K – 3276

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Fifth Semester B.Sc. Degree Examination, February 2021

First Degree Programme under CBCSS

Chemistry

Core Course V

CH 1541 – PHYSICAL CHEMISTRY – I

(2017 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. Glass is an example of ———— solid.
2. How many Bravais lattices does the cubic crystal system have?
3. Property of resistance to flow is called ————.
4. Boiling point of a liquid ———— with increase in external pressure.
5. For an exothermic reaction, the enthalpy change is ————.
6. Miller indices of a plane making intercepts of 2a, 3b and 2c are ————.
7. A symmetry operation is the movement of a molecule that brings it into ———— configurations.
8. What is the order of a C_{2V} point group?

P.T.O.

9. What name denotes the total number of collisions between the molecules of a gas per unit time per unit volume?

10. At a particular temperature. which has the highest value for a particular gas- average velocity, most probable velocity or RMS velocity?

(10 × 1 = 10 Marks)

SECTION – B

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

11. Identify the proper rotation axis of C_6H_6 molecule.

12. What is an inversion center?

13. What is a cyclic process?

14. 500 J of heat was supplied to a system at constant volume. It resulted in the increase of temperature of the system from 293 K to 298 K. What is the change in internal energy of the system?

15. Why does an increase in temperature decreases surface tension?

16. What is reverse osmosis?

17. What is meant by a real gas?

18. RMS velocity of O_2 at 298 K is 4.6×10^2 m/s. Calculate its average velocity?

19. What are F centers?

20. What are lattice planes?

21. State the law of constancy of interfacial angles.

22. What is enthalpy of combustion?

(8 × 2 = 16 Marks)

SECTION – C

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

23. Give the important postulates of kinetic theory.

24. Derive the Bragg equation.

25. Discuss the effect of temperature on distribution of molecular velocities in gases.

26. Explain the terms molality and mole fraction of a solution.

27. Discuss the crystal structure of NaCl.

28. Identify the symmetry elements present in BF_3.

29. Derive the relationship between lowering of vapour pressure and molar mass of a solute.

30. Discuss the physical significance of free energy.

31. Write a note on liquid crystals.

(6 × 4 = 24 Marks)

SECTION – D

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

32. (a) How do you determine critical temperature and critical volume of a gas?

    (b) Derive the relationship between Vander Waal's constants and critical constants.

33. (a) What is Joule Thomson effect?

    (b) Derive the expression for Joule Thomson effect

34. Write an essay on imperfections or defects in crystals.

35. (a) Explain the different kinds of symmetry operations and symmetry elements with suitable examples.

(b) What are group multiplication tables? Give the GMT of C_{2v}

($2 \times 15 = 30$ Marks)
