Ref. No. : Ex/ME/5/T/413F/2024

BACHELOR OF ENGINEERING (MECHANICAL ENGINEERING)
FOURTH YEAR FIRST SEMESTER EXAMINATION 2024

FLUID TRANSPORTATION

Time: 3 hours ***Full Marks: 100***

Answer any five questions

1. Show that velocity distribution for a laminar flow in a long circular pipe is parabolic. Hence obtain the expressions for average velocity, maximum velocity, mass rate of flow and the component of the force on the wetted surface. State the assumptions made in deducing the equation. *14+10+4*
2. Express physically the momentum transport equation for steady flow and discuss briefly the most commonly used boundary conditions. *18*
3. a) What are the physical meanings of the Lennard-Jones parameter and how can they be determined from viscosity data? *6*

   b) Discuss briefly the molecular theory of viscosity in liquids. *12*
4. Obtain the expressions for momentum flux distribution and velocity distribution for flow through an annulus. *18*
5. Obtain the expression of viscosity of a fluid as obtained by Maxwell. *18*
6. Briefly describe the different equations and correlations which are used for analyzing the viscosity of suspensions and emulsions. *18*