Roll No. | | | | | | | | | | | | |

Total No. of Pages: 02
Total No. of Questions: 09

B. Tech. (IE, ME)(Sem.-4th)

FLUID MECHANICS-I

Subject Code: ME-206
Paper ID: [A0810]

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATE:

1. ***Section-A is compulsory consisting of ten questions carrying two marks each.***
2. ***Section-B contains five questions carrying five marks each and a student has to attempt any four questions.***
3. ***Section-C contains three questions carrying ten marks each and student has to attempt any two questions.***

SECTION–A

(10x2=20)

Q1. Write briefly:

a) State Pascal's law with some examples.

b) What is the advantage of Cippoletti weir?

c) Differentiate between kinematic similarity and dynamic similarity.

d) Write equation of continuity of a liquid flow.

e) What is laminar and turbulent flow.

f) Write any two used of flow net.

g) Define meta centre height.

h) What are the dimensions of force and viscosity?

i) Classify turbulent motion.

j) State the assumptions made in derivation of Bernoulli theorem.

SECTION-B

(4x5=20)

Q2. Distinguish between internal mouthpiece and internal mouthpiece?

Q3. Derive Darcy's Equation for the determination of loss of head due to friction in pipeline.

Q4. Define the terms: gauge pressure, meta-centric height and centre of buoyancy.

Q5. A flat circular plate, 1.25 diameter is immersed in water such that its greatest and; east depths are 1.50m and 0.60m respectively. Determine: (i) The force exterted on one face by water pressure, (ii) the position of the centre of pressure.

Q6. An orifice of diameter 100mm is fitted at the bottom of a boiler drum of length 5m and of diameter 2m. The drum is horizontal and half full of water. Find the time required to empty the boiler, given the value of $C_{d=0.6.}$

SECTION-C

(2x10=20)

Q7. Explain the Rayleigh's method for dimensional analysis.

Q8. Derive the continuity equation for incompressible flow in polar coordinates.

Q9. (i) What do you understand by major and major energy losses in pipes? Derive an expression for loss of heat due to obstruction in the pipe?

(ii) What is an equivalent pipe? Derive an expression for equivalent size of the pipe?

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