

INORGANIC CHEMISTRY QUESTION BANK FOR BSC 1st YEAR STUDENTS

Short answer type (2 – 4 marks each)

- 1) Write Schrödinger wave equation. Write three quantum number obtained from it.
- 2) Which element has higher value of electron affinity, F or Cl? Why?
- 3) Which of the two SnCl_4 or SnCl_2 is ionic? Justify your answer.
- 4) Discuss structure of H_3O^+ on the basis of VSEPR theory.
- 5) Discuss the structure of XeO_3 .
- 6) What is difference between intrinsic & extrinsic defects? Explain with example.
- 7) Explain the term bond energy with example.
- 8) Write a note on Froth flotation method.
- 9) Write a note on Aufbau's principle.
- 10) The atomic radius decreases gradually on moving left to right in any period. Explain?
- 11) Nitrogen can form NCl_3 while phosphorus can form PCl_5 as well as PCl_3 . Explain?
- 12) Write down the molecular orbital electronic configuration of C_2 & NO molecules.
- 13) What do you understand by multi centre Bond? Explain with example?
- 14) Differentiate between sigma bond & π bond giving examples.
- 15) SiCl_4 hydrolysis while CCl_4 does not. Explain?
- 16) Differentiate between Calcination & roasting.
- 17) Explain Hund's rule of maximum multiplicity.
- 18) Write a short note on electron affinity.
- 19) Differentiate with example between intermolecular & intramolecular hydrogen bonding.
- 20) Explain sp^3 hybridization with suitable examples.
- 21) H_3PO_4 is tribasic while H_3PO_3 is dibasic. Explain?
- 22) Discuss structure & geometry of XeF_4 ?

- 23) Give Industrial use of Fluorocarbons.
- 24) Write a short note on Heisenberg uncertainty principle.
- 25) Explain why size of Na^+ ion is smaller than Na & that of Cl^- ion is bigger than Cl.
- 26) Define bond energy.
- 27) What are Clathrates?
- 28) Discuss structure of IF_5 .
- 29) Explain purpose of roasting of an ore.
- 30) Explain spin quantum number?
- 31) What is meant by covalent bond?
- 32) Nitrogen is a gas, while phosphorus is solid. Explain?
- 33) Explain the term smelting.
- 34) What do you understand by dual nature of electron?
- 35) Explain principal quantum number.
- 36) Why is first ionisation potential of nitrogen is greater than that of oxygen?
- 37) Explain geometry of NH_3 molecule.
- 38) What are electron deficient molecules?
- 39) Why are elements of first group of periodic table are called the alkali metals?
- 40) What do you understand by atomic number? How is it different from mass number?
- 41) What is meant by group & period of periodic table?
- 42) How does atomic size of elements vary in periodic table & why?
- 43) Explain the geometry of H_2O molecule?
- 44) What do you understand by van der walls force?
- 45) What is meant by diagonal relationship?
- 46) Why is $\text{B}(\text{OH})_3$ acidic?
- 47) Explain the term calcination.

- 48) Size of anion is always bigger than parent atom. Explain.
- 49) Explain sp^2 hybridization with suitable example.
- 50) An orbital cannot accommodate more than two electrons. Justify the statement.
- 51) Nitrogen is electronegative element, however its electron affinity is virtually zero. Explain?
- 52) Explain geometry of hydronium ion.
- 53) Explain the Frenkel defect of ionic crystal.
- 54) Derive de Broglie's equation for dual nature of matter.
- 55) Define lattice energy.
- 56) The chloride of Hg^{+} is covalent while fluoride is ionic. Explain?
- 57) Define atomic radius. Mention briefly, how does it effect ionization potential?
- 58) H_2S is heavier than H_2O molecule however H_2S is gas while H_2O is liquid. Explain?
- 59) Find out value of all the quantum numbers for last electron of Cr.
- 60) Describe schottky defect found in ionic crystals.
- 61) H_2O is linear molecule. Justify your answer?

Long answer type (5 - 10 marks each)

- 1) What is Born-Haber Cycle? How does it explain stability of ionic compounds?
- 2) Write short note on following:
 - a. Complex formation tendency of alkali metals.
 - b. Biological importance of Calcium & Magnesium.
- 3) Explain inert pair effect, Catenation, & diagonal relationship with respect to p block elements.
- 4) Differentiate between following:
 - a. Minerals & Ores
 - b. Calcination & roasting
 - c. VBT & MOT
- 5) (a) What is ionization potential? What are factor influencing ionization potential of

anelement.

- 6) (b) The ionization potential decreases with increase in atomic number in any group. Explain ?
- 7) Describe free electron theory of metallic bonding. Explain how this theory successfully explained properties of metals.
- 8) (a) Discuss preparation, property & use of fluorocarbons.
- 9) (b) Discuss structure & geometry of IF_7 .
- 10) Define electronegativity. Name the factors which influence its value & also explain how do they influence it. How is the value of electronegativity of any elements determined with the help of Mulliken's scale ?
- 11) (a) Write a note on role of Na^+ & K^+ ions in human body.
- 12) (b) Describe Fajan's rule with suitable example.
- 13) Discuss structure of following compounds: **a).** XeOF_2 **b).** BrF_3 **c).** IF_7
- 14) Discuss preparation & properties of diborane. Describe its structure & give additional facts which support the bridge structure.
- 15) What is VSEPR theory ? How it is useful in explaining the geometry of molecules?
- 16) With the help of this theory explain the geometry of NH_3 & H_2O molecules?
- 17) (a) What are interhalogen compounds? Give shape & structure of IF_3 , ICl_4^- & ClF_5 .
(b) Interhalogen compounds are more reactive than halogens. Why?
- 18) (a) Give names & formula of ores of Beryllium.
(b) How the metal is extracted from one of its ore?
- 19) (a) Sketch the shapes of various d orbitals.
(b) Explain the term electronegativity & discuss its periodicity in periodic table.
- 20) Discuss structure of following:
(a) XeF_4 (b) XeF_6
- 21) (a) Discuss the complexation tendencies of Be.
(b) Write a short note on carbides.
- 22) Describe method of extraction of lithium from one of its ore.

- 23) Give an account of hydrogen bond & its significance.
- 24) Discuss alkyl & aryls of s block elements.
- 25) Discuss in detail the structure of diborane.
- 26) Discuss the important features of MOT for covalent molecules & draw Mo diagram for Oxygen molecule.
- 27) Write short note on following:
- 28) Electron affinity & factor affecting its value (b) oxy acids of nitrogen
- 29) Discuss the physical & chemical properties of s block elements & their position in the periodic table.
- 30) Discuss VBT theory for covalent molecules. Mention its limitations.
- 31) Write short note on following:
- discuss structure of diborane
 - radius ratio rule & structure of ionic solids
- 32) Discuss p block elements on basis of electronic configuration, position in periodic table, Electronegativity & its variation, oxidation state & its variation.
- 33) Explain the structure of xenon compounds with oxygen & fluorine, naming XeOF_4 , XeOF_2 & XeF_4 . Explain the process of hybridization giving electronic configuration of central atom, type of hybridization & geometry of molecule in each case.

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