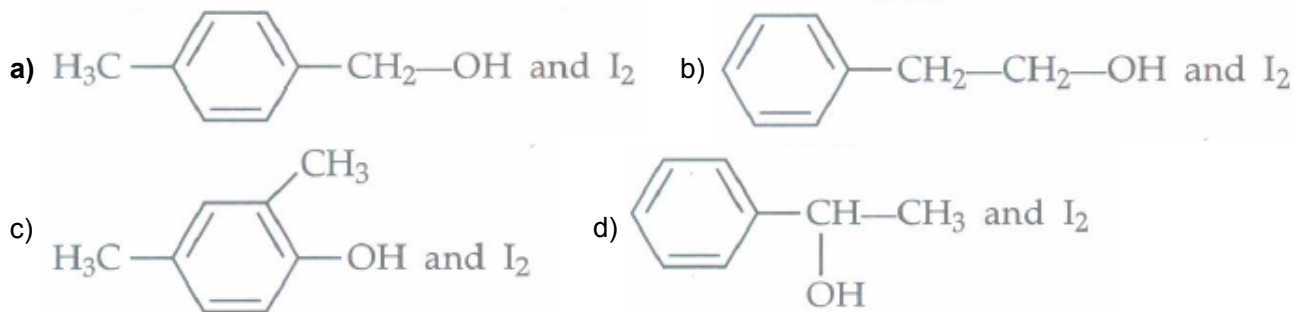
**Solution : -**



Hence Z is ethanol.

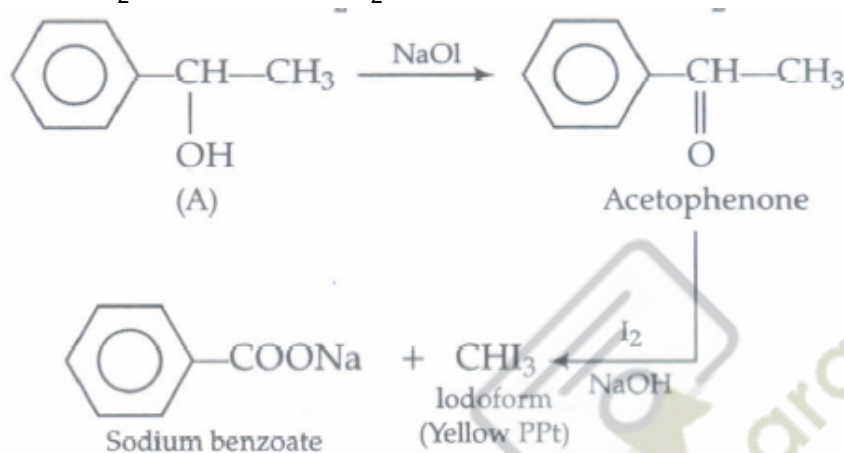


33. Compound A,  $C_8H_{10}O$ , is found to react with NaOI (produced by reacting Y with NaOH) and yields a yellow precipitate with characteristic smell. A and Y are respectively.



**Solution : -**

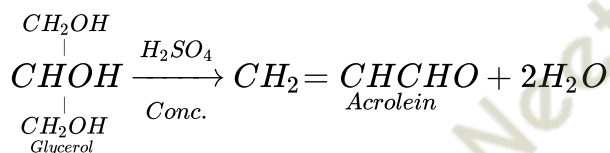
Option (A) is secondary alcohol which on oxidation gives phenylmethyl ketone (Acetophenone). This one reaction with  $I_2$  and NaOH form iodoform and sodium benzoate.



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

- a) **acrolein**    b) formic acid    c) allyl alcohol    d) glycerol sulphate

**Solution : -**



35. Match the column I with column II and mark the appropriate choice

Column I	Column II
(A) Hydrolysis of benzene diazonium chloride	(i) p-Cresol
(B) Phenol + methyl chloride in presence of anh. $AlCl_3$	(ii) Salicylic acid
(C) Reaction of sodium phenoxide with $CO_2$	(iii) Picric acid
(D) Phenol + Conc. $HNO_3$	(iv) Phenol

- a) (A)  $\rightarrow$  (i), (B)  $\rightarrow$  (iii), (C)  $\rightarrow$  (ii), (D)  $\rightarrow$  (iv)    b) (A)  $\rightarrow$  (ii), (B)  $\rightarrow$  (iii), (C)  $\rightarrow$  (iv), (D)  $\rightarrow$  (i)  
c) (A)  $\rightarrow$  (iv), (B)  $\rightarrow$  (i), (C)  $\rightarrow$  (ii), (D)  $\rightarrow$  (iii)    d) (A)  $\rightarrow$  (iii), (B)  $\rightarrow$  (iv), (C)  $\rightarrow$  (i), (D)  $\rightarrow$  (ii)

36. What is formed when a primary alcohol undergoes catalytic dehydrogenation?

- a) **Aldehyde**    b) Ketone    c) Alkene    d) Acid

**Solution : -**

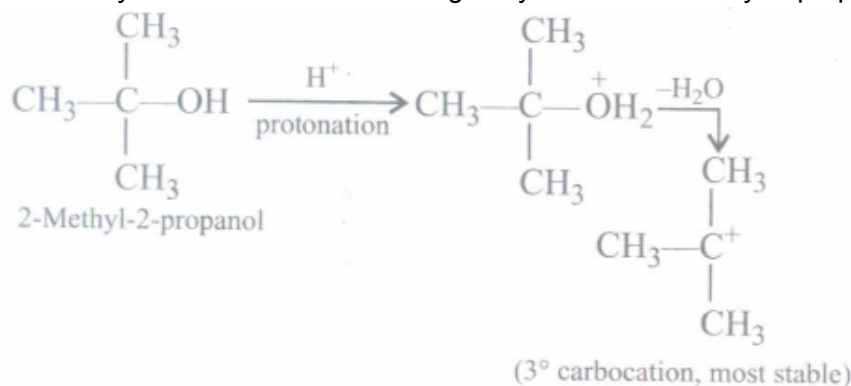
Primary alcohol undergoes catalytic dehydrogenation to give aldehyde.

37. Which of the following alcohols will give the most stable carbocation during dehydration?

- a) 2-Methyl-1-propanol    **b) 2-Methyl-2-propanol**    c) 1-Butanol    d) 2-Butanol

**Solution :-**

The tertiary carbocation formed during dehydration of 2-methyl-2-propanol is most stable



38. 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) III > II > IV > I    b) II > III > I > IV    c) II > III > IV > I    d) III > IV > II > I

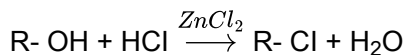
**Solution :-**

As we know that phenols and carboxylic acids are more acidic than aliphatic alcohols thus cyclohexanol is least acidic. On the other hand III is more acidic than IV because of the presence of three highly electron withdrawing NO<sub>2</sub> groups on the benzene ring which makes the OH bond extremely polarized. This facilitates the release of H<sup>+</sup>. In acetic acid the electron withdrawing  $\text{C}(=\text{O})$  group polarizes the O-H bond and increases the acid

strength. Thus, acetic acid is more acidic than phenol or cyclohexanol.

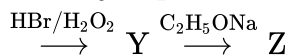
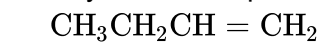
Thus, the order of acidic strength will be III > II > IV > I.

39. What is the correct order of reactivity of alcohols in the following reaction?



- a) 1° > 2° > 3°    b) 1° < 2° > 3°    c) 3° > 2° > 1°    d) 3° > 1° > 2°

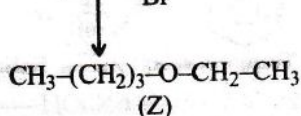
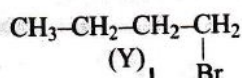
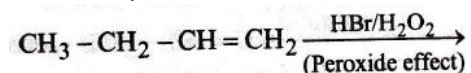
40. Identify Z in the sequence of reactions:



- a) (CH<sub>3</sub>)<sub>3</sub>CH-O-CH<sub>2</sub>CH<sub>3</sub>    b) (CH<sub>3</sub>)<sub>2</sub>CH-O-CH<sub>2</sub>CH<sub>3</sub>    c) CH<sub>3</sub>(CH<sub>2</sub>)<sub>4</sub>-O-CH<sub>3</sub>  
 d) CH<sub>3</sub>CH<sub>2</sub>-CH(CH<sub>3</sub>)-O-CH<sub>2</sub>CH<sub>3</sub>

**Solution :-**

Given sequence of reaction,



41. Assertion: Catalytic reduction of butanal gives butanol.

Reason: Aldehydes on reduction give corresponding primary alcohols.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.  
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.  
 c) If assertion is true but reason is false.    d) If both assertion and reason are false.

42. 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)  $C_nH_{2n}O$    d)  $C_nH_{2n+1}O$

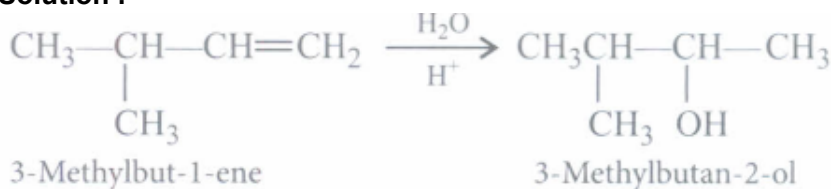
**Solution :** -

All alcohols follow the general formula as  $C_nH_{2n+2}O$ .

43. The best method to prepare 3-methylbutan-2-ol from 3-methylbut-1-ene is

- a) **addition of water in presence of dil.  $H_2SO_4$**    b) addition of HCl followed by reaction with dil. NaOH  
c) hydroboration - oxidation reaction   d) Reimer-Tiemann reaction.

**Solution :** -



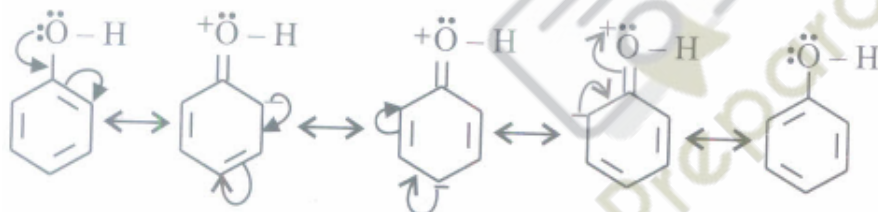
The addition of  $H_2O$  in presence of acid takes place according to Markovnikov's rule.

44. Out of benzene and phenol, phenol is more easily nitrated because

- a) **presence of -OH group in phenol increases the electron density at ortho and para-position**  
b) presence of -OH group in phenol decreases the electron density at ortho and para-position  
c) nitration being electrophilic substitution requires less density at ortho and para-position  
d) phenol is more reactive than benzene due to -R effect.

**Solution :** -

Phenol is more easily nitrated than benzene as the presence of -OH group in phenol increases the electron density at ortho and para-positions in benzene ring by +R effect.



45. Ethanol and dimethyl ether form a pair of functional isomers. The boiling point of ethanol is higher than that of dimethyl ether, due to the presence of:

- a) **H-bonding in ethanol**   b) H-bonding in dimethyl ether   c)  $CH_3$  group in ethanol  
d)  $CH_3$  group in dimethyl ether.

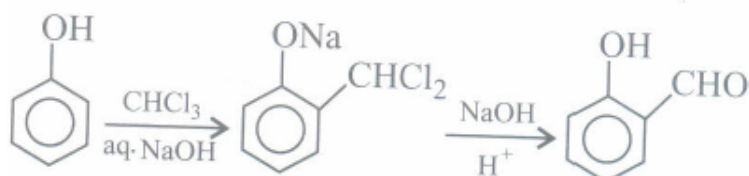
**Solution :** -

The boiling point of ethanol is higher than that of dimethyl ether due to presence of intermolecular hydrogen bonding in ethanol.

46. The reaction between phenol and chloroform in the presence of aqueous NaOH is

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

**Solution :** -



This reaction is Reimer-Tiemann reaction and it is an electrophilic substitution reaction.

47. Assertion Anisole undergoes electrophilic substitution at ortho and para-positions.

Reason: Anisole is less reactive than phenol towards electrophilic substitution reactions.

- a) If both assertion and reason are true and reason is the correct explanation of assertion.  
 b) If both assertion and reason are true but reason is not the correct explanation of assertion.  
 c) **If assertion is true but reason is false.** d) If both assertion and reason are false.

**Solution : -**

Methoxy group in anisole is ortho, para directing and activates the aromatic ring towards electrophilic substitution in the same way as in phenol.

48. Which of the following compounds can be used as antifreeze in automobile radiators?

- a) Methyl alcohols b) **Glycol** c) Nitrophenol d) Ethyl alcohols

**Solution : -**

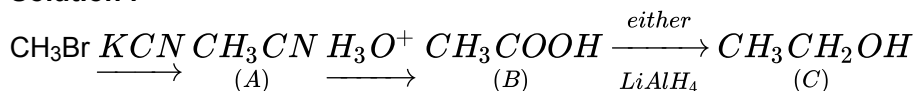
Glycol is chemical commonly used in many commercial and industrial applications including anti-freeze and coolant.

49. In the following sequence of reactions

$\text{CH}_3\text{Br} \xrightarrow{\text{KCN}} \text{A} \xrightarrow{\text{H}_3\text{O}^+} \text{B} \xrightarrow{\text{LiAlH}_4} \text{C}$  the end product (C) is:

- a) acetone b) methane c) acetaldehyde d) **ethyl alcohol**

**Solution : -**



50. Which of the following is most acidic?

- a) Benzyl alcohol b) Cyclohexanol c) Phenol d) **m-Chlorophenol**

**Solution : -**

Halogens have both +R and -I effect, but the -I effect predominates over the +R-effect. Therefore, m-Chlorophenol is most acidic due to electron withdrawing -Cl group. Alcohols are less acidic than phenol.