Roll No…….. **Total No. of Printed Pages: [01]**
Total No. of Questions: [09]

B.Sc. (Hons.) Physics (Semester – 3rd)
PHYSICAL CHEMISTRY-I
Subject Code: BCHMS1-102
Paper ID: [19131518]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) Define collision diameter and mean free path.
b) Define law of equipartition of energy.
c) Explain law of corresponding states..
d) Write down law of constancy of interfacial angles.
e) What do you mean by degrees of freedom?
f) State seven crystal systems.
g) Define ionization constant and ionic product of water.
h) State for common ion effect.
i) Define hydrolysis and hydrolysis constants.
j) State heat capacities.

Section – B **(5 marks each)**

Q2. Explain variation of viscosity with temperature and pressure.
Q3. Derive relation between critical constants and van der Waals constants.
Q4. Explain Van der Waals equation of state, its derivation and application in explaining real gas behaviour.
Q5. Explain cleansing action of detergents.
Q6. Derive derivation of Henderson equation and its applications.

Section – C **(10 marks each)**

Q7. Derive Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy.
Q8. (a) Explain solubility and solubility product of sparingly soluble salts – applications of solubility product principle.
(b) Explain theory of acid–base indicators; selection of indicators and their limitations.
Q9. (a) Explain effect of addition of various solutes on surface tension and viscosity.
(b) Qualitatively discuss structure of water.