Printed Pages: 3 ECE509

(Following Paper ID and Roll No. to be filled in your Answer Book)	
PAPER ID: 2124	Roll No.

B. Tech. (SEMESTER-V) THEORY EXAMINATION, 2012-13 FLUID MECHANICS

Time: 2 Hours] [Total Marks: 50

Note: This question paper contains **three** sections, Section – A, Section – B and Section – C with weightage of 10, 15 and 25 marks respectively. Follow the instructions as given in each Section.

Section - A

- 1. This question contains five parts of two marks each. Attempt all parts of this question. $2 \times 5 = 10$
 - (a) Define the term specific weight and specific gravity.
 - (b) Write a small note on equation of motion for fluid flow.
 - (c) What is Stokes law?
 - (d) Differentiate between Reynold's number and Froude's number.
 - (e) Give two major differences between pipe flow and open channel flow.

Section - B

- 2. This question contains five parts of five marks each. Attempt any three parts. $5 \times 3 = 15$
 - (a) Briefly describe the conditions of equilibrium of a floating body and submerged body.
 - (b) A 30 cm diameter pipe carries water under a head of 15 m with a velocity of 4 m/s if the axis of the pipe turns through 45°, find the magnitude and direction of the resultant force at the bend.

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6. (cAttentificany concerpant of the ingline wing theorem. Write conditions when Buckingham-π theorem is applied.

(a) Write short notes on following:

- (d) A laminar flow is taking place in a pipe of diameter 200 mm. The maximum v(i)cityTotalsdrag on a body mean velocity and the radius at which this occurs.
- (e) E(iii)nerResilltahtsforceignigæbody. Explain any two losses in pipe flow system.
 - (iii) Coefficient of drag and lift
- (b) Explain different types of hydraulic similarities that must exist between a This seprototype and its modelions of five marks each. All questions are compulsory.

 $5 \times 5 = 25$

- 37. Attempt any one part of the following:
 - (a) Briefly explain the following terms:

 A siphon of diameter 200 mm connects two reservoirs having a difference in (ielevation) of classification to the siphon is 600 m and the summit is 4 m (ia) bove the water level in the upper reservoir. If the separation takes place at 2.8 m of water absolute, find the maximum length of siphon from upper reservoir to the (iii) Local acceleration summit. Take f = 0.004 and atmospheric pressure = 10.3 m of water.
 - (b) A wooden block of width 2 m, depth 1.5 m and length 4 m floats horizontally in Explain the principle of water hammer in pipes. Derive the expression for water water, find the volume of water displaced if the specific gravity of wooden block is hammer in case of sudden closure of valve and pipe being rigid.
- 4. Attempt any one part of the following:
 - (a) What is the Euler's equation of motion? How will you obtain Bernoulli equation from Euler's equation?
 - (b) Derive the expression for discharge through a triangular notch.
- 5. Attempt any **one** part of the following:
 - (a) Explain the velocity profile of laminar flow between two parallel stationary plates.
 - (b) Explain Eddy viscosity, mixing length concept and velocity distribution in turbulent flow.

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