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(Pages : 3) H – 6196

Reg. No. : .....

Name : .....

Fifth Semester B.Sc. Degree Examination, December 2019

First Degree Programme Under CBCSS

Core Course – V

CH 1541 : PHYSICAL CHEMISTRY – I

(2014-2016 Admissions)

Time : 3 Hours Max. Marks : 80

SECTION – A

Answer **all** questions. Each question carries **1** mark. (answer in a word/sentence)

1. Define compressibility factor.
2. Define critical constants.
3. Explain the term space lattice.
4. What are intrinsic semiconductors
5. Define fluidity.
6. What is the point group of NH_3 molecule.
7. Write the first law equation for an isobaric process.
8. What is intensive thermodynamic properties? Give one example.
9. Explain the term entropy.
10. Write the symmetry elements of a C_{2v} point group.

(10 × 1 = 10 Marks)

P.T.O.

SECTION – B

Answer **any eight** questions. Each question carries **2** marks. (short answer type)

11. Calculate the *rms* velocity of N_2 at 300K.

12. Define mean free path.

13. What is meant by Osmotic pressure of a solution?

14. Define the term colligative properties.

15. Define enthalpy of vaporization.

16. State and illustrate Hess's law.

17. Discuss partition function.

18. State Carnot's theorem.

19. Explain axis of symmetry of a molecule with one example.

20. Define smectic liquid crystals.

21. State and explain the second law of thermodynamics.

22. Explain the term C_p and C_v and write down the relationship between them.

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each question carries **4** marks. (short essay type)

23. Calculate the work done in expanding one mole of an ideal gas from a volume of 2 dm^3 to 20 dm^3 at 27° C.

24. Write a short note on metal excess defect and metal deficiency defects.

25. Derive an expression for work done in the reversible isothermal expansion of an ideal gas.

26. Derive Gibbs Duhem equation.

27. Discuss the structure of Rutile and Zinc blent.

28. Briefly describe the determination of fugacity of a gas.

29. Identify the symmetric elements present in BF_3 and H_2O.

30. Discuss how critical temperature and critical pressure are determined experimentally?

31. Write a short note on Bravis lattices.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks. (essay type)

32. (a) What is Joule-Thomson expansion? Show that it is an iso enthalpic process. How μ_{JT} is related with Joule-Thomson expansion.

    (b) Derive the expression for μ_{JT} ideal gas.

33. Derive Bragg's law and discuss about rotating crystal method of XRD.

34. (a) Discuss Maxwell-Botzmann distribution of molecular velocities.

    (b) Derive an expression for *rms, most probable and average.*velocity.

35. Explain Andrew's experiment on isotherms of gases showing the significance of critical constants.

(2 × 15 = 30 Marks)
