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DEPARTMENT OF SCIENCE AND HUMANITIES
QUESTION BANK

DEGREE : BE/B.TECH

SUBJECT : ENGINEERING CHEMISTRY

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SEMESTER: I

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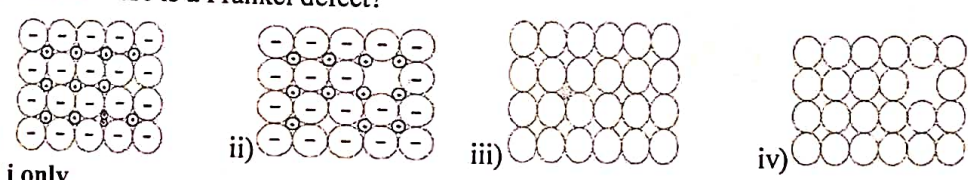
UNIT I -CHEMICAL BONDING
PART A (1 MARKS)

1	Which of the following is known as electrovalent bond? a) Ionic bond b) Metallic bond c) Covalent bond d) None of the above	CO1.1	K1
2	What type of bond completely transfers the electrons during bond formation? a) Covalent bond b) Ionic bond c) Metallic bond d) Hydrogen bond	CO1.1	K1
3	Covalent bond forms between non-metallic elements of a) similar ionization energy b) similar electronic configuration c) similar electro-negativity d) similar electro-positivity	CO1.1	K1
4	The ionic bond is formed by the..... of attraction. a) dispersion force b) magnetic force c) electrostatic force d) electric force	CO1.1	K1
5	Which of the following solid does not contain a covalent bond? a) Copper b) Ice c) Diamond d) Graphite	CO1.1	K1
6	The property of shared pair of electrons closer to one atom than the other in a covalent bond is known as----- a) bond order b) bond polarity c) bond interaction d) bond property	CO1.2	K1

7	When the electro-negativity between atoms is greater than 2.0, then the bond formation would be a) covalent bond b) hydrogen bond c) ionic bond d) metallic bond	CO1.2	K2
8	The measure of the degree of polarity is a) electronegativity b) dipole moment c) ionic character d) ionization energy	CO1.2	K1
9	The covalent compounds are non-polar in nature and are insoluble in..... a) salt solution b) water c) benzene d) carbon tetrachloride	CO1.2	K1
10	When there is no difference in the electronegativity, then the bond is a) polar b) non polar c) coordinate d) none of the above	CO1.2	K2
11	Intermolecular force is also known as..... a) adhesive force b) cohesive force c) interactive force d) Vanderwaals force	CO1.4	K1
12	Ethanol has high boiling point than diethyl ether due to..... a) intramolecular hydrogen bonding b) intermolecular hydrogen bonding c) polar covalent bonding d) none of the above	CO1.4	K2
13	Alcohol is soluble in water due to a) intramolecular hydrogen bonding b) intermolecular hydrogen bonding c) polar covalent bonding d) none of the above	CO1.4	K2
14	Which of the following properties are affected by chemical bonds? a) solubility and melting point b) melting point and boiling point c) stability and hardness d) all of the above	CO1.5	K2
15	Molecular orbitals are filled according to a) Aufbau principle b) Hund's rule c) Pauli's exclusion principle d) all of the above	CO1.6	K1

16	<p>Strength of metallic bond varies according to the</p> <p>a) distance of charges and size of anions b) charge and size of the anions c) distance of charges and size of cations d) charge and size of the cations</p>	CO1.6	K1
17	<p>The number of molecular orbitals formed is to the number of atomic orbitals.</p> <p>a) twice b) thrice c) equal d) none of the above</p>	CO1.6	K1
18	<p>Bond order is used to calculate the.....</p> <p>a) strength of the bond b) length of the bond c) nature of the bond d) number of bonds</p>	CO1.6	K1
19	<p>The bond order of O_2 and N_2 molecules are.....</p> <p>a) 3&1 b) 2&3 c) 3&2 d) 1&2</p>	CO1.6	K1
20	<p>Which is the correct order of the molecular orbitals of N_2 based on energy?</p> <p>a) $(\pi 2p_y) < (\sigma 2p_z) < (\pi^* 2p_x) \approx (\pi^* 2p_y)$ b) $(\pi 2p_y) > (\sigma 2p_z) > (\pi^* 2p_x) \approx (\pi^* 2p_y)$ c) $(\pi 2p_y) < (\sigma 2p_z) > (\pi^* 2p_x) \approx (\pi^* 2p_y)$ d) $(\pi 2p_y) > (\sigma 2p_z) < (\pi^* 2p_x) \approx (\pi^* 2p_y)$</p>	CO1.6	K1
21	<p>Select the exact ionization processes, in which the magnetic behavior has changed from paramagnetic to diamagnetic?</p> <p>a) $NO \rightarrow NO^+$ b) $O_2 \rightarrow O_2^+$ c) $N_2 \rightarrow N_2^+$ d) $C_2 \rightarrow C_2^+$</p>	CO1.6	K3
22	<p>Identify the following ionic species which have equal bond order?</p> <p>i) O_2^- ii) CN^- iii) NO^+ d) O_2^+</p> <p>a) (i) & (ii) b) (i) & (iv) c) (iii) & (iv) d) (ii) & (iii)</p>	CO1.6	K3
23	<p>Make use of MO theory and find which of the following species has the shortest bond length?</p> <p>a) O_2^- b) O_2^{2-} c) O_2^{2+} d) O_2^+</p>	CO1.6	K3

24	The gap between the valence band and conduction band is a) valence gap b) forbidden gap c) conduction gap d) none of these	CO1.7	K1
25	Arrange the following materials, in the increasing order of width of their bond length. a) Semiconductors>Conductor>Insulator b) Conductor<Semiconductor<Insulator c) Conductor>Semiconductor>Insulator d) Insulator>Conductor>Semiconductor	CO1.7	K2
26	The addition of trivalent impurity to an intrinsic semiconductor forms a) n-type Semiconductor b) p-type Semiconductor c) extrinsic Semiconductor d) trivalent Semiconductor	CO1.7	K1
27	From the following atoms, which one is used as a dopant for n-type semiconductor? a) Al b) Ge c) B d) As	CO1.7	K1
28	The energy band gap is maximum in..... a) metals b) superconductors c) insulators d) semiconductors	CO1.7	K1
29	The chalcogenide glasses behave like a a) conductor b) semiconductor c) insulator d) n-type semiconductor	CO1.8	K1
30	The chalcogens are the elements ofgroup in the periodic table. a) 15 th b) 17 th c) 16th d) 14 th	CO1.8	K1
31	Missing of equal number of cations and anions from an ionic crystal leads to a) Schottky defect b) Frenkel defect c) metal excess defect d) metal deficiency defect	CO1.9	K1

32	Which of these is a Frankel defect? 	CO1.9	K2
33	The Iron oxide (FeO) is an example for..... a) SchottkyDefect b) FrenkelDefect c) MetalExcessDefect d) Metal Deficiency Defect	CO1.9	K1

PART-B (4 Marks)

1	Illustrate the formation of covalent and ionic bonds with suitable examples.	CO1.1	K2
2	Demonstrate the consequences of hydrogen bonding.	CO1.3	K2
3	Distinguish the characteristics of intermolecular and intramolecular hydrogen bonding with suitable examples.	CO1.4	K4
4	Apply free electron theory and explain the formation of metallic bonding.	CO1.6	K3
5	Explain the electrical conductivity of n-type and p-type semiconductors.	CO1.7	K2
6	Compare the properties of intrinsic and extrinsic semiconductors with an example.	CO1.7	K2
7	Summarize the features of band theory.	CO1.7	K2
8	Identify the characteristics of Chalcogen semiconductors.	CO1.8	K3
9	Classify the different types of defects in ionic crystals.	CO1.9	K2
10	Interpret the nature of Schottky and Frenkel defects with neat sketch.	CO1.9	K2

PART-C (12 Marks)

1	List the types of chemical bonds and illustrate the formation of chemical bonding with suitable examples.	CO1.1	K4
2	Justify the following statements. i) H_2O is a liquid at room temperature while H_2S is a gas. ii) Density of ice is less than that of water. iii) Melting points of ionic compounds are higher than those of covalent bonds. iv) Aqueous solution of NaCl is a good conductor of electricity than NaCl crystals.	CO1.3	K2
3	Explain the importance of weak interactions.	CO1.4	K2
4	On account of molecular orbital treatment, identify whether the molecule of oxygen is diamagnetic or paramagnetic in nature.	CO1.6	K3
5	Apply MO theory and identify the magnetic behaviour of nitrogen, oxygen and hydrogen.	CO1.6	K3
6	Compare the features of insulators, conductors and semiconductors based on band theory.	CO1.7	K2
7	Compare the salient features of band theory and MO theory.	CO1.7	K2
8	Explain the types of semiconductors with suitable examples.	CO1.7	K2