



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**B.Sc. DEGREE EXAMINATION – MATHEMATICS & PHYSICS**

SECOND SEMESTER – APRIL 2017

**CH 2104- GENERAL CHEMISTRY FOR MATHS & PHYSICS**

Date: 25-04-2017  
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

**Part-A**

*Answer ALL questions.*

**(10 x 2= 20)**

1. Give the IUPAC name of the following coordination compounds.
  - a)  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
  - b)  $\text{K}_3[\text{Fe}(\text{CN})_6]$
1. State the differences between double salts and coordination compounds.
2. Name the type of isomerism involved in the following compounds.
  - a) Cis-2-butene and trans-2-butene
  - b) D-glucose and L-glucose
3. Give the conditions for the compound to show optical activity.
4. Calculate the pH of 0.002M HCl.
5. What is a homogeneous catalyst? Cite an example
6. Write the cell reaction for the following electrochemical cell  $\text{Fe}/\text{Fe}^{2+} // \text{Cd}^{2+}/\text{Cd}$ .
7. What is photosensitization? Cite an example.
8. Write the differences between temporary and permanent hardness of water.
9. Give examples for green house gases.

**Part-B**

*Answer any EIGHT questions.*

**(8 x 5= 40)**

10. Explain the optical isomerism in tartaric acid.
11. Explain the Sidgwick theory of coordination compounds.
12. Define inductive effect and discuss any one application of it.
13. Give one example for each of the following reactions.
  - a) Addition reaction
  - b) Elimination reaction
  - c) Substitution reaction.
14.  $\text{CH}_3\text{-CH}_2\text{-Cl} + \text{KOH}(\text{alcoholic}) \rightarrow \text{A}$   
Identify the organic compound A and give its mechanism.
15. Write the differences between order and molecularity of a chemical reaction.
16. Derive the Nernst equation.

17. What is corrosion? How is it prevented?
18. Define 'quantum yield'. Mention any two reasons for high and low quantum yield.
19. Compare thermal and photochemical reactions.
20. What are disinfectants? Discuss the chlorination process.
21. Discuss the causes, consequences, and control measures of water pollution.

### Part-C

*Answer any FOUR questions.*

**(4 x 10= 40)**

- 23a. Write the mechanism of  $S_N1$  reaction and give its characteristics. (6)
  - b. Give the differences between cis and trans isomers. (4)
- 24a. Write the postulates of Werner's theory of coordination compounds. (6)
  - b. For the complex  $[\text{CoF}_6]^{3-}$ , based on VB theory explain its hybridisation, structure and magnetic property. (4)
- 25a. Discuss the application of coordination chemistry in biological compounds. (5)
  - b. Summarise the differences between galvanic and electrolytic cell. (5)
26. Derive an expression for the rate constant of a second order reaction of the type  $2A \rightarrow \text{product}$ . (10)
- 27a. What is a reference electrode? Mention its advantages and disadvantages. (1+4+2)
  - b. State Beer-Lambert law. (3)
- 28a. How is water purified by ion-exchange method? (5)
  - b. What are BOD and COD values? Mention their significances. (5)

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