

Code: CE4T4

**II B.Tech - II Semester – Regular Examinations – May 2016**

**HYDRAULICS AND HYDRAULIC MACHINERY  
(CIVIL ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

**PART – A**

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1)

- a) Define the terms critical, sub critical and super critical flows.
- b) Define Hydraulic Mean depth.
- c) Define Reynolds number.
- d) Determine the dimensions for Kinetic Viscosity.
- e) Explain the term Impact of Jet.
- f) What is the purpose of velocity triangles?
- g) What is the difference between impulse turbine and reaction turbine?
- h) What is draft tube?
- i) What are the types of pumps?
- j) What is meant by Priming of a pump?
- k) Define hydraulic jump.

## PART – B

Answer any **THREE** questions. All questions carry equal marks.

3 x 16 = 48 M

2)

a) State and Explain Chezy's and Manning's Formulae for open channel flows. What is momentum energy correction factor? 8 M

b) What different types of flows in open channels? And what are different types of open channels? 8 M

3)

a) Discuss briefly various model laws. 8 M

b) Define dimensionless number. What are the types of dimensionless number & Explain? 8 M

4)

a) A jet of water strikes with a velocity of 50 m/sec a flat fixed plate inclined at 30 degrees with the axis of the jet. The cross sectional area of the plate is 100 cm<sup>2</sup>. Find the force exerted by the jet on the plate and the ratio in which the jet gets divided after striking. 8 M

b) Derive the equation for the impact of jet striking a curved plate at the centre when the plate is stationary. 8 M

5)

a) Explain the working of a Pelton wheel with neat sketches.

8 M

b) A Francis turbine works under a head of 8.5 m at a speed of 300 rpm. A power of 100 kW is developed with a discharge of 3 m<sup>3</sup>/sec, the runner diameter is 2.2 m. Find the speed, discharge and power if the head is increased to 18m. 8 M

6)

a) What is a centrifugal pump? How are the centrifugal pumps classified? 8 M

b) A fluid is to be lifted against a head of 120m. The pumps that run at a speed of 1200 rpm with rated capacity of 300 litres per second are available. How many pumps are required to pump the water if specific speed is 700. 8 M