



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

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

FOURTH SEMESTER – APRIL 2017

**CH 4206- GENERAL CHEMISTRY FOR MATHS & PHYS. - II**

Date: 29-04-2017  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**Part-A**

*Answer ALL questions.*

**(10 x 2= 20)**

1. Define unit cell.
2. The radius of  $\text{Na}^+$  ion is  $1.16 \text{ \AA}$  and the radius of  $\text{Cl}^-$  is  $1.67 \text{ \AA}$ . Predict the co-ordination number and structure of  $\text{NaCl}$  using radius ratio rule.
3. What is meant by hydrogen bonding? Cite an example.
4. What are auxochromes? Give any two examples.
5. Write Kirchhoff's equation. Mention the terms involved in it.
6. The molar conductance at infinite dilution of  $\text{H}^+$  and  $\text{OH}^-$  ions are  $349.83 \times 10^{-4}$  and  $198.50 \times 10^{-4} \text{ S m}^2 \text{ mol}^{-1}$ , respectively. Calculate the molar conductance of water at  $25^\circ\text{C}$ .
7. Draw the Haworth projection formula of D-fructose.
8. What is Zwitter ion? Give an example.
9. What is tidal energy?
10. Define octane number.

**Part-B**

*Answer any EIGHT questions.*

**(8 x 5= 40)**

11. Discuss the properties of covalent and molecular crystals.
12. Draw and explain the structure of  $\text{NaCl}$ .
13. How will you separate o- and p-nitrophenol by steam distillation method?
14. Give the synthesis of sulphanilamide. Draw the structure of sulphamethoxazole.
15. Outline the synthesis of aspirin and mention its uses.
16. Explain the principle involved in the conductometric titrations of  $\text{HCl}$  vs.  $\text{NaOH}$ .
17. Define the following terms
  - a. Enthalpy of neutralization
  - b. Enthalpy of combustion
18. Elucidate the structure of D-glucose.
19. Explain the factors affecting enzyme activity in detail.
20. Write a short note on renewable energy sources.
21. Mention the uses of radioisotopes in agricultural and medicinal fields.
22. Differentiate between nuclear fission and fusion reactions.

**Part-C**

*Answer any FOUR questions.*

**(4 x 10= 40)**

- 23 a. Define lattice energy. (2)  
b. Draw and explain Born-Haber cycle for the formation of  $\text{CaCl}_2$ . (8)
24. Discuss the synthesis of following compounds (5+5)  
(a) Congo-red (b) Sulphanilimide
- 25 a. State the reactions occurring at anode and cathode during the electrolysis of  $\text{CuSO}_4$  using platinum electrodes. (5)  
b. Define conductivity and molar conductivity for the solution of an electrolyte. Discuss their variation with concentration. (5)
- 26 a. Describe the secondary structure of proteins. (5)  
b. Explain the lock and key model of enzyme action. (5)
- 27 a. Mention the importance of humus in soil. (5+5)  
b. Write short notes on pesticides and herbicides
- 28 a. How is the sequence of N-terminal amino acids of a peptide determined? (6)  
b. Discuss the importance of micro and macro nutrients in agricultural chemistry. (4)

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