1. Conc. H_2SO_4 reacts with C_2H_5OH at 170^oC to form
   (a) CH_3COCH_3 (b) CH_3COOH
   (c) CH_3CHO (d) C_2H_4

2. Carbylamine test is done by heating alcoholic *KOH* with
   (a) Chloroform and silver powder
   (b) Trihalogen methane and primary amine
   (c) Alkyl halide and primary amine
   (d) Alkyl cyanide and primary amine

3. Absolute alcohol cannot be prepared by fractional distillation of rectified spirit since
   (a) It forms azeotropic mixture
   (b) It is used as power alcohol
   (c) It is used in wines
   (d) None of the above

4. Lucas test is used to distinguish between
   (a) $1^o, 2^o$ and 3^o alcohols (b) $1^o, 2^o$ and 3^o amines
   (c) Aldehydes and ketones (d)Alkenes and alkynes

5. $CH_3-O-C_3H_7$ and $C_2H_5-O-C_2H_5$
   exhibit which type of isomerism
   (a) Metamerism (b) Position
   (c) Chain (d) Functional

6. Phenol $\xrightarrow[H^+]{CHCl_3/NaOH}$ Salicyldehyde
   The above reaction is known as
   (a) Riemer Tiemann reaction
   (b) Bucherer reaction
   (c) Gattermann synthesis
   (d) Perkin reaction

7. In presence of *NaOH*, phenol react with $CHCl_3$ to form *o*-hydroxy benzaldehyde. This reaction is called
   (a) Riemer-Tiemann's reaction
   (b) Sandmeyer's reaction
   (c) Hoffmann's degradation reaction
   (d) Gattermann's aldehyde synthesis

8. Glycerol heated with oxalic acid at 110^oC to form
   (a) Formic acid (b) Oxalic acid
   (c) Allyl alcohol (d) Glycerol trioxalate

9. Methanol and ethanol are miscible in water due to
   (a) Covalent character
   (b) Hydrogen bonding character
   (c) Oxygen bonding character
   (d) None of these

10. Which of the following gives negative iodoform test

(a) CH_3CH_2OH (b) $CH_3CH_2CH_2OH$

(c) $C_6H_5-\underset{\underset{OH}{|}}{CH}-CH_3$ (d) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3$

11. When rectified spirit and benzene are distilled together, the first fraction obtained is

(a) A ternary azeotrope (b) Absolute alcohol

(c) A binary azeotrope (d) Denatured spirit

12. Alcohols can be distinguished from alkenes by

(a) Dissolving in cold concentrated H_2SO_4

(b) Decolourizing with bromine in CCl_4

(c) Oxidizing with neutral permanganate solution

(d) None of the above

13. Which of the following is most acidic

(a) Phenol (b) Benzyl alcohol

(c) *m*-chlorophenol (d) Cyclohexanol

14. When ether is exposed in air for sometime an explosive substance produced is

(a) Peroxide (b) TNT

(c) Oxide (d) Superoxide

15. Diethyl ether can be decomposed by heating with

(a) HI (b) $NaOH$

(c) Water (d) $KMnO_4$

16. Ether is formed when ethyl alcohol is heated with conc. H_2SO_4. The conditions are

(a) Excess of H_2SO_4 and 170^oC

(b) Excess of C_2H_5OH and 140^oC

(c) Excess of C_2H_5OH and 180^oC

(d) Excess of conc. H_2SO_4 and 100^oC

17. The ether that undergoes electrophilic substitution reactions is

(a) $CH_3OC_2H_5$ (b) $C_6H_5OCH_3$

(c) CH_3OCH_3 (d) $C_2H_5OC_2H_5$

18. Etherates are

(a) Ethers

(b) Solution in ether

(c) Complexes of ethers with Lewis acid

(d) Complexes of ethers with Lewis base

19. Ethylene glycol reacts with excess of PCl_5 to give

(a) 1, 1-dichloroethane

(b) 1, 2-dicholoroethane

(c) 1, 1, 1-trichloroethane

(d) 1, 1, 2, 2-tetrachloroethane

(e) 2, 2-dichloroethane

20. The boiling point of methanol is greater than that of methyl thiol because
(a) There is intramolecular hydrogen bonding in methanol and intermolecular hydrogen bonding in methyl thiol
(b) There is intermolecular hydrogen bonding in methanol and no hydrogen bonding in methyl thiol
(c) There is no hydrogen bonding in methanol and intermolecular hydrogen bonding in methyl thiol
(d) There is intramolecular hydrogen bonding in methanol and no hydrogen bonding in methyl thiol
(e) There is no hydrogen bonding in methanol and intramolecular hydrogen bonding in methyl thiol

21. With anhydrous zinc chloride, ethylene glycol gives
(a) Formaldehyde (b) Acetylene
(c) Acetaldehyde (d) Acetone

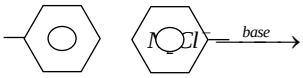
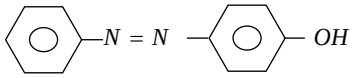
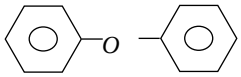
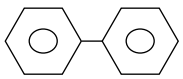
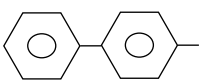
22. Which of the following react with benzoic acid to form ethyl benzoate
(a) Ethyl alcohol (b) Cinnamic acid
(c) Sodium ethoxide (d) Ethyl chloride

23. Fats, on alkaline hydrolysis, gives
(a) Oils (b) Soaps
(c) Detergents (d) Glycol + acid

24. Which of the following can work as a dehydrating agent for alcohols
(a) H_2SO_4 (b) Al_2O_3
(c) H_3PO_4 (d) All of these

25. $A \xleftarrow[\Delta]{Cu} CH_3CH_2OH \xrightarrow[\Delta]{Al_2O_3} B.$ A and B respectively are
(a) Alkene, alkanal (b) Alkyne, alkanal
(c) Alkanal, alkene (d) Alkene, alkyne

26. A compound does not react with 2.4 di-nitrophenyl hydrazine and Na , compound is
(a) Acetone (b) Acetaldehyde
(c) CH_3OH (d) $CH_2 = CHOCH_3$

27. HO 
(a) 
(b) 
(c) 
(d) 

28. Aspirin is also known as
(a) Methyl salicylic acid (b) Acetyl salicylic acid
(c) Acetyl salicylate (d) Methyl salicylate

29. In cold countries ethylene glycol is added to water in the radiators to
(a) Bring down the specific heat of water
(b) Lower the viscosity
(c) Reduce the viscosity
(d) Make water a better lubricant

30. Glycerol is not used in which of following cases
(a) Explosive making (b) Shaving soap making
(c) As an antifreeze for water (d)As an antiseptic agent

1. (d) $\underset{\text{Ethanol}}{C_2H_5OH} \xrightarrow[170^oC]{Conc.\ H_2SO_4} \underset{\text{Ethane}}{C_2H_4} + H_2O$

2. (b) Carbylamine reaction

$$CHCl_3 + CH_3NH_2 + 3\underset{\text{alc.}}{KOH} \rightarrow \underset{\substack{\text{Methyl}\\\text{isocyanide}}}{CH_3N \equiv C} + 3KCl + 3H_2O$$

3. (a)

4. (d)

5. (d)

6. (a)

7. (a)

8. (a)

$$\begin{array}{l} CH_2-OH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array} + \begin{array}{l} COOH \\ | \\ COOH \end{array} \xrightarrow[-H_2O]{110^oC} \begin{array}{l} CH_2-O-CO-COOH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array} \xrightarrow{-CO_2}$$

Glycerol mono-oxolate

$$\begin{array}{l} CH_2-O-CO-H \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array} \xrightarrow{\text{Hydrolysis}} \begin{array}{l} CH_2-OH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array} + HCOOH$$

Glycerol mono-formate — Formic acid

9. (b)Hydrogen bonding : $\overset{\delta-}{O}\overset{\delta+}{-H}$ .... $\overset{\delta-}{O}\overset{\delta+}{-H}$ ..... $\overset{\delta-}{O}\overset{\delta+}{-H}$

R (Alcohol) — H (Water) — R (Alcohol)

10. (b)

11. (a) Azeotropic distillation method –

Rectified spirit + Benzene + water

↓ Fractional distillation

First fraction at 331.8 *K* is ternary azeotrope

(H_2O 7.4% + Benzene 74% + alcohol 18.5%)

Second fraction 341.2 *K* is a binary azeotrope

(Benzene 67.7% + Alcohol 32.2%)

Last fraction at 351*K* is absolute alcohol.

12. (b)

13. (c) Benzyl alcohol and cyclohexanol are not acidic while phenol and *m*-chlorophenol are acidic due to presence of electron withdrawing groups like $-NO_2$, $-Cl$, $-CN$ increases the acidic character of phenols. Hence, *m*-chlorophenol is more acidic than phenol.

14. (a)

15. (a) $C_2H_5OC_2H_5 + HI \rightarrow C_2H_5OH + C_2H_5I$

16. (b)

17. (b) Only alkyl aryl ethers *e.g.*, $C_6H_5OCH_3$ undergoes electrophilic substitution reactions.

18. (c)

$$R-O-R \xrightarrow{BF_3} \underset{R}{\overset{R}{\diagdown}}\!\!\diagup \ddot{O}: \rightarrow BF_3$$

Etherate

19. (b) $\underset{\text{Ethylene glycol}}{\overset{CH_2OH}{\underset{CH_2OH}{|}}} + 2PCl_5 \rightarrow \underset{\text{1, 2 dichloroethane}}{\overset{CH_2Cl}{\underset{CH_2Cl}{|}}} + 2POCl_3 + 2HCl$

20. (b)Methanol has high boiling point than methyl thiol because there us intermolecular hydrogen bonding in methanol and no hydrogen bonding in methyl thiol.

21. (c) $\underset{CH_2OH}{\overset{CH_2OH}{|}} \xrightarrow[-H_2O]{\text{anh. } ZnCl_2} \underset{\text{Acetaldehyde}}{CH_3CHO}$

22. (a) When benzoic acid reacts with ethyl alcohol in the presence of sulphuric acid ethyl benzoate is formed. This is known as esterification.

$$\underset{\text{Benzoic acid}}{C_6H_5COOH} + \underset{\text{Ethyl alcohol}}{C_2H_5OH} \xrightarrow{H_2SO_4} \underset{\text{Ethyl benzoate}}{C_6H_5COOC_2H_5} + \underset{\text{water}}{H_2O}$$

23. (b)Fats are esters of higher fatty acids with glycerol, hence on alkaline hydrolysis they give back glycerol and sodium or potassium salt of acid (this is called soap).

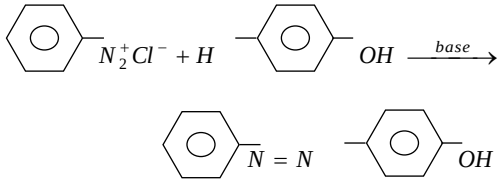
$$\underset{\text{Fat}}{\begin{array}{l}CH_2OCOR\\|\\CHOCOR\\|\\CH_2OCOR\end{array}} + 3NaOH \rightarrow \begin{array}{l}CH_2OH\\|\\CHOH\\|\\CH_2OH\end{array} + \underset{\text{(Soap)}}{3RCOONa}$$

24. (d) H_2SO_4, Al_2O_3 and H_3PO_4 all can act as dehydrating agent.

25. (c) $CH_3CHO \xleftarrow[\Delta]{Cu} CH_3CH_2OH \xrightarrow[\Delta]{Al_2O_3} CH_2 = CH_2$

26. (d)It is not acetaldehyde or acetone as does not react with hydrazine. It is not CH_3OH as does not react with *Na*.

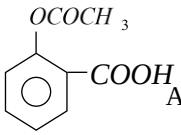
27. (a)



p-hydroxy azobenzene

This is an example of coupling reaction

28. (b)



Aspirin or Acetyl salicylic acid.

29. (a) Ethylene glycol is added to lowering down the freezing point of water so that it does not freeze.

30. (d) Glycerol is not used as an antiseptic agent.