LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS

THIRD SEMESTER – APRIL 2022

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

Date: 28-06-2022   Dept. No.   Max. : 100 Marks
Time: 09:00 AM - 12:00 NOON

Part-A

Answer ALL questions.   (10 × 2= 20)

1. Name the following complexes as per the IUPAC guidelines.

    a) $Na_3[Al(C_2O_4)_3]$ b) $[Fe(H_2O)_5F]SO_4$

2. Mention the limitations of Sidgwick-Powell theory.

3. What is meant by resonance?

4. Draw the structures of *d*- and *l*-lactic acids.

5. Define pH of a solution.

6. Calculate EMF for the cell $Zn/Zn^{2+}//Cu^{2+}/Cu$ ($E^0_{Cu^{2+}/Cu}$ =0.34 V and $E^0_{Zn/Zn^{2+}}$ =0.76 V).

7. What are photochemical reactions? Cite an example.

8. Write any two differences between fluorescence and phosphorescence.

9. What is meant by temporary hardness of water?

10. Define the term monomer.

Part-B

Answer any EIGHT questions.   (8 × 5= 40)

11. Write the postulates of Pauling's theory.

12. Explain the structure and functions of chlorophyll.

13. Describe the S_N2 reaction mechanism of alkyl halides.

14. Illustrate the free radical mechanism of addition reaction with suitable example.

15. Describe the Lewis concept of acids and bases with suitable examples.

16. Derive Nernst equation.

17. What is meant by heterogeneous catalyst? Explain with suitable examples.

18. Bring out the differences between order and molecularity of a chemical reaction.

19. Comment on photosensitization.

20. Explain the condensation polymerization with suitable examples.

21. Discuss the purification of water by reverse osmosis.

22. How are the *d*-orbitals of a metal ion split in the crystal field while forming a tetrahedral complex?

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Part-C

Answer any FOUR questions. **(4 × 10= 40)**

23. What is meant by inductive effect? Explain its impact on the acid strength and the stability of carbonium ions.

24a. Describe the Werner's theory of coordination compounds.

b. Calculate the EAN of the central metal ion in the following complexes.

i) $[Co(en)_2Cl_2]SO_4$ (Atomic No. of Co = 27)

ii) $[Pt(NH_3)_4Cl_2]Br_2$ (Atomic No. of Pt = 78) (6+4)

25. Explain the construction and working of Weston cell and Calomel electrode.

26a. Calculate the pH when K_w is 6.5 x 10^{-14} $mol^2 dm^{-6}$.

b. Derive the rate constant for first order reaction. (5+5)

27a. Write a note on the impact of steric effect on the reactivity a molecule.

b. Describe the process of vulcanization of natural rubber. (5+5)

28a. Explain Grotthus-Drapper and Einstein's laws of photochemical reaction.

b. How is the hardness of water estimated by EDTA method? (5+5)

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