PRACTICE PAPER 20

Time allowed: 45 minutes **Maximum Marks: 200**

General Instructions: *Same as Practice Paper–1.*

Choose the correct option.

1. **CsCl crystallises in body-centered cubic lattice. If '*a*' is its edge length then which of the following expressions is correct?**

   (*a*) $r_{Cs^+} + r_{Cl^-} = \sqrt{3}a$ (*b*) $r_{Cs^+} + r_{Cl^-} = 3a$ (*c*) $r_{Cs^+} + r_{Cl^-} = \frac{3a}{2}$ (*d*) $r_{Cs^+} + r_{Cl^-} = \frac{\sqrt{3}}{2}a$

2. **Photochemical reaction between hydrogen and chlorine on the surface of water is of**

   (*a*) zero order (*b*) first order (*c*) second order (*d*) third order

3. **Among solids, the highest melting point is exhibited by**

   (*a*) covalent solids (*b*) ionic solids

   (*c*) pseudo solids (*d*) molecular solids

4. **For a chemical reaction $xA \longrightarrow yM$, the rate law is $r = k[A]^3$. If the concentration of A is doubled, the reaction rate will be**

   (*a*) doubled (*b*) quadrupled

   (*c*) increased by 8 fold (*d*) unchanged

5. **A metal crystallises into two cubic faces namely face centered (*fcc*) and body centered (*bcc*), whose unit cell edge lengths are 3.5 Å and 3.0 Å respectively. The ratio of the densities of *fcc* and *bcc* will be**

   (*a*) 2.1 : 1 (*b*) 3.3 : 1

   (*c*) 1.259 : 1 (*d*) 2.259 : 1

6. **The mechanism of $2O_3 \rightleftharpoons 3O_2$ is given as,**

   $O_3 \rightleftharpoons O_2 + O$ **(fast)**

   $O + O_3 \rightleftharpoons 2O_2$ **(slow)**

   which of the following is the correct rate expression?

   (*a*) $r = k[O_3]^2$ (*b*) $r = k[O_3]^2\,[O_2]^{-1}$

   (*c*) $r = k[O_3][O_2]$ (*d*) unpredictable

7. **The value of concentration of the electrolyte in standard electrode potential is**

   (*a*) 1 N (*b*) 2 N (*c*) 1 molar (*d*) 1 molal

8. **If molarity of dilute solution is doubled, the value of molal depression constant (K_f) will be**

   (*a*) halved (*b*) tripled

   (*c*) unchanged (*d*) doubled

9. Match the items of Column I and Column II.

Column I	Column II
A. 1 mol of Al^{3+} to Al	(*i*) 2F
B. 1 mol of Cu^{2+} to Cu	(*ii*) 5F
C. 1 mol of MnO_4^- to Mn^{2+}	(*iii*) 1F
D. 1 mol of FeO to Fe_2O_3	(*iv*) 3F

(*a*) A–(*i*), B–(*iv*), C–(*ii*), D–(*iii*) (*b*) A–(*iv*), B–(*i*), C–(*ii*), D–(*iii*)
(*c*) A–(*iii*), B–(*ii*), C–(*iv*), D–(*i*) (*d*) A–(*i*), B–(*iv*), C–(*ii*), D–(*iii*)

10. A mixture of ethyl alcohol and propyl alcohol has a vapour pressure of 290 mm Hg at 300 K. The vapour pressure of propyl alcohol is 200 mm Hg. If the mole fraction of ethyl alcohol is 0.6, its vapour pressure (in mm Hg) at the same temperature will be

(*a*) 360 (*b*) 350 (*c*) 300 (*d*) 700

11. In the mercury cell, the electrolyte contains

(*a*) A mixture of $Zn(OH)_2$ and HgO. (*b*) A mixture of KCl and HgO.
(*c*) A mixture of KOH and ZnO. (*d*) A mixture of $ZnCl_2$ and NH_4Cl.

12. If 1.0 molal aqueous solution of a substance boils at 100.55 °C ; then it freezes at approximately (K_b = 0.51 °C kg mol^{-1} and K_b = 1.86 °C kg mol^{-1})

(*a*) 272 K (*b*) 271 K (*c*) 375 K (*d*) 274 K

13. Given below are two statements labelled as Statement P and Statement Q:

Statement P : The cell constant of a conductivity cell depends upon the nature of the material of the electrodes.

Statement Q : The electrodes of the cell are coated with platinum black to avoid polarisation.

(*a*) P is true, but Q is false (*b*) P is false, but Q is true
(*c*) Both P and Q are true (*d*) Both P and Q are false

14. An emulsifier is a substance which

(*a*) coagulates the emulsion. (*b*) stabilizes the emulsion.
(*c*) accelerates the disperson of liquid in liquid. (*d*) retards the dispersion of liquid in liquid.

15. The negative terminal of electrochemical cell is known as

(*a*) anode (*b*) cathode
(*c*) neither anode nor cathode (*d*) both anode and cathode

16. Among the following properties of colloidal solutions, which property is independent of charge on the colloidal particles?

(*a*) Tyndall effect (*b*) Electroosmosis
(*c*) Electrophoresis (*d*) Coagulation

17. Nitrogen dioxide cannot be obtained by heating

(*a*) KNO_3 (*b*) $Pb(NO_3)_2$ (*c*) $Ca(NO_3)_2$ (*d*) $AgNO_3$

18. Hydrolysis of one mole of peroxydisulphuric acid produces

(*a*) two moles of sulphuric acid.
(*b*) two moles of peroxomonosulphuric acid.
(*c*) one mole of sulphuric acid and one mole of peroxomonosulphuric acid.
(*d*) one mole of sulphuric acid, one mole of peroxomonosulphuric acid and one mole of hydrogen peroxide.

19. Which of the following ion gives coloured solution?

(*a*) Cu^+ (*b*) Zn^{2+} (*c*) Ag^+ (*d*) Fe^{2+}

20. Which one of the following sets correctly represents the increase in the paramagnetic property of the ions?

(*a*) $Cu^{2+} < V^{2+} < Cr^{2+} < Mn^{2+}$ (*b*) $Cu^{2+} < Cr^{2+} < V^{2+} < Mn^{2+}$
(*c*) $Mn^{2+} < V^{2+} < Cr^{2+} < Cu^{2+}$ (*d*) $Mn^{2+} < Cu^{2+} < Cr^{2+} < V^{2+}$

21. **During the extraction of pig iron from haematite ore, $CaCO_3$ is added which acts as**

(*a*) flux (*b*) slag

(*c*) reducing agent (*d*) gangue

22. **Which of these statements abut $[Co(CN)_6]^{3-}$ is true?**

(*a*) $[Co(CN)_6]^{3-}$ has no unpaired electrons and will be in a low spin configuration.

(*b*) $[Co(CN)_6]^{3-}$ has four unpaired electrons and will be in a low spin configuration.

(*c*) $[Co(CN)_6]^{3-}$ has four unpaired electrons and will be in a high spin configuration.

(*d*) $[Co(CN)_6]^{3-}$ has no unpaired electrons and will be in a high spin configuration.

23. **Which of the following is an ore of potassium and magnesium?**

(*a*) Carnalite (*b*) Cryolite

(*c*) Bauxite (*d*) Dolomite

24. **Which of the following complexes show optical isomerism?**

(*a*) *cis* $[Co(en)_2Cl_2]Cl$ (*b*) *trans* $[Co(en)_2Cl_2]Cl$

(*c*) $[Co(NH_3)_4Cl_2]Cl$ (*d*) $[Co(NH_3)_3Cl_3]$

25. **The pair having same magnetic moment is**

[At No: of Cr = 24, Mn = 25, Fe = 26, Co = 27]

(*a*) $[Cr(H_2O)_6]^{2+}$ and $[Fe(H_2O)_6]^{2+}$ (*b*) $[Mn(H_2O)_6]^{2+}$ and $[Cr(H_2O)_6]^{2+}$

(*c*) $[CoCl_4]^{2-}$ and $[Fe(H_2O)_6]^{2+}$ (*d*) $[Cr(H_2O)_6]^{2+}$ and $[CoCl_4]^{2-}$

26. **Four successive member of the first row transition elements are listed below with atomic numbers. Which one of them is expected to have highest $E^{\circ}_{(M^{3+}/M^{2+})}$ value?**

(*a*) Fe (Z = 26) (*b*) Co (Z = 27)

(*c*) Cr (Z = 24) (*d*) Mn (Z = 25)

27. **Which of the following alcohols will yield the corresponding alkyl chloride on reaction with concentrated HCl at room temperature?**

(*a*) $CH_3CH_2—CH_2—OH$

(*b*) $CH_3CH_2—\underset{\displaystyle CH_3}{\underset{|}{CH}}—OH$

(*c*) $CH_3CH_2—\underset{\displaystyle CH_3}{\underset{|}{CH}}—CH_2OH$

(*d*) $CH_3CH_2—\overset{\displaystyle CH_3}{\overset{|}{\underset{\displaystyle CH_3}{\underset{|}{C}}}}—OH$

28. **S_N2 mechanism proceed through the formation of**

(*a*) carbonium ion (*b*) transition state

(*c*) free radical (*d*) carbanion

29. **Chlorination of toluene in presence of sunlight and heat and followed by treatment with aqueous NaOH gives**

(*a*) *o*-cresol (*b*) *p*-cresol

(*c*) 2, 4-dihydroxytoluene (*d*) benzoic acid

30. **Given below are two statements labelled as Assertion and Reason:**

Assertion (A) : Salt of ClO_3^- and ClO_4^- are well known but those of FO_3^- and FO_4^- are non-existent.

Reason (R) : F is more electronegative than O while Cl is less electronegative than O.

(*a*) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(*b*) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(*c*) Assertion is correct statement but reason is wrong statement.

(*d*) Assertion is wrong statement but reason is correct statement.

31. Given below are two statements labelled as Assertion and Reason:

Assertion (A) : NaCl reacts with concentrated H_2SO_4 to give colourless fumes with pungent smell. But on adding MnO_2 the fumes become greenish yellow.

Reason (R) : MnO_2 oxidises HCl to chlorine gas which is greenish yellow.

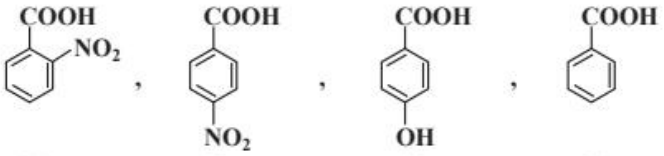
(*a*) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(*b*) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(*c*) Assertion is correct statement but reason is wrong statement.

(*d*) Assertion is wrong statement but reason is correct statement.

32. Arrange the following acids in order of the increasing acidity.



(A) (B) (C) (D)

(*a*) B < C < A < D (*b*) A < B < C < D

(*c*) C < B < D < A (*d*) C < D < B < A

33. Flexiglass is a commercial name of

(*a*) glyptal (*b*) polyacrylonitrile

(*c*) polymethyl methacrylate (*d*) polyethyl acrylate

34. Which of the following gives rise to fibrous and globular proteins?

(*a*) Primary structure of proteins (*b*) Secondary structure of proteins

(*c*) Tertiary structure of proteins (*d*) Quaternary structure of proteins

35. The function of glycerol in soap is

(*a*) just as a filler. (*b*) to increase leathering.

(*c*) to prevent rapid drying. (*d*) to make soap granules.

36. Tertiary amines have lowest boiling points amongst isomeric amines because

(*a*) they have highest molecular mass. (*b*) they do not form hydrogen bonds.

(*c*) they are more polar in nature. (*d*) they are most basic in nature.

37. Electrophilic substitution reaction in benzaldehyde takes place at

(*a*) *o*–position (*b*) *p*–position

(*c*) *m*–position (*d*) *o* and *p*-position

38. The hybrid state of N in R_2NH is

(*a*) sp^3 (*b*) sp^2 (*c*) sp (*d*) dsp^2

39. Carbohydrates are classified on the basis of their behaviour on hydrolysis and also as reducing or non-reducing sugar. Sucrose is a _____.

(*a*) monosaccharide (*b*) disaccharide

(*c*) reducing sugar (*d*) polysaccharide

40. Given the polymers:

A = Nylon; B = Buna-S; C = Polythene.

Arrange these in decreasing order of their intermolecular forces.

(*a*) A > B > C (*b*) B > C > A

(*c*) B < C < A (*d*) C < A < B

41. Glucose gives silver mirror with Tollen's reagent. It shows the presence of

(*a*) An acidic group (*b*) An alcoholic group

(*c*) A ketonic group (*d*) An aldehydic group

42. **Propan-1-ol may be prepared by the reaction of propene with**

(*a*) H_3BO_3

(*b*) $(BH_3)_2$ / NaOH — H_2O_2

(*c*) H_2SO_4 / H_2O

(*d*) $CH_3—\overset{\overset{O}{\|}}{C}—OH$

43. **Phenol is heated with a solution of mixture of KBr and $KBrO_3$. The major product obtained in the above reaction is:**

(*a*) 2, 4, 6-tribromophenol

(*b*) 2-bromophenol

(*c*) 3-bromophenol

(*d*) 4-bromophenol

44. **Name the end product in the following series of reactions**

$$CH_3COOH \xrightarrow{NH_3} A \xrightarrow{\Delta} B$$

(*a*) CH_4 (*b*) CH_3OH (*c*) Acetamide (*d*) Ammonium acetate

45. **Increasing order of acid strength among *p*-methoxyphenol, *p*-methylphenol, and *p*-nitrophenol is**

(*a*) *p*-nitrophenol, *p*-methoxyphenol, *p*-methylphenol

(*b*) *p*-methylphenol, *p*-methoxyphenol, *p*-nitrophenol

(*c*) *p*-nitrophenol, *p*-methylphenol, *p*-methoxyphenol

(*d*) *p*-methoxyphenol, *p*-methylphenol, *p*-nitrophenol

46. **Ethyl alcohol on oxidation with $K_2Cr_2O_7$ gives**

(*a*) Ketone

(*b*) Acetaldehyde

(*c*) Formaldehyde

(*d*) Formic acid

47. **Activation of benzene ring in aniline can be decreased by treating with**

(*a*) dil. HCl

(*b*) ethyl alcohol

(*c*) acetic acid

(*d*) acetic anhydride

48. **An alcohol on oxidation is found to give CH_3COOH and CH_3CH_2COOH. The structure of the alcohol is**

(*a*) $CH_3CH_2CH_2OH$

(*b*) $(CH_3)_2C(OH)CH_2—CH_3$

(*c*) $CH_3(CH_2)_3CH_2OH$

(*d*) $CH_3CHOHCH_2CH_2CH_3$

49. **Match the reactions given in Column I with the suitable reagents given in Column II.**

Column I	Column II
A. Benzophenone — Diphenylmethane	(*i*) $LiAlH_4$
B. Benzaldehyde — 1-Phenylethanol	(*ii*) DIBAL—H
C. Cyclohexanone — Cyclohexanol	(*iii*) Zn(Hg)/Conc.HCl
D. Phenyl benzoate — Benzaldehyde	(*iv*) CH_3MgBr

(*a*) A–(*i*), B–(*ii*), C–(*iii*), D–(*iv*)

(*b*) A–(*i*), B–(*iv*), C–(*iii*), D–(*ii*)

(*c*) A–(*iv*), B–(*ii*), C–(*i*), D–(*iii*)

(*d*) A–(*iii*), B–(*iv*), C–(*i*), D–(*ii*)

50. **Which one of the following is a wrong pair?**

(*a*) Analgesics - Pain killing effect

(*b*) Antacids - Treatment of acidity

(*c*) Disinfectants - Applied to non-living objects

(*d*) Tranquilisers - Applied to diseased skin surfaces

Answers

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1. (*d*)	**2.** (*a*)	**3.** (*b*)	**4.** (*c*)	**5.** (*c*)	**6.** (*b*)	**7.** (*c*)
8. (*c*)	**9.** (*b*)	**10.** (*b*)	**11.** (*b*)	**12.** (*b*)	**13.** (*b*)	**14.** (*b*)
15. (*a*)	**16.** (*a*)	**17.** (*a*)	**18.** (*c*)	**19.** (*d*)	**20.** (*a*)	**21.** (*a*)
22. (*a*)	**23.** (*a*)	**24.** (*a*)	**25.** (*a*)	**26.** (*b*)	**27.** (*d*)	**28.** (*b*)
29. (*d*)	**30.** (*b*)	**31.** (*a*)	**32.** (*d*)	**33.** (*c*)	**34.** (*c*)	**35.** (*c*)
36. (*b*)	**37.** (*c*)	**38.** (*a*)	**39.** (*b*)	**40.** (*c*)	**41.** (*d*)	**42.** (*b*)
43. (*a*)	**44.** (*c*)	**45.** (*d*)	**46.** (*b*)	**47.** (*d*)	**48.** (*d*)	**49.** (*d*)
50. (*d*)						

Solutions

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1. (*d*) In body-centered cubic (*bcc*), oppositely charged ions touch each other along the body diagonal.

$\therefore$ Body diagonal $= 2r_{Cs^+} + 2r_{Cl^-}$

But body diagonal $= \sqrt{3}a$

$\therefore \quad 2(r_{Cs^+} + r_{Cl^-}) = \sqrt{3}a$

or $r_{Cs^+} + r_{Cl^-} = \frac{\sqrt{3}}{2}a$

2. (*a*) Photochemical reaction between hydrogen and chlorine on the surface of water is an example of zero order reaction.

3. (*b*) Ionic solids have highest melting point due to strong electrostatic forces of attraction.

4. (*c*) Rate $= k[A]^3$

If the concentration of A is doubled, the reaction rate will be increased by 8 fold.

Rate $= k[2A]^3$

Rate $= 8k[A]^3$

5. (*c*) $\rho = \frac{Z \times M}{a^3 \times N_A}$ for *fcc*, Z = 4

So, $\rho = \frac{4 \times M}{N_A \times (3.5 \times 10^{-8})^3}$ ...(*i*)

for *bcc*, Z = 2

So, $\rho = \frac{2 \times M}{N_A \times (3 \times 10^{-8})^3}$ ...(*ii*)

By dividing equation (*ii*), we get

$\rho_{fcc} : \rho_{bcc} = 1.259 : 1$

6. (*b*) $O_3 \underset{k_2}{\overset{k_1}{\rightleftharpoons}} O_2 + O$ (Fast)

$O + O_3 \xrightarrow{k_3} 2O_2$ (Slow)

$k = \frac{k_2[O_2][O]}{k_1[O_3]} \Rightarrow \frac{k \cdot k_1[O_3]}{k_2[O_2]} = [O]$ ...(*i*)

$k' = k_3[O][O_3]$ (slow step) ...(*ii*)

Putting the value of [O] in equation(*ii*), we get

$k' = k_3 \times \frac{k \cdot k_1}{k_2} \frac{[O_3][O_3]}{[O_2]}$

$k' = k^*[O_3]^2[O_2]^{-1}$.

7. (*c*) Standard electrode potential(E^o) is defined as the electrode potential developed in the half cell when an electrode is immersed in a solution of its ions, the concentration being 1 mol L^{-1} at 298 K.

8. (*c*) Molal depression constant (K_f) is independent of the concentration term, *i.e.*, molarity and therefore on doubling the value of molarity of dilute solution, the value of K_f remains unchanged.

9. (*b*) $3e^- + Al^{3+} \longrightarrow Al$

3F current is required.

$2e^- + Cu^{2+} \longrightarrow Cu$

2F current is required.

$MnO_4^- + 8H^+ \longrightarrow Mn^{2+} + 4H_2O + 7e^-$

7F current is required.

$FeO \longrightarrow Fe_2O_3$

$Fe^{2+} \longrightarrow Fe^{3+} + e^-$

1F current is required.

10. (*b*) According to Raoult's law

$P = p^\circ_A \cdot \chi_A + p^\circ_B \cdot \chi_B$

$290 = 200 \times 0.4 + p^\circ_B \cdot 0.6$

$p^\circ_B = 350$ mm

11. (*b*) Mercury cell consists of zinc-mercury amalgam as anode and a paste of mercuric oxide and carbon powder acts as a cathode. The electrolyte consists of a mixture of KOH and ZnO.

12. (*b*) $\frac{\Delta T_f}{\Delta T_b} = \frac{K_f}{K_b}$

$\therefore \quad \Delta T_f = \frac{K_f}{K_b} \times \Delta T_b = \frac{1.86}{0.51} \times 0.55 = 2$ K

$\therefore \quad T_f = 273 - 2 = 271$ K

13. (*b*) The cell constant of a conductivity cell depends upon the distance between the electrodes and the area of their cross-section and not on the material of the electrodes.

14. (*b*) Emulsifiers are the substances which help in stabilising emulsions.

15. (*a*) Since the reaction at the anode is the source of electrons for the current, the anode is the negative terminal for the galvanic cell or electrochemical cell.

16. (*a*) Tyndall effect is due to scattering of light by colloidal particles, which cannot be affected by the charge on them.

17. (*a*) Except KNO_3, all other gives nitrogen dioxide on heating.

$4KNO_3 \rightarrow 2K_2O + 2N_2 + 5O_2$

18. (*c*) Hydrolysis of one mole of peroxydisulphuric acid produces one mole of sulphuric acid and one mole of peroxomonosulphuric acid. The reaction is as follow:

$H_2S_2O_8 + H_2O \rightarrow H_2SO_4 + H_2SO_5$

19. (*d*) Fe^{2+} with electronic configuration [Ar] $3d^6$ has 4 unpaired electron. Due to *d*-*d* transition of these unpaired electrons it gives coloured solution.

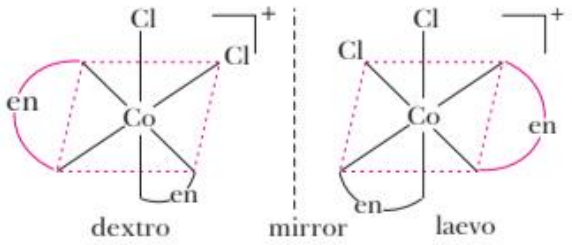
20. (*a*) The number of unpaired electrons are Cu^{2+}, V^{2+}, Cr^{2+}, Mn^{2+} are 1, 3, 4 and 5 respectively. More the number of unpaired electrons, higher in the paramagnetic character.

21. (*a*) Limestone acts as a flux in the extraction of iron from haemetite. It is decomposed to CaO,which removes silicate impurity of the ore as slag.

22. (*a*) $[Co(CN)_6]^{3-}$, the oxidation state of Co is +3 and has d^6 configuration. The CN^- ions are strong ligands because of strong crystal field splitting, as a result all the 6 electrons are filled in t_{2g} orbitals. So the complex becomes low spin.

23. (*a*) Carnallite $[KMgCl_3 \cdot 6(H_2O)]$ is an ore of potassium and magnesium.

24. (*a*) *cis* $[Co(en)_2Cl_2]Cl$ shows optical isomerism as it does not have a plane of symmetry.



Optical isomers (*d* and *l*) of *cis*-$[Co(en)_2Cl_2]^+$

25. (*a*) $[Cr(H_2O)_6]^{2+}$ has d^4 configuration and is a high spin complex with E.C. of $(t_{2g})^3(eg)^1$. The number of unpaired electrons = 4.

$[Fe(H_2O)_6]^{2+}$, has d^6 configuration and also a high spin complex with E.C. of $(t_{2g})^4(eg)^2$. The number of unpaired electrons = 4.

Hence,due to same no of unpaired electrons, magnetic moments are same in both cases.

26. (*b*) The $E^{o}_{(Co^{3+}/Co^{2+})}$ is highest, *i.e.*, 1.97 V, among the given members. This is because of large negative hydration energy and large sublimation energy.

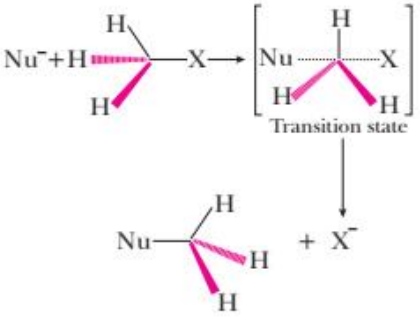
Note: Electrode potential depends on the sum of enthalpy of sublimation of the metal, the ionisation enthalpy and hydration enthalpy.

27. (*d*) The reactivity order of alcohols towards reaction with alkyl halides is

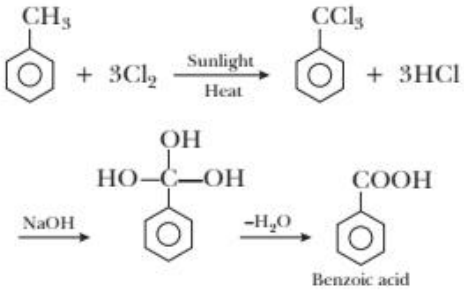
Tertiary>Secondary>Primary

As option *d* is tertiary alcohol so, it is correct option.

28. (*b*)



29. (*d*)



30. (*b*) The correct reason is F cannot show positive oxidation state of +5 and +7 due to absence of vacant *d*-orbital in its valence shell.

32. (*d*) EWG groups increase the acidity of carboxylic acid while EDG groups decrease the acidity of carboxylic acid.

33. (*c*) Flexiglass is commercial name of PMMA (Polymethyl methacrylate).

34. (*c*) The tertiary structure of proteins represents overall folding of the polypeptide chains i.e., further folding of the secondary structure. It gives rise to two major molecular shapes viz. fibrous and globular.

35. (*c*) Glycerol is added to soap to prevent rapid drying.

36. (*b*) Hydrogen bonding leads to higher boiling point and tertiary amines do not form hydrogen bonds whereas primary and secondary amines possesses hydrogen bonding.

37. (*c*) The aldehydic group is electron withdrawing group and therefore it is deactivating and *m*-directing.

38. (*a*) R_2NH is a secondary amine derived from ammonia by replacing two H-atoms with two alkyl groups. Thus, the hybrid state of N in R_2NH will be sp^3.

39. (*b*) On hydrolysis, sucrose gives glucose and fructose.

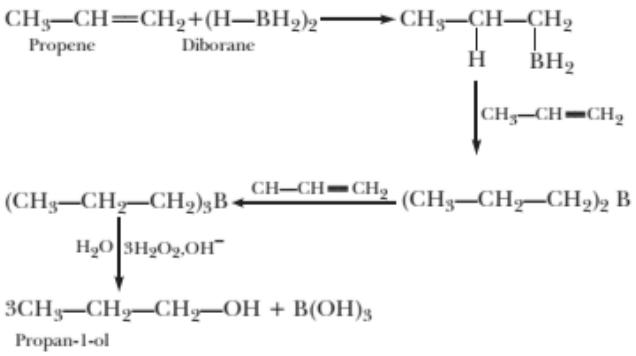
40. (*c*) Buna-S is elastomers having weakest intermolecular force.

Nylon is fibres having strongest intermolecular force.

Polythene is thermoplastic having intermediate intermolecular force.

41. (*d*) Aldehydes reduce Tollens reagent.

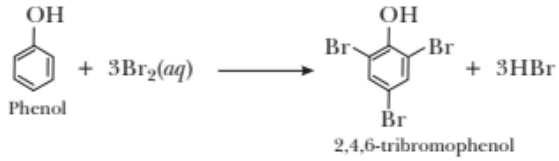
42. (*b*) Propan-1-ol is produced by the hydroboration-oxidation reaction of propene. In this reaction, propene reacts with diborane $(BH_3)_2$ to form trialkyl borane as an addition product. This addition product is oxidized to alcohol by hydrogen peroxide in the presence of aqueous sodium hydroxide.



43. (*a*) Br_2 is formed by a redox reaction.

$$5Br^- + BrO_3^- + 6H^+ \longrightarrow 3Br_2 + 3H_2O$$

–OH group is the activating group and thus activates the benzene towards electrophilic substitution reaction at *o* and *p*-positions giving yellowish white precipitate of 2,4,6-tribromophenol.



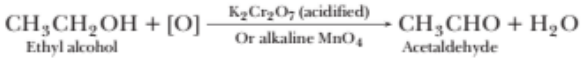
44. (*c*)

45. (*d*) $-OCH_3$, $-CH_3$ being electron donating groups decreases the acidic character of phenols. $-NO_2$, $-CN$ are electron withdrawing groups, tend to increase the acidic character. Moreover, $-OCH_3$ group is more electron donating than $-CH_3$ group.

Thus, the order is

p-methoxyphenol < *p*-methylphenol < *p*-nitrophenol.

46. (*b*)



47. (*d*) The activation of benzene ring in aniline is decreased by protecting the amino group by acetylation with acetic anhydride. This results in formation of monohalogenated derivative.

48. (*d*) Since the secondary alcohol on oxidation gives two different acids containing lesser number of carbon atom than the original alcohol. Thus, the alcohol is secondary alcohol and will contain 5 C atoms as it is forming acetic acid and propanoic acid.

50. (*d*) Tranquilizers are medicinal drug taken to reduce tension or anxiety.