

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



U.G. DEGREE EXAMINATION – ALLIED

THIRD SEMESTER – NOVEMBER 2022

18UCH3AL01 – GENERAL CHEMISTRY FOR PHYSICS-I

Date: 01-12-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART – A

Answer ALL questions.

(10 × 2 = 20 Marks)

1. Write the differences between coordination compound and double salt.
2. What is meant by denticity?
3. Draw the resonance structures of CO₂.
4. Mention the criteria for optical activity in a molecule.
5. Classify the following species into Lewis acids and bases.
i) OH⁻ ii) F⁻ iii) H⁺ iv) BCl₃.
6. Write the cell reaction for the following electrochemical cell, Cd/Cd²⁺// Ag⁺/Ag.
7. What are photosensitizers? Give an example.
8. Define quantum yield.
9. What is meant by temporary hardness of water?
10. Define the term polymer.

PART – B

Answer any EIGHT questions.

(8 × 5 = 40 Marks)

11. How are the *d*-orbitals of a metal ion split in the crystal field while forming an octahedral complex?
12. Explain the structure and function of haemoglobin.
13. Describe the S_N1 reaction mechanism of tertiary butyl halides.
14. Explain the optical isomerism in lactic and tartaric acids.
15. Describe the Arrhenius concept of acids and bases with suitable examples.
16. What is a primary reference electrode? Explain the construction and working of calomel electrode.
17. Explain any two methods of determining order of a reaction.
18. Enlist the differences between thermal and photochemical reaction.
19. State and explain the Grotthus-Draper and Einstein's law of photochemical reaction.
20. Differentiate thermoplastics from thermosetting plastics.
21. Explain the condensation polymerization with suitable example.
22. How is water purified using ion-exchange method?

PART – C

Answer any **FOUR** questions.

(4 × 10 = 40 Marks)

23. Explain the uni- and bimolecular elimination reaction mechanisms with suitable examples.
24. a) Explain the rules to be followed in naming the coordination complexes with suitable examples.
b) $[\text{Ni}(\text{NH}_3)_4]^{2+}$ is paramagnetic with the magnetic moment of 2.83 BM. Predict the hybridization and geometry of the complex. (6+4)
25. Obtain a rate expression for the rate constant of a second order reaction of the type $2\text{A} \rightarrow \text{Product}$.
Mention its characteristics.
26. a) Derive Nernst equation for electrochemical reactions. Write its significances.
b) Calculate the pH of 10^{-2} M H_2SO_4 . (8+2)
27. a) What are disinfectants? Describe the chlorination process.
b) Calculate the solubility of PbSO_4 . Given $K_{\text{sp}} = 1.6 \times 10^{-8}$ at 25°C . (5+5)
28. a) Explain the postulates of valence bond theory.
b) Describe the process of vulcanization of natural rubber. (5+5)

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