

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



B.Sc. DEGREE EXAMINATION – PHYSICS

THIRD SEMESTER – NOVEMBER 2019

16/17/18UCH3AL01 – GENERAL CHEMISTRY FOR PHYSICS-I

Date: 06-11-2019

Dept. No.

Max. : 100 Marks

Time: 01:00-04:00

Part-A

Answer ALL questions.

(10 × 2= 20)

- Write the IUPAC names of the following complexes.
a) $[\text{Pt}(\text{NH}_3)_4\text{Cl}_2]\text{SO}_4$ b) $[\text{Co}(\text{en})_3]\text{Cl}_3$
- Mention any two limitations of Sidgwick's theory.
- What is meant by resonance?
- Draw the structure of *D*- and *L*-lactic acids.
- What is a buffer solution? Give an example.
- Calculate the EMF for the cell $\text{Zn}/\text{Zn}^{2+}/\text{Cu}^{2+}/\text{Cu}$ ($E_{\text{Cu}^{2+}/\text{Cu}}^0 = 0.34\text{V}$ and $E_{\text{Zn}^{2+}/\text{Zn}}^0 = 0.76\text{V}$).
- What are photochemical reactions? Give an example.
- Write any two differences between fluorescence and phosphorescence.
- What is meant by temporary hardness of water?
- Define the term monomer.

Part-B

Answer any EIGHT questions.

(8 × 5= 40)

- Write the postulates of Pauling's valence bond theory.
- Explain the structure and functions of chlorophyll.
- How are the *d*-orbitals of a metal ion split in the crystal field while forming a tetrahedral complex?
- Explain the $\text{S}_{\text{N}}2$ reaction mechanism of alkyl halides.
- Explain the free radical mechanism of an addition reaction with a suitable example.
- Describe Lewis concept of acids and bases with suitable examples.
- Derive Nernst equation.
- What are homo- and heterogeneous catalysts? Give two examples for each.
- Bring out the differences between order and molecularity of a chemical reaction.
- Write a note on photosensitization.
- Explain the condensation polymerization with suitable examples.
- Explain the purification of water by reverse osmosis method.

Part-C

Answer any *FOUR* questions.

(4 × 10 = 40)

- 23a. Explain the Werner's theory of coordination compounds.
- b. Calculate the EAN of the central metal ion in the following complexes.
- i) $[\text{Fe}(\text{H}_2\text{O})_5\text{F}]\text{SO}_4$ (At. No. of Fe = 26)
- ii) $[\text{Pt}(\text{NH}_3)_4\text{Br}_2]\text{Cl}_2$ (At. No. of Pt = 78) (6+4)
- 24a. What is meant by inductive effect? Explain its impact on the acid strength and the stability of carbocations.
- 25a. Write a note on the impact of steric effect on the reactivity of a molecule. (5)
- b. Define the following terms i) ionic product of water ii) strong and weak electrolytes. (5)
26. Explain the construction and working of a) Weston-cadmium cell b) Calomel electrode.
- 27a. Derive the rate constant for a first order reaction.
- b. State the i) Grotthus-Draper law ii) Einstein's law of photochemical reaction. (5+5)
- 28a. Explain the process of vulcanization of natural rubber.
- b. Explain the estimation of hardness of water by EDTA method. (5+5)
