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Total Pages : 3

**322101**

**Mar. 2022**

**B.Sc. (Chemistry) - I SEMESTER**

**Inorganic Chemistry-I (BCH-101)**

Time : 90 Minutes]

[Max. Marks : 25

*Instructions :*

- 1. It is compulsory to answer all the questions (1 mark each) of Part-A in short.*
- 2. Answer any three questions from Part-B in detail.*
- 3. Different sub-parts of a question are to be attempted adjacent to each other.*

**PART-A**

1. (a) All shells except first have a p-subshell. Comment. (1)  
(b) Which element has higher value of electron affinity: F or Cl? (1)  
(c) Calculate the limiting radius ratio  $r^+/r^-$  for an octahedral site. (1)  
(d) Define polarizability. (1)  
(e) Although  $\text{CCl}_4$  has polar bonds but its dipole moment is zero. Why? (1)

- (f) Draw Radial probability distribution curves for  $n = 3$ ,  $l = 0$ . (1)
- (g) Is  $O_2$  paramagnetic or not and why? (1)
- (h) Which has lower IE? Cl or Ar. (1)
- (i) What is resonance and resonance energy? (1)
- (j) Why NaCl is soluble in water but AgCl is insoluble? (1)

### PART-B

2. (a) State Heisenberg's uncertainty principle. Prove that electron cannot exist into the nucleus using this principle. (3)
- (b) Discuss principal and azimuthal quantum number. (2)
3. (a) Define electronegativity and discuss Pauling scale of electronegativity. (3)
- (b) Which of these  $Na^+$ ,  $Mg^{2+}$  and  $Al^{3+}$  will have smaller radii and why? (2)
4. (a) Using VSEPR theory, explain the structure of  $ICl_2$ -ion. (2)
- (b) Draw molecular orbital energy level diagram for NO. (2)
- (c) Give the hybridization and shape of  $SF_6$ . (1)

5. (a) What is Born-Haber cycle? How does it explain the stability of ionic compounds? (3)
- (b) State Fajan's rule and explain which is more covalent AgCl or AgI ? (2)
6. (a) Explain band theory for metals. (2)
- (b) What is meant by hydrogen bonding? Discuss its types using suitable example. (3)
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