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

PAPER ID : 1261 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. III) ODD SEMESTER THEORY EXAMINATION 2013-14

FLUID MECHANICS

Time : 3 Hours *Total Marks : 100*

Note :–Attempt **all** questions.

SECTION–A

1. Attempt all parts : (10×2=20)

   (a) Differentiate between Newtonian and Non-Newtonian fluids.

   (b) State the Pascal's law giving some example where this principle is applied.

   (c) What is the difference between compressible and incompressible flow ?

   (d) Define steady and unsteady flow giving examples.

   (e) State the momentum equation and some of its engineering applications.

   (f) What is the importance of dimensional analysis ?

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(g) State and mention the significance of kinetic energy correction factor.

(h) Define turbulent flow and mention its types.

(i) What is CFD and state its applications.

(j) Define drag and lift.

SECTION–B

2. Attempt any **three** parts of the following : (3×10=30)

(a) What is meant by viscosity of a liquid, how does it manifest and in what units is it measured ? Does the viscosity of liquids and gases increase or decrease with temperature growth ? Suggest reasons for the behavior if any.

(b) Explain the term total pressure acting on a plane surface immersed in a fluid at an angle. Obtain an expression for this, and also for the corresponding depth of the center of pressure.

(c) Define the stream function and clearly bring out its physical significance. Enumerate some of the salient features of the stream function.

(d) A fireman holds a water hose ending into a nozzle that issues a 20 mm diameter jet of water. If the pressure of water in the 60 mm diameter hose is 700 kPa, find the force experienced by the fireman.

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from first principles, make calculations for the drag force exerted by fluid on metallic ball, pressure drag and skin friction drag and the terminal velocity of ball in fluid.

(c) Discuss the following applications of CFD :

(i) Automobile and Engine

(ii) Industrial Manufacturing

(iii) Environmental Engineering.