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

Total No. of Questions : 09

B.Tech. (AE) (Sem.–4) (2011 Batch)

FLUID MECHANICS & 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 has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) Define ideal fluid.

b) What is capillarity?

c) Define centre of pressure.

d) What do you understand by metacentric height?

e) How are fluid flows classified?

f) Explain velocity potential.

g) What is free jet of liquid?

h) What is the use of dimensional analysis?

i) What is a mouthpiece?

j) How is the selection of pumps made?

SECTION - B

2. Derive an expression for the total pressure and centre of pressure for a vertically immersed surface.

3. Differentiate between rotational and irrotational flows.

4. Explain the kinetic energy and momentum correction factor.

5. What are repeating variables? How are these selected by dimensional analysis? Discuss.

6. A solid cylinder 2 m in diameter and 2 m high is floating in water with its axis vertical. If the specific gravity of the material of cylinder is 0.65, find its metacentric height. State whether the equilibrium is stable or unstable.

SECTION - C

7. State and prove Bernoulli's equation. Write the limitations also.

8. Describe the construction and operation of a centrifugal pump.

9. The water is coming out of an orifice of diameter 100 mm under a head of 10 m. It is collected in a circular tank of diameter 1.5 m. The rise of water level in this tank is 1.0 m in 25 seconds. Also the coordinates of a point on the jet, measured from venacontracta are 4.3 m horizontal and 0.5 m vertical. Find the hydraulic coefficients.