

Reg. No. :

Name :

Second Semester M.Sc. Degree Examination, September 2022

Chemistry / Polymer Chemistry / Analytical Chemistry

CH/CL/PC 221: INORGANIC CHEMISTRY - II

(Chemistry / Analytical chemistry (2016 – 2019 Admission) / Polymer Chemistry (2018 – 2019 Admission))

Time : 3 Hours

Max. Marks : 75

SECTION – A

Answer **any two** among (a), (b) & (c) from each question.
Each question carries **2** marks.

1. (a) What are Wade's rules?
(b) Discuss one method of preparation of boron nitride.
(c) What are metallocarboranes? Give two of its uses.
2. (a) What is the effect of vibronic coupling?
(b) What is meant by molar susceptibility?
(c) What is meant by spin state crossover?
3. (a) Distinguish between point and line defects.
(b) What is Bragg's equation?
(c) What is meant by reciprocal lattice concept?

4. (a) What are the applications of lanthanides?
(b) Describe the extraction of thorium.
(c) Discuss the stability of trans uranium elements.
5. (a) Discuss the free electron theory of solids.
(b) What are the applications of pyro-electric solids?
(c) Discuss the colour characteristics of inorganic solids.

(10 × 2 = 20 Marks)

SECTION – B

Answer either (a) or (b) from each question.
Each question carries **5** marks.

6. (a) Discuss the structure and synthesis of Phosphorus sesquisulfide
(b) Discuss the topological approach of boron hydride structure.
7. (a) Describe the Orgel diagram and its significance.
(b) Discuss the inter-molecular interactions caused due to anti-ferromagnetism.
8. (a) Distinguish between transmission grating and reflection grating.
(b) By taking Rutile as an example, explain the structure of an AX₂ type compound.
9. (a) Explain the spectral and magnetic properties of uranium.
(b) Compare the properties of lanthanides and actinides
10. (a) Distinguish between conductors, insulators and semi-conductors.
(b) Discuss the temperature dependences of conductivity in solids.

(5 × 5 = 25 Marks)

SECTION – C

Answer any **three** questions. Each question carries **10** marks.

11. (a) Discuss the structure and properties of a polyhedral borane
(b) Explain the structure and bonding of diborane. **(6+4)**
12. (a) Briefly explain the temperature dependence of magnetism
(b) Explain the Gouy's method for the determination of magnetic moment of a complex. **(5+5)**
13. Explain the various X-Ray diffraction methods.
14. Explain the importances of beach sands of Kerala in terms of its mineral fertility.
15. (a) Distinguish between intrinsic and extrinsic semiconductors.
(b) Explain the various dielectric properties of solids. **(5+5)**

(3 × 10 = 30 Marks)
