

# CHEMISTRY

# **BOOKS - GR BATHLA & SONS CHEMISTRY (HINGLISH)**

# **ALCOHOLS AND ETHERS**

Level 1 (Q.1 To Q.25)

**1.** An alkene obtained by the dehydration of an alcohol (A), on ozolysis gives two molecules of acetaldegyde for ever molecule of alkene. The alcohol (A) is

A.  $CH_3CH_2CH_2OH$ 

 $\mathsf{B.}\, CH_3 CH_2 OH$ 

 $\mathsf{C.}\,CH_3CH=CHCH_2OH$ 

D.  $CH_3CH_2CHCH_3$ 

# Answer: D



**2.**  $R 
ightarrow COOH 
ightarrow R 
ightarrow CH_2OH.$  This mode of reductoin of an acid to

alcohol can be effected by:

A. Zn/HCl

B. Na-alcohoi

C. Aluminium isopropoxide and isopropyl alcohol

D.  $LiAlH_4$ 

Answer: D

**3.** Find the major product of the following reaction.



# Answer: A



**4.** What is product of the followin reaction:



# Answer: C

5. Perdict product of the following reaction,



A.  $CH_3 - CH_2 - OH$ 

B. No reaction

$$\stackrel{O}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}{\overset{\scriptstyleee}{\overset{\scriptstyleee}{\overset{\scriptstyleee}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}{\overset{\scriptstyleee}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}{\overset{\scriptstyleee}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\:ee}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\scriptstyleee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}}{\overset{\:ee}}{\overset{\:ee}}}{\overset{\:ee}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{ee}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{ee}}}{\overset{ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{\:ee}}}{\overset{ee}}}}{\overset{ee}}}}{\overset{ee}}}{$$

$$\mathsf{D}.\,H_2C=CH_2$$

#### Answer: B



6. 1-propanol and 2-propanol can be best distinguished by:

A. oxidation with alkaline  $KMnO_4$  followed by reaction with Fehling's

solution

B. oxidation with alkaline dichromate followed by reaction with

Fehling's solution

C. oxidation by heating with copper followed by reaction with

Fehling's solution

D. oxidation with alkaline  $H_2SO_4$  followed by reaction with Fehling's solution

### Answer: C

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7. On heating glycerol with  $KHSO_4/\Delta$ , a compound is obtained, which

has a bad odour. The compound is:

A. Acrolein

B. Formic acid

C. Allyl alcohol

D. Methyl isocyanide

Answer: A

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**8.** A compound X with moleuclar formula  $C_3H_8O$  can be oxidized to a compoud Y with the molecular formula  $C_3H_6O_2$ . X is most likely to be a:

A. primary alcohol

B. secondary alcohol

C. aldehuyde

D. ketone

Answer: A

9. Identify (Z) in the following series.

$$Ethanol \stackrel{PBr_{3}}{\longrightarrow} (X) \stackrel{Alc. \ / \ KOH}{\longrightarrow} (Y) \stackrel{(i) \ H_{2}SO_{4} \ / \ ( ext{Room temp})}{(ii) \ (H_{2}O, Heat)} \ (Z)$$

A.  $C_2 = CH_2$ 

B.  $CH_3CH_2OH$ 

 $\mathsf{C.}\,CH_3-CH_2-O-CH_2-CH_3$ 

D.  $CH_3 - CH_2 - SO_3H$ 

#### Answer: B

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10. Which one of the following is not the characteristic of alcohols?

A. Their noiling points rise fiarly uniformly with a rise in molecular

weight

B. Lower member have a pleasant smell but buring taste nad the

higher ones are odourless and tasteless

- C. These are lighter than water
- D. Lower member are insoluble in water and organicn solvents bu the

solublity goes on increasing with the rise of molecular weight

#### Answer: D





D. a or b

Answer: D



12. Find the product of reaction



1. NaBH<sub>4</sub>, CH<sub>3</sub>OH

2. Dilute  $H^{\oplus}$ ,  $\Delta$ 







Answer: B

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**13.** 2-Phenylbutan-2-ol can eb prepared by which of the following combinations?

A.  $C_6H_5COCH_3+C_2H_5MgBr$ 

 $\mathsf{B.}\, C_2H_5COCH_3+C_6H_5MgBr$ 

C.  $C_6H_5COC_2H_5+CH_3MgBr$ 

D. All of these

Answer: D

14. Predict tha nature of reducing agent in the following reaction.



A.  $LiAlH_4$ 

B.  $NaBH_4$ 

 $\mathsf{C.}\,H_2\,/\,Pt$ 

D. Both a and c

## Answer: C

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**15.** The correct structure for compound B will be:

$$(i) \quad PBr_3 \longrightarrow [A] \xrightarrow{CH_3CH_2CHO} [B]$$



## Answer: B



16. Find the product of following reaction,







# Answer: C

17. 
$$CH_3 - CH_2 - Br \xrightarrow{DryAg_2O}$$
 Product of reaction is:

A. 
$$CH_3 - CH_2 - OH$$

B. 
$$H_2C=CH_2$$
  
 $O_{||}$   
C.  $CH_3-\overset{||}{C}=H$ 

$$\mathsf{D}.\,CH_3-CH_2-O-CH_2-CH_3$$

# Answer: D

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**18.** The product when glyerol reacts  $PCl_5$  is:

A. 1,2,3-trichoropropane

B. glycero monochlorophydrin

C. glycero dichlorohydrin

D. All of these

Answer: A

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**19.** Glycerol  $\xrightarrow{KHSO_4} A \xrightarrow{LiAlH_4} B$ .

A. Acrolein, allylm, alcohol

B. glyceryl, sulphate, acrylic acid

C. allyl alcohol, acrolein

D. only acrolein (B is not formed)

#### Answer: A







A.  $(i)Cu,\,300^{\,\circ}C-(ii)CH_3CH_2MgBr,\,H_3O^{\,+}$ 

 $\mathsf{B.}\left(i\right)CrO_{3}-(ii)CH_{3}CH_{2}MgBr,H_{3}O^{+}$ 

C.  $(i)KMnO_4-(ii)CH_3CH_2MgBr, H_3O^+$ 

D.  $(i)Na_2Cr_2O_7+H_2SO_4-(ii)CH_3CH_2MgBr,H_3O^+$ 

#### Answer: A



22.

can be effected using:

A.  $LiAlH_4$  and  $thenH^+$ 

B.  $NaBH_4$  and  $thenH^+$ 

C.  $H_2 \,/\, Pt$  carbon

D. All of these

Answer: A



A.  $CH_3CHCH_2OH$ 

- $\mathsf{B.}\, CH_3 CH_3 CH_2 CH_2 OH$
- C. No reaction

D.

Answer: C

# 24. Find the final product of the reaction





Level 1 (Q.26 To Q.50)

**1.** An organic amine (X) was treated with alcoholic potast and another compound (Y), a foul smelling gas ws formed with formula  $C_6H_5NC$ , (Y) was formed by reacting a compound (Z) with  $Cl_2$  in the presence of slaked lime. The compound (Z) is:

A.  $C_6H_5NH_2$ 

 $\mathsf{B.}\, C_2 H_2 OH$ 

 $\mathsf{C.}\, C_2 H_2 OH$ 

D.  $CHCl_3$ 

#### Answer: B

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**2.** An alcohol (A) on hehydraton gives (B), which on ozonalysis gives acetone and formaldehyde, (B) decolurieses alkanine  $KMNO_4$  solution but (A) does not (A) and (B) are respectively:

A.  $CH_3CH_2CH_2CH_2OH$  and  $CH_2CH_2CH = CH_2$ 

 $\texttt{B}. \ CH_3CH_2 - CH - CH_2 \ \text{ and } \ CH_2 - CH = CH = CH_2 \\ | \\ OH \ \end{pmatrix}$ 

 $C. (CH_3)_3 C - OH \text{ and } (CH_3)_2 C = CH_2$ 

D.  $(CH_3)_3CHCH_2 - OH$  and  $(CH_3)_2C = CH_2$ 

#### Answer: C









# Answer: C



**4.** If phenol1 magnesium bromide and acetaldehyde are the reactants, the product formed after hydrolysis would be:

A. benzyl alcohol

**B. 1-Phenylethanol** 

C. 2-Phenylethonal

D. Acetone

#### Answer: B





A.  $CH_3CH_2CH_2MgBr$  and hydrolysis

B.  $CH_3CH(Br)CH_3$ .  $AlCl_3$ 

C.  $(CH_3)_2 CHMgBr$  and acid hydrolysis

D.  $CH_3CHCHCH_3, Zn$ 









#### Answer: B

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8. Which of the following reactions is possiblw?

# A. $C_6H_5OH + HBr ightarrow C_6H_5Br + H_2O$

$$\mathsf{B.} \left( CH_3 \right)_3 CCl + NaOCH_3 \rightarrow \left( CH_3 \right)_3 COCH_3 + NaCl$$

C. (c) 
$$+ CH_{3ONa} \xrightarrow{CH_{3ON}} CH_{CH}$$

(d) 
$$\bigvee_{(ii)} \xrightarrow{(ii) C_6H_3MgBr} C_6H_3CH_2C(CH_3)_2$$
  
(iii)  $H_2O$  OH

#### Answer: D

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9.

$$H_3C-egin{array}{c} CH_3\ dots\ CH_3\ \dots\ CH_3\ \d$$

A.  $BH_3/THF, H_2O_2/OH^{-}$ 

B.  $H_3O^-$ 

C.  $Hg(OAc)_2 / NaBH_4, NaOH$ 

D. All of these

# Answer: C



Answer: B

11.  $CH_3CH = CH_2 \xrightarrow[H_2O_2/OH]{NaBD_4}$  Product X, X is: A.  $CH_3CHCH_2D$  OHB.  $CH_3CHCH_2OH$  DC.  $CH_3CHCH_3$  ODD. None is correct

Answer: B

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12. Identify end product A,B and C of the following:

A.  $CH_3CHCH_3$ in all cases  $\downarrow$  OHB.  $CH_3CH(OH)CH_2D$ ,  $CH_3CH(OD)CH_3CH(OD)CH_2D$ C.  $CH_3CHCH_3$ in all cases

ÔD

D.  $CH_3 \mathop{C}_{|H} HCH_3 D$ in all cases  $\stackrel{|}{_{OH}}$ 

#### Answer: B



Answer: A

14. 
$$H_3C - \overset{CH_3}{\overset{|}{C}}_{CH_3} - CH = CH_2 
ightarrow H_3C - \overset{CH_3}{\overset{|}{C}}_{CH_3} - CH - CH_3.$$
 This  $\overset{CH_3}{\overset{|}{CH_3}}_{CH_3} OH$ 

change can be done by.

A. acid catalysed hydration

B. oxymercuation-demercuation

C. hyrdroboration-oxidation

D. any method mentioned above

### Answer: B

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**15.** 
$$CH_3CHCH_3 \xrightarrow[Br]{alc. / KOH} A \xrightarrow[HBr//peroxide]{HBr//peroxide} B \xrightarrow[CH_3Na]{CH_3Na} C$$

In the above reaction sequence, the final product is:

A. diethyl ether

B. 1-methoxypropane

C. isopropyl alcohol

D. propylene glycol

#### Answer: B

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16. Sodium teritary butoxide forms ether only with:

**T**7

B. 
$$CH_3 - X$$
  
 $CH$   
C.  $H_3C - CH - CH_3$   
D.  $H_3C - CH - CH_3$ 

$$H_3C-CH-CH_3 egin{array}{c} ert \ ert \$$

# Answer: B



# 17. In the give reaction

$$\begin{array}{c} H_{3}C\\ \hline C = CH - CH_{3} \xrightarrow{(i) Hg(OAc)_{2}/CH_{3}OH} [X],\\ H_{3}C \end{array}$$

$$\begin{array}{c} \stackrel{OMe}{=} \\ \text{A. } H_3C - \stackrel{O}{\overset{O}{\underset{CH_3}{CH_3}} - CH_2 - CH_3 \\ & \stackrel{OMe}{=} \\ \text{B. } H_3C - \stackrel{O}{\underset{CH_3}{CH_3}} - \stackrel{OH_2}{\underset{CH_3}{CH_2}} - CH_3 \\ \text{C. } H_3C - \stackrel{O}{\underset{CH_3}{CH_3}} - CH_2 - CH_3 \\ \text{D. } H_3C - \stackrel{OH}{\underset{CH_3}{OH}} - CH_2 - CH_3 \\ \end{array}$$

# Answer: A





A.  $LiAlH_4$  and  $NaBH_4$ B.  $LiAl\frac{H_4}{A}lCl_3$  and  $LiAlH_4$ C.  $LiAlH_4$  and  $LiAl\frac{H_4}{A}lCl_3$ D.  $H_2/Ni$  and  $H_2/Pt$ 

#### Answer: C

**19.** Choose the correct product for the following reaction :



#### Answer: B




#### Answer: A



21. Which of the following reactions is possible?

A.  $C_6H_5OH + HBr 
ightarrow C_6H_5Br + H_2O$ 

$$\mathsf{B}.\,(CH_3)_3CCl + NaOCH_3 \rightarrow (CH_3)_3COCH_3 + NaCl$$

C. (c) 
$$C_{1+CH_{3}ONa} \xrightarrow{CH_{0}OH} C_{1+CH_{3}ONa}$$

(d) 
$$\bigvee_{C_6H_5MgBr} \xrightarrow{H_3O^*} C_6H_5CH_2C(CH_3)_2$$
  
OH

#### Answer: D



 $\mathsf{C.}\,CH_3CH_2CH_2OH$ 

$$\mathsf{D}.\,HO-CH_2-CH_2-CH_2-CH_2-OH$$



23. What is Z in the following sequence of reactions?

 $Z \stackrel{PCl_3}{\longrightarrow} X \stackrel{alc\,.\,KOH}{\longrightarrow} Y \stackrel{(\,i\,)\,Conc\,.\,H_2SO_4}{(\,ii\,)\,H_2Oboil} Z$ 

A.  $H_2C = CH - CH_2 - OH$ 

B.  $CH_3CHOHCH_3$ 

 $C.(CH_3CH_2)COOH$ 

D.  $CH_3CH = CH_2$ 

#### Answer: B



A. 
$$H_3C-CH-CH_2-CH=CH_2-CH_3$$
 $\overset{|}{}_{OMe}$ B.  $H_3C-CH-CH_2-C\equiv C-CH_3$ 

C. 
$$H_3C - CH - CH_2 - C \equiv C - CH_3$$
  
 $OH$   
D. (d)  $H_3C - CH - CH - CH - CH - CH - CH_3$ 

### Answer: B



| 0Me

25. Which of the following reagents cannot be used for the oxidation of

 $1^{\circ}$  alcohol aldehyde?

A. PCC

B. Collin's reagent

 $\mathsf{C}.MnO_2$ 

D.  $MnO_2$ 

Answer: D

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Level 2 (Q.1 To Q.25)



A and B respectively:



### Answer: B

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Which of the following is best set of reagents to performs to the above

conversion?

A.  $ThO_2,\Delta$ 

B.  $H_3PO_4,\Delta$ 

C.  $Conc. H_2SO_4, \Delta$ 

# D. $Al_2O_3,\Delta$

Answer: A







#### Answer: B



$$\textbf{4.} 2Ph - \overset{O}{\overset{||}{C}} - CH_3 \xrightarrow{Mg - Hg} \xrightarrow{Conc. H_2SO_4} \xrightarrow{KMnO_4, H^{\oplus}}$$

# The final product is

A.  $(a) CH_3 - C - C - CH_3$   $(b) CH_3 - C - C - CH_3$  $(b) CH_3 - C - C - CH_3$ 





$${f 5.2Ph}- \mathop{C}\limits_{\substack{||\ O}} - {CH_3} \stackrel{Mg-Hg}{\longrightarrow} \stackrel{Dil\,.\,H_2SO_4}{\longrightarrow} Product$$

The main product is









6.

# The final product A is:







Β.

**C.** (c)  $Ph_3P = CHCH_2CH_3$ ;  $B_2H_6$ ,  $H_2O_2$ ,  $\stackrel{\Theta}{OH}$ 

HO

 $\textbf{D.} (d) Ph_3P = CHCH_2CH_3; H_2SO_4, H_2O$ 

## Answer: A

8. Which of the following sets of reagents would accomplish the following

# conversation



C.



D.

Answer: C

**9.** An organic compound A (Molecular formula  $C_6H_{12}O_4$ ) on treatment with Na metal liberates  $H_2$  gas and on treatment with  $HIO_4$  gives 2 moles of  $CH_3CHO$ , HCOOH(1mole) and  $CO_2(1mole)$ . Find the structure on A.

A.





C.



#### Answer: D



10. An organic compound A (Molecular formula  $C_6H_{12}O_4$ )does not change the colour of acidic dichromate solution. Compound A on treatment with  $H_2SO_4$  produces alkene, which on oxiative ozonolysis gives a molecule  $(C_6H_{10}O_3)$  which gives positive iodoform test. Find the structure of 'A'.



#### Answer: D







-OH group is substituted by -Br. The slowest step is dehydration. Which of the following is correct comparison of rate constant  $K_1$  and  $K_2$ ?

A.  $k_1=k_2$ 

 $\mathsf{B.}\,k_1>k_2$ 

 $\mathsf{C}.\,k_1 < k_2$ 

D. cannot be predict

### Answer: C



The molecule A in the sequence reaction is



#### Answer: D









Product A and B respectively :



### Answer: C





# Answer: A

16. The releative rate or acid catalyssed dehydration of following alcohols

would be:

$$(P) Ph - \bigcup_{OH}^{CH_3} - CH - CH_3$$

$$(Q) Ph - \bigcup_{OH}^{CH_3} - CH_2 - CH_2 - OH$$

$$(Q) Ph - \bigcup_{CH_3}^{CH_3} - CH_2 - CH_2 - OH$$

$$(R) Ph - - \bigcup_{OH}^{CH_3} - CH_2 CH_3$$

$$(R) Ph - - \bigcup_{OH}^{CH_3} - CH_2 OH$$

$$(CH_3) - CH_2 OH$$

### Answer: A

17. Which of the following alcohols will show positive iodoforms test?

D. None is correct

# Answer: C



18. In the given reaction

$$(A) \xrightarrow{CH_3} \xrightarrow{B_2H_6} \xrightarrow{TsCl} \xrightarrow{Me_3CO^{\ominus}K^{\oplus}} (B)$$

The product B is:

A. Identical to B

B. Chain isomer of A

C. a positional isomer of 'A'

D. reduced product of A

### Answer: C







Answer: B





20.

The final product is :

A. (a) (a) (b) (b)







### Answer: D





22.

The final product is :



### Answer: B







(c) CH<sub>2</sub>CH<sub>3</sub> OCH<sub>2</sub>CH<sub>3</sub>



# Answer: A





Answer: A

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Level 2 (Q.26 To Q.50)



The final product is :







C.



D.

# Answer: B





The final product is :



### Answer: C



3. Which of the following reacts fastest with HBr?









Answer: D

D.

Β.

C.

4. The order of reactivity of the following alcohols towards HCl is :



### Answer: C





A. I > II > III

 $\mathsf{B}.\, I < II < III$ 

 $\mathsf{C}.\,II>III>I$ 

D. II > I > III

### Answer: C

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6. Degydration of the following alcohols will be in order:



#### Answer: C
**7.** Which of the following reactions proceeds with retention of configuration?



#### Answer: A







## Answer: B

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## Answer: A







# Answer: C







Identify product D in this reaction





## Answer: A

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14. In the given reaction

 $\xrightarrow{H^{\oplus}/H_2O} (P)$ O-CH<sub>2</sub>CH<sub>3</sub>

P will be:



## Answer: B





15.

'X' will be



D. All of these

## Answer: A







## Answer: B





'X' will be



## Answer: C





The above reaction is known as:

# A. Clemmensen reduction

**B.** Birch reduction





## Answer: B

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The major product obtained in this reaction is:







# Answer: A













## Answer: C

D.





## Answer: A



# Answer: B







Answer: C







#### Answer: B

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# Level 2 (Q.51 To Q.75)









C.

D. None of thses

# Answer: C







D.

# Answer: A





Answer: D

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#### Answer: C









## Answer: A

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**6.** When ethylene glycol is heated with oxalic acid in this presence of conc.

 $H_2SO_4$ , the product formed is:



## Answer: A



7. An organic compoun having molecular formula  $C_3H_6O$  does not react with 2,4-dintrophenol hydrazine and does not react Na metal. The compound is expected to be:

A.  $CH_3CH_2CHO$ 

B.  $CH_3COCH_3$ 

 $\mathsf{C}.\,CH_2=CH-CH_2-OH$ 

 $\mathsf{D}.\,CH_2=CH-O-CH_3$ 

#### Answer: D

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8. Which of the following statements is correct?

A. Phenol is less acidic than ethanol

B. Phenol is more acidic than ethanol

C. Phenol is more acidic than p-nitrophenol

D. Phenol is more acidic than acetic acid

#### Answer: B



**9.** The vapour of an alcohol X are passed over Cy heated at  $300^{\circ}C$  whereby an alkene is formed as prduct . The alcohol X is expected to be:









11.

The major product formed in the reaction is:

A.  $(CH_3)_3C-Br+(CH_3)_3COK
ightarrow$ 

 $\begin{array}{l} \mathsf{B.}\left(CH_3\right)_3C-OH \xrightarrow[140^\circ C]{}\\ \overset{H_2SO_4}{\xrightarrow{}}\\ \mathsf{C.}\left(CH_3\right)_3C-OH \xrightarrow[240^\circ C]{}\\ \end{array}$ 

D. overset

#### Answer: D

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**12.** When-2-chloroethenol is wanted with dilute NaOH, the major product formed is:

A. 
$$Cl - CH_2 - CH_2 - O - CH_2 - CH_2 - Cl$$

 $\mathsf{B}.\,HO-CH_2-CH_2-CH_2-CH_2-OH$ 

$$\mathsf{C}.\,HO-CH_2-CH_2-OH$$



#### Answer: D



with conc.  $H_2SO_4$  gives mainly:





**14.** Which of the following reaction would give the best yield of t- butyl methly ether ?

$$\begin{array}{l} \mathsf{A.} (CH_3)_3 C - OH \xrightarrow[140^\circ C]{}\\ \mathsf{B.} (CH_3)_3 C - Br + CH_3 OH \rightarrow \\ \mathsf{C.} (CH_3)_3 C - Br + CH_3 ONa \rightarrow \\ \mathsf{D.} (CH_3)_3 C - \overset{\Theta}{CK} + CH_3 Br \rightarrow \end{array}$$

#### Answer: D



**15.** Consider the following reactions:

$$CH_3 - CH_2 \xrightarrow[H_2O, \Delta]{NaOH} A \xrightarrow[H_2O, \Delta]{NaH} B, B + CH_2 - CH_2 
ightarrow CH_2 \cap H_2 \cap H_2$$

The major product formed is:





Answer: D



reaction



The major product formed is:







## Answer: C



17. The major product formed in the reaction is"




#### Answer: B



18. Consider the following reaction

$$H_2C = CH - CH_2CH_2 - OH \stackrel{Br_2/\mathit{CCl}_4}{\longrightarrow} A \stackrel{Dil\,.\,KOH}{ ag{25^\circ}C} B$$

The product B is:





Answer: D

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**19.** Find out correct product of reaction:



 $\mathsf{B.}\,CH_2+CH_2$ 



D. CH\_(3)CH\_(2)OH`

Answer: C



# 21. In the reaction



The product X has the structure"

$$\begin{array}{c} CH_{3} \\ \mathsf{A}.\ H_{3}C - \overset{|}{\overset{OCH_{3}}{C}} - CH_{2}OH \\ \overset{OCH_{3}}{\overset{OCH_{3}}{CH_{3}}} \\ \mathsf{B}.\ H_{3}C - \overset{|}{\overset{OH}{C}} - CH_{2} - OCH_{3} \\ \overset{|}{\overset{OH}{CH_{3}}} \\ \mathsf{C}.\ H_{3}C - \overset{|}{\overset{C}{C}} - CH_{3} \\ \overset{|}{\overset{OCH_{3}}{CH_{3}}} \\ \mathsf{D}.\ CH_{3}C - \overset{|}{\overset{C}{C}} - CH_{2} - OCH_{3} \end{array}$$

#### Answer: A

22. Consider the following sequence of reactions



#### Answer: B



23. In the reaction:

 $Me_{3}C - O - CH_{2}CH_{3} + HI_{1 ext{ mole}} \xrightarrow{\Delta}$ A.  $Me_{3}C - OH + CH_{3}CH_{2}I$ B.  $Me_{3}C - I + CH_{3}CH_{2}OH$ C.  $Me_{3}C - I + CH_{3}CH_{2}I$ D.  $Me_{3}C - OH + CH_{3}CH_{2}OH$ 

#### Answer: B

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**24.** Which of the following ethers ethers is the most unreactive to cleavage with conc. HBr?

A. 
$$Ph-CH_2-O-CH_3$$

 $\mathsf{B}. Ph - O - Ph$ 





Answer: B





**Major Product:** 



Β.



## Answer: C



Level 2 (Q.76 To Q.100)

1. The product of the reaction is:





#### Answer: A

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**2.** Which of the following reactions will not result in the formatio of anisole?

A.   
(a) 
$$\bigcirc$$
  $OH + (CH_3)_2SO_4 \xrightarrow{NaOH}$   
B. (a)  $\bigcirc$   $OH + (CH_3)_2SO_4 \xrightarrow{NaOH}$ 

C. (c) 
$$OH + CH_2N_2 \rightarrow OH + CH_3N_2 \rightarrow OH + CH_3M_3$$

#### Answer: D







# Answer: A





# A. $B_2 H_6 \,/\, H_2 O$

## B. $LiAIH_4$

# $\mathsf{C.}\,CH_{3}OH\,/\,Na$

# D. P/HI

#### Answer: A



# A. $B_2H_6$

B.  $LiAlH_4$ 

 $\mathsf{C.}\,Sn\,/\,HCl$ 

D.  $NaBH_4$ 

Answer: B





#### Answer: D

7. The major product formed in the reaction is"



## Answer: C





#### Answer: A





Product B of the above reaction is:



D.

### Answer: B

**10.** Find out the product when compound reacts with  $NaBH_4$ :





Answer: B





11.

Find out X:





### Answer: C







# Answer: A





X, Product is:







OH

# Answer: C

Et O 
$$\xrightarrow{O}$$
  $\xrightarrow{O}$   $\xrightarrow{$ 

Which of the following is best set of reagents to performs to the above conversion?

A.  $LiAlH_4$ 

B.  $NaBH_4$ 

 $\mathsf{C.}\,K_2Cr_2O_7$ 

D. None of these

Answer: B



Product of the reaction is:

A. 
$$Ph - \overset{*}{C}H_2 - CH_2 - SH_2$$

B. 
$$Ph - CH_2 - \overset{*}{C}H_2 - SH$$

C. Both of these

D. None of these

### Answer: C



This conversion can be carried out by:

A.  $H_2SO_4$  /  $\Delta,$   $HIO_4$ 

B.  $NaIO_4, H^{\oplus}$  /  $\Delta$ 

 $\mathsf{C}.HIO_4, NaBH_4$ 

D.  $H^{\oplus}$  / De < s, Zn(Hg - HCl)

#### Answer: C



17. Which of the following alcohols will show positive iodoforms test?



В. 📄

 $\mathsf{C}.\,CH_3-CH_2-OH$ 



## Answer: C





Major product obtained in this reaction is:









**20.** Reduction of  $R - CH_2OH - RCH_3$  can be carried out by:

A.  $LiAlH_4$ 

 $\mathsf{B}.\,H_2-Ni$ 

 $\mathsf{C}. \operatorname{Red} P + HI$ 

D.  $NaBH_4 / AlCl_3$ 

Answer: C

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the following is major product?







D. None of these

## Answer: A

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**22.** Which of the following ethers will get hydrolysed by  $H^{\oplus}$  /  $H_2O$  ?





#### Answer: D



# 23. Which of the following alcohols will not react with $Cu\,/\,\Delta$

A. 
$$CH_3 - CH_2 - OH$$
  
 $Ph$   
B.  $Ph - C$   
 $Ph$   
 $CH_3$   
C.  $H_3C - C$   
 $CH_3$   
 $H_3C - C$   
 $CH_3$   
 $H_3C - OH$   
 $CH_3$   
 $CH_3$ 

## Answer: B





## Answer: A

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# Level 2 (Q.101 To Q.125)



acetone gives.





A. K and L

B. Only K

C. L and M

D. Only M

Answer: A

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2.

identify 'P' in the reaction:







# Answer: C








# Answer: C





identify 'P' in the reaction:







# Answer: C





identify 'P' in the reaction:





Answer: D





identify 'P' in the reaction:





Answer: B



7. Identify the major product of the following reation:





### Answer: A

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# 8. Find the correct method for the following conversion:



B. Conc.  $H_2SO_4, \Delta$ 

 $\mathsf{C}.\,H^{\,\oplus}\,,HBr$ 

D. None of these

Answer: C

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**9.** Which combination of reagents will bring about the following conversion?



A. MeMgBr /  $H^{\oplus}$  ,  $H_2SO_4$  /  $\Delta$  , HBr /  $H_2O_2$ 

B. MeMgBr /  $H^{\oplus}$  ,  $H_2SO_4$  /  $\Delta$  , HBr

C.  $MeMgBr/H^{\oplus}, HBr/CCl_4$ 

D.  $HBr/H_2O_2, MeMgBr/H^{\oplus}$ 

# Answer: A



10. Which of the following alcohols will undergo easiest dehgydration?



### Answer: D

11. The reactio of HBr with the followin compound would produce



### Answer: B



# 12. In the following

 $Me_2C=CH-CH_2-CH=CH_2+C_6H_5CO_3H( ext{1equiv.}) 
ightarrow X,Xis$ 



### Answer: C



13. The most steam volatile species is:









# Answer: A

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14. In the Libermann nitroso reaction, change in the colour of phenol

occur as:

A. Brown or red green red deep blue

B. Red deep blue green

C. Red brown white

D. White red green

Answer: B

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15. The alcohol which is most readily dehydrated is:

A. 2-butanol

B. 1-phenyl-1-propanol





### Answer: B



**16.** A compound  $P(C_7H_8O)$  is insouble in water, dilute HCl,  $NaHCO_3$ but dissolve in dilute NaOH. When P is treated with bromine water, it is converted into a compound of formula  $C_7H_7Obr$ . Compound P is:







D.

# Answer: C



17. In the following sequence of reaction

$$\bigcirc -CH = CH - CH_3 + Hg (CH_3COO)_2 \xrightarrow{CH_3OH} X, X \text{ is}$$

A. (a)  $CH_2$   $CH_2$   $CH_2$   $CH_3$ 







### Answer: C





of the reaction is:



# Answer: B

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**19.** When

treated with proton acid, a resonance stablized cation is produced. Which dience listed below when treated with acid will give the same carbocation?





### Answer: B

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20. Which of the following would undergo most rapid hydrolysis with aqueous to furnish the corresponding hydroxy derivatives?







21.

Find out 'A' of the reaction:



# Answer: C



**22.** Identify the major product of the following reation:



23. Find the product of the following reaction with sterechemistry.



### Answer: C

24. Select the major product of the following reaction:



#### Answer: D



1. What would be the major product of the following reaction?



D. None of these

### Answer: A

**2.** Find out the major product of the following reaction:



D. No reaction

#### Answer: B



#### Answer: C

4. What would be the major product of the following reaction?



#### Answer: B



The unexpected product B is:







# Answer: C

6. The final product in the following reaction is :





### 7. How many structure of final products are possible?



### Answer: B

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# More Than One Correct (Q.1 To Q.25)

1. Chosse the correct statements regarding the following reaction:



- A. Syn addition of -H (from  $BH_3$ ) and -OH (from solution) occur.
- B. Syn addition of -H (from  $BH_3$ ) and -OH (from  $H_2O_2$ ) occur.
- C. The product is optically active.
- D. Addition follows anti Markownikoff orientation

### Answer: A::C





Which of the following are possible are possible products in significant amounts?





Which of the following represent conditions to perfoem given conversation?

A.  $POCl_3$ , pyridine

B.  $Na - metal, CS_2heat$ 

D.  $CF_3SO_2Cl$ , pryidine,  $Me_3CO^{\Theta}K^{\oplus}$ 

#### Answer: B::C::D

**4.** Which of the following alcohols do not give white turbidity on treatment  $HCl/ZnCl_2$ ?

A.  $CH_3CH_2OH$ 

$$\mathbf{B.}^{(b)} \longrightarrow \mathbf{CH}_2 - \mathbf{OH}$$

C. 
$$N=C-CH-OH$$

# Answer: A::C

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5. Which of the followin wil give iodoform?

A.  $CH_3CH_2OH$ 

$$\overset{OH}{\stackrel{}{\mid}}{\mathsf{B}}.\,CH_3-\overset{OH}{CH}-Ph$$



### Answer: A::B::D

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6. which of the following ethers will get hydrolysed by HI?



### Answer: C::D



# 7. Which of the following reactions are correctly matched?

$$\begin{array}{c} CH_3 \\ \mathsf{A}.\,CH_3 & - \overset{|}{\underset{CH_3}{UH}} - O - CH_3 \xrightarrow{HI} S_N 1 \\ \\ \overset{|}{\underset{CH_3}{UH}} \\ \mathsf{B}.\,CH_3 & - \overset{|}{\underset{CH_3}{UH}} - O - CH_3 \xrightarrow{H^{\oplus} / H_2 O} S_N 1 \\ \\ \\ \mathsf{C}.\,CH_3 & - \overset{|}{\underset{CH_3}{UH}} - O - CH_3 \xrightarrow{HI} S_N 2 \\ \\ \\ \\ \mathsf{D}.\,CH_3 - O - CH_2 \xrightarrow{HI} S_N 1 \end{array}$$

### Answer: A::B::C



8. Which of the following compounds will give positive Victor Meyer test?

A.  $CH_3CH_2OH$ 



#### Answer: A::C::D

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**9.** Which of the followin alcohols undergo rearrangement during degydration reaction?


#### Answer: A::B::D



## Answer: B::D



A.  $\bigcirc$   $-CH_2I$ B.  $\bigcirc$   $-CH_2OH$ C.  $\bigcirc$   $-CH_2OH$ 



12. Which of the following reactions will give ether as main product?



Answer: A::D

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13.  $C_2H_5Br$  can be converted into  $C_2H_5 - O - C_2H_5$  by:

A. reacting by  $C_2H_5ONa$ 

B. heating with moist  $Ag_2O$ 

C. heating with dry  $Ag_2O$ 

D. treating with  $C_2H_5MgBr$ 

Answer: A::C

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14.  $1^{\circ}, 2^{\circ} \, \mathrm{and} \, 3^{\circ}$  alcohols can be distinguished by:

A.  $Cu\,/\,573K$ 

B. Victor Meyer test

C.  $ZnCl_2 / HCl$ 

D.  $Br_2 + H_2O$ 

Answer: A::B::C

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**15.** Alcohols can be replaced by-Cl group by the followin reagents:

A.  $Cl_2$ 

 $\mathsf{B.} SOCl_2$ 

 $C. PCl_5$ 

 $\mathsf{D}.\,HCl+ZnCl_2$ 

Answer: B::C::D

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16. Glycerol can be converted to acrolein by dehydration in presence of

A. Conc.  $H_2SO_4$ 

B.  $KHSO_4$ 

 $C. CaCl_2$ 

D. Anhyd.  $ZnCl_2$ 

## Answer: A::B



**17.**  $CH_3CH_2 - OH$  can be converted to  $CH_3CH_2CN$  by the following reaction:

$$\begin{array}{l} \mathsf{A.} CH_{3}CH_{2}OH + KCN \xrightarrow{\Delta} \\ \mathsf{B.} CH_{3}CH_{2}OH + HCN \xrightarrow{\Delta} \\ \mathsf{C.} CH_{3}CH_{2}OH + HCN \xrightarrow{TsCl} \overset{KCl}{\longrightarrow} \\ \mathsf{D.} CH_{3}CH_{2}OH + HCN \xrightarrow{SOCl_{2}} \overset{KCN}{\longrightarrow} \end{array}$$

#### Answer: C::D



18. Which of the following will oxidise to salt of acid by  $Br_2 + KOH$ ?

A.  $CH_3 - CH_2 - OH$ 



#### Answer: A::B







## Answer: A::B







## Answer: A::B::C







Answer: A::B::C



Β.





## Answer: B::C::D



 $\ensuremath{\textbf{23.}}$  Find the final product A ,B ,C,D of the reaction and choose correct

option

$$\underbrace{\begin{array}{c} \text{OH} \\ \hline \\ \text{dil. acetone} \end{array}}_{\text{dil. acetone}} A \xrightarrow{\text{CH}_3\text{MgBr}}_{\text{H}^{\oplus}/\text{H}_2\text{O}} B \xrightarrow{\text{H}_2\text{SO}_4}_{\Delta} C \xrightarrow{\text{B}_2\text{H}_6}_{\text{H}_2\text{O}_2^{\ominus} \text{OH}} D$$



Β.





## Answer: C::D





24.



## Answer: A::C

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#### Answer: A::B::C::D



More Than One Correct (Q.26 To Q.50)



#### Answer: A::B::C







# Answer: A::C::D





A. *Dsi*CH\_(3)-CH=CH\_(2)`

B. E is  $CH_2 - CH_2 - CH_2 - OH$ 

C. FisCH\_(3)underset(OH)underset(|)(CH)-CH\_(3)`

D. B is  $CH_3CH_2CI$ 

#### Answer: A,B,C,D

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A.  $AisH_2C = CH - CH_2CH_2OH$ 



#### Answer: A,B,D





$$A. (a) Z is$$

B. J is PhMgBr

C. 
$$CisHg^{2+} / H_2SO_4$$
  
(d) K is

#### Answer: A,B,C,D



**6.** Compound A is an optically active alcohol. Treatment with oxidising agent converts it to a ketone B. In a separate reaction A is treatment with  $PBr_3$ , converting it into C. C on reaction with Mg is added to B to yield



Identify the

correct option.

A. A is 2-butanol.

B. A is 1-butanol

C. C is 2-bromobutane

D. C is 1-bromobutane

## Answer: A,C

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7. Alcohol A  $(C_{10}H_{18}O)$  is converted into mixture of alkene B and C on heating with conc.  $H_3PO_4$ . Catalytic hydrogenation of B and C yields the same product. Assuming that dehydration of alcohol A proceed without rearrangement. Alkene B on ozonolysis form cyclopentanone. Identify the correct options.



#### Answer: A,B,D

**8.** A compound 'X'  $(C_{14}H_{14}O)$  on mild oxidation yields  $C_{14}H_{12}(Y)$ . If X is treated with a dehydratingg agent, it loses a molecule of  $H_2O$  and resulting product on vigoporus oxidation yields two molecule of benzoic acid. Identify the structure of X and Y.



#### Answer: B,C,D



**9.** Compounds A, B and C are isomeric alcohols with formula  $C_5H_{12}O$ . A

on oxidation given ketone, B gives acid while C is not oxidised, A gives

test with  $I_2/NaOH$ . The three isomerice alcohols react with HBr with decreasing rates C > A > B. Identify A and B.



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10. An optically active alcohol A  $(c_8H_{16}O)$  on oxidation gives B. A on heating gives  $C(C_8H_{14})$  as major product. C on ozonlysis produces  $D(C_5H_8O)$  and  $CH_3 - C - CH_3$ . D on reduction with  $LiAlH_4$  gave



Identify

correct answers.











#### Answer: A,C

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12. A  $3^{\circ}$  optically active alcohol  $C_9H_{18}O$  'A' on dehydration with conc.  $H_2SO_4$  produces  $B(C_9H_{16})$  which exists in two stereoisomeric forms. For ozonolysis of B followed by work up with  $Zn - H_2O$  produces  $CH_3 - C_{0} - H$  and  $C(C_7H_{12}O)$ . C on treatment with  $LiAlH_4$  produces  $D(C_7H_{14}O)$ . D on hehydration produced



Identify the correct the correct answers.



## Answer: B::D



**13.** A  $(C_5H_{12}O)$  produces, on reaction  $PCl_5$  from alkyl chloride B and C. B and C both on reaction with aqueous KOH form alcohol D and E. Both D and E give iodoform test. Identify the correct answers.



#### Answer: A::B::D

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can be





## Answer: A::B



**15.** Among of the following gemdiols which are stable with respect to

corresponding carbonyls:



#### Answer: A::B::C::D



16. Which of the following reactions are correct





D.  $CH_3-C\equiv N \xrightarrow{LiAIH_4} CH_3CH_2NH_2$ 

Answer: A::C::D



17. Which of the following alcohols will give same alkene on reaction with

conc.



A.







## Answer: A::B::C



# 18. Which of the following reactions would produce same product?



C.  $\underbrace{\overset{OH}{\overbrace{}}}_{H^{\mathfrak{B}}_{2}O} \xrightarrow{CHCl_{3} + NaOH}_{H^{\mathfrak{B}}_{2}O}$ 

$$D. \xrightarrow{OH} \xrightarrow{HCN + ZnCl_2} \xrightarrow{HCN + ZnCl_2}$$

Answer: A::B



**19.** Which of the following compound are oxidised by  $HIO_4$ ?



(d) 
$$CH_2$$
—OH  
|  
 $CH_2$ —NH<sub>2</sub>

Answer: B::C::D



20. Which of the following esterification reactions are unimolecular?



## Answer: B::C::D





## 21. Which of the following reaction involve rearrangement?



## Answer: B::C::D



22. Which of the following paris can be distinguished by using Lucas

reagent?



## Answer: A::B::C



**23.** Which of the following compounds are soluble in  $NaHCO_3$ ?








### Answer: A::B::D

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24. Which of the following reactions are correctly interpreted?

A. (a) 
$$\rightarrow$$
 OH  $\xrightarrow{Is(1)}$   $\xrightarrow{KSH}$   $\rightarrow$  SH  
B.  $\xrightarrow{Hg(0, X_{0})_{2}}$   $\xrightarrow{Hg(0, X_{0})_{2}}$   $\xrightarrow{Hg(0, X_{0})_{3}}$   $\xrightarrow{Hg(0, X_{0})_{4}}$  OH



### Answer: A::C::D

**Niew Text Solution** 

**25.** Which of the following reagents can be used for identification of phenol?

A. Neutral  $FeCl_3$ 

B.  $NaNO_2 + HCl$ 

 $C. (NH_4)_2 [Ce(NO_3)_6]$ 

D.  $ZnCl_2 / HCl$ 

Answer: A::B::C

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**1.** Althought epoxides do not contain a good leaving group, they contains a strained three membered ring with polar bonds. Nucleophilic attack opens the strained three membered ring making it favorable process even with the poor leaving group.



This reaction occurs readily with strong nucleophilic , and with acids like

HZ, where Z is nucleophilic atom.



Find out the correct product of the reaction











### Answer: B



**2.** Althought epoxides do not contain a good leaving group, they contains a strained three membered ring with polar bonds. Nucleophilic attack opens the strained three membered ring making it favorable process even with the poor leaving group.



This reaction occurs readily with strong nucleophilic , and with acids like

#### HZ, where Z is nucleophilic atom.





What would be the major product of reaction?



### Answer: C

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**3.** Althought epoxides do not contain a good leaving group, they contains a strained three membered ring with polar bonds. Nucleophilic attack opens the strained three membered ring making it favorable process even with the poor leaving group.



This reaction occurs readily with strong nucleophilic , and with acids like

HZ, where Z is nucleophilic atom.



Find out major product of reaction:

A. 
$$Ph$$
  
C-CH<sub>2</sub>-CH<sub>2</sub>-OH  
H<sub>3</sub>C OCH<sub>3</sub>



D. None of these

#### Answer: A



**4.** 1,2-diols are oxidised to ketones or aldehydes by periodic acid  $HIO_4$ . Periodic acid reacts with dipol to form a cyclic intermeditate. The reaction takes places because iodine is in a highly positive oxidation state, so it readily accepts electrons. When the intermeidate breaks down, the bond between the two carbon bonded to the OH group break.



 $\xrightarrow{\text{Br}_2} A \xrightarrow{\text{alc. KOH}} B \xrightarrow{\text{OsO}_4} C \xrightarrow{\text{HIO}_4} D$ 

# Identify D.





Β.





D.

5. 1,2-diols are oxidised to ketones or aldehydes by periodic acid  $HIO_4$ . Periodic acid reacts with dipol to form a cyclic intermeditate. The reaction takes places because iodine is in a highly positive oxidation state, so it readily accepts electrons. When the intermeidate breaks down, the bond between the two carbon bonded to the OH group break.



Which of the following will not form by above reaction?

A. 
$$H-\overset{O}{\overset{||}{C}}-H$$

 $\mathsf{B.}\, CH_3OH$ 

 $\mathsf{C}.\,CO_2$ 

D. 
$$H-\overset{O}{\overset{||}{C}}-OH$$

#### Answer: B



**6.** 1,2-diols are oxidised to ketones or aldehydes by periodic acid  $HIO_4$ . Periodic acid reacts with dipol to form a cyclic intermeditate. The reaction takes places because iodine is in a highly positive oxidation state, so it readily accepts electrons. When the intermeidate breaks down, the bond between the two carbon bonded to the OH group break.



Which of the following compounds will not react with  $HIO_4$ ?



### Answer: C



**7.** Carbon oxygen double bond are easily reduced by  $NaBH_4$  or  $LiAlH_4$ .

The actual reducing agent in these reduction is hrdride ion  $\left( H^{\,-}
ight)$ 



The metal hydrogen bond in  $LiAlH_4$  is more than polar than metal hydrogen bond in  $NaBH_4$ . As a result  $LiAlH_4$  is strong reducing agent than  $NaBH_4$ . Esters, carboxylic acids, amides cannot be reduced by  $NaBH_4$ 

The carbonyl group of amide of reduced to methylene group by  $LiAlH_4$ Find the correct product of the following reaction:



D. No reaction

#### Answer: C

8. Carbon oxygen double bond are easily reduced by  $NaBH_4$  or  $LiAlH_4$ . The actual reducing agent in these reduction is hrdride ion  $(H^-)$ 



The metal hydrogen bond in  $LiAlH_4$  is more than polar than metal hydrogen bond in  $NaBH_4$ . As a result  $LiAlH_4$  is strong reducing agent than  $NaBH_4$ . Esters, carboxylic acids, amides cannot be reduced by  $NaBH_4$ 

The carbonyl group of amide of reduced to methylene group by  $LiAlH_4$ 







#### Answer: B



**9.** Carbon oxygen double bond are easily reduced by  $NaBH_4$  or  $LiAlH_4$ .

The actual reducing agent in these reduction is hrdride ion  $\left( H^{\,-}
ight)$ 



The metal hydrogen bond in  $LiAlH_4$  is more than polar than metal hydrogen bond in  $NaBH_4$ . As a result  $LiAlH_4$  is strong reducing agent than  $NaBH_4$ . Esters, carboxylic acids, amides cannot be reduced by  $NaBH_4$ 

The carbonyl group of amide of reduced to methylene group by  $LiAlH_4$ 

$$CH_3 \longrightarrow CH_2 \longrightarrow CH_2 \longrightarrow CH_2 \longrightarrow CH_2 \xrightarrow{\text{LiAlH}_4} Y'; \text{ Identify 'Y':}$$

$$\begin{array}{c} OD & OD \\ \downarrow \\ \mathsf{C}.\,CH_3 - \overset{|}{CH} - CH_2 - \overset{|}{OH} - CH_3 \\ OD & OD \\ \downarrow \\ \mathsf{D}.\,CH_3 - \overset{|}{CH} - CH_2 - \overset{|}{CH} - CH_3 \end{array}$$

Answer: D

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**10.** An organic compound (A) on treatment with  $CHCl_3$  and KOH gives (Y) and (Z) both of which in turn gives the same compound (T) when distilled with Zn. Oxidation of (T) Yields (S) of formula  $C_7H_6O_2$ . The sodium salt of (S) with sodalime gives (P) which can also be obtained by distilling (X).

The molecular weight of compound (X) is:

A. 122

B. 94

C. 106

D. 78

### Answer: B



**11.** An organic compound (A) on treatment with  $CHCl_3$  and KOH gives (Y) and (Z) both of which in turn gives the same compound (T) when distilled with Zn. Oxidation of (T) Yields (S) of formula  $C_7H_6O_2$ . The sodium salt of (S) with sodalime gives (P) which can also be obtained by distilling (X).

The compound (T) is





**12.** An organic compound (A) on treatment with  $CHCl_3$  and KOH gives (Y) and (Z) both of which in turn gives the same compound (T) when distilled with Zn. Oxidation of (T) Yields (S) of formula  $C_7H_6O_2$ . The sodium salt of (S) with sodalime gives (P) which can also be obtained by

distilling (X).

# Compounds (Y) and (Z) could be:



### Answer: B



**13.** A tertiary alcohol (H) upon acid-catalysed dehydration gives a product (I). Ozonolysis of (I) leads to compounds (J) and (K). Compound (J) upon reaction with KOH gives benzyl alcohol and a compound (L), whereas (K) on reaction with KOH gives only (M).



Compound (H) is formed by the reaction of:



#### Answer: B



**14.** A tertiary alcohol (H) upon acid-catalysed dehydration gives a product (I). Ozonolysis of (I) leads to compounds (J) and (K). Compound (J) upon reaction with KOH gives benzyl alcohol and a compound (L), whereas (K) on reaction with KOH gives only (M).



The structurer of compound (I) is:





### Answer: A



**15.** A tertiary alcohol (H) upon acid-catalysed dehydration gives a product (I). Ozonolysis of (I) leads to compounds (J) and (K). Compound (J) upon reaction with KOH gives benzyl alcohol and a compound (L), whereas (K) on reaction with KOH gives only (M).



The structures of compounds (J), (K), and (L), respectively, are:

$$Ph - \overset{O}{C} - CH_3, Ph - CH_2 - \overset{O}{C} - CH_3 \text{ and } Ph - CH_2 - \overset{O}{C} - O^{\Theta}$$

$$B. Ph - \overset{O}{C} - H, Ph - CH_2 - \overset{O}{C} - H \text{ and } Ph - \overset{O}{C} - O^{\Theta} K^{\oplus}$$

$$C. Ph - \overset{O}{C} - CH_3, Ph - CH_2 - \overset{O}{C} - H \text{ and } CH_3 - \overset{O}{C} - O^{\Theta} K^{\oplus}$$

$$D. Ph - \overset{O}{C} - H, Ph - \overset{O}{C} - CH_3 \text{ and } Ph - \overset{O}{C} - O^{\Theta} K^{\oplus}$$

#### Answer: D



16. Alcohols are converted to tosylates by treatment with p-toluence sulfonyl chloride (TsCl) in the presence of pyridine. This overall process converts a poor leaving group  $\begin{pmatrix} \Theta \\ H \end{pmatrix}$  into good one  $\begin{pmatrix} \Theta \\ Ts \end{pmatrix}$ . A tosylate is a good leaving group its conjugates acid p-touence sulfonic acid is strong acid. Beacuse alkyl tosylates have food leaving groups, they undergo both nucleophilic substitution and  $\beta$  – elimination.

A.



Find the major product of the following reaction:





#### Answer: C

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17. Alcohols are converted to tosylates by treatment with p-toluence sulfonyl chloride (TsCl) in the presence of pyridine. This overall process converts a poor leaving group  $\begin{pmatrix} \Theta \\ H \end{pmatrix}$  into good one  $\begin{pmatrix} \Theta \\ Ts \end{pmatrix}$ . A tosylate is a good leaving group its conjugates acid p-touence sulfonic acid is strong acid. Beacuse alkyl tosylates have food leaving groups, they undergo both nucleophilic substitution and  $\beta$  – elimination.



What would be the major product of the following reactions?



### Answer: A



**18.** Alcohols are converted to tosylates by treatment with p-toluence sulfonyl chloride (TsCl) in the presence of pyridine. This overall process

converts a poor leaving group  $\begin{pmatrix} \Theta \\ H \end{pmatrix}$  into good one  $\begin{pmatrix} \Theta \\ Ts \end{pmatrix}$ . A tosylate is a good leaving group its conjugates acid p-touence sulfonic acid is strong acid. Beacuse alkyl tosylates have food leaving groups, they undergo both nucleophilic substitution and  $\beta$  – elimination.



Idetify the final product of the following sequences of reactions:





### Answer: B



**19.** Acid catalysed conversation of 1,2-diol or vicinal, into carbonyl compound known as pinocaol-pinacolone rearrangement.



Generally more electron donating group migrate during mechanism, migration of H is faster because of its smaller size.

What would be the major product of reaction?





### Answer: C



**20.** Acid catalysed conversation of 1,2-diol or vicinal, into carbonyl compound known as pinocaol-pinacolone rearrangement.



Generally more electron donating group migrate during mechanism, migration of H is faster because of its smaller size.



In this sequence of reaction final product is"



### Answer: D

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**21.** Acid catalysed conversation of 1,2-diol or vicinal, into carbonyl





Generally more electron donating group migrate during mechanism, migration of H is faster because of its smaller size.

Which of the following is not correct about this rearrangement?



B. The carboncation is stabilised by 1,2-shift

C. Migration aptitude for substituent is in  $R-\ >H-\ >C_{6}H_{5}$ 

D. Product of reaction is carbonyl compound.

#### Answer: C

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22. Compound (A)  $C_{10}H_{22}O_2$  is insoluble in aq. NaOH bu not is  $NaHCO_3$ .

Treatment of (A) with DMSO 
$$\begin{pmatrix} S \\ ert ert ert \\ CH_3 - S - CH_3 \end{pmatrix}$$
 in alkali give (B)

 $C_{11}H_{14}O_2$ . Treatment of (A) with strong alkali alone give an isomeric compound (C). When (A) is reflux with HI,  $CH_3I$  is obtained, compound (B) is insoluble in alkali and decolurises  $Br_2/CCl_4$ . (B) on treating with strong base gives (D), an isomer of (B). Ozonolysis (C) of gives (E),  $C_8H_8O$ and isomer of vanilline. Ozolysis of (D) gives (F)  $C_9H_{10}O_3$ , which is identical with product of methylation of vanilline (4-hydroxy-3-methoxy benzaldehyde).

Structure of compound (A) is:





Β.





## Answer: C



23. Compound (A)  $C_{10}H_{22}O_2$  is insoluble in aq. NaOH bu not is  $NaHCO_3$ .

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Compound (B) is:






(d) H<sub>3</sub>CO 0-CH2-CH=CH2 D.

### Answer: B



24. Compound (A)  $C_{10}H_{22}O_2$  is insoluble in aq. NaOH bu not is  $NaHCO_3$ .

Treatment of (A) with DMSO  $\begin{pmatrix} S \\ | \ | \ CH_3 - S - CH_3 \end{pmatrix}$  in alkali give (B)

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Compound (E) and (F) are respectively:



### D. None of these

#### Answer: A



## **Match The Column**



(d) 
$$CH_3 - C - OH$$
  
 $CH_3 - C - OH$ 

### Column (II)

- *P*. White turbidity with HCl/ZnCl<sub>2</sub>
- Q. Violet colour with FeCl<sub>3</sub>
- $\tilde{R}$ . Colour change of Na<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>. H<sup> $\oplus$ </sup>
  - S.  $I_2 / O^{\odot} H$ , gives bright yellow ppt.

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## 3.

- (a) Fries rearrangement
- (b) Claisen rearrangement
- (c) Buyer-Viliger's rearrangement
- (d) Pinacole-Pinacolone

(P) Acid catalysed rearrangement

- $(Q) \quad {\rm Concerned \ with \ ester}$
- (R) Involve electrophilic substitut:
- (S) Intramolecular rearrangement

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- (a) Fries rearrangement
- (b) Claisen rearrangement
- (c) Bayer-Villiger's rearrangement
- (d) Pinacole-Pinacolone
- 4. rearrangement

- P. Acid catalysed rearrangement
- Q. Concerned with ester
- R. Involve electrophilic substitution
- S. Intramolecular rearrangement



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$$(c)\left(\left(\bigcirc_{N}\right)\right)_{2}\cdot CrO_{3}$$

- $P. \operatorname{KMnO}_4, \Delta, OH$
- Q. Collin's reagent
- R. Jone's reagent
- **5.** (d) Oxidation of alkyne into acid
- S. PCC

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# 6.

- (a) Identification of  $1^{\circ}, 2^{\circ}$  and  $3^{\circ}$  Alcohol (P) Oxyme
- $(b) \quad ext{Identification of 1}^{\,\circ}, 2^{\,\circ} \; ext{ and } \; 3^{\,\circ} ext{Nitroalkane} \qquad \qquad (Q) \quad Cu \,/\, 30$
- (c) Formation of alcohol by anti-Markownikoff's additioin (R) Victor
- (d) Formation of alcohol by Markownikoff's addition
- (S) Huydr

7.

 $((a), Phenol+Neutral FeCl_3, (P), No reaction), ((b), Phenol Br_2(aq.), (Q))$  $((d), \text{Picric acid} + NaHCO_3, (S), CO_2$ gas is envoled)





R. Alkyl oxygen bond cleavage

S. Acyl oxygen bond cleavage

8.

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**Integer Answer Type Problems** 

1. How many compounds A through G are enol tautomer of 2-butanone?





**2.** Consider the pairs of ethers A through F shown below. To the right of each pairs is a description of reaction conditions to be applied to each. One compound of the pair will react more rapidly than the other. Find out number of reactions in which first ether more rapidly cleaved than

second.



3. Find out number of moles of  $HIO_4$  that will react with following compund



CHOH CHOH CHOH CHOH CH<sub>2</sub>OH







6. 
$$R - CH_2 - OH \xrightarrow{?} R - CH_2 - Cl$$

find out the number that can be used for above conversion, from the

## following.



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**8.** Find out number of reagents that converts  $1(\circ)$  alcohols to aldehyde.

 $\begin{array}{c} \text{KMnO}_4 | H^{\textcircled{\bullet}} | \Delta \quad , \quad \text{K}_2 \text{Cr}_2 \Theta_7 | \text{Dil.} \quad \text{H}_2 \text{SO}_4 \quad , \quad \text{Ceric ammonium nitrate} \\ (A) & (B) & (C) \\ & (B) & (C) \\ & H_3 \text{C} \underbrace{-S}_{(D)} \text{CH}_3 (\text{DMSO}) \quad , \quad \left( \underbrace{-H_2 \Theta_7}_{(E)} \text{Cr}_2 \Theta_7^{-2} \quad , \quad \left( \underbrace{-H_2 \Theta_7}_{(E)} \text{Cr}_3 \right)_2 \text{Cr}_3 \\ & (E) & (E) \\ \end{array}$ 

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9. Find out number of alcohols that can give positive iodoform test.



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10. How many mole of HI racts with glycerol to give 2-iodopropane?





### **Subjective Type Problems**





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2. Find out final product of following reactions:



## **3.** Find out final product of following reactions:



6. Find out final product of following reactions:

Ph-
$$CH_2 - OH \xrightarrow{SOCl_2} \longrightarrow NaSH \longrightarrow NaOH \longrightarrow Ph--CH_2--Cl}$$
  
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7. Find out final product of following reactions:  
 $ightarrow - OH \xrightarrow{PBr_3} \longrightarrow Mg \longrightarrow DOD \longrightarrow THF$   
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8. Find out final product of following reactions:

$$\underbrace{\text{OH}} \xrightarrow{\text{KMnO}_4} \underbrace{\begin{array}{c} C_2H_5\text{OH} \\ H^{\oplus} \end{array}} \xrightarrow{\text{PhMgBr}} \\ H^{\oplus}/H_2\text{O} \end{array}$$

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9. Find out final product of following reactions:

