Question Bank for Fluid Mechanics

Chapter 1: Fluid Statics	
1	**Define fluid and explain its classification into various types.** (L1 – Remember, CO1)
2	**Describe the properties of fluids and their significance in fluid mechanics.** (L2 – Understand, CO1)
3	**What is Newton's law of viscosity? Provide examples of Newtonian and Non-Newtonian fluids.** (L1 – Remember, CO1)
4	**Derive the manometric equation and explain its significance in fluid measurement.** (L3 – Apply, CO2)
5	**Explain the concept of hydrostatic equilibrium and how pressure head is determined in fluids.** (L2 – Understand, CO1)
6	**Calculate the pressure difference using a manometer for a given fluid system.** (L3 – Apply, CO2)
7	**List and explain different types of manometers used in fluid statics.** (L1 – Remember, CO2)
8	**How does fluid pressure vary with depth in a static fluid?** (L2 – Understand, CO1)
9	**Discuss the importance of fluid pressure measuring devices in industrial applications.** (L4 – Analyze, CO3)
10	**Analyze the effect of fluid properties on the measurement of fluid pressure.** (L4 – Analyze, CO3)
Chapter 2: Fluid Flow Phenomena	
1.	**What is laminar flow? How does it differ from turbulent flow?** (L1 – Remember, CO1)
2.	**Define Reynolds number and explain its significance in determining the flow type.** (L2 – Understand, CO1)
3.	**State Bernoulli's theorem and explain its applications in fluid flow problems.** (L2 – Understand, CO2)
4.	**Calculate the Reynolds number for a flow of water through a pipe of diameter 0.2 m and velocity 4 m/s. The kinematic viscosity of water is 1.0×10−6m2/s.** (L2 –CO2)
5.	**Given the pressure at point A as 300 kPa300 , the velocity at point A as 4 m/s, and the velocity at point B as 2 m/s, calculate the pressure at point B using Bernoulli's equation. Assume the density of the fluid is 1000 kg/m3.(L3 – Apply, C202.2)**
6.	A pipe is carrying a fluid with a velocity of 5 m/s. The diameter of the pipe is 0.3 m. Calculate the flow rate of the fluid.(L3, C202.2)
7.	**Describe how friction losses occur in pipes and explain the factors that influence them.** (L2 – Understand, CO2)
8	**Calculate the frictional losses in a pipe using the Darcy-Weisbach equation. Assume any data if not given** (L3 – Apply, CO2)
9	**Evaluate the effects of sudden enlargement and contraction on fluid flow in pipes.** (L4 – Analyze, CO3)
Chapter 3: Flow Measurement	

1.	**Define and explain the working principle of an orifice meter.** (L1 – Remember, CO2)
2.	**What is a venturi meter and how is it used to measure flow rate?** (L1 – Remember, CO2)
3.	**Describe the operation and calibration process of a rotameter.** (L2 – Understand, CO2)
4.	**Explain the working of a Pitot tube and its application in flow measurement.** (L2 – Understand, CO2)
5.	**Solve a flow measurement problem using the orifice meter equation.** (L3 – Apply, CO2)
6	**List and compare the advantages and disadvantages of different flow measuring devices.** (L4 – Analyze, CO3)
7	**What factors should be considered when selecting a flow measuring device for a given application?** (L3 – Apply, CO3)
8	**Derive an equation for flow measurement using a venturi meter and solve a practical problem.** (L3 – Apply, CO2)
9	**Analyze the limitations of various flow measurement techniques in industrial processes.** (L4 – Analyze, CO3)
Chapter 4: Pumps and Fittings	
1.	**What are the different types of pumps used in fluid transportation?** (L1 – Remember, CO3)
2.	**Explain the working principle of a centrifugal pump.** (L2 – Understand, CO3)
3.	**Describe the role of pipe fittings in fluid transportation systems.** (L2 – Understand, CO3)
4.	**What are the performance characteristics of reciprocating pumps?** (L3 – Apply, CO3)
5.	**Solve a problem involving the calculation of pump efficiency using performance curves.** (L3 – Apply, CO3)
6	**Discuss cavitation in pumps and explain how it affects pump performance.** (L2 – Understand, CO3)
7	**What is the concept of Net Positive Suction Head (NPSH) and why is it important in pump selection?** (L2 – Understand, CO3)
8	**List the common types of valves used in fluid systems and explain theirplications.** (L1 – Remember, CO3)
9	**Analyze the troubleshooting steps for a centrifugal pump with air binding issues.** (L4 – Analyze, CO3)
Chapter 4: Fluidization	
1.	**Define fluidization and explain its types.** (L1 – Remember, CO3)
2.	**What is the minimum fluidization velocity and how is it determined?** (L2 – Understand, CO3)
3.	**Explain the concept of pneumatic conveyance and its application in industries.** (L2 – Understand, CO3)

4.	**Derive an expression for the pressure drop in a fluidized bed.** (L3 – Apply, CO3)
5.	**Solve a problem involving the calculation of minimum fluidization velocity for a given system.** (L3 – Apply, CO3)
6	**What are the factors affecting the pressure drop in fluidized beds?** (L2 – Understand, CO3)
7	**Discuss the applications of fluidized beds in industrial processes.** (L4 – Analyze, CO3)
8	**Analyze the flow characteristics in packed beds and explain their significance in fluidized systems.** (L4 – Analyze, CO3)
9	**Explain the differences between fixed bed and fluidized bed reactors.** (L4 – Analyze, CO3)