

M.Sc.(Chem.) Semester - 1 (CBCS) Examination
Nov/Dec-2023 (SYLLABUS YEAR JUNE-2016)
INORGANIC CHEMISTRY(CORE)

Time: 2:30 Hours**Marks: 70****Instructions:**

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

- Que.1 Answer the following. (Any Seven) (14)
- 1) Write a short note on history of nanomaterial.
 - 2) Explain J-J coupling with example.
 - 3) Which is more stable H_2 or H_2^+ ? Explain on the basis of MO theory.
 - 4) Explain Magnetic pole, Dipole and Unit pole.
 - 5) Define Huckel's theory for conjugated systems.
 - 6) Draw the structure of $KBrO_3$ and discuss its uses.
 - 7) Draw the structure of EDTA and give its uses in inorganic analysis.
 - 8) Find out the ground state spectral term of the following.
(i) d^9 (ii) d^3
 - 9) What is Nanowires?
 - 10) What is quadrupole splitting?
- Que.2 Answer the following. (Any Two) (14)
- 1) Evaluate the coefficient of wave function of sp^2 hybrid orbital.
 - 2) Discuss the VB treatment of H_2 molecule.
 - 3) Write note on L-S coupling.
- Que.3 Answer the following. (14)
- 1) Discuss in detail about use of KIO_3 .
 - 2) Write a note on following reagents used in inorganic analysis.
(i) NH_4NO_3 (ii) $Ce_2(SO)_4$
 - 3) Applications of Mossbauer spectroscopy.
- OR
- Que.3 Answer the following.
- 1) Derive the Van-Vleck equation.
 - 2) Derive the multiple width small compared to kT .
- Que.4 Answer the following. (Any Two) (14)
- 1) Explain any one process for synthesis of nanomaterials.
 - 2) Discuss the Self Consistent Field (SCF) method in detail.
 - 3) Explain XRD in detail.
- Que.5 Answer the following. (Any Two) (14)
- 1) Discuss the Mossbauer spectrum: (i) $FeSO_4 \cdot 7H_2O$ (ii) $[Fe_2(CO)_9]$
 - 2) Explain recoilless emission and absorption in MB spectroscopy.
 - 3) Discuss the properties of nanomaterial.
