(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 × 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 × 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.

6. (c) Attempt any **one** part of the following :

(a) State and explain Buckingham-π theorem. Write conditions when Buckingham-π theorem is applied.

(d) A laminar flow is taking place in a pipe of diameter 200 mm. The maximum velocity is 1.5 m/sec. Find the mean velocity and the radius at which this occurs.

(e) Explain any two losses in pipe flow system.

(b) Explain different types of hydraulic similarities that must exist between a prototype and its model.

Section – C

This section contains questions of **five** marks each. **All** questions are compulsory.

5 × 5 = 25

7. Attempt any **one** part of the following :

(a) Briefly explain the following terms :

(i) Total acceleration

(ii) Convective acceleration

(iii) Local acceleration

(b) A wooden block of width 2 m, depth 1.5 m and length 4 m floats horizontally in water. Find the volume of water displaced if the specific gravity of wooden block is 0.70.

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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.