LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – MATHEMATICS & PHYSICS

SECOND SEMESTER – NOVEMBER 2016

CH 2102 - GENERAL CHEMISTRY FOR PHYSICS & MATHS

Date: 15-11-2016   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

Part-A

Answer ALL questions.   **(10 × 2= 20)**

1. What are bidentate ligands? Give an example.

2. Calculate EAN of Fe in the following complexes:

    (a) $[Fe(CN)_6]^{3-}$ (b) $[Fe(CN)_6]^{4-}$ (Atomic number of Fe = 26)

3. Arrange the following acids in increasing order of their acidity. Justify your answer.

    $ClCH_2COOH$, CH_3COOH, CCl_3COOH, $Cl_2CHCOOH$

4. Draw the structure of maleic and fumaric acids and mention the isomerism exhibited   by them.

5. State Henry's law.

6. Define quantum yield of a photochemical reaction.

7. Sketch the structure of adenine.

8. Write the functions of oxytocin.

9. What are thermosetting polymers? Cite an example.

10. How is corrosion prevented by electroplating?

Part-B

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

11. Explain Werner's theory of coordination complexes.

12. Discuss the general properties of transition elements.

13. Explain the structure and functions of hemoglobin.

14. Write the mechanism of nitration of benzene.

15. Explain the optical isomerism of tartaric acid.

16. State Raoult's law. Discuss the positive deviations of real solutions from their ideal behaviour.

17. Compare the thermal and photochemical reactions with suitable examples.

18. Differentiate between homogeneous and heterogeneous catalysis with suitable examples.

19. List the applications and risks of genetic engineering.

20. Explain the various types of RNA.

21. Differentiate the following with suitable examples.

    (a) Natural and synthetic polymers

    (b) Step growth and chain growth polymerization

22. How do the following polymers prepared?

    (a) Bakelite   (b) PET

Part-C

23a. Discuss the postulates of valence bond theory. **(4)**

b. Predict the geometry, structure and magnetic property of $[CoF_6]^{3-}$. **(6)**

24a. Discuss the geometrical isomerism exhibited by square planar complexes. **(5)**

b. Explain the conformational isomers of n-butane. **(5)**

25. Discuss the mechanism of S_N1 and S_N2 reactions with suitable examples.

26. State and apply the phase rule to water system.

27a. Derive an expression for the determination of rate constant for a first order reaction. **(6)**

b. Explain how pH can be measured using glass electrode. **(4)**

28 a. Explain the electrochemical mechanism of corrosion. **(6)**

b. Write a note on vulcanization of rubber. **(4)**

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