

MOST IMPORTANT 5 MARKS QUESTIONS FROM VOLUME – I & II**(WITHOUT SUB-DIVISION QNS & PROBLEMS)****1.ATOMIC STRUCTURE - I**

1. Explain formation of O₂ molecule by molecular orbital theory. (B)(M6,10,13,J6,S7)
2. Derive de Broglie's equation. (B)(M11,J7,S6)
3. Discuss Davisson and Germer's experiment. (B)(M7)
4. Give any five postulates of molecular orbital theory. (B)(M8,J,S12)
5. Explain the formation of N₂ molecule using Molecular orbital theory. (J8,9,11,S8,10)

2.PERIODIC CLASSIFICATION

6. Explain Pauling's method to determine ionic radii. (B)(M6,J10,S9,10)
7. Explain the various factors that affect electron affinity. (M7,9,J6,7,11,12,S6)
8. How do electronegativity values help to find out the nature of bonding between atoms? (M11,J7,S7)
9. Explain the Pauling scale for the determination of electronegativity. Give the disadvantage of Pauling scale. (M8,13,S12)
10. Explain any three factors which affect the Ionisation energy (B)(J8)
11. Explain how electronegativity values help to find out the percentage of ionic character in polar covalent bond. (S8)
12. Explain the Mullikan scale for the determination of electronegativity. Give the disadvantage of Mullikan scale.
13. How is atomic radius calculated from covalent bond length?

3.p – BLOCK ELEMENTS

14. How is fluorine isolated from their fluorides by Dennis method? (B)(M6,S9,J11)
15. Mention the use of silicones. (B)(M7,S12)
16. Discuss the structure of inter halogen compounds (ANY 2) of AX, AX₃, AX₅ and AX₇ type. (S7)
17. Describe in detail how noble gases are isolated from air by Ramsay – Rayleigh's method. (S6, M10)
18. How does Fluorine differ from other halogens? (M8,9,13,S10)
19. How is lead extracted from its ore? (B)(J8)
20. Describe in detail how noble gases are isolated by Dewar's process (B)(J6,9,12,M11)
21. What are silicones? How are they prepared? Give their structures.
22. Give any five characteristics of p block elements.
23. Give any five properties of Hydrogen halides.

4. d – BLOCK ELEMENTS

24. How is zinc extracted from its ore? (B)(M6,11,J9,11,12,S10)
25. Explain the extraction of silver from its chief ore Argentite. (B)(M13,J6,8,S7)
26. How is gold extracted from its ore? (B)(M8,J7,10,S6,9,12)
27. Explain how Potassium dichromate is extracted from chromium ore. (B)(M7,10)
28. Explain the extraction of chromium by aluminothermic process. (M9,S8)

5. f – BLOCK ELEMENTS

29. Discuss the position of Lanthanides in the periodic table. (M8)
30. What is Lanthanide contraction? Discuss its causes and two consequences. (B)(S7)
31. Discuss the consequences of Lanthanide contraction. (B)(M7,9,13,J6,12)
32. Compare the points of similarities and differences between Lanthanides and Actinides (any five point) (M6,11,J8,S12)
33. Describe the extraction of lanthanides from Monazite sand. (B)(M10,J7,11,S6,10)
34. Mention the oxidation state and any three uses of Lanthanides (S8)
35. Mention the uses of Lanthanides and Actinides. (J9,S9)

6. CO-ORDINATION COMPOUNDS

36. Explain the postulates of Werner's Theory. B)(M6,J6,7,8,10,11,S7,9,10,12)
37. What are the postulates of Valence bond theory? (M9)
38. Explain coordination and ionisation isomerism with suitable examples. (B)(M8,13,J7,9,12,S8,10)
39. Explain Hydrate isomerism and Linkage isomerism with examples. (B)(M10)
40. For the complex $K_4[Fe(CN)_6]$, write the (B)(M7,S6)
- (a) IUPAC name (b) Ligand (c) Central metal ion
- (d) Co-ordination number (e) Geometry Complex ion
41. For the complex $K_4[Fe(CN)_6]$, $[Cu(NH_3)_4]SO_4$ mention (B)(M11,S7,9)
- (a) IUPAC name (b) Ligand (c) Central metal ion
- (d) Co-ordination number (e) Charge on the Complex ion
42. For the Complex $[Co(NH_3)_6]Cl_3$ mention the following : (J9)
- (a) IUPAC name (b) Ligand (c) Central metal ion
- (d) Co-ordination number (e) Nature of Complex
43. Mention the type of hybridisation, magnetic property and geometry of the following complexes using VB theory. (i) $[FeF_6]^{4-}$ (ii) $[Fe(CN)_6]^{4-}$ (B)(M6,11,J11,S8,12)
44. Using VB theory explain why $[Ni(CN)_4]^{2-}$ is diamagnetic whereas $[Ni(NH_3)_4]^{2+}$ is paramagnetic. (M7,13,J6,8)
45. $[Ni(CN)_4]^{2-}$ is diamagnetic whereas $[NiCl_4]^{2+}$ is paramagnetic. Explain. (J12)
46. Apply VB theory to find out the geometry of $[Ni(NH_3)_4]^{2+}$ and calculate its magnetic moment. (J6)
47. Explain the following terms : (S8)
- (i) Neutral ligand (ii) Chelates (iii) Co-ordination sphere
48. How is chlorophyll important in environmental chemistry? Mention its function. (B)(M8)

49. Mention the function of haemoglobin in natural process. (B)(M10)
 50. Write about ligands.
 51. Give any five uses of co-ordination compounds.

7. NUCLEAR CHEMISTRY

52. How are radioactive isotopes useful in medicine? (B)(M6,J9,11)
 53. Write a note on radio carbon dating. (B)(M8,10,J6,10,S6,7,10)
 54. Explain the principle underlying the function of hydrogen bomb. (B)(M7)
 55. Explain the nuclear reactions that take place in sun. (J7,S12)
 56. Explain nuclear fission reaction with an example. (B)(J8)
 57. Mention the use of radioisotopes in the field of (S8)
 (i) Study of hydrolysis of ester (ii) Mechanism of photosynthesis plants
 58. Give the differences between nuclear reactions & chemical reactions. (B)(M9,11, J12)
 59. Distinguish between nuclear fusion reactions and nuclear fission reactions. (B)(S9)
 60. Explain nuclear fusion reaction.

8.SOLID STATE - II

61. Explain Schottky and Frenkel defects. (B)(M6,7,J10,13,S8,10,12)
 62. Explain Bragg's spectrometer method. (B)(M8,10,J6,9,S6,7)
 63. Explain the nature of glass. (B)(M7)
 64. Write the properties of ionic crystals. (B)(M11,J8)
 65. What are superconductor? Write their uses. (B)(J7,11,12)

9.THERMODYNAMICS -II

66. Write the various statements of second law of thermodynamics. (B)(M6,8,10,13,J6,10,11,S6,9,10)
 67. Write the characteristics of free energy G. (M7,11,J7,9,S7)
 68. What are the characteristics of entropy? (J8,S8,12,M9)
 69. Define Trouton's rule. What are the substances that deviate from this rule? (J12)

10.CHEMICAL EQUILIBRIUM -II

70. Apply Le Chatelier principle to Haber's process of manufacture of ammonia. (M8,J6,10,11)
 71. Derive the expression for K_c and K_p for the decomposition of PCl_5 . (B)(M7,11,13,J12)
 72. Derive a relation between K_c and K_p . (B)(M6,10,J7,S8,10)
 73. Apply Le Chatelier principle to Contact process of manufacture of SO_3 . (M9,J8,S7)
 74. Discuss the effect of temperature and pressure on the following equilibrium:
 $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$ $\Delta H = +59.0KJ/mol$ (B)(J9,S12)
 75. Derive expression for K_c and K_p for the formation of HI. (S9)

11.CHEMICAL KINETICS –II

76. State the characteristics of order of a reaction. (B)(M6,10,11,13,J10,S8)
77. Explain the experimental determination of rate constant for the decomposition of hydrogen peroxide in aqueous solutions. (B)(J6,12,S7)
78. Discuss the characteristics of a first order reaction (S6)
79. Explain the experimental determination of rate constant of acid hydrolysis of methyl acetate. (B)(M7,S12)
80. State the differences between simple and complex reactions. (B)(J7,S10)
81. Write notes on (i) consecutive reactions (ii) parallel (iii) opposing reactions. (B)(M8)
82. Explain various types of complex reactions. (B)(J7,S10)
83. Derive an equation for the rate of a first order reaction. (J9,11)
84. Prove experimentally the decomposition of N_2O_5 in CCl_4 is a first order reaction.

12.SURFACE CHEMISTRY

85. Write briefly about the adsorption theory of catalysis. (B)(M6,9,13)
86. Write methods for preparation of colloids by dispersion Methods. (B)(J6)
87. Give any 5 main differences between physical adsorption & chemical adsorption. (B)(J9)
88. Write briefly on intermediate compound formation theory of catalysis with an example. (B)(J7,11,12,S8)
89. Discuss the factors affecting adsorption. (S12)
90. Explain the chemical methods of preparing colloids. (B)(M7,10,J10,S6,10)
91. What is electro-osmosis? Explain. (B)(S7,J8)
92. What is electrophoresis? Explain.
93. How are colloids prepared by using (i) mechanical dispersion method (ii) electro dispersion method? (B)(M8)
94. How can colloidal solutions be purified by dialysis? (B)(M11)
95. How can colloidal solutions be purified by Ultrafiltration?

13.ELECTROCHEMISTRY - I

96. Differentiate between electronic conduction and electrolytic conduction. (B)(J11)
97. Write the postulates of Arrhenius theory of electrolytic dissociation. (B)(J9)
98. Write the evidences in favour of Arrhenius theory of electrolytic dissociation. (M10)
99. Explain Ostwald's dilution law. (B)(M6,M7,S8)
100. Explain buffer action of acidic buffer with example. (B)(S9,12)
101. Derive Henderson equation. (B)(M8,11,S6,J7)
102. Explain Ostwald's theory of indicators. (B)(J6,12)
103. Explain Quinonoid theory of indicators. (B)(J6,M13)

14. ELECTRO CHEMISTRY - II

104. Write the IUPAC convention of representation of a cell. (M6,7,9,10,11,13)
105. Establish a relation between free energy and emf. (J9,S6,S7)

106. Describe Daniel cell. (J7,S9)
107. With the help of electrochemical series, how will you predict whether a metal will displace another metal from its salt solution or not? Give examples. (J12)
108. How is e.m.f of a half cell determined? (B)(M8)
109. Write an account on cell terminology. (J9)
110. How is standard Hydrogen Electrode (SHE) constructed? Explain its function? (S9)
111. Derive Nernst equation. (M9,J6,8,10,11,S6,8,10,12)

17. ETHERS

112. How do ethers react with HI? Give the significance of the reaction. (M6,S10)
113. Discuss the isomerism in ethers. (B)(J6,S7)
114. Distinguish between anisole (Aromatic ether) and diethyl ethers (Aliphatic ether). (B)(J10,S6,8,10,M11,J9)
115. How does diethyl ether react with the following reagents? (B)(M7,J11)
- (a) O_2 /long contact (b) dil. H_2SO_4 (or) H_2O (c) con. H_2SO_4
- (d) PCl_5 (e) Cl_2 (f) HI
116. Give any three methods of preparing diethyl ether /ether (B)(M8,10,13,J7)
117. Give any 3 methods of preparing anisole from phenol. (J12)
118. Give the possible isomers for a compound of molecular formula $C_4H_{10}O$ and name them.
119. Give any two/three methods of preparation of anisole and explain the reaction of HI with anisole. (M9,J8,12,S12)

22.CHEMISTRY IN ACTION

120. Explain briefly the characteristics of rocket propellants. (B)(M6,9,11,J6,7,8,10,S7)
121. Write a note on anaesthetics? (S6,M10)
122. Write briefly on Buna rubbers (M7)
123. How are Burn-S and Nylon-66 prepared? (M8,13)
124. Give the characteristics of a dye. (J9)
125. What are chromophores and auxochromes? Give 2 examples for each. (S8,J11)
- (or) Explain chromophore and auxochrome theory about dyes. (S12)
- (or) Explain the Otto-Wites theory about dyes with suitable example. (J12)
- (or) Explain the colour and structure of dyes. (S9,10,12,J12)