SENIOR INTER CHEMISTRY (IPE BLUE PRINT)		
S. No.	**CHAPTER NAME**	**WEIGHTAGE**
1.	**SOLID STATE**	**4 (OR) 2 + 2**
2.	**SOLUTIONS**	**4 + 2**
3.	**ELECTROCHEMISTRY & CHEMICAL KINETICS**	**8 + 2**
4.	**SURFACE CHEMISTRY**	**4 (OR) 2 + 2**
5.	**METALLURGY**	**4 + 2**
6.	**P-BLOCK ELEMENTS**	**8 + 4 + 2 + 2**
7.	**D & F- BLOCK ELEMENTS**	**4 + 2**
8.	**POLYMERS**	**4 (OR) 2 + 2**
9.	**BIOMOLECULES**	**4 (OR) 2 + 2**
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11.	**ORGANIC CHEMISTRY**	**8 + 4 + 2 + 2**

SR. INTERMEDIATE

CHEMISTRY IMPORTANT QUESTIONS (I.P.E.)

8 MARKS QUESTIONS

P-BLOCK ELEMENTS

1. How is ozone prepared from oxygen? Explain its reaction with

   (a) C_2H_4 (b) KI (c) Hg (d) PbS (e) Ag (f) NO.

2. How is chlorine prepared by electrolytic method? Explain it's reaction with

   (a) NaOH (b) NH_3 under different conditions (c) NaI (d) Slaked lime.

3. How is chlorine prepared in the laboratory? How does it react with the following?

   (a) Iron (b) Acidified $FeSO_4$ (c) Iodine (d) H_2S (e) $Na_2S_2O_3$.

4. How is nitric acid manufactured by Ostwald's process? How does it react with the following?

   (a) Copper (b) Zn (c) S_8 (d) P_4

5. How is ammonia manufactured by Haber's process? Explain the reactions of ammonia with

   (a) $ZnSO_4$ (b) $CuSO_4$ (c) AgCl.

ELECTRO CHEMISTRY & CHEMICAL KINETICS

6. (a) What is electrolysis? And state Faraday's laws of electrolysis. A solution of $CuSO_4$ is electrolysed for 10 minutes with a current of 1.5amperes. What is the mass of copper deposited at the cathode?

   (b) What is "molecularity" of a reaction? How is it different from the 'order' of a reaction? Name one bimolecular and one tri-molecular gaseous reactions.

7. (a) State and Explain Kohlrausch's law of independent migration of ions.

   (b) Give the applications of Kohlrausch's law of independent migration of ions.

8. Give a detailed account of the collision theory of reaction rates of bimolecular gaseous reaction.

9. (a) What are galvanic cells? Explain the working of a galvanic cell with a neat sketch taking Daniel cell as example.

   (b) What is half-life $t_{1/2}$ of a reaction? Derive the equations for the 'half-life' value of zero and first order reactions.

10. What is rate of reaction? Explain the effect to temperature and effect of catalyst on rate of reaction?

11. (a) State and explain Nernst equation with the help of a metallic electrode and non metallic electrode

    (b) Calculate the emf of cell at $Cr\,|\,Cr^{+3}(0.1\text{M})\,||\,Fe^{+2}(0.01\text{M})\,|\,Fe$. Give that $E^{o}_{Cr^{3+}/Cr} = -0.74\text{V}$ and $E^{o}_{Fe^{-2}/Fe} = -0.44\text{V}$.

12. Give the different type of Batteries and explain the construction and working of each type of battery.

ORGANIC CHEMISTRY

13. With a suitable example write equations for the following.

    (i) Kolbe's reaction (ii) Reimer-Tiemann reaction (iii) Williamson's synthesis (iv) Esterification.

14. Describe the following : (i) Acetylation (ii) Cannizaro reaction (iii) Cross aldol condensation

(iv) Decarboxylation

15. Explain following reactions :

(i) HVZ reaction (ii) Carbylamine reaction (iii) Aldol condensation reaction

(iv) Wurtz fitting reaction.

16. (a) Write any two methods of preparation of phenol

(b) Explain the acidic nature of phenols and compare with that of alcohol.

17. Explain the following (i) sandmayer reaction. (ii) Gattermann reaction. (iii) Wurtz reaction.

(iv) Diazotisation

4 MARKS QUESTIONS

SOLID STATE

1. Derive Bragg's equation.
2. Explain the following: (a) Schottky defect (b) Frankel defect
3. What is doping? Describe the two main types of semiconductors and contrast their conduction mechanism.
4. Explain similarities and differences between ionic and metallic crystalline solids.

SOLUTIONS

5. What is relative lowering of vapour pressure? How is it useful to determine the molar mass of solute?
6. State Raoult's law vapour pressre of water at 293K is 17.535mm Hg. Calculate the vapour pressure of the solution at 293K when 25g of glucose is dissolved in 450g of water.
7. State Raoult's law. Calculate the vapour pressure of a solution containing 9g of glucose in 162g of water at 293K. The vapour pressure of water at 293K is 17.535mm Hg.
8. Calculate the mass of non-volatile solute (molar mass 40g mol^{-1}) which should be dissolved in 114g octane to reduce its vapour pressure to 80%.
9. The vapour pressure of pure benzene at a certain temperature is 0.850 bar. A non-volatile, non-electrolyte solid weighing 0.5g when added to 39g of benzene(molar mass 78) vapour pressure of the solution, then is 0.845 bar. What is the molar mass of the substance?
10. Define molality (m). Calculate molality(m) of 10gm of glucose($C_6H_{12}O_6$) in 90gm of water.
11. Define mole fraction. Calculate the mole fraction of H_2SO_4 in a solution containing 98% H_2SO_4 by mass?
12. What is meant by positive from Raoult's law and how is the sign of $\Delta_{mix}H$ related to positive deviation from Raoult's law.
13. What is meant by negative deviation from Raoult's law and how is the sign of $\Delta_{mix}H$ related to negative deviation from Raoult's law.
14. What is an ideal solution? Give suitable examples.

SURFACE CHEMISTRY

15. What are different types of adsorption? Give any four differences between characteristics of the different types.
16. What is catalysis? How is catalysis classified? Give two examples for each.
17. What is an emulsion? Explain the classification of emulsions with example.
18. What are micelles? Discuss the mechanism of micelle formation and cleaning action of soap.
19. Describe the purification of colloidal solutions by the phenomenon of dialysis with a neat diagram.

METALLURGY

20. Giving examples to differentiate roasting and calcinations.
21. Explain the purification of sulphide ore by froth floatation method.
22. Write any two ores with formula of the following metals (a) aluminium (b) zinc (c) iron (d) copper
23. Explain briefly the extraction of aluminium from bauxite.

D & F-block ELEMENTS

24. Explain Werner's theory of coordination compounds with suitable examples.
25. Using IUPAC names write the systematic names of the following

(i) $\left[CO\left(NH_3\right)_6\right]Cl_3$ (ii) $\left[Pt\left(NH_3\right)_2 Cl(NH_2CH_3)\right]Cl$ (iii) $\left[Ti\left(H_2O\right)_6\right]^{3+}$ (iv) $K_2\left[PdCl_4\right]$

(v) $K_3\left[Fe(CN)_6\right]$ (vi) $Fe_4\left[Fe(CN)_6\right]_3$ (vii) $Ni(CO)_4$ (viii) $(NiCl_4)^{-2}$ (ix) $[Fe(CN)_6]^{-4}$

26. Using IUPAC names write the formulae for the following.

(a) Tetra hydroxyzincate (II) ion (b) Hexa ammine cobalt(III) sulphate

(c) Potassium tetra chloro palladate(II) (d) Potassium tri(oxalato) chromate(III)

27. Write the characteristics properties of transition elements.
28. What is Lanthanide contraction? What are the consequences of lanthanide contraction?
29. Explain geometrical isomerism in coordination compounds giving suitable examples.

BIOMOLECULES

30. Give the sources of the following vitamins and name the diseases caused by their deficiency

(a) A (b) D (c) E and (d) K

31. What are hormones? Give one example for each.

(I) Steroid hormones (ii) Poly peptide hormones and (iii) Amino acid derivatives

32. Explain the denaturation of proteins? With suitable examples.
33. Write notes on the functions of different hormones in the body.
34. What are essential and Non-essential amino acids? Give one example for each.
35. Write a brief note on the structure of glucose.

P-BLOCK ELEMENTS

36. Explain the manufacture of sulphuric acid by contact process.

37. How does Pcl_5 react with the following? (a) water (b) C_2H_5OH (c) CH_3COOH (d) Ag

38. Write balanced equations for the following?

(a) NaCl is heated with conc. H_2SO_4 in the presence of MnO_2.

(b) Chlorine is passed into a solution of NaI in water.

39. Explain the structures of (a) BrF_5 (b) IF_7.

40. What are interhalogen compounds? Give some examples to illustrate the definition how are they classified?

41. How are XeF_2 and XeF_4 are prepared? Give their structures.

42. How are XeO_3 and $XeOF_4$ prepared? Give their structures.

43. Explain the structure of (a) XeF_6 (b) $XeOF_4$.

ELECTRO CHEMISTY & CHEMICAL KINETICS

44. What are fuel cells? How they are different from galvanic cells? Give the constructions of H_2O_2 fuel cell. .

45. What is metallic corrosion? Explain it with respect to iron corrosion.

46. Give the construction and working of a standard hydrogen electrode with a neat diagram.

47. What is Arrhenius equation? Derive an equation which describes the effect of rise of temperature (T) on the rate constant (K) of a reaction.

48. Derive the integrated rate equation for a first order reaction.

ORGANIC CHEMISTRY

49. Explain the SN^1 & SN^2 reactions with mechanism.

50. Define the following: (a) Racemic mixture (b) Retention of configuration (c) Enantiomers.

51. Write the products formed by the reduction and oxidation of phenol.

52. How do you prepare ethyl cyanide and ethyl isocyanide from a common alkylhalide?

2 MARKS QUESTIONS

CHEMISTRY IN EVERYDAY LIFE

1. What are antibiotics? Give example.
2. What are antiseptics? Give example.
3. What are antifertility drugs? Give example.
4. What are artificial sweetening agents? Give example.
5. What are analgesics? Give example.
6. What are non-Narcotic analgesics? Give example.
7. What are antacids? Give example.
8. What are antihistamines? Give example.
9. What are tranquilizers? Give example.
10. What are narcotic analgesics? Give example.
11. What are antimicrobials? Give example.
12. What are disinfectants? Give example.
13. What are the main constituents of dettol?
14. What is tincture of iodine? What is its use?
15. What are food preservatives? Give example.
16. Name two most familiar antioxidants used as food additives?
17. What is the difference between a soap and a synthetic detergent?
18. Name the macromolecules that are chosen as drug targets?

POLYMERS

19. Mention the type of polymerization involved in the formation of the following polymers

    a) Bakelite b) PVC c) Polyethene d) Teflon
20. What is polymerization? Give an example of a polymerization reaction.
21. What is PHBV? How is it useful to man?
22. Define an elastomer? Give example.
23. Mention the structures and names of the monomers used for preparing the following polymers.

    a) Bakelite b) Poly styrene c) Teflon d) Poly vinyl chloride

    ` e) Nylon – 6, 6 f) Glyptal g) Terylene
24. What is vulcanization of rubber?
25. What do you mean by polydispersity index?
26. What is Bio-degradable polymer? Give two examples.
27. Write the names and structures of the monomers of the following polymers

    i) Buna-S ii) Buna-N iii) Dacron iv) Neoprene
28. What is an addition polymer? Give an example of an addition polymer.

29. What is cross linking agent used in vulcanization.

30. Is $[-HN.CHR-CO-]_n$ a homopolymer or a copolymer?

31. Give two examples for Semi-synthetic polymers?

32. What is Ziegler-natta catalyst?

33. Give the structure of Nylon-2-Nylon-6.

34. What are monomer repeating units of Nylon-6 and Nylon-6, 6.

35. Name the different types of molecular masses of polymers.

36. What is the difference between Buna-N and Buna-S?

37. What are fibers? Give example.

38. What are thermoplastic polymers? Give example.

39. What are thermosetting polymers? Give example.

40. What are copolymers? Give example.

41. What are homopolymers? Give example.

42. What are monomers? Give example.

P-BLOCK ELEMENTS (VA, VIA, VIIA & VIIIA)

43. Nitrogen exists as diatomic molecule and phosphoruns as P_4. Why?

44. Nitrogen molecule is highly stable. Why?

45. What happens when white phosphorus is heated with conc. NaOH solution in an inert atmosphere of CO_2?

46. Ammonia is a good complexing agent explain with an example.

47. A mixture of Ca_2P_2 and CaC_2 is used in making Holme's signal – explain?

48. Why is H_2O a liquid while H_2S is a gas.

49. Why is di-oxygen a gas but sulphur a solid.

50. H_2O is neutral while H_2S is acidic – explain.

51 Give the hybridization of sulphur in the following

a) SO_2 b) SO_3 c) SF_4 d) SF_6

52. What is tailing of mercury? How is it removed?

53. SO_2 can be used as an anti-chlor. Explain.

54. Write the reaction of "F_2" and "Cl_2" with water?

55. Electron gain enthalpy of fluorine is less than that of chlorine explain.

56. What is Aqua regia? Write it's reaction with gold and platinum?

57. How is chlorine manufactured by Deacon's method.

58. List out the uses of Neon?

59. In modern diving apparatus, a mixture of He and O_2 is used. Why?

60. How is $XeOF_4$ prepared? Describe its molecular shape?

61. What happens when chlorine react with dry slaked lime.

62. Explain the structure of XeO_3.

63. Write any two uses of Argon.

64. (a) $XeF_4 + O_2F_2 \longrightarrow$; (b) $XeF_2 + H_2O \longrightarrow$.

METALLURGY

65. Give the composition of the following alloys : (a) Brass (b) Bronze (c) German silver.

66. What is the role of cryolite in the metallurgy of aluminium?

67. What is matte? Give its composition.

68. What is blister copper? Why is it so called?

69. What is flux? Give an example.

70. State the role of silica in the metallurgy of copper.

71. What is the difference between a mineral and an ore?

72. What is poling?

SOLUTIONS

73. Define molarity.

74. Define osmotic pressure.

75. What are isotonic solutions? Give example.

76. What is relative lowering of vapour pressure?

77. State Henry's law.

78. What are colligative properties. Give examples.

79. Calculate the molarity of a solution containing 5gm of NaOH in 450ml solution?

80. Calculate the molality of 2.5gm of ethanoic acid (CH_3COOH) in 75gm of benzene.

81. Calculate weight of Glucose required to prepare 500ml of 0.1M solution.

82. Define mole fraction.

83. What is ebullioscopic constant?

84. What is cryoscopic constant?

85. State Raoult's law.

D- & F- BLOCK ELEMENTS

86. Why Zn^{2+} is diamagnetic where as Mn^{2+} is paramagnetic?

87. Scandium is a transition element? But Zinc is not why?

88. What is an alloy? Give example.

89. What is an ambidentate ligand? Give example.

90. Calculate the 'spin only' magnetic moment of $Fe^{2+}_{(aq)}$ ion.

91. $CuSO_4.5H_2O$ is blue in colour where as anhydrous $CuSO_4$ is colourless. Why?

92. What are coordination compounds? Give two examples.

93. What is ligand?

94. Aqueous Cu^{2+} ions are blue in colour where as aqueous Zn^{2+} ions are colourless. Why?

95. What is misch-metal? Give its composition and used.

96. What are complex compounds? Give examples.

97. Calculate the magnetic moment of a divalent ion in aqueous solution if its atomic number is 25.

ELECTRO CHEMISTRY & CHEMICAL KINETICS

98. What is standard hydrogen electrode?

99. How is Gibb's energy (G) related to the cell emf (E) mathematically?

100. What is a primary battery? Give one example.

101. What is a fuel cell?

102. What is metallic corrosion? Give one example.

103. State Faraday's first law of electrolysis?

104. State Faraday's second law of electrolysis?

105. State Kohlraush's law of independent migration of ion.

106. What are the units of rate of reaction?

107. Give two examples for zero order reactions?

108. Give two examples for gaseous first order reactions?

109. Write the integrated equation for a first order reaction in terms of [R], $[R]_0$ and 't'?

110. What are pseudo first order reactions? Give one example?

111. Define order of a reaction? Illustrate your answer with an example.

112. A reaction has a half life of 10 minutes. Calculate the rate constant for the first order reaction.

113. Identify the reaction order from each of the following rate constants.

(i) $k = 2.3 \times 10^{-5}$ L mol^{-1} s^{-1} (ii) $k = 3 \times 10^{-4}$ s^{-1}.

114. What is rate of reaction? (or) Speed of the reaction.

BIO MOLECULES

115. What are amino acids? Give two examples.

116. What is Zwitter ion? Give an example.

117. What are proteins? Give an example.

118. What are fibrous proteins? Give examples.

119. What are globular proteins? Give examples.

120. Write any one method of preparation of glucose. Write the equation.

121. Name the vitamin responsible for the coagulation of blood.

122. Why are vitamin A and vitamin C essential to us? Give their important sources.

123. What is denaturation? Give an example.

124. What is reducing sugars?

SOLID STATE

125. How do you distinguish between crystal lattice and unit cell?

126. What makes a glass different from quartz?

127. Explain Antiferromagnetism with suitable example.

128. What are f-centres?

129. What is co-ordination number?

130. What is tetrahedral void and octahedral void?

SURFACE CHEMISTRY

131. What is emulsifying agent? Give one example.

132. What is Gold number?

133. What is the general difference between soap and detergent chemically?

134. What is autocatalysis? Give one example.

135. What is Tyndal effect?

136. What is Brownian movement?

137. What is Hardy-Schulze's law.

138. What is adsorption? Give two applications.

139. Why is adsorption always exothermic?

140. Sky appears blue in colour. Explain.

ORGANIC CHEMISTRY

141. Write the isomers of the compound having molecular formula C_4H_9Br.

142. What are Enantiomers?

143. Which compound in each of the following pairs will react faster in SN^2 reaction with OH^-?

i) CH_3Br or CH_3I ii) $(CH_3)_3CCl$ or CH_3Cl

144. Find the A and B products in the following reactions : $CH_3CH_2Cl \xrightarrow[ether]{Mg} A \xrightarrow{H_2O} B$

145. Write the structures of the following compounds.

(i) 2-chloro-3-methyl pentane

(ii) p-bromo chloro benzene

146. Explain the Wurtz-fitting reaction.

147. Compare the acidic strength of acetic acid, chloro acetic acid, benzoic acid and phenol.

148. Give structures of A, B and C in the following reaction.

$$C_6H_5N_2Cl \xrightarrow{CuCN} A \xrightarrow{H_2O/H^+} B \xrightarrow{NH_3,\Delta} C$$

149. How do you carryout the following conversions

i) Benzoic acid to Benzamide, ii) Aniline to p-bromo aniline

150. Arrange the following bases in decreasing order of P^{Kb} values. $C_6H_5NH_2$, $C_6H_5NHCH_3$, $C_2H_5NH_2$ and $(C_6H_5)_2NH$.