

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – MATHEMATICS & PHYSICS

SECOND SEMESTER – APRIL 2010

CH 2102 / 2100 - GENERAL CHEMISTRY FOR PHYSICS & MATHS

Date & Time: 22/04/2010 / 1:00 - 4:00 Dept. No.

Max. : 100 Marks

PART – A

Answer **ALL** the questions

(10 x 2 = 20)

1. Write the IUPAC name and calculate EAN of Fe in the following complex:
 $K_4[Fe(CN)_6]$
2. Draw the structure of a hexadentate ligand.
3. State Raoult's Law.
4. Define quantum yield of a photochemical reaction.
5. Why trimethylamine is less basic than methyl amine?
6. Write the equation for the generation of electrophile for Friedel Craft's alkylation and acylation reactions.
7. Mention the types of RNA and its functions.
8. Draw the structure of the following : a) adenine b) Uracil .
9. What is vulcanization of rubber?
10. How will you prevent corrosion of iron by galvanization?

PART – B

Answer **Any EIGHT** questions

(8 x 5 = 40)

11. Predict the hybridization, shape and magnetic nature of the following complex on the basis of VB Theory.
(a) $[CoF_6]^{3-}$ (b) $[Ni(CN)_4]^{2-}$
12. Discuss the geometrical isomerism exhibited by the complexes with square planar geometry.
13. What is resonance effect? Explain its types with suitable examples.
14. Discuss the mechanism of nitration of benzene.
15. a) State Henry's Law and give its limitations. (3)
b) Distinguish between homogeneous and heterogeneous catalysis with suitable examples. (2)
16. The rate constant at 300°C for a first order reaction is $2.41 \times 10^{-10} s^{-1}$ and at 400°C is $1.16 \times 10^{-6} s^{-1}$. Calculate the energy of activation. ($R=8.314 JK^{-1} mol^{-1}$)

17. Explain how pH can be determined using glass electrode?
18. Discuss the electrochemical mechanism of corrosion.
19. Differentiate the following with suitable examples:
 - a) Step growth and chain growth polymerization reactions (2 ½)
 - b) Natural and synthetic polymers. (2 ½)
20. What is genetic engineering? Mention any two applications and risks of it.
21. Draw the structure and functions of the following hormones:
 - (a) Thyroxin
 - (b) Adrenalin
22. Describe the temperature dependence of miscibility of phenol-water system.

PART – C

Answer Any FOUR questions

(4 x 10 = 40)

23. a) Write the postulates of Werner's theory of coordination compounds.(5)
b) Discuss the structure and functions of hemoglobin. (5)
24. a) Compare S_N1 and S_N2 mechanisms with suitable example. (5)
b) Explain the optical isomerism exhibited by tartaric acid. (5)
25. a) Discuss the structure of DNA on the basis of Watson - Crick model. (6)
b) Write a note on the structure and functions of oxytocin. (4)
26. a) State phase rule and apply it to a one component system.(6)
b) Derive the first order rate expression for a reaction. (4)
27. a) Write the manufacture and uses of the following polymers:
 - (i) Buna-S
 - (ii) PUF
 - (iii) PET (2+3+2)
b) What are the factors affecting corrosion? (4)
28. a) Differentiate thermal reactions from photochemical reactions. (5)
b) Discuss the stability of conformers of butane with potential energy diagram. (5)
