

Alcohols, Phenols and Ethers — NEET Chemistry PYQ (2005-2020)

Class 12 Chemistry · 34 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2020 · Q100

1. Reaction between acetone and methylmagnesium chloride followed by hydrolysis will give :

- (A) Isopropyl alcohol
- (B) Sec. butyl alcohol
- (C) Tert. butyl alcohol
- (D) Isobutyl alcohol

NEET 2020 · Q135

2. Anisole on cleavage with HI gives :

- (A) Phenol ($\text{C}_6\text{H}_5\text{OH}$) + CH_3I
- (B) Iodobenzene ($\text{C}_6\text{H}_5\text{I}$) + CH_3OH
- (C) Phenol ($\text{C}_6\text{H}_5\text{OH}$) + $\text{C}_2\text{H}_5\text{I}$
- (D) Iodobenzene ($\text{C}_6\text{H}_5\text{I}$) + $\text{C}_2\text{H}_5\text{OH}$

NEET 2019 · Q47

3. The structure of intermediate A in the following reaction, is: $\text{C}_6\text{H}_5\text{-CH}(\text{CH}_3)_2$ (cumene) $\xrightarrow{\text{O}_2}$ A $\xrightarrow{\text{H}^+/\text{H}_2\text{O}}$ $\text{C}_6\text{H}_5\text{OH}$ (phenol) + CH_3COCH_3 (acetone)

- (A) $\text{C}_6\text{H}_5\text{-O-CH}(\text{CH}_3)_2$
- (B) $\text{C}_6\text{H}_5\text{-C}(\text{CH}_3)_2\text{-O-O-H}$
- (C) $\text{C}_6\text{H}_5\text{-O-O-CH}(\text{CH}_3)_2$
- (D) $\text{C}_6\text{H}_5\text{-CH}(\text{CH}_3)\text{-CH}_2\text{-O-O-H}$

NEET 2019 · Q69

4. The compound that is most difficult to protonate is:

- (A) H-O-H
- (B) $\text{H}_3\text{C-O-H}$
- (C) $\text{H}_3\text{C-O-CH}_3$
- (D) Ph-O-H

NEET 2018 · Q52

5. Identify the major products P, Q and R in the following sequence of reactions:

Benzene + $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$ $\xrightarrow{\text{(Anhydrous AlCl}_3)}$ P; P $\xrightarrow{\text{(i) O}_2, \text{(ii) H}_3\text{O}^+/\Delta}$ Q + R

- (A) P = $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)_2$, Q = $\text{C}_6\text{H}_5\text{OH}$, R = $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
- (B) P = $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{CH}_3$, Q = $\text{C}_6\text{H}_5\text{CHO}$, R = $\text{C}_6\text{H}_5\text{COOH}$
- (C) P = $\text{C}_6\text{H}_5\text{CH}_2\text{CH}_2\text{CH}_3$, Q = $\text{C}_6\text{H}_5\text{CHO}$, R = $\text{CH}_3\text{CH}_2\text{-OH}$
- (D) P = $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)_2$, Q = $\text{C}_6\text{H}_5\text{OH}$, R = $\text{CH}_3\text{-CO-CH}_3$

NEET 2018 · Q60

6. The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give diethyl ether. A, B and C are in the order

- (A) $\text{C}_2\text{H}_5\text{Cl}$, C_2H_6 , $\text{C}_2\text{H}_5\text{OH}$
- (B) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{Cl}$, $\text{C}_2\text{H}_5\text{ONa}$
- (C) $\text{C}_2\text{H}_5\text{OH}$, C_2H_6 , $\text{C}_2\text{H}_5\text{Cl}$
- (D) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{ONa}$, $\text{C}_2\text{H}_5\text{Cl}$

NEET 2018 · Q66

7. In the reaction: phenol + CHCl_3 + NaOH $\rightarrow$ sodium salt of o-hydroxybenzaldehyde (o-formyl sodium phenoxide, O^-Na^+ with -CHO at the ortho position), the electrophile involved is

- (A) dichloromethyl anion ($^-\text{CHCl}_2$)
- (B) formyl cation (^+CHO)
- (C) dichloromethyl cation ($^+\text{CHCl}_2$)
- (D) dichlorocarbene ($:\text{CCl}_2$)

NEET 2018 · Q68

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

- (A) $C_6H_5-CH(OH)-CH_3$ and I_2
- (B) $C_6H_5-CH_2-CH_2-OH$ and I_2
- (C) $H_3C-C_6H_4-CH_2-OH$ (p-methylbenzyl alcohol) and I_2
- (D) $CH_3-C_6H_3(CH_3)-OH$ (dimethylphenol, CH_3 groups ortho and para to OH) and I_2

NEET 2017 · Q13

9. Which one is the most acidic compound?

- (A) p-Cresol (4-methylphenol)
- (B) Phenol
- (C) p-Nitrophenol (4-nitrophenol)
- (D) Picric acid (2,4,6-trinitrophenol)

NEET 2017 · Q18

10. The heating of phenyl-methyl ethers with HI produces.

- (A) ethyl chlorides
- (B) iodobenzene
- (C) phenol
- (D) benzene

NEET 2017 (Gujarati paper) · Q11

11. Of the following alcohols, the one that would react fastest with conc. HCl and anhydrous $ZnCl_2$ is:

- (A) Butan-1-ol
- (B) Butan-2-ol
- (C) 2-methylpropan-2-ol
- (D) 2-methylpropanol

NEET 2016 Phase 1 · Q63

12. Which of the following reagents would distinguish cis-cyclopenta-1,2-diol from the trans-isomer?

- (A) Acetone
- (B) Ozone
- (C) MnO_2
- (D) Aluminium isopropoxide

NEET 2016 Phase 1 · Q82

13. The reaction

Cyclopentanol (C_5H_9-OH) $\xrightarrow{NaH}$ $C_5H_9-O^- Na^+$ $\xrightarrow{Me-I}$ C_5H_9-O-Me can be classified as:

- (A) Williamson ether synthesis reaction
- (B) Alcohol formation reaction
- (C) Dehydration reaction
- (D) Williamson alcohol synthesis reaction

AIPMT 2015

14. The reaction $(CH_3)_3C-ONa + CH_3CH_2Cl \rightarrow (CH_3)_3C-O-CH_2CH_3 + NaCl$ is called:

- (A) Gatterman - Koch reaction
- (B) Williamson Synthesis
- (C) Williamson continuous etherification process
- (D) Etard reaction

AIPMT 2014

15. Which of the following will not be soluble in sodium hydrogen carbonate?

- (A) Benzoic acid
- (B) o-Nitrophenol
- (C) Benzenesulphonic acid
- (D) 2, 4, 6-trinitrophenol

AIPMT 2014

16. Identify Z in the sequence of reactions: $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 \xrightarrow{\text{HBr}/\text{H}_2\text{O}_2} \text{Y} \xrightarrow{\text{C}_2\text{H}_5\text{ONa}} \text{Z}$

- (A) $(\text{CH}_3)_2\text{CH}_2\text{-O-CH}_2\text{CH}_3$
- (B) $\text{CH}_3(\text{CH}_2)_4\text{-O-CH}_3$
- (C) $\text{CH}_3\text{CH}_2\text{-CH}(\text{CH}_3)\text{-O-CH}_2\text{CH}_3$
- (D) $\text{CH}_3\text{-(CH}_2)_3\text{-O-CH}_2\text{CH}_3$

AIPMT 2014

17. Among the following sets of reactants which one produces anisole?

- (A) $\text{C}_6\text{H}_5\text{OH}$; NaOH ; CH_3I
- (B) $\text{C}_6\text{H}_5\text{OH}$; neutral FeCl_3
- (C) $\text{C}_6\text{H}_5\text{-CH}_3$; CH_3COCl ; AlCl_3
- (D) CH_3CHO ; RMgX

NEET 2013

18. Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI?

- (A) $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_2\text{-O-CH}_3$
- (B) $\text{CH}_3\text{-CH}_2\text{-CH}(\text{CH}_3)\text{-O-CH}_3$
- (C) $(\text{CH}_3)_3\text{C-O-CH}_3$
- (D) $(\text{CH}_3)_2\text{CH-CH}_2\text{-O-CH}_3$

AIPMT 2012 Mains

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

- (A) Methyl alcohol
- (B) Glycol
- (C) Nitrophenol
- (D) Ethyl alcohol

AIPMT 2012 Prelims

20. In the following reaction:

$(\text{CH}_3)_3\text{C-CH}=\text{CH}_2 \xrightarrow{(\text{H}_2\text{O}/\text{H}^+)} \text{A (major product)} + \text{B (minor product)}$

The major product is

- (A) $(\text{CH}_3)_3\text{C-CH}_2\text{-CH}_2\text{OH}$
- (B) $(\text{CH}_3)_2\text{C(OH)-CH}(\text{CH}_3)_2$
- (C) $\text{HOCH}_2\text{-C}(\text{CH}_3)(\text{OH})\text{-CH}_2\text{CH}_3$
- (D) $(\text{CH}_3)_3\text{C-CH(OH)-CH}_3$

AIPMT 2012 Prelims

21. In the following sequence of reactions

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

- (A) Ethyl alcohol
- (B) Acetone
- (C) Methane
- (D) Acetaldehyde

22. Among the following four compounds

- a. Phenol
- b. Methyl phenol
- c. Metanitrophenol
- d. Paranitrophenol

The acidity order is

- (A) $d > c > a > b$
- (B) $c > d > a > b$
- (C) $a > d > c > b$
- (D) $b > a > c > d$

23. Following compounds are given

- a. $\text{CH}_3\text{CH}_2\text{OH}$
- b. CH_3COCH_3
- c. $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$
- d. CH_3OH

Which of the above compound(s), on being warmed with iodine solution and NaOH, will give iodoform?

- (A) a, c and d
- (B) Only b
- (C) a, b and c
- (D) a and b

24. Which one of the following compounds has the most acidic nature?

- (A) $(\text{C}_6\text{H}_{11})_2\text{CHOH}$ (dicyclohexylmethanol)
- (B) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$ (benzyl alcohol)
- (C) $\text{C}_6\text{H}_5\text{OH}$ (phenol)
- (D) $\text{C}_6\text{H}_{11}\text{OH}$ (cyclohexanol)

25. Given are cyclohexanol (I), acetic acid (II), 2, 4, 6-trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be

- (A) $\text{III} > \text{IV} > \text{II} > \text{I}$
- (B) $\text{III} > \text{II} > \text{IV} > \text{I}$
- (C) $\text{II} > \text{III} > \text{I} > \text{IV}$
- (D) $\text{II} > \text{III} > \text{IV} > \text{I}$

26. Consider the following reaction:

ethanol $\xrightarrow{(\text{PBr}_3)}$ X $\xrightarrow{(\text{alc. KOH})}$ Y $\xrightarrow{((\text{i}) \text{H}_2\text{SO}_4, \text{room temperature}; (\text{ii}) \text{H}_2\text{O}, \text{heat})}$ Z

The product Z is:

- (A) $\text{CH}_3\text{CH}_2\text{-O-CH}_2\text{-CH}_3$
- (B) $\text{CH}_3\text{-CH}_2\text{-O-SO}_3\text{H}$
- (C) $\text{CH}_3\text{CH}_2\text{OH}$
- (D) $\text{CH}_2=\text{CH}_2$

27. $\text{HOH}_2\text{C-CH}_2\text{OH}$ on heating with periodic acid gives:

- (A) 2HCOOH
- (B) OHC-CHO
- (C) 2HCHO
- (D) 2CO_2

AIPMT 2009 Prelims · Q188

28. Consider the following reaction:

Phenol $\xrightarrow{(\text{Zn dust})}$ X $\xrightarrow{(\text{CH}_3\text{Cl, anhydrous AlCl}_3)}$ Y $\xrightarrow{(\text{alkaline KMnO}_4)}$ Z

The product Z is:

- (A) Benzaldehyde
- (B) Benzoic acid
- (C) Benzene
- (D) Toluene

AIPMT 2008 Prelims · Q94

29. Which one of the following is most reactive towards electrophilic attack?

- (A) Chlorobenzene ($\text{C}_6\text{H}_5\text{Cl}$)
- (B) Benzyl alcohol ($\text{C}_6\text{H}_5\text{CH}_2\text{OH}$)
- (C) Nitrobenzene ($\text{C}_6\text{H}_5\text{NO}_2$)
- (D) Phenol ($\text{C}_6\text{H}_5\text{OH}$)

AIPMT 2007 Prelims · Q97

30. In the reaction:

$(\text{CH}_3)_2\text{CH}-\text{CH}_2-\text{O}-\text{CH}_2-\text{CH}_3 + \text{HI} \xrightarrow{\text{Heated}}$

Which of the following compounds will be formed?

- (A) $(\text{CH}_3)_2\text{CH}-\text{CH}_3 + \text{CH}_3\text{CH}_2\text{OH}$
- (B) $(\text{CH}_3)_2\text{CH}-\text{CH}_2\text{OH} + \text{CH}_3\text{CH}_3$
- (C) $(\text{CH}_3)_2\text{CH}-\text{CH}_2\text{OH} + \text{CH}_3-\text{CH}_2-\text{I}$
- (D) $(\text{CH}_3)_2\text{CH}-\text{CH}_2-\text{I} + \text{CH}_3\text{CH}_2\text{OH}$

AIPMT 2006 Prelims · Q66

31. The general molecular formula, which represents the homologous series of alkanols is :

- (A) $\text{C}_n\text{H}_{2n}\text{O}_2$
- (B) $\text{C}_n\text{H}_{2n}\text{O}$
- (C) $\text{C}_n\text{H}_{2n+1}\text{O}$
- (D) $\text{C}_n\text{H}_{2n+2}\text{O}$

AIPMT 2006 Prelims · Q73

32. The major organic product in the reaction,

$\text{CH}_3-\text{O}-\text{CH}(\text{CH}_3)_2 + \text{HI} \rightarrow$ Product is :

- (A) $\text{CH}_3\text{OH} + (\text{CH}_3)_2\text{CHI}$
- (B) $\text{ICH}_2\text{OCH}(\text{CH}_3)_2$
- (C) $\text{CH}_3\text{O}-\text{C}(\text{CH}_3)_2\text{I}$
- (D) $\text{CH}_3\text{I} + (\text{CH}_3)_2\text{CHOH}$

AIPMT 2006 Prelims · Q86

33. Ethylene oxide when treated with Grignard reagent yields :

- (A) secondary alcohol
- (B) tertiary alcohol
- (C) cyclopropyl alcohol
- (D) primary alcohol

AIPMT 2005 Prelims · Q65

34. Which one of the following compounds is most acidic ?

- (A) $\text{Cl}-\text{CH}_2-\text{CH}_2-\text{OH}$
- (B) o-Nitrophenol (2-nitrophenol)
- (C) Phenol
- (D) o-Cresol (2-methylphenol)

Answer key and explanations

1. Answer: (C) Tert. butyl alcohol

CH_3MgCl adds to the carbonyl carbon of $(\text{CH}_3)_2\text{C}=\text{O}$, and hydrolysis of the alkoxide gives $(\text{CH}_3)_3\text{C}-\text{OH}$, tert-butyl alcohol. A ketone with a Grignard reagent always gives a tertiary alcohol; isopropyl alcohol would come from reduction of acetone instead.

2. Answer: (A) Phenol ($\text{C}_6\text{H}_5\text{OH}$) + CH_3I

HI protonates the ether oxygen and I^- attacks the methyl carbon by $\text{S}_\text{N}2$, because the O-aryl bond has partial double-bond character and cannot be cleaved; so anisole gives phenol and methyl iodide. Iodobenzene is not formed, and anisole has a methyl group, not an ethyl group.

3. Answer: (B) $\text{C}_6\text{H}_5-\text{C}(\text{CH}_3)_2-\text{O}-\text{O}-\text{H}$

Air oxidation of cumene attacks the tertiary benzylic C-H, giving cumene hydroperoxide $\text{C}_6\text{H}_5\text{C}(\text{CH}_3)_2\text{OOH}$, which rearranges in acid to phenol and acetone. Isopropyl phenyl ether is not formed by O_2 and would not give acetone on hydrolysis.

4. Answer: (D) Ph-O-H

In phenol the oxygen lone pair is delocalised into the benzene ring, so it is least available to accept a proton. In water, methanol and dimethyl ether the lone pairs are localised, and the electron-donating methyl groups make the ether easiest to protonate.

5. Answer: (D) P = $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)_2$, Q = $\text{C}_6\text{H}_5\text{OH}$, R = $\text{CH}_3-\text{CO}-\text{CH}_3$

In Friedel-Crafts alkylation the n-propyl carbocation rearranges to the more stable isopropyl cation, giving cumene. Air oxidation gives cumene hydroperoxide, which on acid hydrolysis gives phenol and acetone (not propan-2-ol).

6. Answer: (D) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{ONa}$, $\text{C}_2\text{H}_5\text{Cl}$

Ethanol with Na gives sodium ethoxide; with PCl_5 it gives chloroethane. Williamson synthesis $\text{C}_2\text{H}_5\text{ONa} + \text{C}_2\text{H}_5\text{Cl} \rightarrow \text{C}_2\text{H}_5\text{OC}_2\text{H}_5$. Na does not convert ethanol to ethane, and the order of B and C matters.

7. Answer: (D) dichlorocarbene ($:\text{CCl}_2$)

In the Reimer-Tiemann reaction, OH^- removes a proton from CHCl_3 and the $^-\text{CCl}_3$ loses Cl^- to give dichlorocarbene $:\text{CCl}_2$, an electron-deficient electrophile that attacks the phenoxide ring at the ortho position. The dichloromethyl anion is a nucleophile, not an electrophile.

8. Answer: (A) $\text{C}_6\text{H}_5-\text{CH}(\text{OH})-\text{CH}_3$ and I_2

The yellow precipitate with antiseptic smell is iodoform, formed by NaOI (from $\text{I}_2 + \text{NaOH}$). It requires a $\text{CH}_3\text{CH}(\text{OH})-$ or $\text{CH}_3\text{CO}-$ unit; 1-phenylethanol has it, while 2-phenylethanol, p-methylbenzyl alcohol and the dimethylphenol do not.

9. Answer: (D) Picric acid (2,4,6-trinitrophenol)

Electron-withdrawing $-\text{NO}_2$ groups at ortho and para positions stabilise the phenoxide ion by resonance, so acidity rises with the number of nitro groups; 2,4,6-trinitrophenol (pK_a about 0.4) is the strongest acid. The methyl group of p-cresol is electron-donating and makes it weaker than phenol.

10. Answer: (C) phenol

HI protonates anisole and I^- attacks the methyl carbon by $\text{S}_\text{N}2$, giving phenol and CH_3I . Iodobenzene does not form because the aryl C-O bond has partial double-bond character and $\text{S}_\text{N}2$ attack on an sp^2 ring carbon does not occur.

11. Answer: (C) 2-methylpropan-2-ol

The Lucas reagent reacts through a carbocation, so the tertiary alcohol 2-methylpropan-2-ol, which forms the most stable tertiary carbocation, reacts at once. Secondary butan-2-ol reacts in minutes, and the primary alcohols barely react at room temperature.

12. Answer: (A) Acetone

In the cis-1,2-diol both OH groups are on the same face of the ring, so acetone can bridge them to form a five-membered cyclic ketal (acetonide); the trans-diol cannot reach both groups. Ozone acts on $\text{C}=\text{C}$ bonds, which neither diol has.

13. Answer: (A) Williamson ether synthesis reaction

NaH converts cyclopentanol into its sodium alkoxide, which then displaces iodide from methyl iodide by an $\text{S}_\text{N}2$ reaction to give methoxycyclopentane, an ether. Forming an ether from an alkoxide and an alkyl halide is the Williamson ether synthesis; no alcohol is formed and no water is eliminated.

14. Answer: (B) Williamson Synthesis

An alkoxide reacting with a primary alkyl halide by $\text{S}_\text{N}2$ to give an ether is the Williamson synthesis. Gattermann-Koch and Etard reactions make aromatic aldehydes, not ethers.

15. Answer: (B) o-Nitrophenol

Only acids stronger than carbonic acid release CO_2 from NaHCO_3 and dissolve. Benzoic acid, benzenesulphonic acid and picric acid (2,4,6-trinitrophenol) are strong enough, but o-nitrophenol, with only one nitro group and intramolecular H-bonding, is weaker than H_2CO_3 .

16. Answer: (D) $\text{CH}_3\text{-(CH}_2\text{)}_3\text{-O-CH}_2\text{CH}_3$

With peroxide, HBr adds anti-Markovnikov to but-1-ene giving 1-bromobutane (Y). Williamson synthesis with sodium ethoxide then gives $\text{CH}_3(\text{CH}_2)_3\text{-O-CH}_2\text{CH}_3$; the branched sec-butyl ether would come from Markovnikov addition.

17. Answer: (A) $\text{C}_6\text{H}_5\text{OH}$; NaOH ; CH_3I

Phenol with NaOH forms sodium phenoxide, which reacts with CH_3I by Williamson synthesis to give $\text{C}_6\text{H}_5\text{OCH}_3$ (anisole). Neutral FeCl_3 only gives a colour test, and the other reagent sets give ketones or alcohols.

18. Answer: (C) $(\text{CH}_3)_3\text{C-O-CH}_3$

With tert-butyl methyl ether, HI cleavage goes by $\text{S}_\text{N}1$ through the stable tert-butyl carbocation, giving tert-butyl iodide and methyl alcohol. For the primary and secondary alkyl methyl ethers the reaction is $\text{S}_\text{N}2$, where I^- attacks the less hindered methyl group, giving methyl iodide and the other alcohol.

19. Answer: (B) Glycol

Ethylene glycol (ethane-1,2-diol) is the standard radiator antifreeze: it lowers the freezing point of water and, unlike methyl or ethyl alcohol, has a high boiling point so it does not evaporate away.

20. Answer: (B) $(\text{CH}_3)_2\text{C(OH)-CH(CH}_3\text{)}_2$

Protonation of the alkene gives the secondary carbocation $(\text{CH}_3)_3\text{C-C}^+\text{H-CH}_3$, which undergoes a 1,2-methyl shift to the more stable tertiary carbocation $(\text{CH}_3)_2\text{C}^+\text{-CH(CH}_3\text{)}_2$. Water attacks this to give 2,3-dimethylbutan-2-ol, $(\text{CH}_3)_2\text{C(OH)-CH(CH}_3\text{)}_2$. The unrearranged alcohol $(\text{CH}_3)_3\text{C-CH(OH)-CH}_3$ is the minor product.

21. Answer: (A) Ethyl alcohol

$\text{CH}_3\text{Br} + \text{KCN}$ gives CH_3CN ; acid hydrolysis converts it to CH_3COOH ; LiAlH_4 then reduces the acid to $\text{CH}_3\text{CH}_2\text{OH}$, ethyl alcohol, as the end product. Acetaldehyde is not isolated because LiAlH_4 reduces carboxylic acids all the way to primary alcohols.

22. Answer: (A) $d > c > a > b$

Electron-withdrawing $-\text{NO}_2$ increases acidity of phenol most from the para position ($-\text{R}$ and $-\text{I}$), less from meta ($-\text{I}$ only), while $-\text{CH}_3$ donates electrons and lowers acidity. So para-nitrophenol $>$ meta-nitrophenol $>$ phenol $>$ methylphenol. Putting meta above para ignores the resonance effect.

23. Answer: (C) a, b and c

The iodoform test is given by compounds with $\text{CH}_3\text{CO-}$ or $\text{CH}_3\text{CH(OH)-}$ groups: ethanol, acetone and 2-propanol all qualify. Methanol has no such group and gives no iodoform.

24. Answer: (C) $\text{C}_6\text{H}_5\text{OH}$ (phenol)

Phenol is far more acidic ($\text{pK}_\text{a} \approx 10$) than any alcohol because the phenoxide ion is resonance-stabilised by the ring. Benzyl alcohol, cyclohexanol and dicyclohexylmethanol give alkoxide ions with no such delocalisation.

25. Answer: (B) $\text{III} > \text{II} > \text{IV} > \text{I}$

Picric acid (2,4,6-trinitrophenol, $\text{pK}_\text{a} \approx 0.4$) is the strongest because three $-\text{NO}_2$ groups stabilise the phenoxide; acetic acid ($\text{pK}_\text{a} \approx 4.8$) is next, then phenol (≈ 10), then cyclohexanol (≈ 16). Putting phenol above acetic acid is the common trap.

26. Answer: (C) $\text{CH}_3\text{CH}_2\text{OH}$

PBr_3 converts ethanol to bromoethane (X); alcoholic KOH eliminates HBr to give ethene (Y). Cold conc. H_2SO_4 adds across the double bond giving ethyl hydrogen sulphate, which on boiling with water is hydrolysed back to ethanol (Z). Ethyl hydrogen sulphate is only the intermediate.

27. Answer: (C) 2HCHO

Periodic acid cleaves the C-C bond between the two $-\text{OH}$ bearing carbons of a 1,2-diol. Each CH_2OH becomes $\text{H}_2\text{C=O}$, so ethylene glycol gives two molecules of formaldehyde. Glyoxal would need oxidation without C-C cleavage.

28. Answer: (B) Benzoic acid

Distilling phenol with zinc dust removes the $-\text{OH}$, giving benzene (X). Friedel-Crafts methylation gives toluene (Y). Alkaline KMnO_4 oxidises the whole side chain to $-\text{COOH}$, giving benzoic acid (Z), not just benzaldehyde.

29. Answer: (D) Phenol (C_6H_5OH)

The $-OH$ group of phenol donates its lone pair into the ring (+R effect), which strongly activates the ring towards electrophiles. $-CH_2OH$ is only weakly activating, $-Cl$ deactivates by its $-I$ effect, and $-NO_2$ strongly deactivates.

30. Answer: (C) $(CH_3)_2CH-CH_2OH + CH_3-CH_2-I$

With two primary alkyl groups, I^- attacks the less hindered carbon by SN_2 after protonation of the ether oxygen. The ethyl carbon is less hindered than the isobutyl carbon, so the products are CH_3CH_2I and $(CH_3)_2CHCH_2OH$.

31. Answer: (D) $C_nH_{2n+2}O$

Alkanols are $C_nH_{2n+1}OH$, which written as a molecular formula is $C_nH_{2n+2}O$ (e.g. CH_4O for methanol, C_2H_6O for ethanol). $C_nH_{2n}O$ fits aldehydes and ketones, and $C_nH_{2n}O_2$ fits acids and esters.

32. Answer: (D) $CH_3I + (CH_3)_2CHOH$

HI protonates the ether oxygen and I^- attacks by SN_2 at the less hindered carbon, which is the methyl group. The products are CH_3I and isopropyl alcohol, $(CH_3)_2CHOH$. Attack at the secondary isopropyl carbon, giving CH_3OH and isopropyl iodide, is slower under these conditions.

33. Answer: (D) primary alcohol

The carbanion of $RMgX$ attacks a ring carbon of ethylene oxide and opens the strained ring, giving RCH_2CH_2OMgX . Hydrolysis yields RCH_2CH_2OH , a primary alcohol with two more carbons than R .

Secondary and tertiary alcohols come from aldehydes and ketones with Grignard reagents.

34. Answer: (B) o-Nitrophenol (2-nitrophenol)

Phenols are more acidic than alcohols because the phenoxide ion is resonance-stabilised. The $-NO_2$ group withdraws electrons and further stabilises the phenoxide, so o-nitrophenol is most acidic; the $-CH_3$ of o-cresol lowers acidity.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.