

M.Sc.(Chem.) Semester - 1 (CBCS) Examination

Nov/Dec - 2022 [OLD COURSE]

INORGANIC CHEMISTRY(CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q.1 Answer the following: (Any Seven) 14

- (a) Which is more stable He_2 or He ? Explain based on MO theory.
- (b) Explain, why the shape of BeCl_2 is linear?
- (c) What is J-J coupling? Explain with example.
- (d) Write brief intro of Huckel's theory for conjugated systems.
- (e) Discuss the MB spectrum of FeCl_2 .
- (f) Discuss the nuclear recoil in brief.
- (g) What is nanomaterial? Give examples.
- (h) Give the classification of nanomaterial.
- (i) Draw the structure of KBrO_3 and discuss its uses.
- (j) Find out the ground state spectral term of the following
 - (i) d^8
 - (ii) d^4

Q.2 Answer the following: (Any Two) 14

- (a) Discuss the hybridization and valence MO's of methane.
- (b) Deduced the secular equation for H_2^+ .
- (c) Give detailed note on KIO_3 in inorganic analysis.

Q.3 Answer the following: 14

- (a) Discuss the Curie Law and Curie-Weiss Law.
- (b) Write any two application of MB spectroscopy in detail.
- (c) Explain the spin-orbit interaction.

OR

Q.3 Answer the following: 14

- (a) Write a note on magnetic properties of f-block elements.
- (b) Deduced the equation for multiple width large compared to kT .

Q.4 Answer the following: (Any Two) 14

- (a) Explain in detail: Semi electron microscope characterization technique.
- (b) Write a note on following reagents used in inorganic analysis.
 - (i) NH_4NO_3
 - (ii) $\text{Ce}_2(\text{SO})_4$
- (c) Explain the Self Consistent Field (SCF) method in detail.

Q.5 Answer the following: (Any Two) 14

- (a) Discuss the recoilless emission and absorption phenomenon in MB spectroscopy.
- (b) Discuss the various properties of nanomaterials.
- (c) Write a detail note on inorganic analytical reagent: EDTA.
