6 PRACTICE PAPER

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

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

Choose the correct option.

1. Which one of the following is a covalent crystal?

(*a*) Rock salt (*b*) Ice (*c*) Quartz (*d*) Dry ice

2. The number of atoms in a face centred cubic unit cell is

(*a*) 2 (*b*) 4 (*c*) 5 (*d*) 6

3. Match the defects given in Column I with the statements given in Column II.

Column I	Column II
A. Simple vacancy defect	(*i*) shown by non-ionic solids and increases density of the solid.
B. Simple interstitial defect	(*ii*) shown by ionic solids and decreases density of the solid.
C. Frenkel defect	(*iii*) shown by non-ionic solids and density of the solid decreases.
D. Schottky defect	(*iv*) shown by ionic solids and density of the solid remains the same.

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

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

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

Statement P : If more volatile liquid is added to another liquid, vapour pressure of solution will be greater than that of pure solvent.

Statement Q : Vapour pressure of solution is entirely due to solvent molecules.

(*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

5. Which of the following colligative property is used to calculate the molar mass of biomolecules?

(*a*) Relative lowering of vapour pressure (*b*) Elevation in boiling point

(*c*) Depression in freezing point (*d*) Osmotic pressure

6. For an aqueous solution, freezing point is –0.186°C. Elevation of the boiling point of the same solution is (K_f = 1.86°C mol^{-1} kg and K_b = 0.512°C mol^{-1} kg)

(*a*) 0.186°C (*b*) 0.0512°C

(*c*) 1.86°C (*d*) 5.12°C

7. The correct order of equivalent conductance at infinite dilution among LiCl, NaCl and KCl is

(*a*) LiCl > NaCl > KCl (*b*) KCl > NaCl > LiCl

(*c*) NaCl > KCl > LiCl (*d*) LiCl > KCl > NaCl

8. Saturated solution of KNO_3 is used to make salt bridge because

(*a*) Velocity of K^+ is greater than that of NO_3^-.

(*b*) Velocity of NO_3^- is greater than that of K^+.

(*c*) Velocity of K^+ and NO_3^- ions are nearly equal.

(*d*) KNO_3 is highly soluble in water.

9. The cell reaction, $Cu(s) + 2Ag^+(aq) \longrightarrow Cu^{2+}(aq) + 2Ag(s)$ can be represented as

(*a*) Cu (*s*) | Cu^{2+} (*aq*) || Ag^+ (*aq*) | Ag (*s*)

(*b*) Ag^+ (*aq*) | Ag || Cu^{2+} (*aq*) | Cu (*s*)

(*c*) Cu (*s*) | Cu^{2+} (*aq*) || $2Ag^+$ (*aq*) | Ag (*s*)

(*d*) $2Ag^+$ (*aq*) | Ag (*s*) || Cu (*s*) | Cu^{2+} (*aq*)

10. Which of the following factor does not influence the rate of reaction?

(*a*) Concentration of reactants (*b*) Temperature

(*c*) Nature of reactants (*d*) Molecularity

11. The slope of the graph plotted between log *k* and $\frac{1}{T}$ for a first order reaction is equal to

(*a*) $\frac{-2.303}{E_a.R}$ (*b*) $-\frac{E_a}{2.303\,R}$ (*c*) $\frac{E_a}{2.303R}$ (*d*) $\frac{-E_a}{R}$

12. For an endothermic reaction, where ΔH represents the enthalpy of reaction in kJ/mol, the minimum value of free energy of activation will be

(*a*) less than ΔH (*b*) Zero (*c*) greater than ΔH (*d*) equal to ΔH

13. Adsorption is multilayer in case of

(*a*) physisorption (*b*) chemisorption

(*c*) both (*a*) and (*b*) (*d*) none of these

14. The effect of a catalyst in a chemical reaction is to change the

(*a*) activation energy (*b*) equilibrium concentration

(*c*) heat of reaction (*d*) final product

15. Given the standard electrode potential,

$$E^{o}_{(H^+/O_2/H_2O)} = 1.23\ V,\ E^{o}_{(Fe^{2+}/Fe)} = -0.44\ V$$

The E^{o}_{cell} of corrosion will be:

(*a*) +0.79 V (*b*) – 1.67 V (*c*) – 0.79 V (*d*) +1.67 V

16. Which of the following statement is incorrect regarding lead storage battery?

(*a*) It consist of lead anode.

(*b*) A 38% solution of sulphuric acid acts as the electrolyte.

(*c*) During discharging, $PbSO_4$ (*s*) on anode is converted into Pb (*s*).

(*d*) All of the above

17. At room temperature, HCl is a gas while HF is a liquid. This is because

(*a*) H—F bond is covalent. (*b*) H—F bond is ionic.

(*c*) H—F has metallic bond. (*d*) H—F has hydrogen bond.

18. Which of the following ligands form a chelate?

(*a*) Acetate (*b*) Oxalate (*c*) Cyanide (*d*) Ammonia

19. The geometry of $Ni(CO)_4$ and $[Ni(PPh_3)_2\ Cl_2]$ are

(*a*) both square planar (*b*) tetrahedral and square planar, respectively

(*c*) both tetrahedral (*d*) square planar and tetrahedral, respectively

20. In the electrolytic reduction process for aluminium extraction, electrolyte used is

(*a*) An aqueous solution of $Al_2(SO_4)_3$.

(*b*) A molten mixture of Al_2O_3 and Na_3AlF_6.

(*c*) $Al(OH)_3$ in NaOH solution.

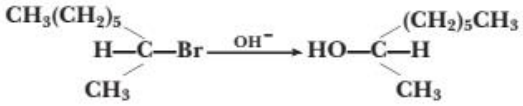
(*d*) A molten mixture of Al_2O_3 and $Al(OH)_3$.

21. The correct order of electron affinity is

(*a*) F > Cl > Br (*b*) F < Cl < Br

(*c*) F > Cl < Br (*d*) F < Cl > Br

22. The reaction



is described as

(*a*) S_E2 reaction (*b*) S_N1 reaction

(*c*) S_N2 reaction (*d*) S_N0 reaction

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

Assertion (A) : KCN reacts with methyl chloride to give methyl isocyanide.

Reason (R) : CN^- is an ambident nucleophile.

(*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.

24. The reaction of ammonium sulphate with sodium hydroxide results in the formation of

(*a*) ammonium hydroxide (*b*) ammonia gas

(*c*) ammonium chloride (*d*) ammonium nitrate

25. The method of zone refining of metals is based on the principle of

(*a*) greater mobility of the pure metal than that of the impurity.

(*b*) higher melting point of the impurity than that of the pure metal.

(*c*) greater mobile character of the solid metal than that of the impurity.

(*d*) greater solubility of the impurity in the molten state than in the solid.

26. IUPAC name of $[Pt(NH_3)_3\ Br(NO_2)Cl]\ Cl$ is

(*a*) Triamminechloridobromidonitroplatinum (IV) chloride

(*b*) Triamminochloridobromidonitrochloroplatinum (IV) chloride

(*c*) Triamminebromidochloridonitroplatinum (IV) chloride

(*d*) Triamminenitrochloridobromidoplatinum (IV) chloride

27. Iron in +3 oxidation state,

(*a*) has a d^6 configuration. (*b*) has a d^7 configuration.

(*c*) is isoelectronic with Co(II). (*d*) is isoelectronic with Mn(II).

28. Among the following ions, which one has the highest magnetic moment?

(*a*) V^{3+} (*b*) Mn^{2+} (*c*) Fe^{2+} (*d*) Cu^{2+}

29. BCl_3 is a planar molecule whereas NCl_3 is pyramidal because

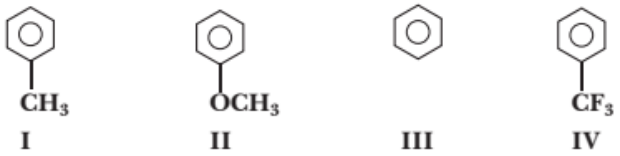
(*a*) N—Cl bond is more covalent than B—Cl bond.

(*b*) B—Cl bond is more polar than N—Cl bond.

(*c*) nitrogen atom is smaller than boron.

(*d*) BCl_3 has no lone pair but NCl_3 has a lone pair of electrons.

30. **The decreasing order of reactivity of the following compound towards electrophilic substitution is**



I II III IV

(*a*) III > I > II > IV (*b*) IV > I > II > III

(*c*) I > II > III > IV (*d*) II > I > III > IV

31. **Which of the following compound is formed when a mixture of $K_2Cr_2O_7$ and NaCl is heated with conc. H_2SO_4?**

(*a*) CrO_2Cl_2 (*b*) $CrCl_2$ (*c*) $Cr_2(SO_4)_3$ (*d*) Na_2CrO_4

32. **Which of the following statements about benzaldehyde is/are true ?**

(*a*) Reduces Tollen's reagent.

(*b*) Undergoes aldol condenation.

(*c*) Does not form an addition compound with sodium hydrogen sulphite.

(*d*) All of the above

33. **Hydrolysis of sucrose is called :**

(*a*) inhibition (*b*) saponification

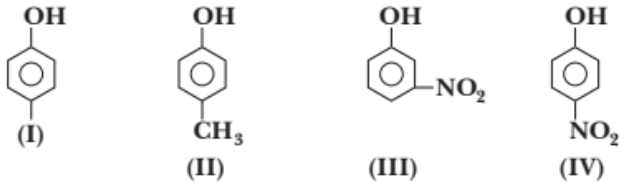
(*c*) inversion (*d*) hydration

34. **The reaction of $CH_3CH{=}CH$–C$_6$H$_4$–OH with HBr gives**

(*a*) $CH_3CHBrCH_2$–C$_6$H$_4$–OH (*b*) CH_3CH_2CHBr–C$_6$H$_4$–OH

(*c*) $CH_3CHBrCH_2$–C$_6$H$_4$–Br (*d*) CH_3CH_2CHBr–C$_6$H$_4$–Br

35. **In the following compound**



(I) (II) (III) (IV)

The order of acidity is

(*a*) III > IV > I > II (*b*) I > IV > III > I

(*c*) II > I > III > IV (*d*) IV > III > I > II

36. **Compound A on reduction gives B which on further reaction with $CHCl_3$ and alcoholic KOH gives compound C. This compound upon hydrolysis gives aniline. The compound A is**

(*a*) Nitrobenzene (*b*) Methylamine

(*c*) Nitromethane (*d*) Nitrosobenzene

37. **The acid which does not contain —COOH group is**

(*a*) Ethanoic acid (*b*) Lactic acid

(*c*) Picric acid (*d*) Palmitic acid

38. Drug which is used to reduce anxiety and brings calmness is known as

(*a*) Tranquilizer (*b*) Diuretic

(*c*) Analgesic (*d*) Antacids

39. Soft drinks and baby feeding bottles are generally made up of:

(*a*) polyester (*b*) polyurethane

(*c*) polyurea (*d*) polystyrene

40. The least basic among the following is

(*a*) NH_3 (*b*) $C_6H_5NH_2$

(*c*) $(C_6H_5)_3N$ (*d*) $(C_6H_5)_2NH$

41. Hydrogenation of benzoyl chloride in presence of Pd supported on $BaSO_4$ gives

(*a*) Benzyl alcohol (*b*) Benzaldehyde

(*c*) Benzoic acid (*d*) Phenol

42. $CH_3CH_2Cl \xrightarrow{NaCN} X \xrightarrow{Ni/H_2} Y \xrightarrow[\text{anhydride}]{\text{Acetic}} Z$. **Z in the above sequence of reaction is:**

(*a*) $CH_3CH_2CH_2NHCOCH_3$ (*b*) $CH_3CH_2CH_2NH_2$

(*c*) $CH_3CH_2CH_2CONHCH_3$ (*d*) $CH_3CH_2CH_2CONHCOCH_3$

43. Electrophilic substitution in phenol generally occurs at

(*a*) para position (*b*) *o* and *p*-positions (*c*) *m*-position (*d*) ortho position

44. Nylon-6 is made from:

(*a*) 1, 3-butadiene (*b*) Chloroprene

(*c*) adipic acid (*d*) Caprolactam

45. Which one of the following is a broad spectrum drug?

(*a*) Chloramphenicol (*b*) Chloroquine

(*c*) Chloroxylenol (*d*) Plasmoquine

46. Which of the following carboxylic acids undergoes decarboxylation easily?

(*a*) $C_6H_5—CO—CH_2—COOH$ (*b*) $C_6H_5—CH_2—COOH$

(*c*) $C_6H_5—\underset{\displaystyle OH}{\underset{|}{CH}}—COOH$ (*d*) $C_6H_5—\underset{\displaystyle NH_2}{\underset{|}{CH}}—COOH$

47. Formation of diethyl ether from ethanol in presence of H_2SO_4 is based on

(*a*) dehydrogenation reaction (*b*) hydrogenation reaction

(*c*) dehydration reaction (*d*) heterolytic fission reaction

48. Which statement is appropriate for anomer of glucose?

(*a*) they are isomers of glucose contain different structure with C_1 and C_2.

(*b*) they are isomers of glucose which contains different structure with C_1.

(*c*) they are enantiomers of glucose.

(*d*) they are mixture of D-glucose and L-glucose.

49. Which of the following is the strongest acid ?

(*a*) CH_3OH (*b*) CH_3CH_2OH

(*c*) $C_6H_5SO_3H$ (*d*) C_6H_5COOH

50. The change of optical rotation of glucose solution with time is referred to as :

(*a*) mutarotation (*b*) inversion

(*c*) specific rotation (*d*) autorotation

Answers

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

Solutions

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1. (*c*) Rock salt is an ionic solid, Ice and dry ice are molecular solids.

2. (*b*) In *fcc* there are 8 corners 6 faces and their contribution in a unit cell is $\frac{1}{8}$ and $\frac{1}{2}$ respectively.

Hence, number of atoms in *fcc* = $8\times\frac{1}{8}+6\times\frac{1}{2}$

$= 1 + 3 = 4$

4. (*a*) If solute is volatile than vapour pressure will be of both solute and solvent.

6. (*b*) $\Delta T_b = K_b m$

$\Delta T_f = K_f m$

$$\frac{\Delta T_b}{\Delta T_f} = \frac{K_b}{K_f} = \frac{0.512}{1.86} \quad (\because \text{The solution is same})$$

$$\Delta T_b = \frac{0.512\times 0.186}{1.86} = 0.0512°C$$

7. (*b*) The correct order of equivalent conductance at infinite dilution is KCl > NaCl > LiCl.

Anion is same (chloride ion) for all the species. Larger is the size of the cation, greater is the equivalent conductance at infinite dilution and vice versa.

8. (*c*) For a good salt bridge, the velocities of ions should be same. If the velocities are not same, then the ions would not be able to neutralize the charge equally in both half cells. Consequently, an opposite force would be developed that restricts the flow of current.

9. (*a*) **At cathode(reduction):**

$$2Ag^+(aq) + 2e^- \longrightarrow 2Ag(s)$$

At anode(oxidation):

$$Cu(s) \longrightarrow Cu^{2+}(aq) + 2e^-$$

∴ Cell can be represented as:

$Cu(s) \mid Cu^{2+}(aq) \mid\mid Ag^+(aq) \mid Ag(s)$

10. (*d*) Molecularity of a reaction is defined as the number of reacting species taking part in an elementary reaction which must collide simultaneously in order to bring about a chemical reaction. It does not influence the rate of reaction.

11. (*b*) A plot of log *k* v/s $\frac{1}{T}$ is a straight line whose slope is $\frac{-E_a}{2.303\,R}$ and intercept is log *A*.

12. (*c*) For an endothermic reaction, $E_a > E'_a$

$\Delta H = E_a - E'_a$

where E_a = energy of activation of forward reaction

E'_a = energy of activation of backward reaction

Therefore, $E_a > \Delta H$

13. (*a*) As in physical adsorption a gas can be adsorbed the one over the other by van der Waal's forces, physisorption results into multimolecular layers on adsorbent surface under high pressure.

14. (*a*) Catalyst in a chemical reaction changes the activation energy of the reaction. Positive catalyst lowers the activation energy while negative catalyst increases the activation energy by raising the potential energy barrier.

15. (*d*) The anode and cathode reaction for corrosion is as follow:

At anode: $2Fe(s) \longrightarrow 2Fe^{2+}(aq) + 4e^-$

$(E^\circ_{Fe^{2+}/Fe} = -0.44\ V)$

At cathode:

$$O_2(g) + 4H^+(aq) + 4e^- \longrightarrow 2H_2O(l)$$

$(E^\circ_{H^+/O_2/H_2O} = 1.23\ V)$

The overall cell reaction:

$$2Fe(s) + O_2(g) + 4H^+(aq) \longrightarrow 2Fe^{2+}(aq) + 2H_2O(l)$$

$E^\circ_{cell} = E^\circ_{cathode} - E^\circ_{anode}$

$= 1.23\ V - (-0.44\ V) = 1.67\ V$

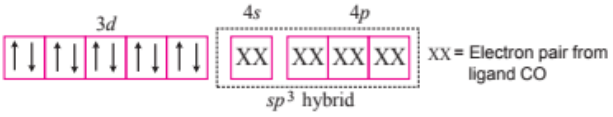
16. (*c*) Lead storage battery consist of lead anode and grid of lead packed with lead oxide as cathode. A 38% solution of sulphuric acid acts as the electrolyte. During charging, the cell reactions are reversed and $PbSO_4$ (*s*) on anode and cathode is converted into Pb and PbO_2, respectively.

17. (*d*) Due to extensive hydrogen bonding present in HF molecule, it is a liquid while HCl is a gas at room temperature.

18. (*b*) When a bidentate or a polydentate ligand uses its two or more donor atoms to bind a single metal ion, then a ring-like structure is obtained. It is called chelate and the ligand is known as chelating ligand. e.g oxalate, EDTA, etc.

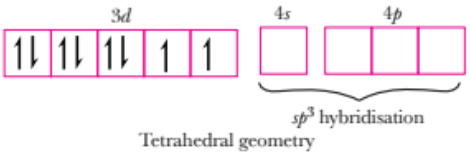
19. (*c*) $[Ni(CO)_4]$: tetracarbonyl nickel(0);

Ni = $3d^8\,4s^2$



Structure = Tetrahedral; Magnetic behaviour : Diamagnetic and in $[Ni(Ph_3)_2Cl_2]$ Ni– $3d^8\,4s^2$

$Ni^{2+} - 3d^8$



Tetrahedral geometry

Cl is a weak ligand

21. (*d*) Electron affinity of the elements of the group becomes less negative down the group. However, the negative electron affinity of fluorine is less than that of chlorine. It is due to small size of fluorine atom. As a result, there are strong interelectronic repulsions in the relatively small orbitals of fluorine and thus, the incoming electron does not experience much attraction.

22. (*c*) S_N2 reactions gives 100% inversion of configuration.

23. (*d*) The correct assertion is, KCN reacts with methyl chloride to give methyl cyanide as major product.

24. (*b*) $(NH_4)_2SO_4 + 2NaOH \longrightarrow 2NH_3 + 2H_2O + Na_2SO_4$

25. (*d*) Zone refining method is based on the principle that the impurities are more soluble in the melt than in the solid state of the metal.

26. (*c*) Let the oxidation state of Pt be x

$x + 3(0) - 1 - 1 - 1 - 1 = 0$

$x = +4$

IUPAC name of $[Pt(NH_3)_3\ Br(NO_2)Cl]Cl$ is Triamminebromidochloridonitroplatinum (IV) chloride.

27. (*d*) The electronic configuration of Fe(III) is [Ar] $3d^5$ and thus, it has 5 unpaired electrons as in Mn(II).

28. (*b*) More the number of unpaired electrons, more is the magnetic moment as $\mu = \sqrt{n(n+2)}$ B.M.

The number of unpaired electrons of the given ions are as follows:

Ion	Configuration	Number of unpaired electrons
V^{3+}	[Ar] $3d^2$	2
Mn^{2+}	[Ar] $3d^5$	5
Fe^{2+}	[Ar] $3d^6$	4
Cu^{2+}	[Ar] $3d^9$	1

29. (*d*) BCl_3 is a planar molecule whereas NCl_3 is pyramidal because the former has no lone pair but the latter has a lone pair of electrons.

30. (*d*) OCH_3 and CH_3 groups show +I effect and increase the electron density on benzene ring and make the ring active towards electrophilic attack while F shows –I effect, Hence, the correct order towards electrophilic substitution will be:

$C_6H_5OCH_3 > C_6H_5CH_3 > C_6H_6 > C_6H_5CF_3$

31. (*a*)

$K_2Cr_2O_7 + 2H_2SO_4 \longrightarrow 2KHSO_4 + 2CrO_3 + H_2O$

$NaCl + H_2SO_4 \longrightarrow NaHSO_4 + HCl] \times 4$

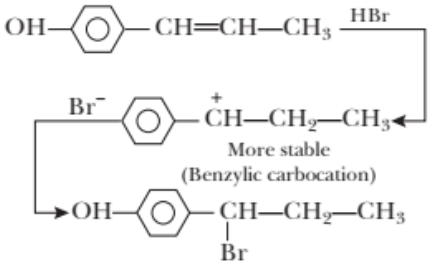
$CrO_3 + 2HCl \longrightarrow CrO_2Cl_2 + H_2O] \times 2$

$K_2Cr_2O_7 + 6H_2SO_4 + 4NaCl \longrightarrow 2KHSO_4 + 4NaHSO_4 + 2CrO_2Cl_2 + 3H_2O$

32. (*a*) Both aliphatic and aromatic aldehydes reduces Tollen's reagent.

33. (*c*) Sucrose is dextrorotatory but after hydrolysis gives dextrorotatory glucose and laevorotatory fructose. Since, laevorotation of fructose (–92.4°) is more than dextrorotation of glucose (+52.5°), the mixture is laevorotatory. Thus, hydrolysis of sucrose brings about a change in sign of rotation, from dextro (+) to laevo (–) and the product is named as invert sugar.

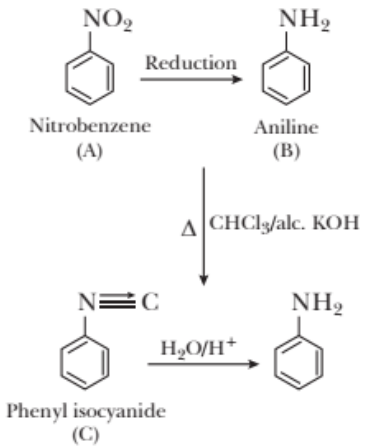
34. (*b*) This is due to formation of benzylic carbocation as an intermediate which is stabilized by resonance.



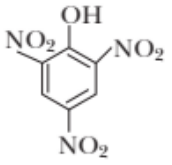
35. (*d*) Presence of electron withdrawing groups such as nitro group enhance the acidic strength of phenol and the presence of electron releasing groups such as alkyl group decreases the acidic strength of phenol.

As NO_2 group at *p*-position withdraws electrons towards itself by stronger —R effect as compared to —NO_2 group at *m*-position which withdraws electrons by the weaker —I effect. Thus, *p*-nitrophenol is more acidic than *m*-nitrophenol.

36. (*a*)



37. (*c*) The structure of picric acid is



2,4,6-trinitrophenol

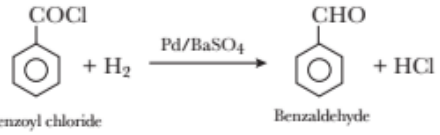
Therefore, it doesn't contain —COOH group.

38. (*a*) A tranquilizer refers to a drug which is designed for the treatment of anxiety, fear, tension, agitation, and disturbances of the mind, specifically to reduce states of anxiety and tension.

39. (*d*) Polystyrene is a polymer of styrene which is used to soft drink bottles and feeding bottles.

40. (*c*) $(C_6H_5)_3N$ is least basic due to maximum steric hindrance by three electron withdrawing phenyl groups.

41. (*b*)



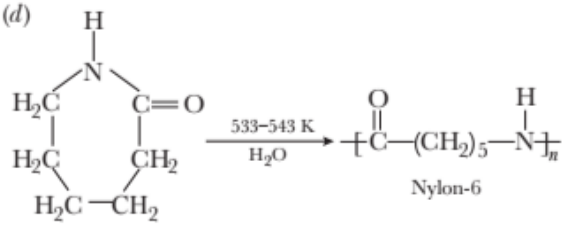
Benzoyl chloride — Benzaldehyde

42. (*a*) $CH_3CH_2Cl \xrightarrow{NaCN} \underset{\text{Propylnitrile [X]}}{CH_3CH_2CN} \xrightarrow{Ni/H_2}$

$\underset{\text{Propylamine [Y]}}{CH_3CH_2CH_2NH_2} \xrightarrow[\text{anhydride}]{\text{Acetic}} \underset{\text{N-propylethanamide [Z]}}{CH_3CH_2CH_2NHCOCH_3}$

43. (*b*) The presence of —OH group activates the benzene ring towards electropilic substitution reaction and directs the incoming group at *o* and *p*- positions as these positions become electron rich due to the resonance effect.

44. (*d*)



Caprolactam — Nylon-6

45. (*a*) Chloramphenicol , is a broad spectrum drug. A broad-spectrum antibiotic is an antibiotic that acts on the two major bacterial groups, gram-positive and gram-negative, or any antibiotic that acts against a wide range of disease-causing bacteria.

46. (*a*) $C_6H_5—CO—CH_2—COOH$ undergoes decarboxylation easily as it is a β-keto acid. This acid when decarboxylates forms a resonance stabilized enolate ion.

47. (*c*) Diethyl ether is formed by the acid catalysed dehydration reaction of ethanol and conc. sulphuric acid by the loss of water molecule. Conc. sulphuric acid used as catalyst, as well as a dehydrating agent.

$\underset{\substack{\text{Ethanol}\\\text{(excess)}}}{2C_2H_5OH} + H_2SO_4 \xrightarrow{413\ K}$

$C_2H_5—O—C_2H_5 + H_2O$

Ethoxyethane

48. (*b*) Anomers differ from each other in the configuration of C-1.

49. (*c*) Carboxylic acids are more acidic than alcohols. Further, since the conjugate base of benzene sulphonic acid is more resonance stabilized as compared to benzoic acid and therefore it is the strongest acid.

50. (*a*) Mutarotation is the change in the optical rotation because of the change in the equilibrium between two anomers. When the corresponding stereocentres inter convert.