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Reg. No. : .....

Name : .....

Third Semester B.Sc. Degree Examination, December 2017
First Degree Programme Under CBCSS
Complementary Course for Physics
CH 1331.1 : PHYSICAL AND INORGANIC CHEMISTRY
(2013 Admissions Onwards)

Time : 3 Hours Max. Marks : 80

All Saints' College Trivandrum

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

Fill in the blanks :

1. The mean free path of the molecules in a gas is _____ to the pressure at constant temperature.
2. The Collision frequency _____ with increase of temperature.
3. Anisotropy is a characteristic phenomenon of _____ solids.
4. A 100 plane cuts the Y axis at _____
5. An increase of pressure _____ the forward reaction in $2HI \rightleftharpoons H_2 + I_2$.
6. For an endothermic reaction, Kp _____ with increase in temperature.
7. The conjugate acid of carbonate ion is _____
8. BCl_3 is a _____ acid.
9. Pentlandite is the principal ore of _____.
10. An example for a natural colloid which constitute nano materials is _____

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SECTION – B

Answer **any eight** questions. **Each** question carries **2** marks.

11. Calculate the RMS velocity of N_2 at 100°C.
12. Define Boyle temperature. What is the relationship between Boyle temperature and the vander Waal's constants.
13. Draw the primitive, BCC and FCC unit cells.
14. Give any two applications of liquid crystals.
15. Explain Van't Hoff's reaction isotherm.
16. What is the effect of catalyst on an equilibrium ? Explain.
17. Calculate the pH of 0.1 M potassium hydroxide solution.
18. What is the Arrheneus concept of acids and bases ? Mention one of its drawbacks.
19. Give any one metallurgical process in which TiO_2 is converted to Ti.
20. How are ores purified by froth flotation process ?
21. Comment on the optical properties of nano particles.
22. Explain any two applications of nano materials.

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SECTION – C

Answer **any six** questions. **Each** question carries **4** marks.

23. Write down the vander Waal's reduced equation of state and explain the terms. State the law of corresponding states.
24. Explain the Linde's process of liquefaction of gases.
25. The second order diffraction from a particular plane of a crystal appeared at 21.8° when X-ray of wavelength 1.5 Å was used. Calculate the interplannar distance.
26. Briefly explain the powder method of X-ray diffraction.

27. Distinguish between Kp and Kc and bring out the relationship between them.

28. Derive the relationship between Kh and Ka for a salt formed between a strong base and a weak acid.

29. Derive Henderson equation.

30. Write a short note on calcination of ores.

31. Explain how metallic uranium is obtained from U_3O_8.

SECTION – D

Answer **any two** questions. **Each** question carries **15** marks.

32. a) Distinguish between real gas and an ideal gas. Why do real gases deviate from ideal behaviour ? Derive the vander Wall's equation.

    b) List the seven crystal systems and their relative axial lengths and angles.

33. a) Explain the principle and procedure for the potentiometric determination of pH.

    b) Briefly explain the metallurgy of nickel.

34. a) What are buffer solutions ? Explain buffer action with suitable examples.

    b) State and explain the Bronsted theory of acids and bases. What are its merits and demerits ?

35. Explain the different methods adopted for the preparation of nano materials.

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