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Total No. of Pages : 02

Total No. of Questions : 19

M.Sc. (Chemistry) (Campus) (2015 to 2017) (Sem.-1)

BASIC INORGANIC CHEMISTRY

Subject Code : CHL-401

M.Code : 51140

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying FIVE marks each and students have to attempt ALL questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Define Hall effect. What is its significance?
2. Draw the structures of (i) Zinc blende and (ii) Wurtzite.
3. What are the point groups for (i) $[\text{Pt}(\text{NH}_3)_4]\text{Cl}_2$ and (ii) COS?
4. Write the IUPAC names for (i) $\text{K}_3[\text{Fe}(\text{ox})_3]$ and (ii) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Br}$.
5. Draw crystal field splitting diagram for $[\text{Ni}(\text{CO})_4]$.
6. Write the Mulliken symbols for F and P state in an octahedral field.
7. How are polarizability of bridging anion and rate of transfer of electron related to each other?
8. The Q-value for the $^3\text{He} (n,p)$ is 0.76 MeV. What is the nuclidic mass of ^3He ?
9. Identify isolobal pairs from the following:
 CH_3 , CH_2 , CH , $\text{Cr}(\text{CO})_4$, $\text{Mn}(\text{CO})_5$, and $\text{Co}(\text{CO})_3$
10. Calculate the spin magnetic moment of (i) $\text{K}_2[\text{Ni}(\text{CN})_4]$ and (ii) $[\text{FeF}_6]^{3-}$



SECTION-B

11. What are magnetic materials? Describe its types.
12. Predict structures for (i) $B_2H_7^-$ (ii) $B_3H_8^-$ and (iii) $B_{10}H_{14}$. Also, show the calculations.
13. Give an account of a nuclear reactor.
14. What is chelate effect? How does the chelate effect help in increasing the stability of the coordination complexes? Explain with the help of at least two examples.
15. Discuss the mechanism of inner sphere redox reaction of coordination compounds.
16. Draw and explain the splitting of d-orbitals in a (i) square planar and (ii) an octahedral field.

SECTION-C

17. Explain the Jahn-Teller effect and sketch the splitting of the d-orbitals for a compressed and elongated octahedron. Also, discuss its consequences.
18. What is radioactivity and radioactive particles? What is the order of radioactive disintegration process? Derive the relationship between half-life and decay constant.
19. Discuss the band gap theory of solids. Also, explain how this band gap is modified in case of semiconductors. How does the conductivity of solids vary with temperature?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.