B. Sc. DEGREE (C.B.C.S.S.) EXAMINATION, APRIL 2018
(2017 Admission Regular, 2016 Admission Improvement/Supplementary &
2015 Admission Supplementary)
SEMESTER II - CORE COURSE (CHEMISTRY)
CH2B02TB - STATES OF MATTER

Time: Three Hours   **Maximum Marks: 60**

PART A

I.   Answer all questions. Each question carries 1 mark

1.   What is Boyle temperature ?
2.   The unit of surface tension is ____.
3.   What is radius ratio?
4.   Crystalline solids are ____ in nature a) isotropic b) anisotropic.
5.   With increase in temperature, the physisorption of a gas on a solid _____.
     a) increases b) decreases c) either increases or decreases depending on the nature of the gas and solid d) does not change.

                                                                      (5×1=5)

PART B

II. Answer any five questions. Each question carries 2 marks

6.   Calculate RMS velocity of O_2 gas at 17°C.
7.   State and explain the law of equipartition of energy.
8.   What is meant by collision frequency and mean free path?
9.   What is surface tension of a liquid? How is it affected by increase of temperature?
10. Density of copper is 8.935×10^3 kgm^{-3}. The edge length of FCC unit cell of Cu is 3.6A°. Calculate the Avogadro number (Cu=63.54 gmol^{-1}).
11. What do you mean by superconductivity?
12. What is meant by a unit cell and space lattice?
13. Explain the term chemisorption with suitable examples.

                                                                      (5×2=10)

PART C

III. Answer any five questions. Each question carries 5 marks

14. Draw and explain PV isotherms of CO_2.
15. Explain Claud's method for the liquefaction of air.

16. Define viscosity. How is it determined? Discuss the effect of temperature on the viscosity of a liquid.
17. Write an explanatory note on Hydrogen bonding.
18. What are liquid crystals? Differentiate between nematic and cholestric phases.
19. How is crystal density from unit cell dimensions determined?
20. Explain the structure of NaCl.
21. How is BET isotherm used to determine the surface area of solid adsorbents?

(5×5=25)

PART D

IV. Answer any two questions. Each question carries 10 marks

22. Define critical constants. How are they determined experimentally? Derive relationship between critical constants and van der Waal's constants.
23. Explain the powder method. Discuss the powder diffraction pattern of NaCl and correlate it with its crystal structures.
24. Derive Langmuir adsorption isotherm. What are its limitations?
25. a) What are the postulates of kinetic theory of gases?
    b) Write briefly on n-type and p-type semiconductors.

(2×10=20)