

M.Sc. Semester - 1 (CBCS) Examination
Jan/Feb. -2022 [OLD COURSE]
INORGANIC CHEMISTRY (CORE)

Time: 1:30 Hours

Marks: 42

Instructions:

1. Figures to the right indicate marks.
 2. There are five questions in the question paper.
 3. Answer any three of the following questions.
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- Q.1 Answer the following: (Any Seven) 14**
- (a) What are Nano particles?
 - (b) What is electron capture?
 - (c) Briefly discuss Born-Oppenheimer approximation.
 - (d) Give the equation for measurement of multiple width small compared to kT .
 - (e) Discuss Doppler effect in MB spectra briefly.
 - (f) Draw the structure of KIO_3 and discuss its uses.
 - (g) Write the types of Magnetism.
 - (h) Find out the ground state spectral term of the following
(i) $d6$ (ii) $d7$
 - (i) Write a note on quantum dots.
 - (j) Discuss the Stability of H_2 and H_2^+ on the basis of MO theory.
- Q.2 Answer the following: (Any Two) 14**
- (a) Discuss the VB treatment of H_2 molecule.
 - (b) Explain hybridization and valence MO's of CH_4 .
 - (c) Write note on stereo chemical applications of magnetic properties of the first transition series.
- Q.3 Answer the following: 14**
- (a) Discuss the spin-orbit interaction.
 - (b) Explain the use of $Ce(SO_4)_2$ in inorganic analysis.
 - (c) Write a note on Self-Consistent Field Method.
- OR**
- Q.3 Answer the following: (Any Two) 14**
- (a) Write note on Magnetic properties of Actinide series.
 - (b) Derive the multiple width large compared to kT .
- Q.4 Answer the following: (Any Two) 14**
- (a) Write a note on determination of magnetic susceptibility by Faraday's and NMR method.
 - (b) Discuss the properties of nanomaterials.
 - (c) Write a note on characterisation semi electron microscope characterisation technique.
- Q.5 Answer the following: (Any Two) 14**
- (a) Discuss the isomer shift and quadrupole splitting.
 - (b) Give a brief account on applications of nanomaterials.
 - (c) Write a note on following reagents used in inorganic analysis.
(i) DMG (ii) NH_4VO_3
