| MODEL SET QUESTION PAPER FOR PRACTICE | |
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| **Semester:4th** | **Branch: Mechanical Engineering** |
| **Subject Name: Fluid Mechanics** | |
| **Full Marks- 80** | **Time- 3 Hrs.** |
| **Answer any five Questions including Q No.1& 2**<br>**Figures in the right hand margin indicates marks** | |

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| 1. | | Answer **All** questions | 2 x 10 |
| | a. | Define Specific Gravity. What is its unit? | |
| | b. | Define the term Dynamic Viscosity. State its SI unit. | |
| | c. | What is mean by Rate of Flow or Discharge? | |
| | d. | What do you mean by Surface Tension? State the expression for Surface Tension on a water bubble. | |
| | e. | State the Bernoulli's theorem for steady flow for an incompressible fluid. | |
| | f. | Define centre of pressure. | |
| | g. | What do you mean by Bouyancy? | |
| | h. | Define Laminar and Turbulent flow. | |
| | i. | Define Venturimeter. | |
| | j. | State the Chezy's Formula for loss of head. | |
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| 2. | | Answer **Any Six** Questions | 5 x 6 |
| | a. | State and derive the Pascal's Law. | |
| | b. | Classify the Hydraulic Coefficients. State the relationship between them. | |
| | c. | Derive the discharge over a Rectangular Notch. | |
| | d. | Find the discharge of water flowing over a rectangular notch of 2m length When the constant head over the notch is 300 mm. Take Cd= 0.60. | |
| | e. | Derive the force exerted by a jet in the direction of the jet on a moving unsymmetric curved plate. Also derive the work done per second on the plate. | |
| | f. | Calculate the specific weight, specific mass, specific volume and specific Gravity of a liquid having a volume of $6m^3$ and weight of 44kN. | |
| | g. | Write working principle of Bourdon Tube Pressure Gauge. | |
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| 3 | | I. The head of water over an orifice of diameter 40mm is 10m. Find the actual discharge and actual velocity of jet at vena contracta. Take $C_C = 0.6$ and $C_d = 0.98$.<br>II. The discharge over a rectangular notch is $0.135m^3/s$ when the water level is 22.5m above the still. If the coefficient of discharge is 0.6, find the length of the notch. | 10 |
| 4 | | I. Describe Hydraulic Gradient Line and Total Energy Line.<br>II. Derive the continuity equation. | 10 |

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| 5 | | Define Metacenter and Metacentric Height. Derive the expression for Metacentric Height. | 10 |
| 6 | | Derive the pressure expression of a simple U-Tube manometer. 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 specific gravity 0.9 is flowing. The centre of the pipe is 12cm below the level of mercury in the right limb. Find the pressure of fluid in the two limbs if the difference of mercury level in the two limbs is 20cm. | 10 |
| 7 | | A jet of water of diamter 10cm strikes a flat plate normally with a velocity of 15m/s. the plate is moving with the velocity of 6m/s in the direction of the jet and away from the jet. Find:<br>I. The force exerted by the jet on the plate.<br>II. Work done by the jet on the plate per second. | 10 |