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Total No. of Pages : 02

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B.Tech.(ME) (2011 Onwards) (Sem.–4)

FLUID MECHANICS

Subject Code : BTME-403

Paper ID : [A1213]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a) Define specific volume.

b) Differentiate between dynamic and kinematic viscosity.

c) State Pascal Law.

d) What is a metacentric height?

e) What is the stability criteria of floating body?

f) Obtain Bernoulli's equation from Euler's equation.

g) What is the difference between model and prototype?

h) What are the various losses occurred in pipes?

i) What are the various flow measurement devices?

j) Define weber number.

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SECTION-B

2. Derive an expression for the determination of metacentric height analytically.

3. Derive continuity equation in cylindrical coordinates.

4. Check whether the flow defined by stream function 2xy is irrotational? Also determine the corresponding velocity potential.

5. A weir 36 metres long is divided into 12 equal bays by vertical posts, each 60cm wide. Determine the discharge over the weir if the head over the crest is 1.2m and the velocity of approach is 2m/s.

6. Discuss any three similarity model laws.

SECTION-C

7. Derive an expression for loss of head due to friction in pipes.

8. A rectangular tank 6m long, 2m wide and 2m deep contains water to a depth of lm. It is accelerated horizontally at 2.5 m/s^2 in the direction of its length. Determine :

   a) Slope of the free surface,

   b) Maximum and minimum pressure intensities at bottom,

   c) Total force due to water acting on each end of the tank. Check the difference between these forces by calculating the inertia force of the acceleration mass.

9. Derive Euler's equation of motion in Cartesian coordinates.

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