(6 pages)

Reg. No. : .....

Code No. : 5058 **Sub. Code : PCHM 42**

M.Sc.(CBCS) DEGREE EXAMINATION, APRIL 2023.

Fourth Semester

Chemistry – Core

INORGANIC CHEMISTRY – IV

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The study of observing the charge of optical rotation with wavelength is known as ————

(a) UV spectroscopy

(b) Raman effect

(c) Optical rotatory dispersion

(d) Polarization

2. The Mossbauer spectra is observed in ————

(a) Solid state

(b) Liquid state

(c) Gaseous state

(d) Liquid crystalline state

3. ESCA is concerned with the measurement of ———— energy.

(a) Core electron binding

(b) Rotational

(c) Electronic

(d) Vibrational

4. The number of PES peaks given by NH_3 ————

(a) 1 (b) 2

(c) 3 (d) 4

5. What is the biological role of Haemoglobin and Myoglobin is ————

(a) Oxygen transport (b) Electron transfer

(c) Enzyme action (d) Iron storage

6. Vitamin B_{12} is ———— complex.

(a) Iron complex

(b) Cobalt complex

(c) Magnesium complex

(d) Iron Sulphur complex

7. Carboxy peptidase is a ———— enzyme.

(a) Mg (b) Fe

(c) Zn (d) Graphite

8. Azurin is ———— containing protein.

(a) Zn (b) Cu

(c) Fe (d) Mg

9. Which of the following complexes has highest excited state redox potential

(a) $*[Cr(bpy)_3]^{2+}$ (b) $*[Ru(bpy)_3]^{2+}$

(c) $*[Ir(bpy)_3]^{3+}$ (d) $[OS(bpy)_3]^{2+}$

10. A charge transfer complex otherwise called ———— complex.

(a) Electron donar

(b) Electron–donar–acceptor

(c) Electron acceptor

(d) None of these

PART B — (5 × 5 =25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Write notes on isomer shift.

Or

(b) Give an account on spin state cross over determination.

12. (a) Write notes on shake-up and shake off processes.

Or

(b) Explain the theory of photo electron spectroscopy.

13. (a) Draw the structure of chlorophyll and explain its role in photosynthesis.

Or

(b) Describe the role of in vivo and in vitro nitrogen fixation.

14. (a) Explain the structure, function and mechanism of action of super oxide dismutase.

Or

(b) Explain the mechanism of action of ascorbic oxidase.

15. (a) Write a note on High temperature reactions.

Or

(b) Write notes on chemical vapour Deposition.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Elucidate the absolute configuration of chelate complexes with the help of ORD and CD.

Or

(b) Discuss in detail about Quadrupole and magnetic splitting of Mossbauer spectroscopy.

17. (a) Explain the theory and applications of Auger electron spectroscopy.

Or

(b) State and explain Koopman's theorem.

18. (a) List and explain the functions of Non-metals in the biological system.

Or

(b) Discuss in detail about ferredoxin and rubredoxin.

19. (a) Discuss the mechanism of action of metal complexes as anticancer agents.

Or

(b) Discuss in detail about Toxicity of metals and the role of Metallothionins.

20. (a) Describe the structure and properties of Fullerenes and Fullerides.

Or

(b) Write the synthesis of inorganic materials by solution and Hydrothermal methods.

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