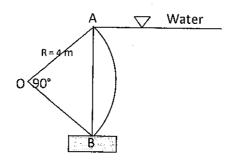JAYPEE UNIVERSITY OF INFORMATRION TECHNOLOGY, WAKNAGHAT
TEST 3 Examination Dec- 2017

B. Tech III Semester

COURSE CODE: **10B11CE312**   MAX. MARKS: 35
COURSE NAME: **Fluid Mechanics**
COURSE CREDITS: 04   MAX. TIME: 2 HRS

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. Answer the following in brief.

(a) Define centre of pressure and total pressure for a vertical plane.   [1]
(b) Define Reynolds Number.   [1]
(c) Define the term venacontracta in orificemeter.   [1]
(d) Drag and Lift force.   [1]
(e) Prove that equipotential line and stream line are mutually orthogonal.   [2]

Q2. A cylinder 0.1 m diameter rotates in an annular sleeve 0.102 m internal diameter at 100 rpm. The cylinder is 0.2 m long. If the viscosity of the lubricant between the two cylinders is 1.0 poise, find the torque needed to drive the cylinder against viscous resistance.   [3]

Q3. What is a Pitot tube? How will you determine the velocity at any point with the help of Pitot tube?   [3]

Q4. Define the terms: notch, weir, nappe and crest with sketch. Derive the expression for the discharge over a rectangular weir.   [4]

Q5. A 300 mm diameter pipe carries water under a head of 20 m with a velocity of 3.5 m/s. If the axis of the pipe turns through 45 degree, find the magnitude and direction of the resultant force at the bend.   [5]

Q6. A main pipe divides into two parallel pipes which again forms one pipe. The length and diameter of pipes are 2000m, 1.0 m and 2000m and 0.8m respectively. Find the rate of flow in each parallel pipe if total flow is 3 cumec. Value of f = 0.005.   [5]

Q7. Find the expression for the drag force F on smooth sphere of diameter D, moving with a uniform velocity V in a fluid of density ρ and dynamic viscosity μ.   [5]

Q8. Find the horizontal and vertical component of water pressure on the face of a tainter gate of 90° sector of radius 4 m as shown in figure. Width of tainter gate is 2 m.   [4]