

PART A

30 x 1 = 30

- The intramolecular hydrogen bonding is present in
(a) O – nitrophenol (b) m – nitrophenol (c) P – nitrophenol (d) none
- The bond order in nitrogen is
(a) 1 (b) 2 (c) 3 (d) 4
- Among the following which has higher electron affinity value
(a) Fluorine (b) Chlorine (c) Bromine (d) Iodine
- The compound with garlic odour is
(a) P_2O_3 (b) P_2O_5 (c) H_3PO_3 (d) H_3PO_4
- The chemical composition of slag formed during the smelting process in the extraction of copper is
(a) $Cu_2O + FeS$ (b) $FeSiO_3$ (c) $CuFeS_2$ (d) $Cu_2S + FeO$
- Which of the following compounds will not give positive chromyl chloride test?
(a) $CuCl_2$ (b) $HgCl_2$ (c) $ZnCl_2$ (d) C_6H_5Cl
- Which isotope is used as a power source in long mission space probes.
(a) U – 235 (b) Pu – 235 (c) Pu – 238 (d) U – 238
- Maximum oxidation state exhibited by Lanthanides
(a) + 1 (b) + 2 (c) + 3 (d) + 4
- The isomerism present in the compounds $[Pt(NH_3)_4][CuCl_4]$ and $[Cu(NH_3)_4][PtCl_4]$
(a) Ionisation isomerism (b) Co-ordination isomerism
(c) Linkage isomerism (d) ligand isomerism
- ${}_{92}U^{235}$ nucleus absorbs a neutron and disintegrates into ${}_{54}Xe^{144}$, ${}_{38}Sr^{90}$ and X. What will be the product X?
(a) 3 neutrons (b) 2 neutrons (c) α particle (d) β particle
- In a simple cubic cell, each point on a corner is shared by
(a) one unit cell (b) Two unit cell (c) 8 unit cell (d) 4 unit cell
- In an adiabatic process which of the following is true
(a) $q = W$ (b) $q = 0$ (c) $\Delta E = q$ (d) $P\Delta V = 0$
- If ΔG for a reaction is negative the change is
(a) spontaneous (b) non-spontaneous (c) Reversible (d) Irreversible
- In the reversible reaction $2HI \rightleftharpoons H_2 + I_2$, K_p is
(a) greater than K_c (b) less than K_c (c) Equal to K_c (d) zero
- State of chemical equilibrium is
(a) dynamic (b) stationary (c) None (d) both
- For a reaction : $aA \rightarrow bB$, the rate of reaction is double when the concentration of A is increased by four times, the rate of reaction is
(a) $K[A]^a$ (b) $K[A]^{1/2}$ (c) $K[A]^{1/a}$ (d) $K[A]$
- Fog is a colloidal solution is
(a) gas in liquid (b) liquid in gas (c) gas in solid (d) solid in gas
- In case of physical adsorption, there is desorption when
(a) temperature increases (b) temperature decreases
(c) pressure increases (d) concentration increases
- Colloids are purified by
(a) precipitation (b) coagulation (c) dialysis (d) filtration
- When p^H of a solution is 2, the hydrogen ion concentration in moles litre⁻¹ is
(a) 1×10^{-12} (b) 1×10^{-2} (c) 1×10^{-7} (d) 1×10^{-4}
- The alcohol obtained by the hydrolysis of oils and fats is
(a) pentanol (b) propanol (c) glycerol (d) glycol
- Oxygen atom of ether is
(a) very active (b) replacable (c) oxidizing (d) comparatively inert
- When ether is exposed to air for sometime an explosive substance produced is
(a) peroxide (b) oxide (c) TNT (d) superoxide
- The compound which does not reduce fehling solution is
(a) formaldehyde (b) acetaldehyde (c) benzaldehyde (d) propionaldehyde
- Which of the following compound is optically active
(a) CH_3CH_2COOH (b) $HOOC - CH_2 - COOH$ (c) $CH_3CH(OH)COOH$ (d) $Cl_2CHCOOH$
- When nitromethane is reduced with Zn dust + NH_4Cl in neutral medium, we get
(a) CH_3NH_2 (b) $C_2H_5NH_2$ (c) CH_3NHOH (d) C_2H_5COOH
- The basic character of amines is due to the
(a) tetrahedral structure (b) presence of nitrogen atom
(c) lone pair of electrons on nitrogen atom (d) high electronegativity of nitrogen
- Oxidation of aniline with acidified potassium dichromate gives

- (a) P-benzo quinone (b) benzoic acid (c) benzaldehyde (d) benzyl alcohol

29. Glucose is not oxidized to gluconic acid by

- (a) $\text{Br}_2/\text{H}_2\text{O}$ (b) Fehling solutions (c) Tollen's reagent (d) conc. HNO_3

30. Ultimate products of hydrolysis of protein

- (a) aniline (b) aliphatic acid (c) amino acid (d) aromatic acid

PART – II

Answer any fifteen.

15 x 3 = 45

31. What is the significance of negative electronic energy?
32. Why electron affinity of Fluorine is less than that of Chlorine?
33. How Phosphine reacts with Silver nitrate?
34. Write the uses of Neon.
35. Most of the d-block elements and its compounds acts as a catalyst. Why?
36. Potassium di chromate is a very good oxidizing agent illustrate.
37. How many α and β particles are ejected in the nuclear reaction of the element ${}_{90}\text{Th}^{234}$ is converted into ${}_{84}\text{Po}^{218}$?
38. What is super conductivity?
39. State the Kelvin statement of second law of thermodynamics?
40. Dissociation of PCl_5 decreases in presence of increase in Cl_2 . Why?
41. Give the two examples of First order reaction.
42. What is parallel reaction? Give an example.
43. What is Tyndall effect? Give reaction for the effect.
44. What is common ion effect? Give examples.
45. What are the conditions of optical isomerism?
46. How is acroline obtained from glycerol?
47. How will you convert phenol into benzene?
48. How is urotropine prepared? Write its use.
49. How lactyl chloride, lactide are prepared from lactic acid?
50. How is diazonium chloride prepared?
51. Give any three characteristics of Dye.

PART – III Answer any 7 choose atleast two from each section

7 x 5 = 35

SECTION – A

52. Derive de-Broglies equation. What is its significance?
53. How gold is extracted from its ore?
54. Write the causes of Lanthanide contraction and its consequences.
55. Explain coordination and ionization isomerism with suitable examples.

SECTION – B

56. What is the characteristics of free energy 'G'?
57. Apply Lechatelier's principle to Haber process of manufacture of NH_3 .
58. Explain the experimental determination of rate constant of acid hydrolysis of methyl acetate.
59. Calculate the E.M.F. of the Zinc – Silver cell at 25°C when $[\text{Zn}^{2+}] = 0.10 \text{ M}$ and $[\text{Ag}^+] = 10 \text{ M}$ [E^0 cell at $25^\circ\text{C} = 1.56 \text{ volt}$]

SECTION – C

60. How does ether react with HI? Give its significance.
61. Write the mechanism of cannizaro reaction.
62. How is oxalic acid manufactured from sodium formate?
63. How terylene, nylon are prepared? Give its properties and uses.

PART – IV

Q.No. 70 in compulsory

4 x 10 = 40

64. (a) Explain pauling method to determine ionic radii.
(b) Give an account of manufacture of lead.
65. (a) Mention the type of hybridization, geometry and magnetic property of the following complexes using VB theory. (i) $[\text{FeF}_6]^{4-}$ (ii) $[\text{Fe}(\text{CN})_6]^{4-}$
(b) Explain types of nuclear reactions with suitable examples.
66. (a) Explain Schottky and Frenkel defects.
(b) How are colloids prepared by condensation methods?
67. (a) Explain Buffer action with example.
(b) How emf of a half cell is determined?
68. (a) Explain the optical isomerism of tartaric acid
(b) How is benzoic acid obtained from the following compounds?
(i) Ethyl benzene (ii) Phenyl cyanide (iii) Carbon-di-oxide

69. (a) Distinguish between primary, secondary and tertiary amines.
(b) How is the structure of Glucose determined?
70. (a) An organic compound A (C_7H_6O) forms a bisulphate. 'A' when treated with alcoholic KCN forms B ($C_{14}H_{12}O_2$) and 'A' on refluxing with sodium acetate and acetic anhydride forms an acid C ($C_9H_8O_2$)
(b) Compound (A) on heating changes its colour from blue to white. This compound reacts with ammonium hydroxide gives the compound (B) and the colour of this compound is blue. The compound (A) when reacts with sodium hydroxide gives light blue coloured compound (C). Identify (A) (B) and (C). Explain the reactions.
(OR)
(c) An organic compound (A) of molecular formula C_6H_6O gives violet colour with neutral $FeCl_3$. (A) gives maximum of two isomers (B) and (C). When an alkaline soln of (A) is refluxed with CCl_4 . A also reacts with $C_6H_5NH_2Cl$ to give the compound (D). Which is a red orange colour dye. Identify A, B, C and D. Explain with suitable chemical reactions.
(d) Find the p^H of a buffer solution containing 0.20 mole per litre CH_3COONa and 0.15 mole per litre CH_3COOH . K_a for acetic acid is 1.8×10^{-5} .