MAR IVANIOS COLLEGE (AUTONOMOUS)
THIRUVANANTHAPURAM

Reg. No. :…… **Name :……**

Third Semester B.Sc. Degree Examination, November 2015
First Degree Programme under CBCSS
Core Course: Chemistry – II
AUCH341: Inorganic Chemistry II

Time: **3** Hours Max. Marks: **80**

SECTION – A

*Answer **ALL** questions in a word or one or two sentences.*

1. Define the term covalency.
2. According to VSEPR theory ClF_3 molecule has _____ shape.
3. Water is a good solvent for ionic solids than benzene. Why ?
4. What happens to the electrical conductivity of a metal with the increase of temperature ?
5. What is meant by half life period of a radioactive substance ?
6. Define the term curie.
7. Write equation showing potassium nuclei ($_{19}K^{40}$) undergo electron capture.
8. Classify the following solvents into protic and aprotic C_6H_6, NH_3, H_2O, CCl_4, HF.
9. In thermal methods of analysis change in physical or chemical properties of a substance measured as a function of _____.
10. On December 29, 1959 the Nobel Prize winning physicist gave a talk at the annual meeting of the American Physical society, that is the initiation of nano science and nano technology. Identify the Nobel laureate.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

*Answer any **EIGHT** questions, not exceeding a paragraph.*

11. Do NH_3 and NF_3 have same bond angle ? Explain.
12. Define lattice energy. How is it related to the stability of an ionic compound ?
13. Explain the conductivity of the metals using free electron theory.
14. Define bond order. How is related to bond length?
15. Which orbitals are used in the formation of σ bonds in XeF_2 ?
16. What is the relation between binding energy and mass defect ?
17. State group displacement law.
18. What is the relation between average life and half life time of a radioactive element ?
19. Compare the precipitation reactions in water and liquid ammonia.
20. What is meant by levelling effect ?
21. Write down the mathematical form of Beer – Lambert equation and explain the terms.
22. Find out the bond order of CO and NO molecules.

(8 × 2 = 16 Marks)

SECTION – C

*Short essay type : Answer any **SIX** questions.*

23. On the basis of MO theory, compare the bond lengths and magnetic properties of O_2, O_2^+ and O_2^-
24. Write a short note on van der Waals forces.
25. What is Born Haber Cycles? Explain its importance and utility.
26. Write a note on radiocarbon dating.
27. Account for the stability of the nucleus using packing fraction.
28. Explain sp^3d and sp^3d^2 hybridisation with suitable example.
29. Explain the following properties of alkali metal in liquid ammonia. Colour, density, conductivity and paramagnetism.
30. Discuss the sol gel synthesis for the preparation of nano particles.
31. Explain the electrical conductivity of doped fullerenes.

(6 × 4 = 24 Marks)

SECTION – D

*Long essay type : Answer any **TWO** questions.*

32. i). Explain hydrogen bonding with suitable example. What are its consequences ?
    ii). Write Born Lande equation and explain the terms. What is its significance ?
33. Discuss the principle, instrumentation and applications of Atomic Absorption Spectroscopy.
34. i). Describe briefly the applications of radioactive tracers.
    ii). What are carbon nano tubes ? Give an account of their preparation and applications.
35. Compare VB and MO theory for bonding.

(2 × 15 = 30 Marks)

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