[This question paper contains 2 printed pages.]

**4719**                                     *Your Roll No.* ...............

## CHEMISTRY – Paper III

### (Physical Chemistry)

*Time : 2 Hours*                                *Maximum Marks : 25*

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt any **four** questions.
Use of Calculator is allowed.

1. (a) In a measurement of viscosity by Ostwald's
   viscometer at 20.2°C, water takes 30 seconds to
   flow between the upper and lower marks while
   the flow of another liquid of density 1.5 g/c.c.
   takes 35 seconds. Taking density of water at
   20.2°C to be 0.9982 g/c.c., calculate the viscosity
   of the other liquid. (Viscosity of water at this
   temperature is 10 centipoise.)                    (3)

   (b) Calculate the r.m.s. velocity of oxygen molecules
   at 27°C.                                          (2)

   (c) The resistance of a N/10 solution is found to be
   $2.5 \times 10^3$ ohms. Calculate the equivalent conductance
   of the solution if the all constant = $1.15 \text{ cm}^{-1}$.
                                                     (2)

2.  (a) Explain the term co-efficient of viscosity.     (2)

    (b) Describe Ostwald's viscometer method for the determination of viscosity of a liquid.          (4)

3.  (a) What is meant by transport number of an ion ?

          (2)

    (b) Describe moving boundary method for the determination of transport numbers.          (4)

4.  (a) What is a buffer solution ?          (2)

    (b) Derive Henderson equation for the pH of an acidic buffer mixture.          (4)

5.  Write short notes on any two :

    (a) Law of rational indices

    (b) Kammerlingh-Dunes virial equation of state for real gases

    (c) Law of Equipartion of Energy          (2×3)