AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD

DEPARTMENT OF MECHANICAL ENGINEERING

SESSIONAL TEST- II

Course : B.Tech	Semester : III
Session: 2017-18	Section: ME-1,2,3 & CE-1,2
Subject: Fluid Mechanics	Subject Code : RCE-303
Max. Marks : 50	Time : 2 hrs.

Note: Attempt all the sections.

Section – A

Attempt all the questions. **5×2 =10**

1. Water flows at a velocity of 1.417 m/s a differential gauge which contains a liquid of specific gravity 1.25 is attached to a pitot static tube. What is the deflection of the gauge fluid. Assume the coefficient of tube as 1.
2. Differentiate among streak line, path line, stream line and flow net.
3. What do you understand by term circulation and vorticity?
4. Explain the impulse-momentum equation and the also explain the conservation of momentum.
5. Derive the expression for discharge over rectangular weir.

Section – B

Attempt all the questions. **5×5 =25**

6. In a 2D incompressible flow the fluid velocity components are given by:

   u = x-4y and v = -y-4x. Show that velocity potential exists and find its form as well as stream function.
7. A pipe diameter changes from 0.50 m to 1.0 m in length of 1 m giving a pipe diffuser or transition. If a discharge Q flows from the 0.50 m diameter section towards 1.0 m diameter section, obtain a general expression for velocity.

8. Two similar pipes of the same diameter of lengths L_1 and L_2 are placed in parallel. Calculate the equivalent length of single pipe of same diameter. What should be the equivalent length if the two pipes are equal in length?

9. A stream function is given by

$\Psi = 3x^2y + (3+t)\, y^2$. Find the flow rate across the faces of triangular prism at t =5 sec if prism thickness is 3 m in z direction.

10. Derive Euler's equation of motion along a stream line for an ideal fluid stating clearly the assumptions.

Section – C

Attempt all the questions. **2×7.5 =15**

11. Find the discharge of water flowing a pipe 200 mm diameter placed in an inclined position where a venturimeter is inserted, having throat diameter of 100 mm. The difference of pressure between the main and throat is measured by liquid of specific gravity 0.75 in an inverted U-tube which gives a reading of 300 mm. The loss of head between the main and throat is 0.3 times the kinetic head of the pipe.

12. Water is flowing through a pipe of diameter 300 mm with a rate of flow as 250 litre per second. If the pipe is bent by 135° find the magnitude and the direction of the resultant force on the bend. The pressure of water flowing in the pipe is 400kPa.

******End*****