

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS-2022

B.Tech-V1 Semester (Civil Engineering)

COURSE CODE: 18B1WCE639

MAX. MARKS: 15

COURSE NAME: Open Channel flow and Hydraulic Machines

COURSE CREDITS: 3

MAX. TIME: 1 Hour

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Marks are indicated against each question in brackets.

- Q.1) Find the discharge and velocity through a pipe of diameter 30 cm placed in an inclined position where a venturi meter is inserted having throat diameter 15 cm. The difference of pressure between the main and throat is measured by a liquid of specific gravity .6 in an inverted U- tube which gives a reading of 30 cm. The loss of head between the main pipe and throat is .2 times the kinetic head of the pipe. Draw Hydraulic Energy Line for this state of flow. **(3.5 Marks)**
- Q.2) Derive the expression of Euler equation and Bernoulli's Equation for a fluid. **(2 Marks)**
- Q.3) Explain to following in brief (Write bullet points):
- a). What are the forces responsible for motion of fluid? Which of the forces are considered to be equal to zero while deriving Euler Equation? **(1 Mark)**
 - b). What is the difference between local acceleration and convective acceleration? **(.5 Mark)**
 - c). Can two Streamlines cross each other? What is the difference between streak line and a path line? **(1 Mark)**
 - d). What is the significance of upper critical Reynolds number and Lower Critical Reynolds number? **(.5 Mark)**
- Q.4) A fluid is flowing with a velocity u between two parallel stationary plates. Derive an expression for the following:
- a). Velocity Distribution (Also plot the variation along the cross section) **(1.5 Marks)**
 - b). Shear Stress (Also plot the variation along the cross section) **(1 Mark)**
 - c). Ratio of Maximum velocity to average velocity **(1.5 Marks)**
 - d). Distance from the center where velocity is equal to average velocity? **(1 Mark)**
 - e). Write the equation of motion for the fluid flowing with a velocity u , when both plates start moving in opposite direction (W.r.t each other) having an equal velocity of V ? Also mention the boundary conditions for this state of flow. **(1.5 Marks)**