LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SECOND SEMESTER – **APRIL 2022**

UCH 2502 – CHEMICAL BONDING AND MAIN GROUP ELEMENTS

(21 BATCH ONLY)

Date: 18-06-2022 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

SECTION A

Answer ALL the Questions

1.	**Define the following**		**(5 x 1 = 5)**
a)	Ionisation energy.	K1	CO1
b)	Unit cell.	K1	CO1
c)	F-center.	K1	CO1
d)	's' block metals.	K1	CO1
e)	Catenation.	K1	CO1
2.	**Fill in the blanks**		**(5 x 1 = 5)**
a)	Ionic compounds are soluble in _____.	K1	CO1
b)	LiAg crystallizes in cubic lattice in which both lithium and silver has coordination number of eight. The crystal class is _____.	K1	CO1
c)	Hydrogen atom must be linked to _____ atom for hydrogen bonding to occur.	K1	CO1
d)	Anomalous behaviour of lithium is due to its _____ polarizing effect.	K1	CO1
e)	The oxidation state of P in H_3PO_3 is _____.	K1	CO1
3.	**Match the following**		**(5 x 1 = 5)**
a)	Ionic compounds -- Vander Waals attraction	K2	CO1
b)	fcc -- borax	K2	CO1
c)	Weak forces -- crown ethers	K2	CO1
d)	's' block -- NaCl	K2	CO1
e)	Ore of boron -- high melting point	K2	CO1
4.	**TRUE or FALSE**		**(5 x 1 = 5)**
a)	Many ionic compounds have some covalent ability due to ion polarization.	K2	CO1
b)	Crystalline solids are isotropic.	K2	CO1
c)	Liquid ammonia does not contain hydrogen bond.	K2	CO1
d)	's' block elements exhibit variable oxidation state.	K2	CO1
e)	Borazine is isomorphous with benzene.	K2	CO1

SECTION B

Answer any TWO of the following in 100 words		**(2 x 10 = 20)**		
5.	(a)Write Born-Lande equation. Explain the various terms involved in it. (b) Discuss Fajan's rules with suitable examples.	(5) (5)	K3	CO2
6.	(a) Comment on the properties of ionic compounds. (b) Write short notes on radius ratio rule and coordination number.	(5) (5)	K3	CO2
7.	(a) Explain the variation of boiling point of15, 16 and 17 group hydrides. (b) Illustrate the extraction of beryllium from its important ore.	(5) (5)	K3	CO2
8.	(a) Explain the anomalous behaviour of Li. (b) Write down the preparation and structure of diborane.	(5) (5)	K3	CO2
	SECTION C			
Answer any TWO of the following in 100 words		**(2 x 10 = 20)**		
9.	Discuss briefly the effect of hydration energy on the solubility of ionic compounds.	(10)	K4	CO3
10.	(a) Illustrate the classification of clathrates. (b) Discuss the preparation, properties and uses of any one clathrates.	(5) (5)	K4	CO3
11.	(a) Compare the properties of amorphous and crystalline solids. (b) Determine the preparation and properties of $NaHCO_3$.	(5) (5)	K4	CO3
12.	(c) Elaborate the method for extraction of boron from its important ore. (d) Explain the preparation and properties of hydroxylamine.	(5) (5)	K4	CO3
	SECTION D			
Answer any ONE of the following in 250 words		**(1 x 20 = 20)**		
13.	(a) Compare intramolecular and intermolecular hydrogen bonding with appropriate examples. (b) Describe the structure of sodium chloride and caesium chloride with a neat sketch.	(10) (10)	K5	CO4
14.	(a) Discuss briefly the classification of carbides. (b) Write short notes on the complexes of crown ethers.	(10) (10)	K5	CO4
	SECTION E			
Answer any ONE of the following in 250 words		**(1 x 20 = 20)**		
15.	(a) Discuss briefly the steps involved in the determination of lattice energy of NaCl by Born-Haber cycle. (b) Describe the stoichiometric and non-stoichiometric defects in solids.	(10) (10)	K6	CO5
16.	(a) Explain the biological importance of the ratio of sodium and potassium. (b) Summarize the classification of silicates with one example.	(10) (10)	K6	CO5

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