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 $P_c V_c = \frac{3}{8} R T_C$ 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

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