

(FOR THE CANDIDATES ADMITTED

SUB CODE

24UCY405

DURING THE ACADEMIC YEAR 2024-2025 ONLY)

REG.NO.:

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

END-OF-SEMESTER EXAMINATIONS: MAY 2026

B.Sc., CHEMISTRY

MAXIMUM MARKS: 75

SEMESTER -IV

TIME: 3 HOURS

PART - III

INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

(K1)

1. The method used for separating lanthanides is: _____

a) Fractional crystallization b) Sublimation c) Distillation d) Ion-exchange

2. Electrophilic nitration of benzene is catalyzed by: _____

a) HCl b) H_2SO_4 c) NaOH d) Na_2CO_3

3. Most stable conformation of n-butane:

a) Eclipsed b) Syn c) Gauche d) Anti

4. Positive deviation from Raoult's law indicates: _____

a) Strong A–B interactions b) Ideal behavior c) Weak A–B interactions d) Immiscible liquid

5. Magic numbers in nuclear stability include: _____

a) 2, 8, 20, 28 b) 1, 2, 4 c) 3, 6, 12 d) 5, 10, 15

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES

(K2)

6. Which d-block series is more metallic: 3d, 4d, or 5d?

7. Write the reagent for Reimer-Tiemann reaction.

8. Define racemization.

9. Give one application of Nernst distribution law .

10. Name an isotope used as a tracer in chemistry.

SECTION – B

(5 X 5 = 25 MARKS)

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

11. a) Compare 3d, 4d, and 5d elements in terms of oxidation states and metallic nature.

(OR)

b) Show the magnetic and spectral properties of lanthanides.

12. a) Construct the Reimer-Tiemann reaction of phenol.

(OR)

b) Outline the preparation and properties of nitromethane.

13. a) Describe preparation of aniline from nitrobenzene.

(OR)

b) Explain cis-trans isomerism in maleic and fumaric acids .

14. a) Develop the Nernst distribution law thermodynamically
(OR)
b) Execute the steam distillation
15. a) Construct the relation between half-life and decay constant
(OR)
b) Examine the nuclear stability using n/p ratio and magic numbers

SECTION – C

(5 X 8 = 40 MARKS)

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

(K4 (Or) K5)

16. a) Estimate lanthanide contraction and its consequences
(OR)
b) Determine the extraction of uranium from pitchblende
17. a) Compare preparation of phenol by aryl halide, cumene, and Grignard reagent
(OR)
b) Illustrate the nitro–acinitro tautomerism
18. a) Compare conformational analysis of ethane, n-butane, and cyclohexane
(OR)
b) Explain racemization and resolution of optical isomers
19. a) Evaluate the Raoult's law, Henry's law, and their applications
(OR)
b) Discuss the phenol–water partially miscible system with a solubility curve
20. a) Summarize the transmutation, artificial transmutation, and applications
(OR)
b) Investigate isotopes: separation, identification, isotopes of hydrogen, isotope effect, and applications
