QP Code: RM20MSC103 Reg. No | | | | | | | | | | | AR 20

GIET UNIVERSITY, GUNUPUR – 765022

M. Sc (First Semester) Examinations, May – 2021

20CHPC102– INORGANIC CHEMISTRY – I

(CHEMISTRY)

Time: 2 hrs Maximum: 50 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 10 = 20 Marks)**

Q.1. Answer ***ALL*** questions

a. Write the molecular orbital electronic configuration for HF molecule
b. What is meant by the term bond order? Calculate the bond order of N_2, O_2, O_2^+ and O_2^-
c. Give the differences between atomic orbitals and molecular orbitals
d. Give the chemical formulae of the coordination compounds
   i. Potassium hexacyano ferrate (III)
   ii. Trichloro triamine cobalt (III)
e. Calculate CFSE for d^4 system both strong and weak field?
f. How many microstates are possible for a d^2 configuration including both weak and strong field?
g. What do you mean orgal diagram?
h. Plot a curve between paramagnetic susceptibility (χ_p) and diamagnetic susceptibility (χ_D) with variation of temperature
i. Calculate the magnetic moments of $[Cr(NH_3)_6]Br_3$ and $[Co(NH_3)_6]Cl_3$
j. How does nuclear reactions differ from chemical reactions?

PART – B **(6 x 5 = 30 Marks)**

Answer ***ANY FIVE*** questions Marks

2. Show that oxygen molecule is paramagnetic based on molecular orbital theory (6)
3. What is meant by hybridisation of atomic orbitals? Draw the shapes of sp, sp^2 and sp^3 hybrid orbitals (6)
4. Explain the d-orbitals splitting diagrams of trigonal bi-pyramidal and square pyramidal complexes of ML_5 (6)
5. Draw MO diagram for $[Ti(H_2O)_6]^{3+}$ octahedral complex. Explain the formation of bonding, non- bonding and antibonding MOs and comment on spectra & its magnetic property (6)
6. Discuss Gouy's method for measuring magnetic susceptibility of the complex (6)
7. Discuss the K_2CrO_4, $KMnO_4$, HgI_2 and $FeCl_2$ compounds are coloured, why? (6)
8. a. How many α -particles and β-particles are emitted in the decay of ^{238}U to ^{206}Pb? 3 + 3
   b. What do you mean radioactive equilibrium?

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