BHARATI VIDYAPEETH INSTITUTE OF TECHNOLOGY
Question Bank (K-Scheme)

Name of subject: Hydraulics **Unit Test: I**
Subject code: 314303 **Course: CE**
Semester: IV

Unit 1 (Pressure Measurement)

2 Marks

1. Define Fluid Mechanics, Hydraulics.
2. State Newton's law of Viscosity.
3. What do you mean by gauge pressure and absolute pressure?
4. State the advantages of U-tube manometer over the piezometer tube.
5. Difference between Real and ideal fluid.
6. Define Capillarity.
7. Define i) Mass Density ii) Weight Density iii) Specific Gravity

4 Marks

1. Explain with a neat sketch and the working of Bourdons pressure gauge.
2. Explain Surface Tension.
3. If the specific gravity of oil is 0.85, what is its specific weight ?
4. The volume of liquid is 2.5 m^3 .it is reduced by 0.025 m^3 by increasing the pressure from 10atm to 220atm.Estimate the bulk modulus of elasticity of the liquid.
5. If the specific gravity of liquid is 0.80, calculate its density, specific volume and specific weight.
6. A liquid weighs 25KN and occupies 3.75 m^3,find its specific weight,mass density,specific gravity and specific volume.
7. The right limb of a simple U-tube manometer containing mercury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of sp.gr. 0.9 is flowing.The centre of pipe is 12cm below the level of mercury in the right limb .Find the pressure of fluid in the pipe if the difference of mercury level in the two limbs is 20cm.
8. An inverted U-tube manometer is connected to two horizontal pipes A and B through which water is flowing.The vertical distance between the axis of these pipes is 30cm.Manometric liquid is an oil of sp.gr. 0.8.The vertical height of water column in the two limbs of inverted manometer (when measured from respective centre of pipe) is found to be same and equal to 35cm.Determine the pressure difference in two pipes.
9. A flat plate of area 0.5m^2 is pulled at 0.5m/s with respect to another plate 5mm distant from it,its space between is filled with an oil of viscosity 1.4Ns/m^2.Find the force necessary to maintain this velocity.
10. A right limb of mercury U tube manometer is connected to a pipe which carries water under pressure. Left limb is open to atmosphere. The deflection of mercury was observed 250mm. If centre of pipe is 750mm above the free surface of mercury in left limb,calculate the water pressure in pipe.

Unit 2 (Hydrostatics)

2 Marks

1. Define total hydrostatic pressure and Centre of pressure. Draw diagram to describe it.

2. State Pascal’s law and give its application.
3. State the uses of Pressure Diagram.
4. Define Pressure and its S.I. Unit.

4 Marks

1. Explain the concept of pressure diagram with neat sketches and explain the use of pressure diagram.
2. A vertical tank square in plan has side width 3.5m. It contains an oil of specific gravity 0.9 to a depth of

2.4m. Calculate total pressure on bottom and on one side of tank.

3. A cylindrical water tank 10m in diameter and 15m high is filled with water.
   Find. (a) Intensity of water on bottom of tank
   (b) Total force on bottom
   (c) Total force on side

4. A circular plate of 4m diameter is immersed in water such that its greatest and least depth below the free surface of water are 5m and 3m respectively.Calculte the total pressure and centre of pressure.

5. A partition wall 2m long divides a storage tank. On one side there is turpentine of sp.gr.0.87 upto a depth of 3m.On the other side there is a oil of sp.gr. 0.8 stored to a depth of 2.4m.Determine the resultant pressure on the partition wall.

6. A square plate of sides 1.5m is held in water such that two sides are horizontal and the plate makes an angle of 60 degree with the horizontal.If upper horizontal side is at water surface.Calculate total pressure and centre of pressure.

7. A circular plate 3m in diameter immersed in water vertically 2 m below free liquid surface.Find centre of pressure and total pressure.

Unit 3 (Hydrokinematics and Hydrodynamics)

2 Marks

1. Explain Continuity Equation for liquid flow.
2. Define Pressure head and give its unit.
3. Explain Energy of flowing liquid.
4. Define Uniform flow and Non Uniform flow.
5. State Bernouli's theorem and its applications.

4 Marks

1. A pipeline carry oil of specific gravity 0.87, changes in diameter from 200mm diameter at a position A to 500mm, diameter at a position B which is 4m at a higher level. If the pressure at A and B are 9.81 N/cm^2 and 5.886 N/cm^2 resp. and the discharge is 200lit/sec, determine the loss of head and direction of flow.
2. While performing the experiment of Reynolds number , a batch of students observed actual discharge of 4.4 X 10^{-6} m^3/s from a pipe of 2.5 cm dia. The dynamic viscosity (μ) at room temperature 25° C was 0.824 X10^{-3} N-sec/m^2. Identify the flow observed and draw the sketch of it.
3. Explain Reynold's Number and its use.
4. Determine the total pressure acting on one side and bottom of tank containing water upto depth 2.0m and length 3.0m, width 3.0m.
5. Define : (a) Steady and Unsteady flow
   (b) Uniform and Non-Uniform flow
   (c) Laminar and Turbulent flow
   (d) Reynolds No. and their use
6. State the Bernoulli's theorem and write the mathematical expression for it.
7. Explain Continuity Equation for liquid flow.
8. Differentiate between Laminar flow and Turbulent flow.
9. Water is flowing upward through a vertical pipe line 15m height is gradually tapers from 200mm diameter at bottom to 100mm at top and 300KPa pressure ,2m/s velocity at bottom. Calculate the pressure at top of pipeline.if loss of head is 4.5m of water.

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