INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR
Instructor: Prof Mohammad Saud Afzal
Department of Civil Engineering
Course: CE21003
Submission Deadline:
Total Marks:

Laminar and Turbulent flow

Q1) What is the physical significance of the Reynolds number? How is it defined for (*a*) flow in a circular pipe of inner diameter *D* and (*b*) flow in a rectangular duct of cross section $a * b$?

Q2) Show that the Reynolds number for flow in a circular pipe of diameter *D* can be expressed as $Re = \frac{4\dot{m}}{\pi D \mu}$.

Q3) Water flows at a steady mean velocity of 1.5 m/s through a 50 mm diameter pipe slopping upwards at 45° to the horizontal. At a section some distance downstream of the inlet the pressure is 700 k Pa and at a section 30 m further along the pipe the pressure is 462 kPa. Determine the average shear stress at the wall of the pipe and at a radius of 10 mm.