

This question paper contains 3 printed pages]

ST—13—2022

FACULTY OF SCIENCE

M.Sc. (First Year) (First Semester) EXAMINATION

MAY/JUNE, 2022

(CBCS/New Pattern)

CHEMISTRY

CH-411

(Inorganic Chemistry-I)

(Tuesday, 28-6-2022)

Time : 9.30 a.m. to 1.15 p.m.

Time— 3.45 Hours

Maximum Marks—75

1. Solve any *three* out of six : 15
 - (a) Explain liability and inertness on the basis of Taubes concept.
 - (b) What is SN^2 mechanism ? Give the characteristics of SN^2 mechanism.
 - (c) Calculate the number of microstates for p^2 and d^5 configuration.
 - (d) Determine the ground states term symbol for d^5 configuration.
 - (e) Explain optical properties of Nanomaterials.
 - (f) Explain top down fabrication.

2. Solve any *three* : 15
 - (a) What is electron transfer reaction ? Give the characteristics of Inner sphere mechanism.
 - (b) Compare between OSM and ISM.

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- (c) Compare two-dimension control in quantum wells.
- (d) Explain scanning electron microscopy technique.
- (e) Explain Laporte selection and spin selection rules.
- (f) Explain Tanabe-Sugano diagram for d^3 configuration.
3. Solve the following : 15
- (a) Explain the outer sphere mechanism and give essential requisite for electron transfer reaction.
- Or*
- Draw the Orgel diagram for d^1 and d^4 configuration for tetrahedral complexes.
- (b) Explain the characteristics of SN^1CB reaction.
- Or*
- Explain one-dimensional control in carbon Nanotubes and Nanowires.
4. Solve of the following : 15
- (a) What is SN^1 mechanism in substitution reactions of complex ? Give the characteristics of SN^1 mechanism.
- Or*
- Explain DNA and Nanomaterilas.
- (b) Give the comparison between $d-d$ transition and charge transfer spectra.
- Or*
- Explain in detail three-dimension control Nanomaterials.

5. Write short notes on (any *three*) :

15

- (a) Anation reaction;
- (b) Self-assembled Nanostructures;
- (c) Metal to ligand charge transfer
- (d) R-S and J-C coupling.