# Exp 3.b FALLING BALL VISCOMETER

**Instructions:**

For submission of this experiment you have to submit two files, one excel sheet and **one pdf file** and name of the files should have following format ***enroll\_exp1 (Ex.183109002\_exp1* ).** The detailed instructions are given below

**Excel sheet**

Fill the columns in the excel sheet provided to you.

1. In the excel you have to plot two graphs
   1. Cd vs Re plot
   2. Kinematic viscosity variation for two fluids

(Details are in the excel sheet for better clarification)

1. Diameter and mass for all the balls are given also density of the fluids are also given and distance between two markings in the experiments is **0.5 meters.**

**PDF**

* In the PDF you have to scan and **submit hand written document** containing one calculation from each of the table(smooth and rough).Instruction for calculation is given in “**note**” This representative calculation is a means to check if the calculations done by you in the excel sheet is correct and without errors. Make sure that the calculations that you write down are step by step **detailed** calculations using all the formulas provided to you
* Attach also the screenshot of graphs and calculated table in the pdf which you have drawn in the excel sheet. (copy pasting will be okay)
* Write handwritten sources of error (at least two).
* Next will come the handwritten answers to the following questions:

1. Deduce the velocity for a spherical ball moving in a fluid as function of distance and take initial velocity and initial position to be zero.
2. In actual experiment there is an entry length of 29 cm for a glycerin column and 26 cm for a motor oil column. One of the underlying assumption while doing the experiment is that we assume the terminal velocity is reached at first marking! So as an engineer **you have to calculate the entry length**, from the above derived formula (Use the data which you have assigned and also you have to take your calculated viscosity and terminal velocity. And also comment weather the above entry length is sufficient or not? (If this is sufficient then the experiment is okay otherwise you have to change the entry length then again do the experiment, calculate once again the viscosity and terminal velocity and use that above formula to deduce that the entry length is okay or not. So it is an iterative process.)

Note:

|  |  |
| --- | --- |
| Roll No. last digit | Choosing of Sr no. from given table |
|  |  |
| 0<=x1<=8 | take Sr no. as it is |
| If X1 is 9 | Take Sr no. 5 for calculation |