**E 1750**                    (Pages : 2)                    Reg. No.............................

Name.................................

## B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, OCTOBER 2015

### Fifth Semester

Core Course—STATES OF MATTER

(Common for B.Sc. Chemistry Model I and Model II, B.Sc. Petrochemicals, B.Sc. Chemistry Environment and Water Management)

[2013 Admissions]

Time : Three Hours                                            Maximum : 60 Marks

### Part A

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

1. Write down the expression for RMS velocity.

2. Write down van der Waals equation for real gases.

3. Total degrees of freedom processed by $CO_2$ molecule.

4. What you mean by adhesive force ?

5. Explain centre of symmetry.

6. Write the unit cell dimensions of monoclinic system.

7. Write the Miller indies of crystal planes which cut through the crystal axes at (6a, 3b, 3c).

8. How will you calculate the number of Schottky defects in a crystal ?

$(8 \times 1 = 8)$

### Part B

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

9. Staet and explain Charles law.

10. What is the relation between mean free path and co-efficient of viscosity.

11. State barometric distribution law.

12. What is the relation between Cp and Cv ?

13. Why do liquid drops assumes spherical shape ?

14. What is anisotropic crystal ? Give example.

15. Sketch the planes with Miller indices (110) and (110).

16. Differentiate betwen n-type and p-type semiconductors.

**Turn over**

17. What are the factors influencing adsorption ?

18. Explain Schottky defect.

$(6 \times 2 = 12)$

## Part C

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

19. Explain the temperature and pressure dependence of viscosity of gases.

20. The van der Waals constants for $O_2$ are $a = 0.1378 \ Nm^4 \ mol^{-2}$, and $b = 3.18 \times 10^{-5} \ m^3 \cdot mol^{-1}$. Assuming $O_2$ behaves as a van der Waals gas. Calculate its critical constants.

21. How can you determine the coefficient of viscosity of a liquid ?

22. Explain Langmir adsorption isotherm.

23. Differentiate between CCP and BCP.

24. How will you determine the density of cubic crystals ?

$(4 \times 4 = 16)$

## Part D

*Answer any **two** questions.*
*Each question carries 12 marks.*

25. Derive the relationship between van der Waals constants and critical constants.

26. Discuss the Andrews experiments on the isotherms of $CO_2$ and bring out the idea of continuity of state.

27. (a) How are liquid crystals classified ?

    (b) List their characteristics.

    (c) Give a brief account of the a molecular arrangements which exist in various states of liquid crystals.

28. (a) How can we identity cubic crystal from crystallographic data ?

    (b) Discuss the structure of CsCl and $Na_2O$.

    (c) What is superconductivity ?

$(2 \times 12 = 24)$