

JK Lakshmipat University, Jaipur
Institute of Engineering and Technology
End Term Examination

B.Tech.[2ndYear]/[III Semester]/[Academic Year 2013-14]

Course Name: Fluid Mechanics and Applications

Course Code: CE 302

Instructions:

1. This paper contains three sections. Attempt all sections.
2. Read the instructions carefully before attempting each section.



Max Marks: 40

Time: 03.00 hr

Section A

(10 Marks)

Attempt all parts from section A. Part (a) of 5 marks ,each of 1 mark and part (b) of 5 marks, each of 2.5 marks.

Q.1 (a) (I) Surface Tension is expressed in

- | | |
|-------------|------------|
| i N/m | ii N/m^2 |
| iii N^2/m | iv N/m^3 |

(II) Pressure measured above the absolute zero of pressure is termed as

- | | |
|------------------------|-------------------|
| i Atmospheric pressure | ii Gauge pressure |
| iii Either of above | iv None of these |

(III) Point of application of total pressure on the surface is

(IV) Define Hydraulic Radius ?

(V) The Pelton wheel or Pelton turbine is turbine as energy available at inlet is only Kinetic energy .

Q.1 (b) (I) Define Impulse momentum equation (IME) . Find out the relation between force and velocity in IME

(II) What are the displacement pumps? Describe with diagram.

Section B

(20 Marks)

Attempt any four out of five questions. Each question carries equal marks.

Q.2 Find out the total pressure exerted on vertically immersed surface?

P.T.O.

- Q.3 How we can describe the geometry of fluid motion?
- Q.4 Derive the equation for discharge through open channel?
- Q.5 If a fluid is flowing through a pipe and pipe is bend by a certain angle than find out the force exerted by the flowing fluid on a Pipe bend ?
- Q.6 A pitot tube is inserted in a pipe of 300 mm diameter. The static pressure in the pipe is 100 mm of Hg (Vacuum). The stagnation pressure at the centre of pipe recorded by pitot tube is 0.981 N/cm^2 . Calculate the rate of flow of water through the pipe, if the mean velocity of flow is 0.85 times the central velocity. (Take $C_v = 0.98$)

Section C**(10 Marks)**

Q.7 If a viscous fluid is flowing through a circular horizontal pipe than derive the relation for loss of pressure head in a fluid element of length Δx .

OR

Define minor energy losses. Find out the energy loss due to sudden contraction and loss of head due to sudden enlargement in a pipe ?

(7 Marks)

Q.8A nozzle is situated at a distance 1.2 m above the ground level and is inclined at 60° to the horizontal. The diameter of nozzle is 40 mm and jet of water from nozzle strikes the ground at a horizontal distance of 5m . Find the flow rate?

(3 Marks)