



CHEMISTRY

BOOKS - NCERT FINGERTIPS CHEMISTRY (HINGLISH)

ALCOHOLS, PHENOLS AND ETHERS

Classification

1. What type of isomerism exists between the following pairs of compounds ?

(i) Pentan-1-ol and 3-Methylbutan-1-ol

(ii) Ethanol and Dimethyl ether

(iii) Butan-1-ol and Butan-2-ol

A. (i) Chain isomerism (ii) Functional isomerism (iii) Position isomerism

B.

(i) Functional isomerism (ii) Chain isomerism (iii) Position isomerism

- | | | | |
|----|-----------------|--------------------|----------------------|
| | (i) | (ii) | (iii) |
| C. | Chain isomerism | Position isomerism | Functional isomerism |
| | (i) | (ii) | (iii) |
| D. | Chain isomerism | Position isomerism | Function isomerism |

Answer: A

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2. $C_2H_{12}O$ is a monohydric alcohol . How many isomers of this alcohol are possible ? How many of these contain chiral centres as well as can exhibit enantiomerism ?

- A. 8 and 3
- B. 6 and 2
- C. 4 and 2
- D. 12 and 4

Answer: A

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Nomenclature

1. IUPAC name of $CH_3CH_2CH_2 \underset{\substack{| \\ CH_2OH}}{C} H - CH_2CH_3$ is

- A. 3-propylbutan-1-ol
- B. 2-ethylpentan-1-ol
- C. 3-methyl hydroxyhexane
- D. 2-ethyl-2-propyl ethanol.

Answer: B

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2. A compound $C_6H_{14}O_2$ has two tertiary alcoholic groups . The IUPAC name of this compound is

- A. 2,3-dimethyl -1, 2 - butanediol

B. 3,3-dimethyl - 1 , 2 - butanediol

C. 2,3-dimethyl-2 , 3-butanediol

D. 2-methyl-2 , 3- pentanediol .

Answer: C



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3. Which of the following is phenol ?

A. Cresol

B. Catechol

C. Benzenol

D. All of these

Answer: D



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1. The C-O-C angle in ether is about

- A. 180°
- B. $190^\circ 28'$
- C. 110°
- D. 105°

Answer: C

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2. Why is the $C - O - H$ bond angle in alcohols slightly less than the tetrahedral angle whereas the C-O-C bond angle in ether is slightly greater?

- A. of repulsion between the two bulky R groups .

B. O atom in both alcohols and ethers is sp^3 -hybridised .

C. lone pair-lone pair repulsion is greater than bond pair - bond pair repulsion .

D. none of these

Answer: A

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Alcohols And Phenols

1. The best method to prepare 3-methylbutane-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 .

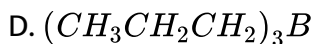
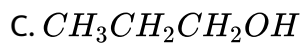
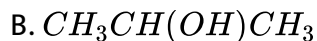
Answer: A



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2. An alkene $CH_3CH = CH_2$ is treated with B_2H_6 in presence of H_2O_2 .

The final product formed is

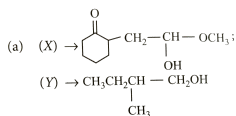
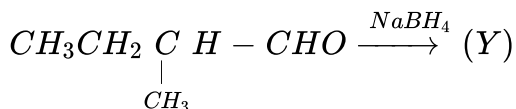
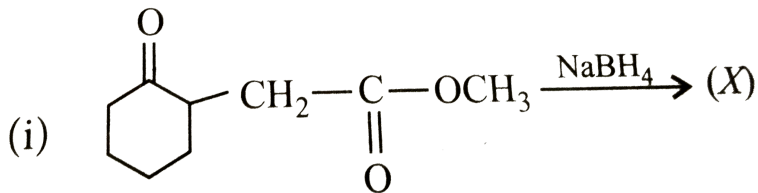


Answer: C

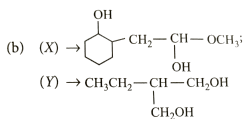


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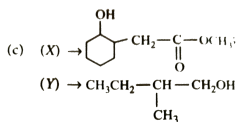
3. Choose the correct X and Y in the given reactions .



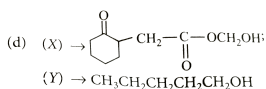
A.



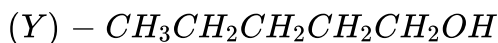
B.



C.



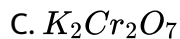
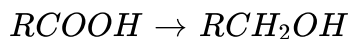
D.



Answer: C

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



Answer: A



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5. One mole of ethyl acetate on treatment with an excess of $LiAlH_4$ in dry ether and subsequent acidification produces

A. 1 mol acetic acid + 1 mol ethyl alcohol

B. 1 mol ethyl alcohol + 1 mol methyl alcohol

C. 2 moles of ethyl alcohol

D. 1 mol of 2-butanol .

Answer: C

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6. Tertiary butyl alcohol can be prepared by the reaction of

A. acetadehyde and ethyl magnesium iodide

B. acetone and methyl magnesium iodide

C. formaldehyde and propyl magnesium iodide

D. butanone and methyl magnesium iodide.

Answer: B

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7. 1-Phenylethanol can be prepared by the reaction of benzaldehyde with the product obtained in the reaction between :

- A. methyl bromide
- B. ethyl iodide and magnesium
- C. methyl iodide and magnesium
- D. methyl bromide and aluminium bromide .

Answer: C



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

- A. Propanal and proyl 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

Answer: D

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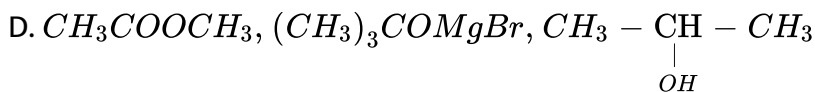
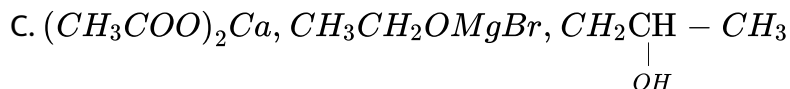
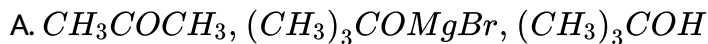
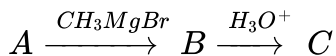
9. Reaction of propanone with methylmagnesium bromide followed by hydrolysis gives :-

- A. primary alcohol
- B. secondary alcohol
- C. tertiary alcohol
- D. carboxylic acid

Answer: C

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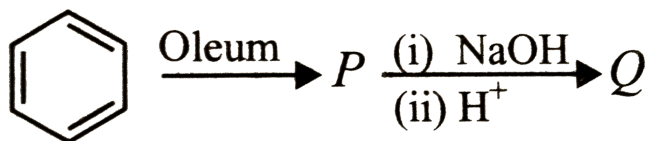
10. Complete the missing links .



Answer: A

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11. In the following sequence of reactions ,



the compound Q formed will be

A. aniline

B. phenol

C. benzaldehyde

D. benzene sulphonic acid .

Answer: B

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12. Cumene on reaction with oxygen followed by hydrolysis gives

A. CH_3OH and $C_6H_5COCH_3$

B. C_6H_5OH and $(CH_3)_2O$

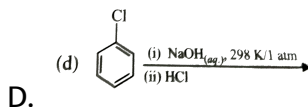
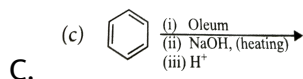
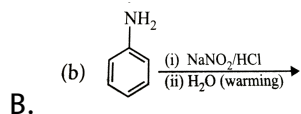
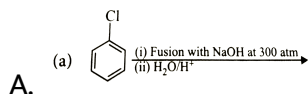
C. $C_6H_5OCH_3$ and CH_3OH

D. C_6H_5OH and CH_3COCH_3

Answer: D

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13. Which of the following reactions will not yield phenol ?



Answer: D

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14. The decreasing order of boiling points of the following alcohols is

A. 3-methylbutan-2-ol > 2-methylbutan-2-ol > pentan-1-ol

B. pentan-1-ol > 3-methylbutan-2-ol

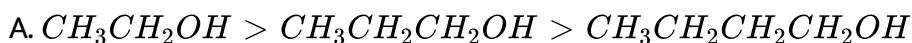
C. 2-methylbutan-2-ol > 3-methylbutan-2-ol > pentan-1-ol

D. 2-methylbutan -2-ol < pentan -1-ol < 3-mehtylbutan-2-ol

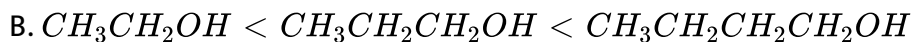
Answer: B

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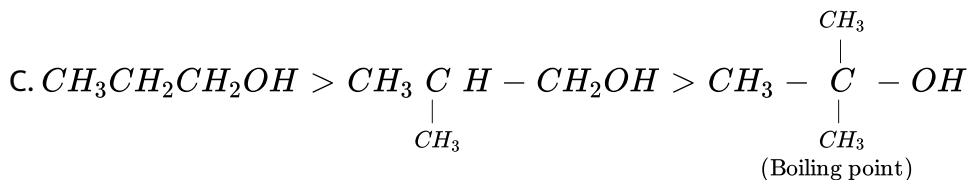
15. Which of the following statements is not correctly showing the trend of the properties mentioned ?



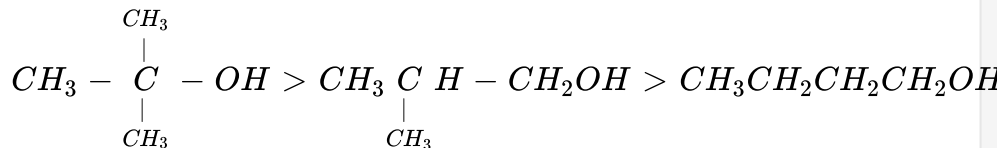
(Solubility)



(Boiling point)



D.



(Boiling point)

Answer: D



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

:

Prpane-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

A. Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol

B. Propan-1-ol, butan-1-ol, butan-2-ol, pentan-ol

C. pentan-1-, butan-2-ol, butan-1-ol, propan-1-ol

D. pentan-1-l, butan-1-ol, butan-2-,ol, propan-1-ol

Answer: A



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17. Which of the following is not characteristic of alcohols?

- A. They are lighter than water .
- B. Their boiling points rise fairly uniformly with rising molecular weight .
- C. Lower members are insoluble in water and organic solvents but the solubility regularly increases with molecular mass .
- D. Lower members have a pleasant smell and burning taste , higher members are colourless and tasteless .

Answer: C



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18. Ortho -nitrophenol is less soluble in water than *p*- and *m*- nitrophenols because

- A. o-nitrophenol shows intramolecular H-bonding
- B. o-nitrophenol shows intermolecular H-bonding
- C. melting point of o-nitrophenol is lower than those of *m*- and *p*- isomers
- D. o-nitrophenol is more volatile in steam than those of *m*- and *p*- isomers .

Answer: A

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19. Unlike phenol , 2,4-dinitrophenol is soluble in sodium carbonate solution in water because

- A. presence of two- NO_2 groups in the ring makes 2,4- dinitrophenol a stronger acid than phenol
- B. presence of two - NO_2 groups in the ring makes 2,4-dinitrophenol a weaker acid than phenol
- C. presence of two - NO_2 groups make the hydrogen bonding easier , making 2,4-dinitrophenol soluble
- D. nitro group reacts with Na_2CO_3 while $-OH$ group does not .

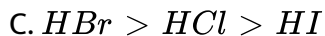
Answer: A

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20. In reaction $C_2H_5OH + HX \xrightarrow{ZnX_2} C_2H_5X + H_2O$ the order of reactivity of HX is :

A. $HCl > HBr > HI$

B. $HI > HBr > HCl$

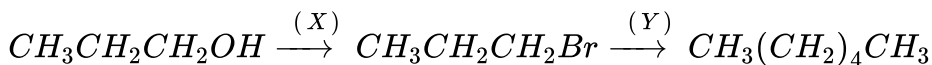


Answer: B



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21. Which of the following is the proper method to prepare n-hexane from n-propyl alcohol ?



A. (X) - HBr , (Y) - HCN

B. (X) - HBr, (Y) - Na , ether

C. (X)- Br_2 , (Y) - CH_3CN

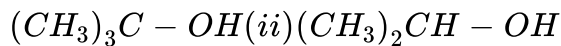
D. (X) - Br_2 , (Y) - $KMnO_4$

Answer: B



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22. Arrange the following alcohols in order of increasing reactivity towards sodium metal .



A. (iii) < (ii) < (i)

B. (ii) < (i) < (iii)

C. (i) < (ii) < (iii)

D. (iii) < (i) < (ii)

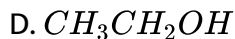
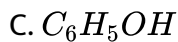
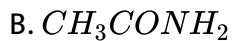
Answer: C



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23. Which of the following compounds does not react with NaOH ?

A. CH_3COOH



Answer: D

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

A. 2-Chloroethanol due to $+I$ effect of Cl

B. Ethanol due to $+I$ effect of CH_3

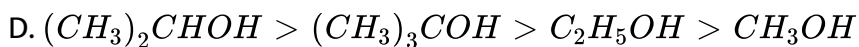
C. 2-Chloroethanol due to $-I$ effect of Cl

D. Ethanol due to $-I$ effect of CH_3

Answer: C

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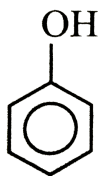
25. Which of the following options shows the correct order of decreasing acidity:



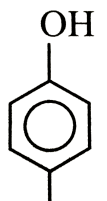
Answer: B

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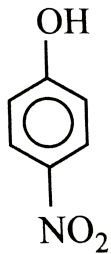
26. The correct order of strength of acidity of the following compounds is



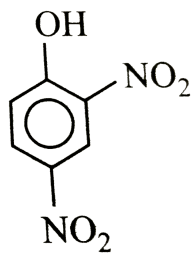
(i)



(ii)



(iii)



(iv)

A. (ii) > (i) > (iii) > (iv)

B. (i) > (ii) > (iii) > (iv)

C. (iv) > (iii) > (ii) > (i)

D. (iv) > (iii) > (i) > (ii)

Answer: D

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27. P-nitrophenol is a stronger acid than phenol while p-cresol is a weaker acid. Discuss.

A. $-CH_3$ group decreases the electron density on oxygen of O-H group making p-cresol a weaker acid

B. $-NO_2$ group decreases electron density on oxygen of $O-H$ group making p-nitrophenol a stronger acid

C. $-CH_3$ group increases the electron density on oxygen of $O-H$

group making release of H^+ easier

D. $-NO_2$ group increases the electron density on oxygen of $O-H$

group making release of H^+ easier .

Answer: B

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28. In esterification

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

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

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

D. none of these

Answer: C

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29. An unknown alcohol is treated with the 'Lucas reagent' to determine whether the alcohol is primary, secondary or tertiary. Which alcohol reacts faster and by what mechanism?

- A. Tertiary alcohol by S_N2
- B. Secondary alcohol by S_N1
- C. Tertiary alcohol by S_N1
- D. Secondary alcohol by S_N2

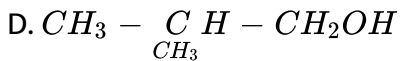
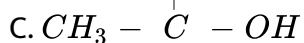
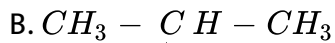
Answer: C



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30. Which of the following compounds reacts immediately with Lucas reagent ?

- A. $CH_3CH_2CH_2OH$



Answer: C

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31. Tertiary butyl alcohol gives tertiary butyl chloride on treatment with

A. conc. HCl / anhydrous $ZnCl_2$

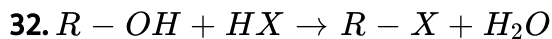
B. KCN

C. NaOCl

D. Cl_2

Answer: A

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In the above reaction the reactivity of different alcohols is

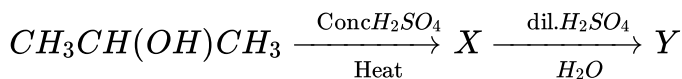
- A. tertiary > secondary > primary
- B. tertiary < secondary < primary
- C. tertiary > primary > secondary
- D. secondary > primary > tertiary

Answer: A



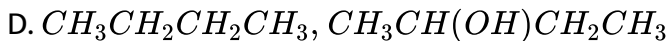
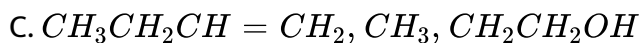
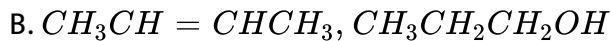
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33. Consider the following reaction sequence ,



X and Y in the reaction respectively are

- A. $CH_3CH = CH_2, CH_3CH(OH)CH_3$



Answer: A



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34. 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

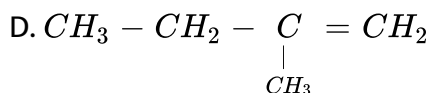
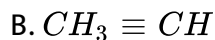
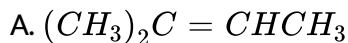
Answer: B



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35. In this reaction, $(CH_3)_3C - CH_2OH \xrightarrow[170^\circ C]{\text{Conc. } H_2SO_4} X$

X is



Answer: A



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36. Acid catalysed dehydration of t-butanol is faster than that of n-butanol because

A. tertiary carbocation is more stable than primary carbocation

B. primary carbocation is more stable than tertiary carbocation

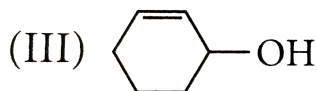
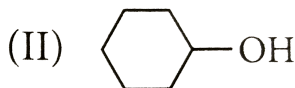
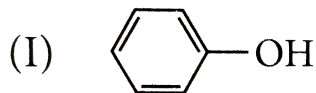
C. t-butanol has a higher boiling point

D. rearrangement takes place during dehydration of t-butanol.

Answer: A

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37. Dehydration of the following in increasing order is



A. $I < II < III < IV$

B. $II < III < IV < I$

C. $I < III < IV < II$

D. none of these

Answer: A





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38. An alcohol of unknown structure gave a positive Lucas test in about five minutes. When alcohol was heated with concentrated H_2SO_4 an alkene was formed with the formula C_4H_8 . Ozonolysis of this alkene gave a single product, C_2H_4O . What was the structure of the alcohol ?

- A. butan-1-ol
- B. butan-2-ol
- C. 2-methylpropan-1-ol
- D. 2,2-dimethylbutan-1-ol

Answer: B



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39. The major product of acid catalysed dehydration of 2-methylcyclohexanol and butan-1-ol are respectively

A. 1-methylcyclohexene and but-1-ene

B. 2-methylcyclohexene and but-2-ene

C. 2-methylcyclohexene and butane

D. 1-methylcyclohexene and but-2-ene.

Answer: A



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40. Which of the following alcohols on dehydration with conc. H_2SO_4 will yield But-2-ene ?

A. $p-O_2NC_6H_4CH(OH)CH_3$

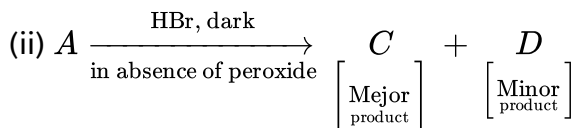
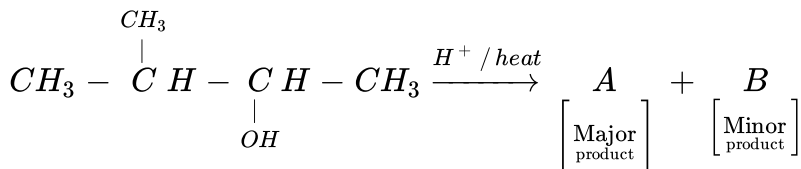
B. $p-ClC_6H_4CH(OH)CH_3$

C. $p-CH_3OC_6H_4CH(OH)CH_3$

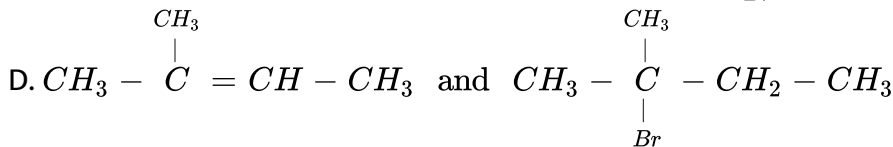
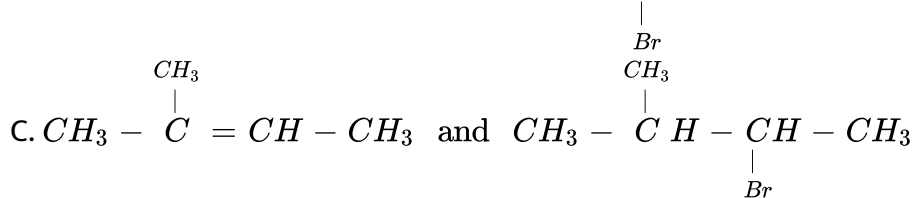
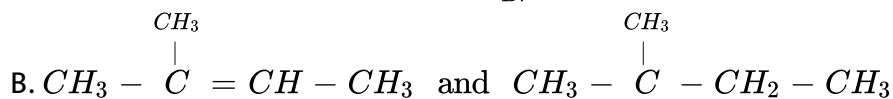
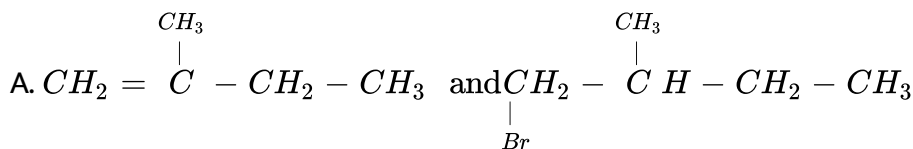
D. $C_6H_5CH(OH)CH_3$

Answer: C

41. In the following reactions . ltb rgt

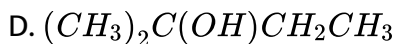
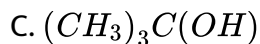
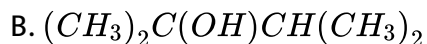
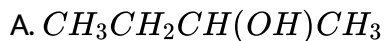


The major products A and C are repectively



Answer: B

42. An alcohol X on heating with concentrated H_2SO_4 gives an alkene Y which can show geometrical isomerism. The alcohol X is



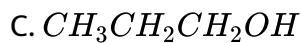
Answer: A



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





Answer: C

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44. The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is

A. acidic permanganate

B. acidic dichromate

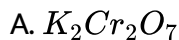
C. chromic anhydride in glacial acetic acid

D. pyridinium chlorochromate.

Answer: D

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45. The most suitable reagent for the conversion of RCH_2OH to $RCHO$ is

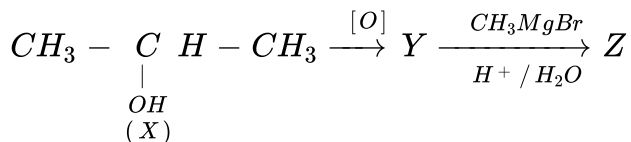


Answer: D



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46. In the following reaction sequence,



Z is



B. butan-2-ol

C. 2-methylpropan-2-ol

D. 1,1 - dimethylethanol.

Answer: C

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47. Conversion of ethyl alcohol into acetaldehyde is an example of

A. hydrolysis

B. oxidation

C. reduction

D. molecular rearrangement

Answer: B

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48. When tertiary butyl alcohol is passed over reduced copper, the reaction taking place is

- A. primary alcohol
- B. secondary alcohol
- C. tertiary alcohol
- D. dihydric alcohol

Answer: C



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49. Which of the following is not true in case of reaction with heated copper at $300^{\circ}C$?

- A. Phenol \rightarrow Benzyl alcohol
- B. Secondary alcohol \rightarrow Ketone
- C. Primary alcohol \rightarrow Aldehyde

D. Tertiary alcohol \rightarrow Olefin .

Answer: A

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50. When tertiary butyl alcohol is passed over reduced copper, the reaction taking place is

A. Secondary butyl alcohol is formed

B. 2-Methylpropene is formed

C. 1-Butene is formed .

D. Butanal is formed .

Answer: B

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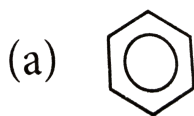
51. Which of the following reagents can be used to oxidise primary alcohols to aldehydes ?

- A. CrO_3 in anhydrous medium .
- B. $KMnO_4$ in acidic medium
- C. Pyridinium chlorochromate .
- D. Heat in the presence of Cu at 573 K .

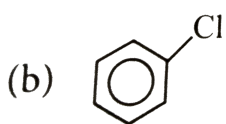
Answer: B

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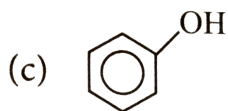
52. Which of the following compounds will be most easily attacked by an electrophile ?



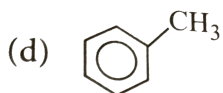
A.



B.



C.



D.

Answer: C

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53. Out of phenol and benzene, which can be more easily nitrated ?

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 .

Answer: A

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54. Picric acid is a yellow coloured compound. Its chemical name is

- A. m-nitrobenzoic acid
- B. 2,4,6-trinitrophenol
- C. 2,4,6-tribromophenol
- D. p-nitrophenol.

Answer: B

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55. When phenol is treated with excess bromine water, it gives

A. 2,4,6-tribromophenol

B. o-bromophenol

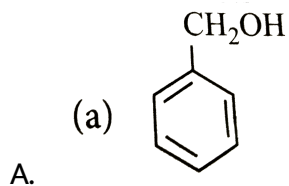
C. p-bromophenol

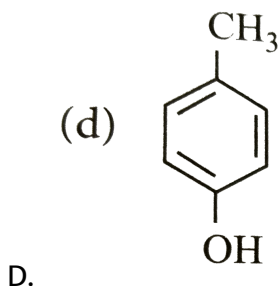
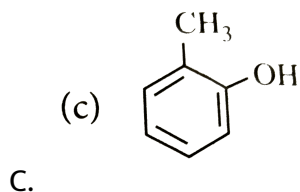
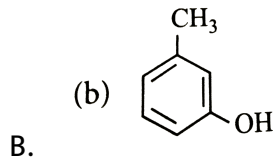
D. bromobenzene.

Answer: A

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56. The structure of the compound that gives a tribromo derivative on treatment with bromine water is :





Answer: B

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57. The major product obtained on interaction of phenol with sodium hydroxide and carbon dioxide is :

A. benzoic acid

B. salicylaldehyde

C. salicylic acid

D. phthalic acid .

Answer: C

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58. 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.

Answer: C

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59. Conversion of phenol to salicylic acid and to salicylaldehyde are known as (respectively)

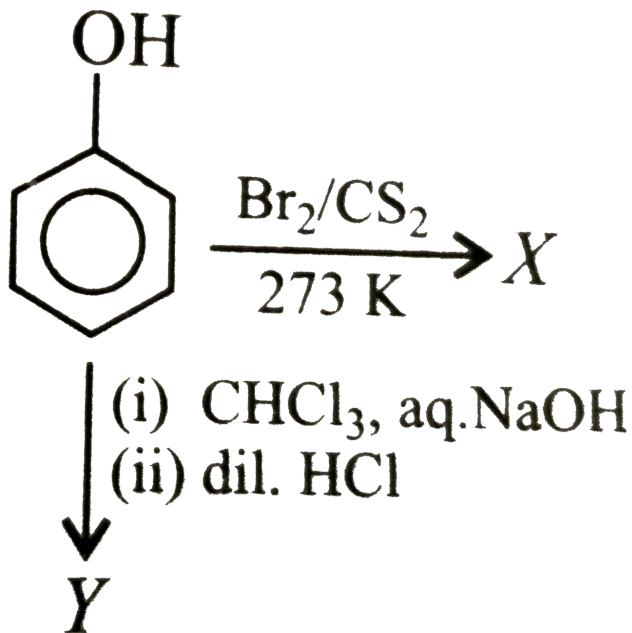
- A. Reimer-Tiemann reaction and Kolbe's reaction
- B. Williamson's synthesis and Hydroboration-oxidation
- C. Kolbe's reaction and Williamson's synthesis
- D. Kolbe's reaction and Reimer-Tiemann reaction

Answer: D



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60. In this given reactions,



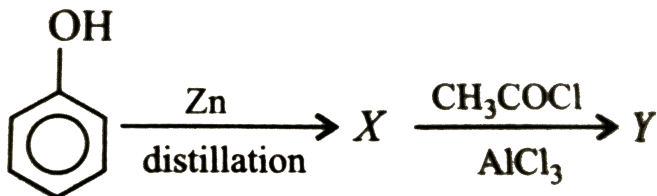
X and Y are respectively

- A. Bromobenzene and acetophenone
- B. o- and p-Bromophenol and salicylaldehyde
- C. p-Bromophenol and salicylic acid
- D. o-Bromophenol and benzoic acid .

Answer: C

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61. Identify the final product of the reaction sequence .



- A. Benzophenone
- B. Acetophenone
- C. Diphenyl
- D. Methyl salicylate

Answer: B

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62. Benzoquinone is prepared by reaction of phenol with

A. $Na_2Cr_2O_7, H_2SO_4$

B. $KMnO_4, H_2SO_4$

C. Na_2CrO_4, HCl

D. K_2MnO_4, H_2SO_4

Answer: C



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63. Which of the following statements is correct ?

A. The reaction of methyl magnesium iodide with acetone followed by hydrolysis gives secondary butanol .

B. Primary alcohols are dehydrated easily than secondary and tertiary alcohols .

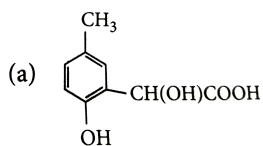
C. Tertiary alcohol is more acidic than primary alcohol .

D. Tertiary butyl alcohol gives turbidity fastest with Lucas reagent .

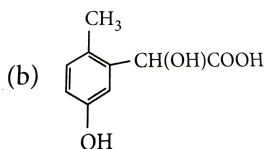
Answer: D

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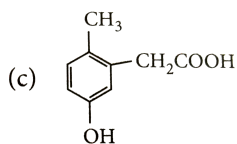
64. p-cresol reacts with chloroform in alkaline medium to give the compound A which adds hydrogen cyanide to form, the compound B. the latter on acidic hydrolysis gives chiral caboxylic acid. The structure of the carboxylic acid is



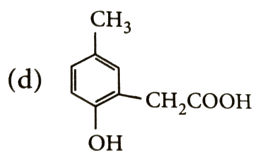
A.



B.



C.



D.

Answer: A



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65. A primary alcohol, $C_3H_8O(W)$ on heating with sulphuric acid undergoes dehydration to give an alkene, (X), which reacts with HCl to give (Y). (Y) on treatment with aqueous KOH gives compound (Z), C_3H_8O .

Compounds (W) and (Z) are :

- A. functional isomers
- B. position isomers
- C. chain isomers
- D. stereoisomers .

Answer: B



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

Column I		Column II	
(A)	Hydrolysis of benzene diazonium chloride	(i)	<i>p</i> -Cresol
(B)	Phenol + methyl chloride in presence of anhydrous 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)

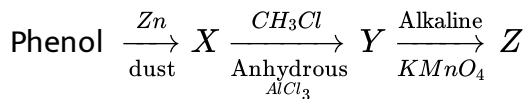
D. (A) \rightarrow (iii), (B) \rightarrow (iv), (C) \rightarrow (i), (D) \rightarrow (ii)

Answer: C



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67. Consider the following reaction



The product Z is

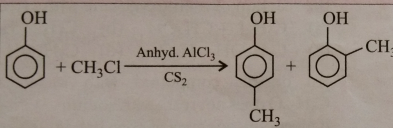
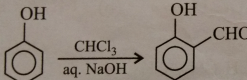
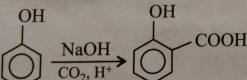
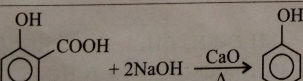
- A. benzaldehyde
- B. benzoic acid
- C. benzene
- D. toluene .

Answer: B



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

Column I	Column II
(A) 	(i) Decarboxylation
(B) 	(ii) Friedel—Crafts reaction
(C) 	(iii) Reimer—Tiemann reaction
(D) 	(iv) Kolbe's reaction

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

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

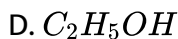
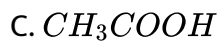
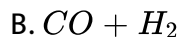
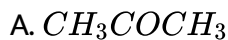
C. (A) → (iii) , (B) → (iv) , (C) → (i) , (D) → (ii)

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

Answer: B

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1. Methanol is industrially prepared by



Answer: B



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2. Which of the following statements is not correct about methanol ?

A. It is used for drinking purposes .

B. It is highly poisonous compound .

C. It can be prepared by reduction of formaldehyde with $LiAlH_4$

D. It is miscible with water in all proportions .

Answer: A

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3. The enzyme which can catalyse the conversion of glucose to ethanol is

A. invertase

B. zymase

C. maltase

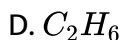
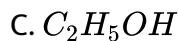
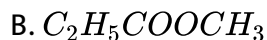
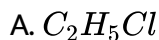
D. diastase.

Answer: B

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4. An organic liquid *A* containing *C*, *H* and *O* has a pleasant odour with a boiling point of 78°C . On boiling, *A* with conc. H_2SO_4 a colourless gas

is produced which decolourises bromine water and alkaline $KMnO_4$. One mole of this gas also takes one mole of H_2 . The organic liquid A is



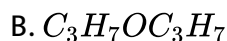
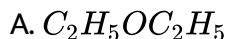
Answer: C

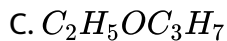


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Ethers

1. An equimolarr quantities of ethanol and propanol are heated with conc. H_2SO_4 . The product /s formed is /are :





D. All of these

Answer: D

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2. Which of the following alcohols gives the best yield of dialkyl ether on being heated with a trace of sulphuric acid ?

A. 2- pentanol

B. 2-Methyl-2-butanol

C. 1-Pentanol

D. 2-Propanol

Answer: C

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3. Ether is obtained from ethyl alcohol

A. 113K

B. 443K

C. 413 K

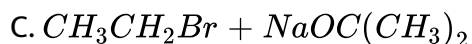
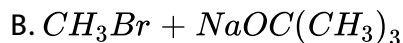
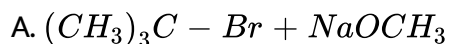
D. 213 K

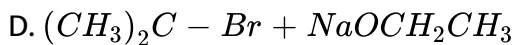
Answer: C



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4. Ethers are prepared by the reaction of sodium alkoxides and alkyl halides. Which of the following reagents should be taken to prepare methyl tert-butyl ether ?



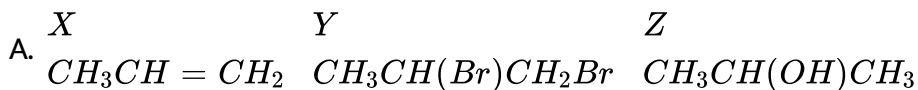
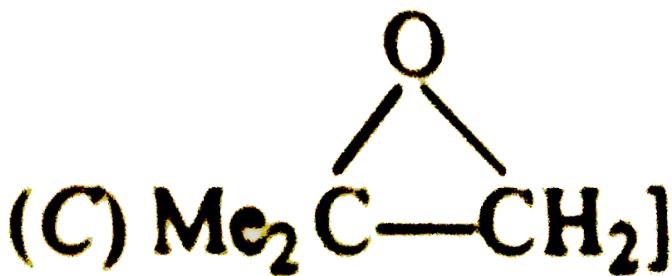
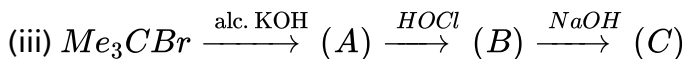
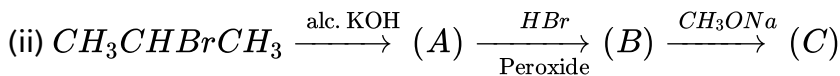
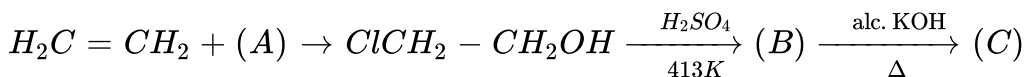


Answer: B

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5. Supply structural formulae for missing compounds.

(i)



- C. $\overset{X}{CH_2CH} = \overset{Y}{CH_3} \quad \overset{Z}{CH_3CH(Br)CH_3} \quad CH_3CH_2OCH_2CH_2$
- D. $\overset{X}{CH_2CH} = \overset{Y}{CH_3} \quad CH_3CH_2CH_2Br \quad CH_2CH_2CH_2OCH_3$

Answer: D

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6. Ethers have lower boiling points than their corresponding isomeric alcohols because of

- A. hydrogen bonding in alcohols that is absent in ethers due to low polarity
- B. hydrogen bonding in ethers due to high polarity
- C. insolubility of ethers in water due to less polarity
- D. inertness of ethers as compared to alcohols.

Answer: A

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7. Correct order of boiling points among following is

$CH_3(CH_2)_3CH_3$ X $C_2H_5OC_2H_5$, Y $CH_3(CH_2)_3OH$ Z "

A. $X < Y < Z$

B. $Y > X < Z$

C. $Z < X < Y$

D. $Z > X < Y$

Answer: A



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8. Diethyl ether when refluxed with excess of HI gives two molecules of (i)

. Ethers can be most commonly prepared by reaction of (ii) and ((III)).

The method is called ((IV))

(i),(ii) , (iii) and (IV) respectively are

A. ethyl iodide, sodium alkoxide, alkyl halide, Williamson's synthesis

B. ethanol, alcohol, alkyl halide, substitution

C. methyl iodide Grignard's reagent, alkyl halide. Williamson's synthesis

D. ethyl iodide, phenyl ethyl iodide, esterification

Answer: A

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9. Two compounds [A] and [B] have molecular formula C_2H_6O . On reacting with HI [A] gives alkyl iodide and water while [B] gives alkyl iodide and alcohol. What are the compounds [A] and [B]? Write the reactions involved.

A. $CH_3OC_2H_5$ and CH_3CH_2OH

B. CH_3OCH_3 and $C_2H_5OCH_3$

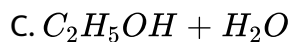
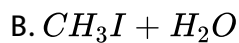
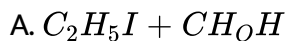
C. C_2H_5OH and CH_3OCH_3

D. CH_3OH and CH_3OCH_3

Answer: C

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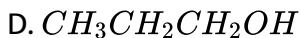
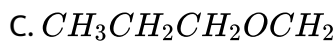
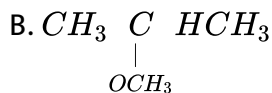
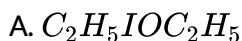
10. Which of the following are the products shown by the reaction of methoxyethane with HI?



Answer: D

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11. An organic compound of molecular formula $C_4H_{10}O$ does not react with sodium. With excess of HI, it gives only one type of alkyl halide. The compound is

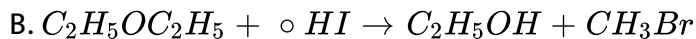
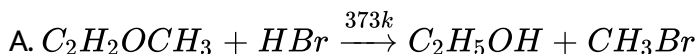


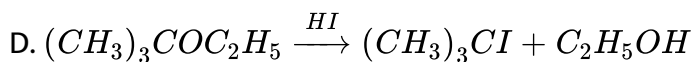
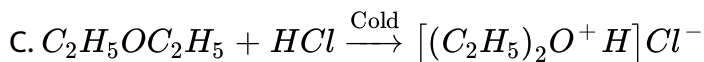
Answer: A



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12. Which of the following products are not correctly matched in the given reaction ?





Answer: B

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13. Phenyl methyl ether (on anisole) reacts with HI to give phenol and methyl iodide and not iodobenzene and methyl alcohol. Justify .

A. I^- ion prefers to combine with the smaller group in order to minimise steric hindrance group in order to minimise steric hindrance

B. I^- ion is not reactive towards benzene

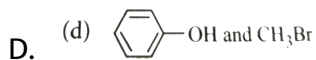
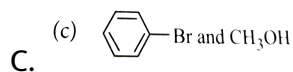
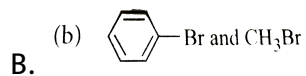
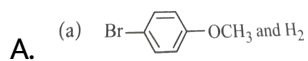
C. phenol is formed as a result of hydrolysis of iodobenzene

D. methyl alcohol formed during reaction reacts with I^- to form methyl iodide .

Answer: A

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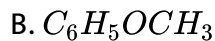
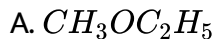
14. In the reaction



Answer: D

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15. The ether that undergoes electrophilic substitution reactions is



Answer: B



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16. Anisole on reaction with chloromethane in presence of anhydrous $AlCl_3$ gives

A. o-methyl anisole and p-methoxy anisole

B. o-methyl anisole and p-methoxy anisole

C. o-methyl anisole and p-methyl anisole

D. o-methoxy acetophenone and p-methoxy acetophenone

Answer: C

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17. Which of the following is not correctly matched with its uses?

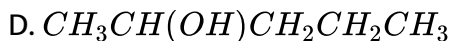
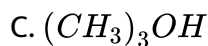
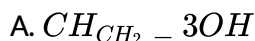
- A. Methanol: As a solvent for paints, varnishes etc
- B. Ethanol : For denaturing spirit, in manufacture of formaldehyde
- C. Ethers : To provide inert medium for chemical reactions, as anaesthetic.
- D. All are correctly matched

Answer: B

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Higher Order Thinking Skills

1. An alcohol (A) gives Lucas test within 5 min. 7.4 g of alcohol when treated with sodium metal liberates 1120 mL of H_2 at STP. What will be alcohol (A)?



Answer: B



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2. 2.2 g of an alcohol (A) when treated with $CH_3 -MgI$ liberates 560 mL of CH_4 at STP. Alcohol (A) on dehydration followed by ozonolysis gives ketone (B) along with (C). Oxime of ketone (B) contains 19.17% N. (A) on oxidation gives ketone (D) having same number of carbon atom.

Molecular mass of (A) is

A. 74

B. 88

C. 60

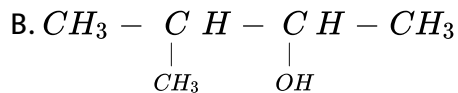
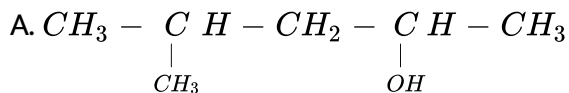
D. 102

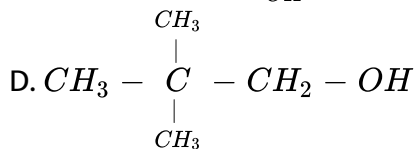
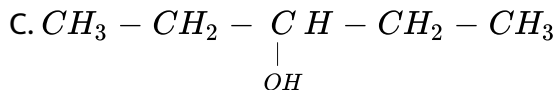
Answer: B

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3. 2.2 g of an alcohol (A) when treated with CH_3-MgI liberates 560 mL of CH_4 at STP. Alcohol (A) on dehydration followed by ozonolysis gives ketone (B) along with (C). Oxime of ketone (B) contains 19.17% N. (A) on oxidation gives ketone (D) having same number of carbon atom.

Structure of (A) is



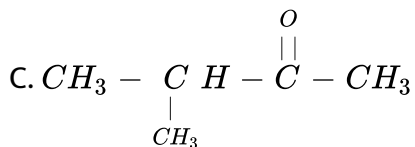
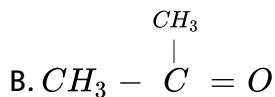
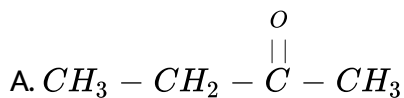


Answer: B

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4. 2.2 g of an alcohol (A) when treated with $\text{CH}_3\text{-MgI}$ liberates 560 mL of CH_4 at STP. Alcohol (A) on dehydration followed by ozonolysis gives ketone (B) along with (C). Oxime of ketone (B) contains 19.17% N. (A) on oxidation gives ketone (D) having same number of carbon atom.

Structure of (B) is



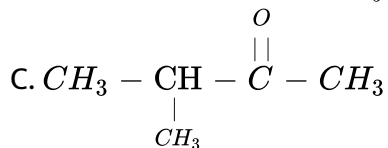
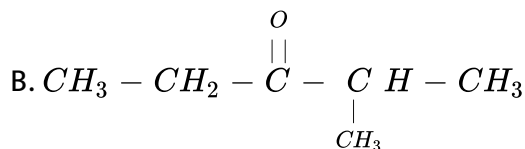
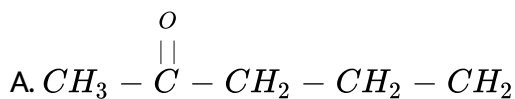
D. none of these

Answer: B

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5. 2.2 g of an alcohol (A) when treated with CH_3MgI liberates 560 mL of CH_4 at STP. Alcohol (A) on dehydration followed by ozonolysis gives ketone (B) along with (C). Oxime of ketone (B) contains 19.17% N. (A) on oxidation gives ketone (D) having same number of carbon atom.

Structure of ketone (D) is

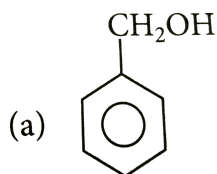


D. none of these

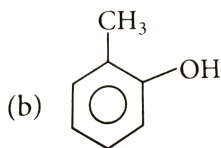
Answer: C

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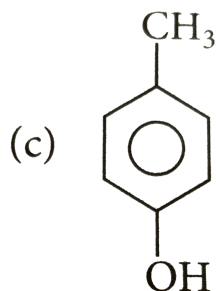
6. A compound (a) of molecular formula C_7H_8O is insoluble in water and dilute aqueous sodium bicarbonate



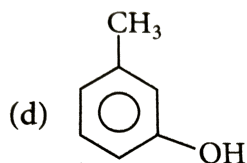
A.



B.



C.



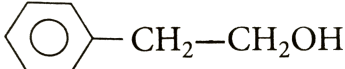
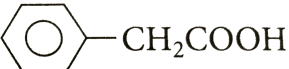
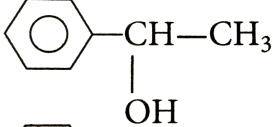
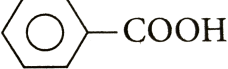
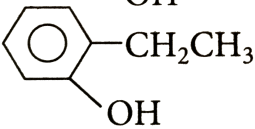
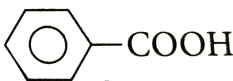
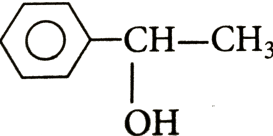
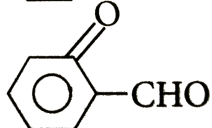
D.

Answer: D

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Hots

1. A compound $X(C_8H_{10}O)$ upon treatment with alkaline solution of iodine gives a yellow precipitate. The filtrate on acidification gives a white solid $Y(C_7H_6O_2)$. Write the structures of X and Y.

- | | X | Y |
|-----|---|---|
| (a) |  |  |
| (b) |  |  |
| (c) |  |  |
| (d) |  |  |

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1. Monochlorination of toluene in sunlight followed by hydrolysis with aq.

NaOH yields

A. o-cresol

B. m-cresol

C. 2,4 dihydroxytoluene

D. benzyl alcohol.

Answer: D



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2. How many alcohols with molecular formula $C_4H_{10}O$ are chiral in nature ?

A. 1

B. 2

C. 3

D. 4

Answer: A



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

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

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

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

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

Answer: C



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4. CH_3CH_2OH can be converted into CH_3CHO by

- A. catalytic hydrogenation
- B. treatment with $LiAlH_4$
- C. treatment with pyridinium chlorochromate
- D. treatment with $KMnO_4$

Answer: C



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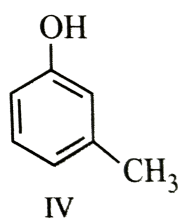
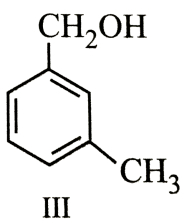
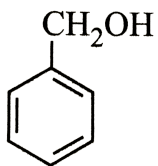
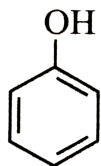
5. The process of converting alkyl halides into alcohols involves..... .

- A. addition reaction
- B. substitution reaction
- C. dehydrohalogenation reaction
- D. rearrangement reaction.

Answer: B

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6. Which of the following compounds is aromatic alcohol?



A. I,II,III,IV

B. I,IV

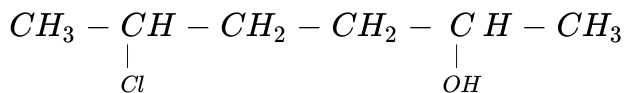
C. II,III

D. I

Answer: C

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7. Give IUPAC name of the compound given below:



- A. 2-Chloro-5-hydroxyhexane
- B. 2-Hydroxy-5-chlorohexane
- C. 5-Chlorohexan-2-ol
- D. Chlorohexan-5-ol

Answer: C

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

- A. 3-methylphenol
- B. 3-chlorophexan-5-ol
- C. 3-methoxyphenol

D. benzene-1,3-idol.

Answer: A

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9. IUPAC name of the compound $CH_3 - \underset{\substack{| \\ CH_3}}{CH} - OCH_3$ is

A. 1-methoxy-1-methylethane

B. 2-methoxy-2-methylethane

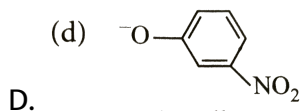
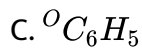
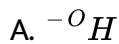
C. 2-methoxypropane

D. isorproplmethyl ether.

Answer: C

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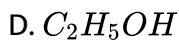
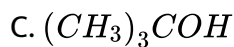
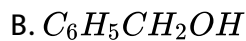
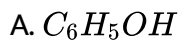
10. Which of the following species can act as the strongest base ?



Answer: B

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



Answer: A



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12. Phenol is less acidic than

- A. ethanol
- B. o-nitrophenol
- C. o-mehtyphenol
- D. o-methoxyphenol.

Answer: B



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13. Which of the following is most acidic?

- A. Benzyl alcohol

B. Cyclohexanol

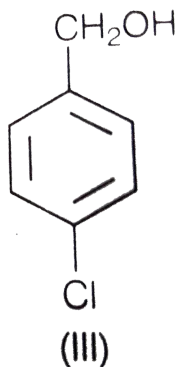
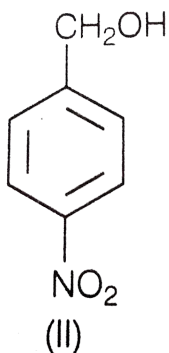
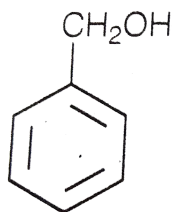
C. Phenol

D. m-Chlorophenol

Answer: D

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



A. (i) < (ii) ≤ (iii)

B. (ii) < (i) < (iii)

C. $(ii) < (iii) < (i)$

D. $(iii) < (ii) < (i)$

Answer: C

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15. Arrange the following compounds in increasing order of boiling point

:

Prpane-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

A. Propan-1-ol, butan-1-ol, butan-1-ol, pentan-1-ol

B. Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol

C. Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol

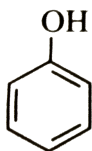
D. Pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

Answer: A

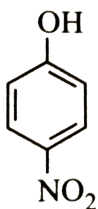
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Exemplar Problems

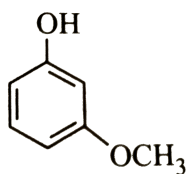
1. Mark the correct order of decreasing acid strength of the following compounds.



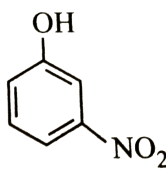
(i)



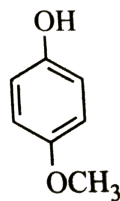
(ii)



(iii)



(iv)



(v)

A. $(v) > (iv) > (ii) > (i) > (iii)$

B. $(ii) > (iv) > (i) > (iii) > (v)$


C. $(iv) > (v) > (iii) > (ii) > (i)$

D. $(v) > (iv) > (iii) > (ii) > (i)$

Answer: B



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1. Assertion: The bond angle  in alcohols is slightly less than the tetrahedral angle.

Reason : In alcohols, the oxygen of the -OH group is attached to carbon by a sigma bond formed by the overlap a sp^3 hybridised orbital of carbon with sp^3 hybridised orbital of oxygen .

- 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.

Answer: B



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1. 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.

Answer: A



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

Reason (R) Addition of water in acidic medium proceeds through the formation of primary carbocation.

- A. 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.

Answer: D



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3. Assertion : Boiling point of ethanol is higher than that of propane.

Reason : Molecular mass of ethanol is higher than propane.

- 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.

Answer: B

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4. 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.

Answer: B

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5. 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 both assertion and reason are false.

Answer: C

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6. Assertion: Cresols are less acidic than phenol.

Reason: Electron releasing groups do not favour the formation of phenoxide ion.

- 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.

Answer: A



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7. Assertion: The relative ease of dehydration of alcohols following order:

Tertiary > secondary > Primary

Reason : Formation of carbocation is the slowest step of 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.

Answer: A



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8. Assertion : When the vapours of a primary, secondary or tertiary alcohol are passed over heated copper at 573 K, an aldehyde or ketone is formed. Reason : Reduction of alcohols takes place

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.

Answer: D



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9. Assertion: *o* - and *p*-nitrophenol can be separated by steam distillation.

Reason: *o* – nitrophenols have intramolecular hydrogen bonding while *p*-nitrophenols exists as associated molecules.

- 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.

Answer: C

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10. Assertion : Picric acid is a strong acid inspite of the absence of the carboxyl group.

Reason : The three – NO_2 groups in picric acid activate the phenate ion.

- 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.

Answer: C



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

Reason (R) Bromine polarises in carbon disulphide.

- A. 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.

Answer: D

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12. 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.

Answer: C

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13. 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.

Answer: A

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14. Assertion: Anisole undergoes electrophilic substitution at *o* – and *p* – 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.

Answer: C

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