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Roll No. | | | | | | | | | | | | |  Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (2011 Onwards) (Sem.–4)

# FLUID MECHANICS AND MACHINERY

Subject Code : BTAE-403

Paper ID : [A1163]

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

**Q1 Answer briefly :**

a) Define Bulk modulus.

b) Illustrate ideal fluid.

c) What is difference between forward and reverse centrifugal pumps?

d) Write short note on pitot tube.

e) List the minor head losses in pipes.

f) Define hydrostatic paradox.

g) Brief about steady flow energy equation.

h) What is utility of accumulator?

i) 2 liter of petrol Weighs 14 n. calculate its specific volume.

j) What are dimensions of surface tension and thrust?

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## SECTION-B

Q2 What is meant by viscosity of a liquid, how does it manifest and in what units it is measured?

Q3 Explain the determination of metacentric height.

Q4 Velocity distribution at entry to pump intake is inversely proportional to square of radial distance from inlet to suction pipe. If velocity at a radial distance of 1 m from the pipe inlet is 0.75 m/s, make calculation for the acceleration of flow at 0.5 m and 1.5 m from the inlet. Consider the streamlines to be radial.

Q5 A pipe 12.5 cm in diameter is used to transport oil of relative density 0.75 under a pressure of 1 bar. If the total energy relative to datum plane 2.5 m below the center of pipe is 20 Nm/N, work out the flow rate of oil.

Q6 What is difference between solids, liquids and gases? Define pascal's law.

## SECTION-C

Q7 The resistance R experienced by a partially submerged body depends upon the velocity V, length of the body 1, viscosity of the fluid μ, density of the fluid ρ and gravitational acceleration g. Obtain a dimensionless expression for R.

Q8 Discuss about following :

a) Vapour pressure

b) Local and convective acceleration

c) Dimensional homogeneity.

Q9 What is principle of centrifugal pumps? Explain its construction.

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