GOVT. POLYTECHNIC MAYURBHANJ

QUESTION BANK

SUB- FLUID MECHANICS(TH-3)   **SEMESTER- 4TH**

BRANCH- MECHANICAL ENGINEERING

1.0 Properties of Fluid

2 MARKS

1. Define fluid.
2. Define real and ideal fluids.
3. Define mass density and specific weight.
4. Distinct b/w statics and kinematics.
5. Define viscosity.
6. Define specific volume.
7. Define specific gravity.
8. State Newton's law of viscosity.
9. Name the types of fluids.
10. Define compressibility.
11. Define kinematic viscosity.
12. Write down the expression for capillary fall.
13. Explain vapor pressure and cavitation.
17. What is capillarity

6MARKS

1. Calculate the density, specific weight and weight of one liter of petrol of specific gravity 0.7
2. Explain about the types of the fluids.
3. The capillary rise in glass tube is not to exceed 0.2mm of water. Determine its minimum size given that surface tension for water in contact with air is 0.0725N/m
4. Determine the specific gravity of fluid having dynamic viscosity 0.05 poise and kinematic viscosity is 0.035 stokes.
5. Calculate the specific weight, density, specific gravity of one liter of liquid which weighs 7N.

2.0 Fluid Pressure and its measurements

2 MARKS

1. Define pascal's law.
2. What are the types of pressure gauges?
3. Draw the simple manometer
4. What is differential manometer?
5. Draw the U tube manometer for negative pressure.

   6 MARKS

1. Explain about U-tube manometer

2. What is single column manometer and classify it?

10 marks

1. A U - tube manometer is used to measure the pressure of oil os specific gravity 0.85 flowing in a pipe line. Its left end is connected to the pipe and the right limb is open to the atmosphere. The centre of the pipe is 100 mm below the level of mercury(specific gravity = 13.6) in the right limb. If the difference of mercury level in the two limbs is 160 mm. Determine the absolute pressure of the oil in the pipe

3.0 Hydrostatics

2 marks

1. Define centre of pressure.
2. What do you mean by total pressure?
3. Name the different experimental setup of Centre of pressure
4. Write the moment of inertia formula for rectangle and triangle about base

10 marks

1. A trapezoidal 2 m wide at the bottom and 1 m deep has side slopes 1:1. Determine (i)total pressure   (ii)Centre of pressure on the vertical gate closing the channel when it is full of water.
2. Figure shows a circular plate of diameter 1.2 m placed vertically in water in such a way that the centre of the place is 2.5 m below the free surface of water. Determine (i) Pressure on the plate (ii) position of centre of pressure
3. Derived total pressure and position of centre of pressure when a body vertically submerged in liquid

4.0 Kinematics of Flow

2 marks

1. What is the deference between laminar and turbulent flow.
2. State the continuity equations
3. Write the assumptions of Bernoullis Theorem.
4. What is a venturimeters? Where it is used?
5. What are the types of fluid flow?
6. State Bernnoullis Theorem
7. Write the expression of bernoullis equations.
8. What is the deference between steady and unsteady flow.
9. What is the deference between compressible and incompressible flow?

10 MARKS

1. Derive the expression for Bernoullis equation
2. Water flows in a circular pipe. At one section the diameter is 0.3 m the static pressure is 260 kpa gauge, the velocity is 3 m/s and the elevation is 10 m above ground level. The elevation at a section downstream is 0 m and the pipe diameter is 0.15 m. Find the gauge pressure at the

downstream section. Frictional effect may be neglected. Assume density of water to be 999 kg/m3

3. An oil of specific gravity 0.9 and viscosity 0.06 poise is flowing through a pipe of diameter 200 mm at the rate of 60 litre / sec. Find the head lost due to friction for a 500 m length of pipe. Find the power required to maintain this flow.

4.0 Orifices, notches & weirs

2MARKS

1. What is the function of orifices .
2. Differentiate between orifice and mouthpiece.
3. What is venacontracta?
4. What are notch and weirs?

10 marks

1.What are Orifices coefficient & the relation between the orifice coefficients?

2. Derived discharge over a rectangular notch or weir.

3. Derived discharge over a rectangular notch or weir.

6.0 Flow through pipe

2 marks

1. What do you mean by pipe
2. Describe major and minor loss of pipe.
3. What is Darcy-weisbach equation?
4. What do you mean by HGL?

6 MARKS

1.Describe HGL and TEL.

2.Derived chezy's formula .

3. Derived Darcy-Weisbach formula.

10 marks

1.Find the dia of a pipe of length 2000m when the rate of flow of water through the pipe is 200 lit/sec and the head loss due to friction is 4m . Take the value of c=50 in chezy's formula

2.An oil of sp.gr.=0.7 is flowing through a pipe of dia 300 mm at the rate of 500lit/s .Find the head loss due to friction and powered required to maintained the flow for a leanth of 1000m. Take V=0.29 stokes.

7.0 Impact of jets

2 marks

1. **What do you mean by Jet of water?**
2. **What is impact of jet?**

6 marks

1. What is the force exerted by jet of water on stationary vertical plate?
2. What is the force exerted by jet of water on stationary inclined flat plate?
3. What is the force exerted by jet of water on stationary curved plate?
4. What is the force exerted by jet of water on moved vertical plate?
5. What is the force exerted by jet of water on moved inclined flat plate?