Roll No…….. **Total No. of Printed Pages: 1**

Total No. of Questions: [09]

B.Sc. (Non-Medical) (Semester – 4th)
PHYSICAL CHEMISTRY-III
Subject Code: BSNMS1-404
Paper ID: [22131421]

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 Ostwald dilution law.
b. What do you mean by equivalent conductance? How is equivalent conductance related to specific conductance?
c. Explain the term transport number. How you can determine it?
d. Define electrode potential and standard electrode potential of a metal.
e. What do mean by buffer action?
f. Distinguish between electrolytic and galvanic cells.
g. What is the Soddy-Fajans Group Displacement Law?
h. State general characteristics of radioactive decay.
i. What do you mean by artificial radioactivity? Mention its two applications.
j. State Born-Oppenheimer approximation.

Section – B **(5 marks each)**

Q2. Explain Kohlrausch law. For strong electrolyte NaOH, NaCl and $BaCl_2$, the molar ionic conductance at infinite dilution are 248.1×10^{-4}, 126.5×10^{-4} and 280.0×10^{-4} S m^2 mol^{-1}, respectively. Calculate $\Lambda^0 m$ for $Ba(OH)_2$.

Q3. Derive the Nernst equation? How is it utilized in determining cell electromotive force (EMF)?

Q4. Discuss the different types of nuclear decay processes with the help of suitable examples.

Q5. Give an overview of various nuclear models used to describe atomic nuclei.

Q6. With the help of a suitable schematics, explain basic features of a spectrophotometer.

Section – C **(10 marks each)**

Q7. Write a note on Debye-Huckel-Onsager's equation for strong electrolytes.

Q8. Discuss in details the phenomenon of hydrolysis of salts. Illustrate your answer by taking example of strong acid and weak base.

Q9. Draw molecular orbital energy level diagram for O_2 and workout the bond order and magnetic properties of O_2.