Department of Turbomachinery and Fluid Mechanics
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FLUID MECHANICS FOR MECHATRONICS – LIST OF QUESTIONS

1. **What basic features distinguish fluids from the solid bodies?**
2. **What are the conditions for fluid equilibrium?**
3. **On what quantities does the hydrostatic force on a flat wall submerged in a liquid depend?**
4. **What are the differences between the general motion of a fluid and the general motion of a solid?**
5. **Formulate the mass conservation equation for the flow of an incompressible fluid through a pipe of variable cross-section.**
6. **What physical principle is described by the Navier-Stokes equation?**
7. **Write the Bernoulli equation and give the physical interpretation of its terms.**
8. **Give the physical interpretation of the following criteria of flow similarity: Strouhal number, Euler number, Froude number and Reynolds number.**
9. **Characterize the laminar and turbulent flows.**
10. **What is the boundary layer? In what conditions the boundary layer separation may occur?**
11. **What is cavitation and in what conditions it may occur?**
12. **What are the potential flows and how they may be modelled mathematically?**
13. **How are the fluid energy losses accounted for in the Bernoulli equation describing the real flow of a viscous fluid through a pipeline?**
14. **What is a hydraulic jump and what are its consequences for the flow in an open channel?**
15. **What is a shock wave? How do the flow parameters change with crossing the perpendicular shock wave?**

The final test will contain 5 questions from the above list