Department of Energy and Industrial Apparatus
Section of Fluid Mechanics, Water Turbines and Pumps
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IDE - SELECTED PROBLEMS OF FLUID MECHANICS

QUESTIONS FOR THE WRITTEN TEST

1. **What physical principle is described by the Navier-Stokes equation? Provide the physical interpretation of the respective terms of this equation.**
2. **Write the Bernoulli equation and provide its physical interpretation.**
3. **Define the specific speed coefficient in turbo-machinery.**
4. **What parameters are included in the formula for the efficiency of the rotary pump?**
5. **Characterize the laminar and turbulent flows.**
6. **Describe the separation of the boundary layer. In which conditions it may occur?**
7. **Describe the entrained mass of fluid? How does it influence the vibrations of the solid object immersed in the fluid?**
8. **Describe the phenomenon of cavitation. In which conditions it may occur?**
9. **What are the negative consequences of cavitation in hydromachinery?**
10. **How are potential flows modelled in calculations?**
11. **How is the Finite Difference Method employed in flow calculations?**
12. **How is the Finite Element Method employed in flow calculations?**
13. **How is the Finite Volume Method employed in flow calculations?**
14. **How is the turbulent character of flow taken into account in numerical calculations?**
15. **What methods are used for determination of the free surface geometry In numerical flow calculations?**

Written test will contain 5 questions selected from the above list.