Alcohol, Phenol and Ether

SET Self Evaluation Test - 26

1. $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow{PBr_3} A \xrightarrow{Mg} B \xrightarrow[CH_2-CH_2]{O} C \xrightarrow{H_2O} D$ Here, D is **[BVP 2004]**

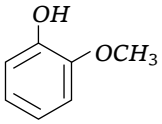
(a) $CH_3-\underset{\underset{CH_3}{|}}{CH}-O-CH_2-CH_3$

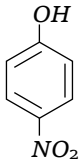
(b) $CH_3-O-\underset{\underset{CH_3}{|}}{CH}-CH_2CH_3$

(c) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2CH_2OH$

(d) $CH_3-CH_2-\underset{\underset{CH_3}{|}}{CH}-CH_2OH$

2. Phenol is more acidic than **[Pb. CET 2003]**

(a) 

(b) 

(c) C_2H_2 (d) Both (a) and (c)

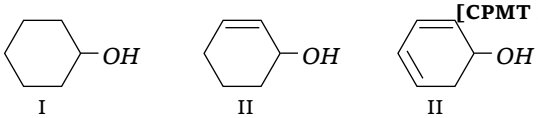
3. In the reaction,

$C_6H_5CHO+(CH_3CO)_2O \xrightarrow{CH_3COONa} (A)$ product (A) is **[Pb. CET 2000]**

(a) Acetaldehyde (b) Cinnamic acid

(c) β-nephthol (d) Phenol

4. The correct order of ease of dehydration of following is **[CPMT 2004]**



I II II

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

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

5. PCl_5 reacts with a compound containing **[Pb. CET 2002]**

(a) $-SO_3$ group (b) – OH group

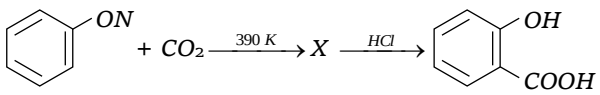
(c) $-NO_3$ group (d) – NO group

6. Cumene process is the most important commercial method for the manufacture of phenol. Cumene is **[KCET 2004]**

(a) 1-methyl ethyl benzene (b) Ethyl benzene

(c) Vinyl benzene (d) Propyl benzene

7. The compound X in the reaction **[Roorkee 1999]**



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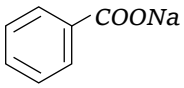
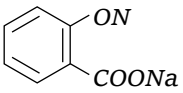
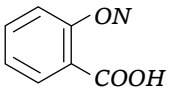
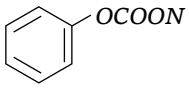
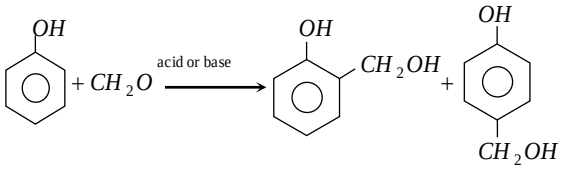
(a)  (b) 

(c)  (d) 

8. Reaction



is called **[MP PET 2003]**

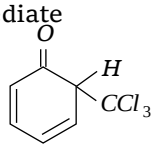
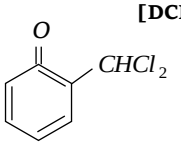
(a) Lederer Manasse reaction

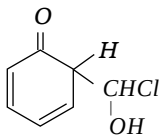
(b) Claisen condensation

(c) Benzoin condensation

(d) Etard reaction

9. When phenol is reacted with $CHCl_3$ and $NaOH$ followed by acidification, salicyldehyde is obtained. Which of the following species are involved in the above mentioned reaction as inter mediate **[DCE 2000]**

(a)  (b) 

(c)  (d) All of these

10. The order of solubility of alkanols in water is

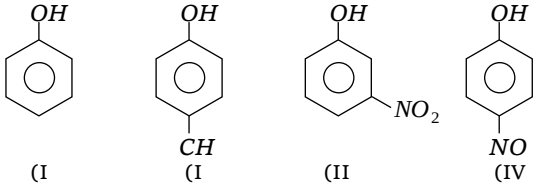
(a) Propanol < Butanol > Pentanol

(b) Propanol > Butanol > Pentanol

(c) Propanol > Butanol < Pentanol

(d) Propanol = Butanol = Pentanol

11. In the following compounds



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The order of acidity is **[IIT-JEE 1996]**

(a) $III > IV > I > II$ (b) $I > IV > III > II$

(c) $II > I > III > IV$ (d) $IV > III > I > II$

12. Butanal with dilute *NaOH* gives **[UPSEAT 2000]**

(a) $CH_3CH_2CH_2\underset{\underset{H}{|}}{\overset{\overset{OH}{|}}{C}}CH_2CH_2CH_2CH_2CHO$

(b) $CH_3CH_2CH_2\overset{\overset{O}{\|}}{C}CH_2CH_2CH_2CHO$

(c) $OHCCH_2CH_2CH_2CH_2CH_2CH_2CHO$

(d) $CH_3CH_2CH_2\overset{\overset{OH}{|}}{C}-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_2}{|}}{CH}}CHO$

13. The correct order of the solubility of the different alcohols in water is **[Pune CET 1998]**

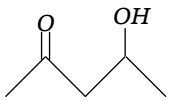
(a) *n*-propyl alcohol > ethyl alcohol > *n*-butyl alcohol

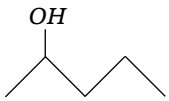
(b) Ethyl alcohol > *n*-butyl alcohol > *n*-propyl alcohol

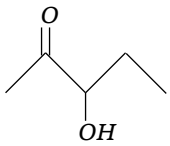
(c) *n*-butyl alcohol > *n*-propyl alcohol > ethyl alcohol

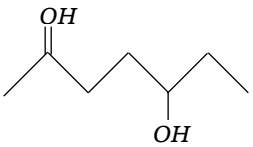
(d) Ethanol > *n*-propanol > *n*-butyl alcohol

14. Which one of the following will most readily be dehydrated in acidic condition **[IIT-JEE (Screening) 2000]**

(a) 

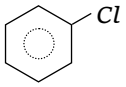
(b) 

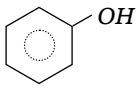
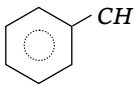




(c) (d)

15. Which of the following compounds will be most easily attacked by an electrophile **[CBSE PMT 1998, 99]**

(a)  (b) 

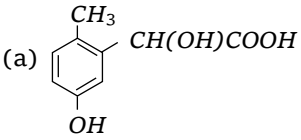
(c)  (d) 

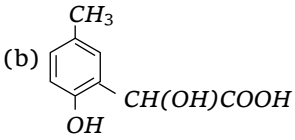
16. Fittig's reaction produces

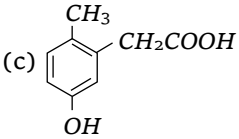
(a) Alkane (b) Alcohol

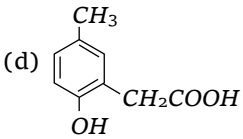
(c) Diphenyl (d) Diethyl ether

17. 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 **[AIEEE 2005]**

(a) 

(b) 

(c) 

(d) 

Answers and Solutions

(SET -26)

1. (c) The reaction sequence is as follows

$$CH_3-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow{PBr_3} CH_3-\underset{\underset{Br}{|}}{CH}-CH_3 \xrightarrow{Mg}$$

2 propanol

[A]

$$CH_3-\underset{\underset{[B]}{|}}{\overset{\overset{CH_3}{|}}{CH}}-MgBr \xrightarrow{\overset{O}{\diagup\diagdown}\ CH_2-CH_2}$$

$$(CH_3)_2CH.CH_2CH_2OMgBr \xrightarrow[-Mg(OH)Br]{H_2O} (CH_3)_2CH.CH_2CH_2OH$$

[C] [D]

isopentyla lcohol or 3 methyl butcane 2-ol

2. (d) Methoxy group due to $+I$ effect increase electron density on OH – group, thus making it less acidic. Thus *o*-methoxy phenol and acetylene are less acidic than phenol, *p*-nitrophenol is more acidic than phenol

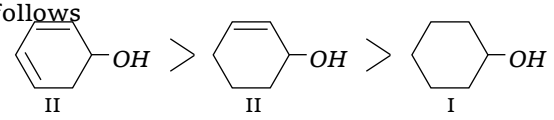
3. (b) Perkin reaction is the condensation reaction in which an aromatic aldehyde is heated with an aromatic aldehyde is heated with an anhydride of an aliphatic acid in presence of sodium salt of same acid to form α, β unsaturated acid.

$$\underset{\text{Benzaldehy de}}{C_6H_5CHO} + \underset{\text{acetic anhy dride}}{(CH_3CO)_2O} \xrightarrow{CH_3COONa}$$

$$C_6H_5CH=CHCOOH + CH_3COOH$$

cinnamic acid acetic acid

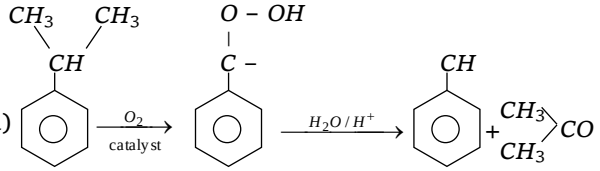
4. (b) The correct order of stability of carbocation is as follows



II II I

5. (b) PCl_5 is used in organic chemistry to replace the $-OH$ group by $-Cl$ and carbonylic oxygen by $(-Cl_2)$.

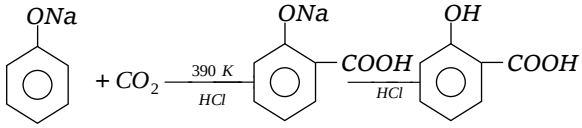
6. (a)



Cumene or 1, methyl ethyl

Pheno Aceton

7. (b)



It is Kolbe's reaction.

8. (a) It is Lederer Manasse reaction.

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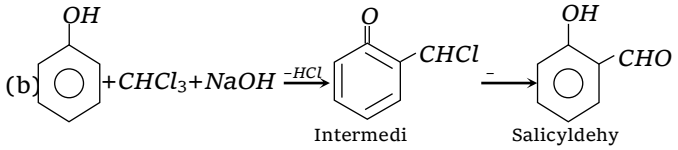
9. (b)



Intermedi Salicyldehy

10. (b) Propanol > Butanol> Pentanol

The solubility of alcohols in water decreases as the molecular mass increases. As the size of alkyl group increases, hydrophobic character increases, Hence solubility decreases.

11. (d) IV > III > I > II.

$-NO_2$ group is electron withdrawing group while $-CH_3$ group is electron releasing group.

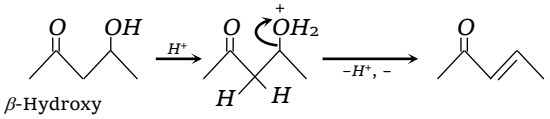
12. (d) $2CH_3-CH_2-CH_2-CHO + \text{dil. } NaOH \rightarrow$

$$CH_3CH_2CH_2-\underset{\underset{H}{|}}{\overset{\overset{OH}{|}}{C}}-\overset{\overset{CHO}{|}}{CH}-CH_2-CH_3$$

13. (d) Ethanol > *n*-propanol > *n*-butyl alcohol

Solubility of alcohols in water decreases as the size of alkyl group increases because tendency to form hydrogen bonding decreases.

14. (a) Aldols (β-hydroxy aldehydes or β-hydroxy ketones) readily undergo dehydration to form α, β-unsaturated aldehydes or ketones.



β-Hydroxy

15. (c) Phenol is most easily attacked by an electrophile because presence of $-OH$ group increases electron density at *o*- and *p*-positions.

16. (c) $2C_6H_5Cl + 2Na \xrightarrow[\text{ether}]{\text{Dry}} \underset{\text{diphenyl}}{C_6H_5 - C_6H_5} + 2NaCl$

17. (b)