CLASS: M.Sc. CHEMISTRY **15A / 259**

St. JOSEPH'S COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 620 002

SEMESTER EXAMINATIONS – APRIL 2015

TIME: 3 Hrs. **MAXIMUM MARKS: 100**

SEM	SET	PAPER CODE	TITLE OF THE PAPER
IV	2013	12PCH4116	INORGANIC CHEMISTRY – IV

SECTION – A

Answer all the questions: **20 x 1 = 20**

Choose the correct answer:

1. A cubic crystal posses a total of _____ elements of symmetry.
   a) 9 b) 23
   c) 3 d) 13
2. The high electrical conductivity of magnesium is due to
   a) The presence of two electrons in the 3s level
   b) The varancy of 3p level
   c) The overlap of 3s band with 3p band
   d) The overlap of 2s band with 2p band
3. The toxic element is
   a) Hg b) Mg
   c) K d) Na
4. The oxidation state of magnesium in chlorophyll is
   a) zero b) +1
   c) +2 d) +3
5. In CTML transitions, oxidation state of metal
   a) increases b) decreases
   c) remains constant d) none of these

Fill in the blanks:

6. The Bragg's equation is _____.
7. Conduction by electrons is _____ type semiconduction.
8. The metal complex that is used in the treatment of cancer is _____.
9. The macro cyclic ring system present in vitamin – B_{12} is _____.
10. The molecule which undergoes chemical reaction is one which is previously in a _____ excited state.

Answer in one or two sentences:

11. Define the term unit cell.
12. Define space lattice.
13. What are colour centres?
14. What is super conductivity?
15. What do you mean by toxic elements?
16. What is the role of blue copper proteins in biological systems?
17. What are cytochromes?
18. What are synthetic oxygen carriers?
19. What is meant by fluorescence emission?
20. Define photo dissociation.

SECTION – B

Answer all the questions: **5 x 6 = 30**

21. a. Explain the structures of diamond and graphite.

OR

b. How would you determine the structure of sodium chloride by rotating crystal method?

22. a. Discuss the structure of alloys.

OR

b. Explain the band theory of solids.

23. a. Outline the mechanism of fixation of N_2 by Ti-alkoxides.

OR

b. Discuss the general features of DNA metal complex interaction.

24. a. Explain structure and functions of any two synthetic oxygen carriers.

OR

b. Discuss the role of cytochrome in electron transfer reactions.

25. a. Write the basic laws of photo chemistry.

OR

b. Write the differences between fluorescence and phosphorescence.

SECTION – C

Answer any FIVE questions: **5 x 10 = 50**

26. Derive Bragg's equation and discuss the single crystal method and powder method of X-ray diffraction.

27. Discuss the different methods of crystal growth.

28. Discuss on (a) Channel forming ionopheres (3)
(b) Carrier ionopheres (3)
(c) Transcription & Translation (4)

29. Discuss in detail the role of hemoglobin in biological systems.

30. Explain the following
(a) Photo substitution reaction (3)

(b) Photo redox reaction (3)

(c) Geometrical isomerisation in metal complexes (4)

31. Explain the structure of the following

(a) Rutile (3)

(b) fluorite (3)

(c) wurtzite (4)

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