

Reg. No. :

Name :

Second Semester M.Sc. Degree Examination, November 2021

Chemistry / Polymer Chemistry / Analytical Chemistry

CH / CL / PC 221 : INORGANIC CHEMISTRY - II

**(Common for Chemistry / Analytical Chemistry (2016-2019 Admission)
and Polymer Chemistry (2018-2019 Admission))**

Time : 3 Hours

Max. Marks : 75

SECTION – A

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

1. (a) Explain Lande g-factor.
(b) What are Racah Parameters?
(c) What is nephelauxetic effect?
2. (a) Give examples for extended defects in crystals.
(b) Write a short note on structure of Zinc Blende.
(c) Gold (197) crystallises in a FCC unit cell. The second order reflection of X rays for the planes is $\theta = 22.2^\circ$. The wavelength of X-ray is 1.54Å . Calculate the density of the metallic gold ($\sin 22.2^\circ = 0.3778$).

P.T.O.



3. (a) What are Carboranes?
(b) How Borazine is prepared?
(c) Discuss briefly the structure of disulfur dinitride.
4. (a) Why EuFOD is an excellent shift reagents?
(b) What are the uses of Lanthanide compounds?
(c) Actinides have greater tendency for complex formation compared to lanthanides why?
5. (a) What are intrinsic semiconductors? Give examples.
(b) What is Brillouin zone?
(c) Electrical conduction in metals decreases as temperature is increased why?

(10 × 2 = 20 Marks)

SECTION – B

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

6. (a) What are Phosphazines? Discuss one method for the synthesis of phosphazines?
(b) Discuss the preparation and properties of Polyhedral Boranes.
7. (a) Explain effective magnetic moment. Calculate μ_{eff} of V^{3+} and Fe^{3+} .
(b) Explain Tanabe-Sugano Diagrams.
8. (a) Discuss with example origin of color centres in solids.
(b) Explain the structure of perosvskite and ilmenite.



9. (a) What are the different techniques used for the separation of Lanthanides?
(b) Discuss the relation between oxidation state and ionic radii of Lanthanides.
10. (a) What are Pyro electric and Piezo electric materials, Give examples.
(b) Write a short note on Super conductivity.

(5 × 5 = 25 Marks)

SECTION – C

Answer any **three** questions from the following. **Each** question carries **10** marks.

11. Discuss the selection rules for electronic transition in metal complexes. Also explain LMCT and MLCT in complexes.
12. Explain major crystal defects in solids with suitable examples.
13. Discuss the preparation, properties and structure of Diborane.
14. (a) Explain free electron theory.
(b) Differentiate photoconductivity and photovoltaic effect. (5 + 5 = 10)
15. Compare the oxidation state, spectral and magnetic properties of Lanthanides and actinides.

(3 × 10 = 30 Marks)

