**Exp.3a LEVEL OF THE FLUID IN VORTEX FLOW**

**Instructions:**

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

**Excel sheet**

1. In the excel sheet provided to you there are four columns for readings.
   * First column is for radius at which the experimental and theoretical height of the parabola are measured or will be calculated. Column will be provided to you.
   * Second column is for experimental values for height of the parabola, this are measured as explained in the video and are provided to you in the excel sheet.
   * Third column is the theoretical height of the parabola and you will have to do calculations using formulae provided and fill this values in the column.
   * Forth column is the RPM of rotation for the water tank and will be provided in the excel sheet. Use this value of RPM in your calculations for theoretical height of the parabola.
2. Plot the graph of the Experimental height and Theoretical height with respect to radius.

**PDF:**

1. In the PDF you have to write down at least one calculation for the Theoretical Height of the parabolic curve. Details are given in the note
2. You have to attach the screenshot of graphs and calculated table in the pdf which you have drawn in the excel sheet. (copy pasting will be okay)
3. You have to write sources of error (at least two).
4. Write down your conclusion from the results.
5. Answer following questions:
   1. Derive the equation for parabolic curve of the liquid surface in the forced vortex.
   2. What will be the velocity of the fluid at time t=0, if I put small hole at the bottom of the central axis in cylinder having forced vortex motion? You have to analytically deduce the velocity which should be a function of angular velocity, initial height of the liquid and some other parameters. [inputs: Initial Height H, Diameter of cylindrical shell D and angular velocity ) ] Hint: you can use the fact of incompressibility means the volume before the rotation and volume after the rotation will be same.

Note:

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| --- | --- |
| Roll No. last two digit | Choosing of Sr no. from each table to do calculation |
|  |  |
| 0<=x1\_x2<=22 | take Sr no. as it is |
| 23<=x1\_x2<=45 | subtract 23 from your last two digit |
| 46<=x1\_x2<=68 | subtract 46 from your last two digit |
| 69<=x1\_x2<=91 | subtract 69 from your last two digit |
| 92<=x1\_x2<=99 | subtract 92 from your last two digit |