PRACTICE PAPER 21

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

General Instructions:

(*i*) The examination will consist of **Objective type with Multiple Choice Questions (MCQs).**

(*ii*) There are **50** questions in total in this paper, out of which **40** questions are to be attempted.

(*iii*) Each question carries **five** marks.

(*iv*) There is **negative** marking of **one** mark for every **incorrect answer**.

(*v*) Use of calculator and log tables is **NOT** permitted.

Choose the correct option.

1. Which of the following conditions favours the existence of a substance in the solid state?

(*a*) High temperature (*b*) Low temperature

(*c*) High thermal energy (*d*) Weak cohesive forces

2. The van't Hoff factor *i* for a compound which undergoes dissociation in one solvent and association in other solvent is respectively

(*a*) less than one and greater than one (*b*) less than one and less than one

(*c*) greater than one and less than one (*d*) greater than one and greater than one

3. Which one of the following is a strongest reducing agent?

(*a*) Zn^{2+} (*b*) Fe^{2+} (*c*) H_2 (*d*) Cu^{2+}

4. In a 1st order reaction A $\longrightarrow$ B, if *k* is rate constant and the initial concentration of reactant A is 0.5M, then the half-life is

(*a*) $\frac{\log 2}{k}$ (*b*) $\frac{\ln 2}{k}$ (*c*) $\frac{\log 2}{k\sqrt{0.5}}$ (*d*) $\frac{0.693}{0.5k}$

5. A mixture of crystalloid and colloid can be separated by

(*a*) filtration (*b*) dialysis

(*c*) cataphoresis (*d*) diffusion

6. Adsorption is a phenomenon in which a substance

(*a*) goes into the body of the other substance (*b*) accumulates on the surface of the other substance

(*c*) remains close to other substance (*d*) none of the above

7. Which of the following reaction is of pseudo first order?

(*a*) $2NO + O_2 \longrightarrow 2NO_2$

(*b*) $H_2 + Cl_2 \longrightarrow 2HCl$

(*c*) $CH_3COOC_2H_5 + H_2O \longrightarrow CH_3COOH + C_2H_5OH$

(*d*) None of these

8. The amount of charge required for conversion of 1 mole of MnO_4^- to Mn^{2+} is

(*a*) 96500 (*b*) 96500 × 3

(*c*) 96500 × 5 (*d*) 96599 × 7

9. Match the items given in Column I with the type of solutions given in Column II.

Column I	Column II
A. Soda water	(*i*) A solution of gas in solid
B. Sugar solution	(*ii*) A solution of gas in gas
C. German silver	(*iii*) A solution of solid in liquid
D. Air	(*iv*) A solution of solid in solid
E. Hydrogen gas in palladium	(*v*) A solution of gas in liquid

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

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

10. The type of crystal defect indicated in the diagram below is

Na^+	Cl^-	Na^+	Cl^-	Na^+	Cl^-
Cl^-	◯	Cl^-	Na^+	◯	Na^+
Na^+	Cl^-	◯	Cl^-	Na^+	Cl^-
Cl^-	Na^+	Cl^-	Na^+	◯	Na^+

(*a*) Frenkel defect (*b*) Frenkel and Schottky defect

(*c*) Interstitial defect (*d*) Schottky defect

11. Which of the following is true about the charge acquired by *p*-type semiconductors?

(*a*) Positive (*b*) Neutral

(*c*) Negative (*d*) Depends on concentration of *p* impurity

12. Elevation of boiling point was 0.52°C when 6 g of a compound X was dissolved in 100 g of water. Molecular weight of X is (K_b = 0.52 Km^{-1}.)

(*a*) 120 g/mol (*b*) 60 g/mol (*c*) 180 g/mol (*d*) 342 g/mol

13. Reaction taking place at cathode during electrolysis can be classified as

(*a*) dissociation (*b*) oxidation (*c*) reduction (*d*) none of the above

14. For the reaction, $2a + b \longrightarrow c$ the following kinetic data were obtained:

$[a]$ (mol L^{-1})	$[b]$ (mol L^{-1})	$\frac{d[c]}{dt}$ (mol L^{-1} s^{-1})
4·0	1·0	1·0
4·0	4·0	2·0
1·0	4·0	1·0

The rate expression is

(*a*) $k[a][b]^{1/2}$ (*b*) $k[a]^2[b]$ (*c*) $k[a]^{\frac{1}{2}}[b]^{\frac{1}{2}}$ (*d*) $k[a]^{\frac{1}{2}}[b]$

15. Which of the following reactions is not a type of redox reaction?

(*a*) $4KClO_3 \longrightarrow 3KClO_4 + KCl$ (*b*) $SO_2 + 2H_2S \longrightarrow 2H_2S + 3S$

(*c*) $BaO_2 + H_2SO_4 \longrightarrow BaSO_4 + H_2O_2$ (*d*) $Zn + NiSO_4 \longrightarrow ZnSO_4 + Ni$

16. The equivalent conductivity of 0.1 N CH_3COOH at 25°C is 80 ohm^{-1} cm^2 eq^{-1} and at infinite dilution is 400 ohm^{-1} cm^2 eq^{-1}. The degree of dissociation of CH_3COOH is

(*a*) 1 (*b*) 0.2 (*c*) 0.1 (*d*) 0.5

17. **Out of the following halides of group 16, which does not possess reducing property?**

(*a*) H_2Te (*b*) H_2Se

(*c*) H_2S (*d*) H_2O

18. **The composition of 'Copper Matte' is**

(*a*) $FeSiO_3$ (*b*) $FeS + SiO_2$

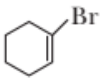
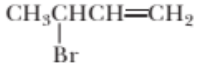
(*c*) $FeS + Cu_2S$ (*d*) $CuS + SiO_2 + FeO$

19. **Which of the following is the IUPAC name of $K_4[Fe(CN)_6]$?**

(*a*) potassium ferricyanide (*b*) potassium ferrocyanide

(*c*) potassium hexacyanoferrate (III) (*d*) potassium hexacyanoferrate (II)

20. **Which of the following is vinylic halide?**

(*a*) $CH_3CH{=}CHCH_2Br$ (*b*)  (*c*)  (*d*) 

21. **Which of the following arrangements represents the correct order of electron gain enthalpy (with negative sign) of the given atomic species?**

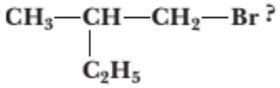
(*a*) S < O < Cl < F (*b*) F < Cl < O < S

(*c*) Cl < F < S < O (*d*) O < S < F < Cl

22. **Which of the following is an ambidentate ligand?**

(*a*) NO_2^- (*b*) SO_4^{2-}

(*c*) $C_2O_4^{2-}$ (*d*) NH_3

23. **Which is the correct IUPAC name for**  **?**

(*a*) 1-Bromo-2-ethylpropane (*b*) 1-Bromo-2-ethyl-2-methylethane

(*c*) 1-Bromo-2-methylbutane (*d*) 2-Methyl-1-bromobutane

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

Assertion (A) : Nitrogen does not form compounds in +5 oxidation state with halogens.

Reason (R) : All oxidation states of nitrogen from +1 to +4 tend to disproportionate in acid solution.

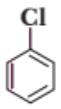
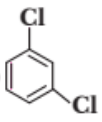
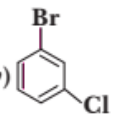
(*a*) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(*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.

25. **Arrange the following compounds in the increasing order of their densities.**

(*i*)  (*ii*)  (*iii*)  (*iv*) 

(*a*) (*i*) < (*ii*) < (*iii*) < (*iv*)

(*b*) (*i*) < (*iii*) < (*iv*) < (*ii*)

(*c*) (*iv*) < (*iii*) < (*ii*) < (*i*)

(*d*) (*ii*) < (*iv*) < (*iii*) < (*i*)

26. **To which isomers the following compounds belong?**

$[Co(NO_2)(NH_3)_5]Cl_2$ and $[Co(ONO)(NH_3)_5]Cl_2$

(*a*) Geometrical isomers (*b*) Linkage isomers

(*c*) Ionisation isomers (*d*) Ligand isomers

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

Assertion (A) : F–F bond in F_2 molecule is weak.

Reason (R) : F atom is small in size.

(*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.

28. **The number of unpaired electrons in gaseous species of Mn^{3+}, Cr^{3+} and V^{3+} respectively are**

(*a*) 4, 4 and 2 (*b*) 3, 3 and 2

(*c*) 4, 3 and 2 (*d*) 3, 3 and 3

29. **To obtain metal from Cr_2O_3, the method used is**

(*a*) carbon reduction (*b*) aluminothermic reduction

(*c*) CO reduction (*d*) electrolytic reduction

30. **What happens when potassium iodide reacts with acidic solution of potassium dichromate?**

(*a*) It liberates iodine. (*b*) Potassium sulphate is formed.

(*c*) Chromium sulphate is formed. (*d*) All of these

31. **Which one of the following is a diamagnetic ion?**

(*a*) Co^{2+} (*b*) Ni^{2+} (*c*) Cu^{2+} (*d*) Zn^{2+}

32. **Methyl ketone is identified by the reagent**

(*a*) Tollen's reagent (*b*) I_2/KOH

(*c*) Fehling's solution (*d*) Schiff's reagent

33. **Which of the following compounds is oxidised to prepare methyl ethyl ketone?**

(*a*) Propan-2-ol (*b*) Butanol

(*c*) Butan-2-ol (*d*) *Tert*-butyl alcohol

34. **Among the following a natural polymer is:**

(*a*) Cellulose (*b*) PVC

(*c*) Teflon (*d*) Polyethylene

35. **Which of the following monosaccharide is a pentose?**

(*a*) Glucose (*b*) Fructose

(*c*) Arabinose (*d*) Galactose

36. **When a solution of HCHO and KOH is heated, it will give**

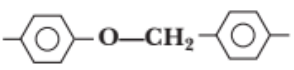
(*a*) acetylene and methane (*b*) methanol and potassium formate

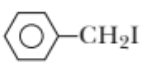
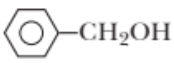
(*c*) methanol and methane (*d*) acetylene and methanol

37. **The reaction of benzyl chloride with sodium cyanide followed by reduction with hydrogen in the presence of nickel gives:**

(*a*) β-phenyl ethylamine (*b*) N-isobutylaniline

(*c*) Benzyl amine (*d*) Aniline

38. **The ether**  **when treated with HI produces :**

(*a*)  (*b*)  (*c*)  (*d*) 

39. **Toluene can be oxidised to benzoic acid by**

(*a*) $KMnO_4$ (alk.) (*b*) $K_2Cr_2O_7$ (alk.)

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

40. **Which one is maximum basic in the following compounds?**

(*a*) NH_3 (*b*) CH_3NH_2

(*c*) $(CH_3)_2NH$ (*d*) $C_6H_5N(CH_3)_2$

41. **Which is the main storage polysaccharide of plants?**

(*a*) Starch (*b*) Cellulose

(*c*) Glycogen (*d*) Amino acids

42. **Carbonyl group undergoes**

(*a*) electrophilic addition reactions (*b*) nucleophilic addition reactions

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

43. **Tincture iodine is**

(*a*) aqueous solution of I_2. (*b*) solution of I_2 in aqueous KI.

(*c*) alcoholic solution of I_2. (*d*) aqueous solution of KI.

44. **In the following sequence of reactions,**

$$CH_3Br \xrightarrow{KCN} A \xrightarrow{H_3O^+} B \xrightarrow[ether]{LiAlH_4} C$$

the end product (C) is

(*a*) acetone (*b*) methane

(*c*) acetaldehyde (*d*) ethyl alcohol

45. **In the reaction given below, X is:**

$$\text{Neopentyl alcohol} \xrightarrow{conc} X$$

(*a*) 2-methylpent-2-ene (*b*) 2-methylpentane

(*c*) 2-methylbut-2-ene (*d*) neopentane

46. **Which of the following base is not present in DNA?**

(*a*) Adenine (*b*) Guanine (*c*) Cytosine (*d*) Uracil

47. **The number of optically active stereoisomers are possible for butane-2, 3-diol is**

(*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4

48. **Which of the following amines gives carbylamine reaction?**

(*a*) $C_2H_5NH_2$ (*b*) $(C_2H_5)_2NH$

(*c*) $(C_2H_5)_3N$ (*d*) $CH_3NHC_2H_5$

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

Statement P : Glycine must be taken through diet.

Statement Q : It is a non-essential amino acid.

(*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

50. **The fibre obtained by the condensation of hexamethylene diamine and adipic acid is:**

(*a*) dacron (*b*) nylon –6, 6

(*c*) rayon (*d*) teflon

Answers

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

Solutions

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1. (*b*) At low temperature, substance exists in solid state due to low thermal energy and hence decreased molecular motion, which in turn leads to strong intermolecular cohesive forces, *i.e.*, which hold the constituent particles together.

2. (*c*) van't Hoff factor (i) $\propto$ number of particles present in solution.

During dissociation number of particles increases while on association number of particles decreases.

3. (*a*) The strongest reducing agent should have more negative value of standard reduction potential.

$Zn^{2+}/Zn = -0.76$ V, $Fe^{2+}/Fe = -0.44$ V, $H^+/H_2 = 0.00$ V, $Cu^{2+}/Cu = +0.34$ V

4. (*b*) Integrated rate equation for first order reaction is

$$k = \frac{1}{t}\ln\frac{a}{a-x}$$

Half-life means 50% completion of the reaction. Hence, the formula becomes

$$k = \frac{1}{t_{1/2}}\ln\frac{a}{a-\frac{a}{2}}$$

$$k = \frac{1}{t_{1/2}}\ln\frac{2a}{a}$$

$$t_{1/2} = \frac{1n2}{k}$$

So, Half-life of a first order reaction does not depends on initial concentration.

5. (*b*) The separation of crystalloids from the colloids is based on the principle that the particles of the crystalloids pass through semipermeable membrane whereas those of the colloids do not. The process based on this is called dialysis and the apparatus used is called a dialyser.

6. (*b*) Adsorption is a phenomenon of attracting and retaining the molecules of a substance on the surface of a liquid or solid leading to a higher concentration on the surface in comparison to the bulk.

7. (*c*) Acidic hydrolysis of ester is an example of pseudo first order reaction.

$$CH_3COOC_2H_5 + H_2O \xrightarrow{H^+} CH_3COOH + C_2H_5OH$$

In this reaction, the concentration of water is not considered as it present in excess amount.

8. (*c*) $8H^+ + MnO_4^- + 5e^- \longrightarrow Mn^{2+} + 4H_2O$

Hence, amount of charge required for conversion of 1 mole MnO_4^- to Mn^{2+} is 5×96500 C.

10. (*d*) Schottky defect due to equal number of cations and anions missing from the lattice sites.

11. (*b*) When an element of Group 14 doped with element of group 13, a large number of holes are created an the number of holes created and electrons in *p*-type semiconductor is same. Hence, it is electrically neutral.

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

$$\Rightarrow 0.52 = \frac{0.52\times 6\times 1000}{100\times M}$$

$$M = \frac{0.52\times 6\times 1000}{0.52\times 100} = 60 \text{ g/mol}$$

13. (*c*) Reaction taking place at cathode during electrolysis can be classified as reduction pick up electrons there to form neutral species, *i.e.*, cations undergo reduction.

14. (*c*) Let the order with respect to a and b is m and n respectively.

$$\therefore \quad \frac{dc}{dt} = k[a]^m[b]^n$$

$1.0 = k[4]^m[1]^n$ ...(*i*)

$2.0 = k[4]^m[4]^n$ ...(*ii*)

$1.0 = k[1]^m[4]^n$ ...(*iii*)

On dividing equation(*ii*) by(*i*), we get

$2 = [4]^n$

$\therefore \quad n = \frac{1}{2}$

On dividing equation(*ii*) by(*iii*), we get

$2 = [4]^m$

$\therefore \quad m = \frac{1}{2}$

Thus, Rate $= k[a]^{1/2}[b]^{1/2}$

15. (*c*) $\overset{+2\ -1}{BaO_2} + \overset{+2\ -2}{H_2SO_4} \longrightarrow \overset{+2\ -2}{BaSO_4} + \overset{+2\ -1}{H_2O_2}$

There is no change in oxidation number of any element. So, this reaction is not a redox reaction.

16. (*b*) $\Lambda^c_{(eq)(CH_3COOH)} = 80$ S ohm^{-1} cm^2 eq^{-1}

$\Lambda^\infty_{eq(CH_3COOH)} = 400$ S ohm^{-1} cm^2 eq^{-1}

$$\alpha = \frac{\Lambda^{c}_{eq(CH_3COOH)}}{\Lambda^{\infty}_{eq(CH_3COOH)}} = \frac{80}{400} = 0.2$$

17. (*d*) Reducing property means tendency to donate electrons, as oxygen is most electronegative than other group elements, also the O—H bond is very strong in case of H_2O. Hence, H_2O does not show reducing property.

18. (*c*) Copper is produced in the form of Copper Matte. When copper pyrite after concentration by froth floatation process is roasted in a reverberatory furnace where copper pyrites ($CuFeS_2$) is converted into a mixture of FeS and Cu_2S (Copper Matte).

19. (*d*) The oxidation number of K is +1 and CN is –1. So, the oxidation number of Fe will be

$K_4[Fe(CN)_6]$

$+4 + x - 6 = 0$

$x = +2$

The oxidation number of Fe in the given complex is +2 and the given complex is anionic complex.

Therefore, the IUPAC name is potassium hexacyanoferrate(II)

20. (*c*) In vinylic halides, the halogen is attached to one of the carbon atoms of the C=C bond.

21. (*d*) The elements of group16 elements have large negative electron gain enthalpy next only to the halogens. It may be rated that the electrons affinity of fluorine is unexpectedly low (<Cl). This is due to presence of strong electron-electrons repulsions in the relatively compact 2*p*-orbitals of small size of F atom. Hence correct order is Cl>F>S>O.

22. (*a*) NO_2^- ligand is an ambidentate ligand at it contains two donor atoms but only one of them forms a coordinate bond at a time with central metal atom/ion.

23. (*c*) $CH_3-\overset{2}{C}H(\overset{3}{C_2H_5})-\overset{1}{C}H_2-Br$

1-Bromo-2-methylbutane

24. (*b*) The correct explanation of assertion is nitrogen does not form compounds in +5 oxidation state with halogens due to absence of *d*-orbitals.

25. (*a*) Density $= \frac{\text{Mass}}{\text{volume}}$, Density is directly proportional to molecular mass.

Hence, the correct order is (*i*)<(*ii*)<(*iii*)<(*iv*)

26. (*b*) Linkage isomerism shown by

$[Co(NO_2)(NH_3)_5]Cl_2$ and $[Co(ONO)(NH_3)_5]Cl_2$ due to the presence of an ambidentate ligand.

27. (*a*) F—F bond in F_2 molecule is weak due to strong electron-electron repulsions of small size of F-atoms.

28. (*c*) $Mn^{3+} \Rightarrow [Ar]\ 3d^4$ = 4 unpaired electrons

$Cr^{3+} \Rightarrow [Ar]\ 3d^3$ = 3 unpaired electrons

$V^{3+} \Rightarrow [Ar]\ 3d^2$ = 2 unpaired electrons

29. (*b*) The process of reduction of metal oxide by aluminium is known as aluminothermic reduction. Metals like manganese and chromium are extracted by thermite process.

$$Cr_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Cr + \text{Heat}$$

30. (*d*) $K_2Cr_2O_7 + 7H_2SO_4 + 6KI$

$\longrightarrow 2K_2SO_4 + Cr_2(SO_4)_3 + 7H_2O + 3I_2$

Therefore, the products obtained are potassium sulphate, chromium sulphate, water and iodine.

31. (*d*) The electronic configuration of the given ions are

$Co^{2+} \Rightarrow [Ar]\ 3d^7$; $Ni^{2+} \Rightarrow [Ar]\ 3d^8$

$Cu^{2+} \Rightarrow [Ar]\ 3d^9$; $Zn^{2+} \Rightarrow [Ar]\ 3d^{10}$

Since, Zn^{2+} has no unpaired electrons and therefore it is a diamagnetic ion.

32. (*b*) Iodoform reaction (reaction with sodium or potassium hypoiodite) is used for the detection of methyl ketone(CH_3CO) or a compound having $CH_3CH(OH)$ group present.

33. (*c*) 1° alcohol $\xrightarrow[573K]{Cu}$ Aldehyde

2° alcohol $\xrightarrow[573K]{Cu}$ Ketone

3° alcohol $\xrightarrow[573K]{Cu}$ Alkene

$CH_3-\underset{\underset{\text{Butan-2-ol}}{OH}}{CH}-CH_2CH_3 \xrightarrow[573K]{Cu} CH_3-\overset{\overset{O}{\|}}{C}-CH_2-CH_3 + H_2O$

Methyl ethyl ketone

34. (*a*) Cellulose is obtained from wood pulp.

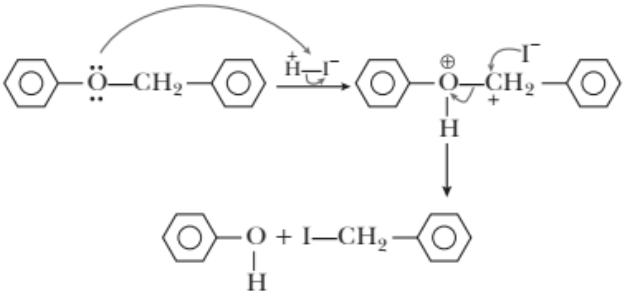
35. (*c*) Arabinose has a chemical formula $C_5H_{10}O_5$.

36. (*b*) HCHO does not contain an α-hydrogen atom, when it treated with conc.KOH undergoes disproportionation*i.e.*,selfoxidation-reduction.

$$\underset{\text{Formaldehyde}}{2HCHO} \xrightarrow{\text{conc. KOH}} \underset{\text{Methyl alcohol}}{CH_3-OH} + \underset{\text{Potassium formate}}{HCOO^-K^+}$$

37. (*a*) $\underset{\text{Benzyl chloride}}{C_6H_5CH_2Cl} \xrightarrow{NaCN} \underset{\text{Benzyl cyanide}}{C_6H_5CH_2C\equiv N} \xrightarrow{H_2/Ni} \underset{\substack{\beta\text{-phenyl ethylamine}\\(2\text{-phenylethanamine})}}{C_6H_5CH_2CH_2NH_2}$

38. (*a*) The ether when treated with HI produces both benzyl iodide or phenol, due to following mechanism:



39. (*c*) Benzoic acid can be obtained by vigorous oxidation of toluene with chromic acid or acidic or alkaline potassium permanganate or alkaline potassium dichromate.

40. (*c*) Due to delocalisation of lone pair of electrons of the N-atom over the benzene ring, all aromatic amines are less basic than alkylamines. $(CH_3)_2NH$ is an aliphatic amine and has two electron donating methyl groups, thus maximum basic in nature.

41. (*a*) Starch is the main storage polysaccharide of plants. It is the most important dietary source for human beings. High content of starch is found in cereals, roots, tubers and some vegetables.

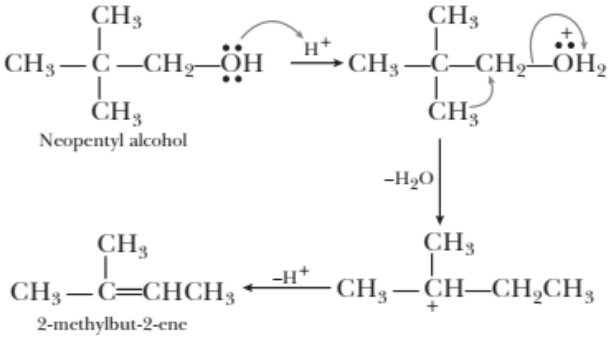
42. (*b*) Carbonyl group undergoes nucleophilic addition reaction because it behaves as an electrophile due to greater electronegativity of oxygen as compared to carbon.

43. (*c*) Tincture of iodine, iodine tincture, or weak iodine solution is an antiseptic. It is usually 2–3% elemental iodine, along with potassium iodide or sodium iodide, dissolved in a mixture of ethanol and water.

44. (*d*) $CH_3Br \xrightarrow{KCN} CH_3CN \xrightarrow{H_3O^+}$

$CH_3COOH \xrightarrow[ether]{LiAlH_4} C_2H_5OH$

45. (*c*)

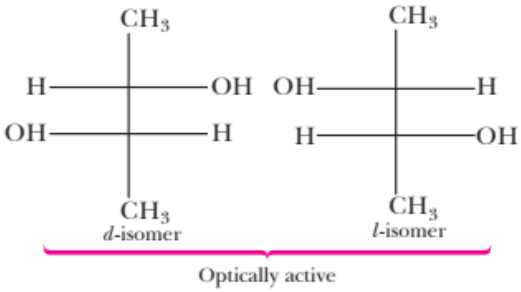


Neopentyl alcohol

2-methylbut-2-ene

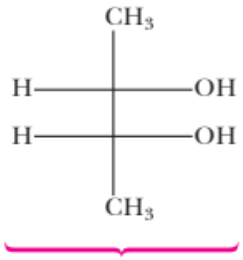
46. (*d*) DNA contains cytosine and thymine as pyrimidine bases and, guanine and adenine as purine bases while RNA contains cytosine and uracil as pyrimidine bases and guanine and adenine as purine bases.

47. (*b*) The number of optically active stereoisomers possible for butane-2, 3−diol is 2. They are *d* and *l* isomers which are optically active. The meso-compound is optically inactive due to internal compensation.



d-isomer *l*-isomer

Optically active

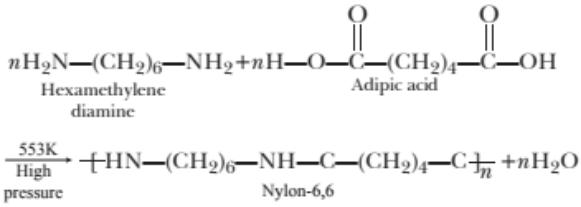


meso- compound
(Optically inactive)

48. (*a*) Carbylamine reaction is given by only primary amines.

49. (*b*) Out of 20 amino acids required for protein synthesis, human body can synthesise only 10 and are called non-essential amino-acids.

50. (*b*)



Hexamethylene diamine

Adipic acid

Nylon-6,6