Roll No……..….. **Total No. of Printed Pages: 1**
Total No. of Questions: [09]

B.Sc. (Non-medical) (Semester – 2nd)
PHYSICAL CHEMISTRY - I
Subject Code: BSNMS1-203
Paper ID: [22131409]

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. What do you understand by Miller indices? Explain.
b. Discuss the law of corresponding states.
c. What do you mean by half-life of a reaction?
d. What is compressibility factor?
e. Write van der Waals equation describing all the terms.
f. What do you understand by nematic and cholesteric phases?
g. Write Bragg's law explaining all the terms involved.
h. What do you understand by order and molecularity of a reaction?
i. What are symmetry elements and symmetry operations?
j. Define stoichiometric and non-stoichiometric defects.

Section – B **(5 marks each)**

Q2. Calculate root mean square velocity and average velocity for hydrogen gas at 0 ℃.
Q3. Discuss Maxwell distribution of molecular velocities.
Q4. Explain the differences between solid crystal and liquid crystal.
Q5. State and explain the principle of corresponding states.
Q6. Derive an expression for integrated rate equation for first order reaction.

Section – C **(10 marks each)**

Q7. Explain all postulates of kinetic theory of gases pointwise.
Q8. The rate constant of a second order reaction is 5.70×10^{-5} $dm^3mol^{-1}s^{-1}$ at 25℃ and 1.64×10^{-4} $dm^3mol^{-1}s^{-1}$ at 40℃. Calculate the activation energy and the Arrhenius pre-exponential factor.
Q9. Explain collision theory and activated complex theory of bimolecular reactions in detail.