(NO. OF PAGES: 2)

(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2024 ONLY) **SUB CODE 23PCY413** **REG.NO. :**

N.G.M. COLLEGE (AUTONOMOUS): POLLACHI

END-OF-SEMESTER EXAMINATIONS: MAY 2025

B.S.c CHEMISTRY **MAXIMUM MARKS: 75**

SEMESTER IV **TIME: 3 HOURS**

23PCY413 – INORGANIC CHEMISTRY –III: BIOINORGANIC CHEMISTRY

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. The sodium-potassium pump is an example of:

   A) Passive transport B) Facilitated diffusion C) Active transport D) Osmosis

2. The active site of nitrogenase contains which metal ion?

   A) Cu B) Ni C) Fe-Mo D) Zn

3. Which vitamin contains a corrin ring structure?

   A) Vitamin A B) Vitamin C C) Vitamin D D) Vitamin B12

4. Which type of binding involves metal complexes inserting between DNA base pairs?

   A) Covalent binding B) Intercalation C) Groove binding D) Electrostatic binding

5. Cisplatin, a platinum-based anticancer drug, primarily targets which cellular component?

   A) Mitochondria B) DNA C) Ribosomes D) Cell membrane

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. Why is copper important in biological systems?
7. What are metalloenzymes?
8. How does hemocyanin differ from hemoglobin?
9. Why is EDTA used in metal poisoning treatment?
10. Define the chemotherapeutic index

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Describe the role of catecholase in biological systems

(OR)

b) Distinguish between PS-I and PS-II in photosynthesis

12. a) Show the role of Zn^{2+} in carboxypeptidase A

(OR)

b) Outline the function of xanthine oxidase

(CONTD …. 2)

13. a) Compare hemoglobin and myoglobin

(OR)

b) Infer the ferredoxins and rubredoxins

14. a) Explain the role of tris-phenanthroline metal complexes in DNA interactions

(OR)

b) Determine the use of MRI contrast agents in medical imaging

15. a) Infer the bleomycin in cancer treatment, and what is its primary mechanism of action?

(OR)

b) Describe the significance of clinical trials in the drug development process

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS (K4 (Or) K5)

16. a) Discuss the role of different metal ions in biological systems with examples

(OR)

b) Describe the structure-function relationship of chlorophyll in photosynthesis

17. a) Examine the active site and mechanism of action of carbonic anhydrase

(OR)

b) Illustrate the structure and mechanism of action of nitrogenase

18. a) Explain the cooperative binding mechanism of oxygen in hemoglobin

(OR)

b) Summarize the non-heme iron-sulfur proteins, and what roles do they play?

19. a) Elaborate the different techniques used to monitor metal complex interactions with DNA

(OR)

b) Explain the principle and application of chelation therapy with reference to EDTA

20. a) Construct the mechanism of action of cisplatin and its role in cancer chemotherapy

(OR)

b) Evaluate the applications of coordination complexes in medicine and give examples

****