1. The IUPAC name of CH3–CH2–CH(OH)–CH3 is:

A. Butan-2-ol
B. Butan-1-ol
C. 2-hydroxybutane
D. 1-hydroxybutane

Answer: A. Butan-2-ol
Explanation: Longest chain is butane, OH at position 2 → Butan-2-ol.

2. Which of the following alcohols gives Lucas test immediately?

A. Methanol
B. Ethanol
C. 2-propanol
D. 2-methyl-2-propanol

Answer: D. 2-methyl-2-propanol
Explanation: Tertiary alcohols react instantly in Lucas test.

3. Oxidation of a primary alcohol with acidic $KMnO_4$ gives:

A. Ketone
B. Aldehyde
C. Carboxylic acid
D. Ester

Answer: C. Carboxylic acid
Explanation: Primary alcohols are fully oxidized to carboxylic acids.

4. The correct order of acidic strength is:

A. Water > Ethanol > Phenol
B. Ethanol > Phenol > Water
C. Phenol > Water > Ethanol
D. Water > Phenol > Ethanol

Answer: C. Phenol > Water > Ethanol

Explanation: Phenol stabilizes phenoxide ion via resonance.

5. Which of the following compounds can be used to distinguish alcohol from phenol?

A. Bromine water
B. Sodium metal
C. Lucas reagent
D. PCC

Answer: A. Bromine water
Explanation: Phenol decolorizes Br_2 water and forms white ppt; alcohols don't.

6. In the reaction of phenol with bromine water, the product formed is:

A. Bromobenzene
B. o-bromophenol
C. 2,4,6-tribromophenol
D. p-bromophenol

Answer: C. 2,4,6-tribromophenol
Explanation: Phenol reacts with Br_2 water → electrophilic substitution at ortho & para.

7. Which of the following will give a positive iodoform test?

A. Ethanol
B. Methanol
C. Propan-1-ol
D. Butan-1-ol

Answer: A. Ethanol
Explanation: Ethanol has CH_3–CH(OH) group → gives yellow ppt of iodoform.

8. Which compound shows the highest boiling point?

A. Ethanol
B. Diethyl ether
C. Acetone

D. Propane

Answer: A. Ethanol
Explanation: Strong hydrogen bonding in alcohol increases boiling point.

9. The Williamson synthesis is used for preparing:

A. Alcohols
B. Aldehydes
C. Ketones
D. Ethers

Answer: D. Ethers
Explanation: Reaction between alkoxide and alkyl halide → ether.

10. Which of the following is least reactive in Williamson synthesis?

A. CH3Br
B. C2H5Br
C. (CH3)3CBr
D. CH3CH2Cl

Answer: C. (CH3)3CBr
Explanation: Tertiary alkyl halides undergo elimination, not substitution.

11. Dehydration of alcohols to give alkenes is an example of:

A. Electrophilic addition
B. Nucleophilic substitution
C. Elimination (E1)
D. Free radical reaction

Answer: C. Elimination (E1)
Explanation: In acid → protonated OH group leaves → forms alkene.

12. On heating phenol with Zn dust, the product is:

A. Benzene
B. Benzoic acid
C. Toluene
D. Aniline

Answer: A. Benzene
Explanation: Zn removes –OH group from phenol → benzene forms.

13. What is the major product of reaction of ethanol with HBr?

A. Ethene
B. Bromoethane
C. Acetaldehyde
D. Ethanol

Answer: B. Bromoethane
Explanation: Alcohol reacts with HBr → substitution → R–Br.

14. Which of the following is aromatic alcohol?

A. Ethanol
B. Phenol
C. Benzyl alcohol
D. Propanol

Answer: C. Benzyl alcohol
Explanation: Alcohol with –CH2OH group attached to benzene ring.

15. Phenol on treatment with NaOH followed by CO_2 and then acidification gives:

A. Benzene
B. Salicylic acid
C. Benzoic acid
D. Anisole

Answer: B. Salicylic acid
Explanation: Kolbe reaction → ortho-hydroxybenzoic acid (salicylic acid).

16. Which among the following will not give iodoform test?

A. Ethanol
B. Acetone
C. 2-Propanol
D. Methanol

Answer: D. Methanol
Explanation: Iodoform test is given by compounds with CH_3–CO or CH_3–CH(OH) groups. Methanol lacks both.

17. Phenol reacts with conc. HNO_3 to form:

A. 2,4,6-trinitrophenol
B. Nitrobenzene
C. o-nitrophenol
D. p-nitrophenol

Answer: A. 2,4,6-trinitrophenol
Explanation: Strong nitration forms picric acid (tri-substituted).

18. The reagent used to distinguish between alcohol and phenol is:

A. $FeCl_3$
B. Br_2 water
C. Zn dust
D. NaOH

Answer: A. $FeCl_3$
Explanation: Phenol forms violet complex with $FeCl_3$, alcohols do not.

19. Ether on reaction with excess HI gives:

A. Alcohol and iodoalkane
B. Two molecules of alcohol
C. Two molecules of alkyl iodide
D. Alcohol and water

Answer: C. Two molecules of alkyl iodide
Explanation: R–O–R + 2HI → 2R–I + H_2O.

20. Phenol is more acidic than alcohol due to:

A. +M effect of –OH
B. Hydrogen bonding
C. Resonance stabilization of phenoxide ion
D. Inductive effect of phenyl group

Answer: C. Resonance stabilization of phenoxide ion
Explanation: Delocalization of negative charge increases acidity.

21. Which of the following is most reactive toward dehydration?

A. 1° Alcohol
B. 2° Alcohol
C. 3° Alcohol
D. Phenol

Answer: C. 3° Alcohol
Explanation: 3° carbocation is most stable → faster dehydration.

22. Ethanol can be converted to ethene by:

A. Reaction with HBr
B. Heating with Zn
C. Dehydration using conc. H_2SO_4
D. Reaction with PCC

Answer: C. Dehydration using conc. H_2SO_4
Explanation: Acid-catalyzed elimination forms alkene.

23. On heating anisole with HI, the products are:

A. Phenol + CH_3I
B. Benzene + CH_3I

C. $CH_3OH + I_2$
D. Phenol + CH_4

Answer: A. Phenol + CH_3I
Explanation: R–O–Ar ether cleaves at R–O bond → phenol + alkyl iodide.

24. Which alcohol shows maximum hydrogen bonding in liquid state?

A. Methanol
B. Ethanol
C. Propanol
D. Butanol

Answer: A. Methanol
Explanation: Smallest molecule → strongest intermolecular H-bonding.

25. The mechanism of dehydration of alcohol involves:

A. Free radical
B. Carbocation intermediate
C. Carbanion
D. Carbonyl formation

Answer: B. Carbocation intermediate
Explanation: Follows E1 mechanism with carbocation intermediate.

26. Which one of the following compounds will react fastest with Lucas reagent at room temperature?

A. 1-Butanol
B. 2-Butanol
C. 2-Methyl-2-propanol
D. Ethanol

Answer: C. 2-Methyl-2-propanol
Explanation: It is tertiary → forms carbocation instantly.

27. Which of the following is formed when phenol reacts with NaOH?

A. Phenoxide ion
B. Benzene
C. Benzoate ion
D. Quinone

Answer: A. Phenoxide ion
Explanation: Phenol loses H^+ → phenoxide ion forms.

28. Lucas reagent is a mixture of:

A. $ZnCl_2$ + HCl
B. $AlCl_3$ + HCl
C. $FeCl_3$ + HCl
D. $ZnCl_2$ + H_2SO_4

Answer: A. $ZnCl_2$ + HCl
Explanation: Used to distinguish between primary, secondary, tertiary alcohols.

29. In Williamson synthesis, which combination is best for preparing ethyl methyl ether?

A. Methyl bromide + sodium ethoxide
B. Ethyl bromide + sodium methoxide
C. Both A and B
D. Ethyl chloride + sodium tert-butoxide

Answer: C. Both A and B
Explanation: Both combinations produce ethyl methyl ether.

30. Which among the following is not an electrophilic substitution reaction of phenol?

A. Bromination
B. Nitration
C. Sulphonation
D. Oxidation

Answer: D. Oxidation
Explanation: Oxidation is not an electrophilic substitution.

31. Which among the following is the correct product of Kolbe's reaction with phenol and CO_2?

A. o-Cresol
B. p-Hydroxybenzoic acid
C. o-Hydroxybenzoic acid
D. Benzoic acid

Answer: C. o-Hydroxybenzoic acid
Explanation: Kolbe's reaction gives salicylic acid (major) by ortho substitution.

32. Which of the following alcohols will undergo dehydration most easily?

A. $CH_3CH_2CH_2OH$
B. $(CH_3)_2CHCH_2OH$
C. $(CH_3)_3COH$
D. CH_3CH_2OH

Answer: C. $(CH_3)_3COH$
Explanation: Tertiary alcohol forms a stable carbocation → faster dehydration.

33. Which of the following gives violet color with neutral $FeCl_3$?

A. Benzyl alcohol
B. Ethanol
C. Phenol
D. Cyclohexanol

Answer: C. Phenol
Explanation: Phenol forms a complex with Fe^{3+} → violet color.

34. In Williamson synthesis, the best combination to prepare tert-butyl ethyl ether is:

A. Ethyl bromide + sodium tert-butoxide
B. tert-Butyl bromide + sodium ethoxide
C. Ethyl chloride + sodium tert-butoxide
D. Both A and C

Answer: A. Ethyl bromide + sodium tert-butoxide
Explanation: Less hindered alkyl halide avoids elimination.

35. What happens when phenol is treated with bromine water?

A. Monobromo phenol is formed
B. Tribromo phenol is formed
C. No reaction
D. Bromobenzene is formed

Answer: B. Tribromo phenol is formed
Explanation: Phenol activates the ring → 2,4,6-tribromo phenol forms.

36. Ether is cleaved by HI because:

A. It is a strong oxidizing agent
B. It is a nucleophile
C. It provides both H^+ and I^-
D. It forms water

Answer: C. It provides both H^+ and I^-
Explanation: H^+ protonates ether, I^- attacks alkyl group → cleavage.

37. Which of the following is a correct product of Reimer–Tiemann reaction?

A. Benzoic acid
B. Salicylaldehyde
C. Benzaldehyde
D. Acetophenone

Answer: B. Salicylaldehyde
Explanation: Phenol + $CHCl_3$/NaOH → o-hydroxybenzaldehyde.

38. Boiling point order for isomeric alcohols is:

A. 1° > 2° > 3°

B. 3° > 2° > 1°
C. 2° > 1° > 3°
D. 1° > 3° > 2°

Answer: A. 1° > 2° > 3°
Explanation: 1° alcohols form stronger H-bonds → higher b.p.

39. Which of the following is the major product when ethanol is oxidized with PCC?

A. Acetic acid
B. Ethanal
C. Ethene
D. Methanol

Answer: B. Ethanal
Explanation: PCC oxidizes alcohol to aldehyde, not further to acid.

40. Reaction of phenol with conc. HNO_3 forms:

A. Picric acid
B. Nitrobenzene
C. Salicylic acid
D. Acetophenone

Answer: A. Picric acid
Explanation: Strong nitration gives 2,4,6-trinitrophenol (picric acid).

41. What is the correct IUPAC name for $CH_3–CH(OH)–CH_2–CH_3$?

A. 1-butanol
B. 2-butanol
C. 3-butanol
D. Butyl alcohol

Answer: B. 2-butanol
Explanation: OH at position 2 on a 4-carbon chain → 2-butanol.

42. Which of the following reagents can convert phenol to benzene?

A. NaOH
B. Zn dust
C. $KMnO_4$
D. $Na_2Cr_2O_7$

Answer: B. Zn dust
Explanation: Reduction of phenol with Zn dust removes OH group.

43. Ether can be distinguished from alcohol by:

A. Lucas test
B. Sodium test
C. $FeCl_3$ test
D. Reaction with Na

Answer: D. Reaction with Na
Explanation: Alcohol reacts with Na → H_2 gas, ether does not.

44. What is the hybridization of oxygen atom in diethyl ether?

A. sp^3
B. sp^2
C. sp
D. None

Answer: A. sp^3
Explanation: Oxygen has 2 lone pairs + 2 sigma bonds → sp^3.

45. Phenol is less volatile than ethanol due to:

A. Larger size
B. Resonance
C. Stronger H-bonding
D. More acidic nature

Answer: C. Stronger H-bonding

Explanation: Phenol forms stronger H-bonds → lower volatility.