Roll No. .....

91050

B. Sc. Bio-Technology 1st Semester

w. e. f. 2012-13

Examination – November, 2019

PHYSICAL CHEMISTRY

Paper : BT-105

Time : Three Hours] *[Maximum Marks : 40*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is ***compulsory***. All questions carry equal marks.

1. (a) Define unit cell.

(b) Name the crystalline solid which is insulator in solid state and conductor in molten state.

(c) Which is more viscous : Water or Honey ? Give reason.

(d) What is the effect of addition of sand in water on the viscosity of water ?

(e) What is the formula of critical temperature ?

(f) Define real gas.

(g) Define Most probable speed.

(h) What is the effect of tem perature on mean free path. 1 × 8

SECTION – I

2. (a) What is the value of : 2

(i) Gas constant(R)

(ii) Absolute Zero

(b) Explain the following term : 2

(i) Collision number

(ii) Collision frequency

(c) What is the formula of : 2

(i) Average speed

(ii) Root mean square speed

(d) What is the unit of : 2

(i) Vander waal constant 'a'

(ii) Vander Waal constant 'b'

3. (a) What is the value of compressibility factor(Z) for : 2

(i) Ideal gas

(ii) Non ideal gas with positive deviation

(b) What changes should be done in : 2

(i) Pressure term

(ii) Volume term of Ideal gas equation to get Vander Waal equation

(c) Explain the application of Vander Waals equation in calculation of Boyle's temperature. 2

(d) Calculate the average velocity and most probable velocity of carbon mono-oxide molecules at 437°C. 2

SECTION – II

4. (a) Derive reduced equation of state from Vander Waal's equation. 4

(b) To prove that $P_c V_c = \frac{3}{8} RT_C$ 4

5. (a) Define the following terms : 4

(i) Reduced temperature

(ii) Reduced Pressure

(iii) Inversion temperature

(iv) PV isotherm

(b) Write a short note on liquification of gases. 4

SECTION – III

6. (a) Write down the properties of the liquid. 4

(b) Explain the term Specific rotation. 2

(c) Give the formula which gives relation in between : 2

(i) Rheochor [R] and Coefficient of viscosity(η).

(ii) Surface tension (γ) and Parachor [P].

7. (a) Explain the term Liquid crystals. 4

(b) Define the term vapour pressure. What is the unit of vapour pressure. Explain the factors affecting vapour pressure. 4

SECTION – IV

8. (a) In which unit cell, the particles are present at : 2

(i) the corners of unit cell

(ii) face centre along with at the corners of unit cell.

(b) Name the primitive unit cell/s in which : 2

(i) $\alpha = \beta = \gamma$

(ii) $a \neq b \neq c$

(c) Give differences between Molecular solid and Metallic solid. 4

9. (a) Which type of solid is : 2

(i) Glass

(ii) NaCl

(b) What is the total number of : 2

(i) Crystallographic systems

(ii) Point groups

(c) Explain the following terms : 4

(i) Law of constancy of interfacial angles

(ii) Bragg's equation
