MAR IVANIOS COLLEGE (AUTONOMOUS)
THIRUVANANTHAPURAM

Reg. No. :…… **Name :…….**

Third Semester B.Sc. Degree Examination, November 2016
First Degree Programme under CBCSS
Complementary Course: Chemistry – III (for Physics)
AUCH331.2d: Physical and Inorganic Chemistry I

(*for 2014 Admissions – **Improvement** Only*)

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

SECTION – A

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

1. How is RMS velocity related to temperature ?
2. What do you meant by collision frequency ?
3. Give one application of STM technique.
4. Define equilibrium constant Kp for any gaseous reaction.
5. Give an expression for Bragg's equation.
6. State the law of corresponding states.
7. Give the relation between Kp, Kc and Kx if there is no change in the number of moles in a chemical equilibria.
8. What is the application of Kroll's process ?
9. Differentiate between calcination and roasting.
10. Give the unit of van der Waals constant, b.

(10 × 1 = 10 Marks)

SECTION – B

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

11. Define: collision number, mean free path.
12. Calculate the average velocity and most probable velocity of O_2 molecule at $27^{\circ}C$.
13. What is Boyle temperature ?

14. Explain: Miller indices.
15. Give the application of Van – Arkel method of refining of metals.
16. Explain the principle of zone refining.
17. Draw and explain a diagram representing the Maxwell distribution of molecular velocities.
18. What are buffer solutions ? Give one example for acidic and basic buffer solution.
19. Mention the relevance of critical temperature.
20. Define pH of a solution. Calculate the hydrogen ion concentration of a solution whose pH is 5 ?
21. Write a short note on the various elements of symmetry of a crystal.
22. Write a note on the anisotropy of crystalline materials.

(8 × 2 = 16 Marks)

SECTION – C

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

23. Explain: Joule Thomson effect and its application.
24. Explain the deviation of gases from ideal behavior.
25. What are liquid crystals ? Explain the applications.
26. Explain the structure of KCl.
27. Briefly explain the applications of nanomaterials in electronics and medicine.
28. Explain the methods used for the liquefaction of gases.
29. Explain: TEM – a tool for nano material characterisation.
30. Discuss the hydrolysis of a salt of strong base and weak acid.
31. Write a short essay on the metallurgy of uranium.

(6 × 4 = 24 Marks)

SECTION – D

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

32. Explain the various diffraction methods used for the study of crystalline materials.
33. State Le Chatelier's principle and discuss it for the reaction between nitrogen and hydrogen.
34. Explain the various methods used for preparation of nanomaterials.
35. Write an essay on SEM and AFM techniques used for the characterization and measurement of nano structures.

(2 × 15 = 30 Marks)

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