1. What is the viscosity (or coefficient of viscosity) of a fluid? What is its dimension? 6%

2. What we mean by the term 'non-Newtonian fluids'? Can Navier-Stokes equations be applied to them? 6%

3. What is the Reynolds number and what is its significance? Explain with two different ways how is this important parameter in fluid mechanics can be obtained. 10%

4. State and carefully explain each term in the integral form of the linear momentum theorem. Briefly explain how is this theorem derived (do not derive it). 12%

5. Show (in Cartesian coordinates) that both the stream function and velocity potential satisfy the Laplace equations for two-dimensional incompressible irrotational flows 18%

6. Given a steady two-dimensional velocity distribution $u = Kx$, $v = -Ky$, $w = 0$, where K is a positive constant. Compute and plot the streamlines of the flow, including flow directions. 12%

7. For incompressible flow due to a pressure gradient between two fixed parallel plates, compute (a) the maximum velocity, (b) the wall shear stress, and (c) the vorticity. 21%

8. Briefly but carefully explain main features of each of the three regimes in incompressible turbulent flow near a wall. Hint, be sure to use the concept such as the friction velocity, for example. 15%