R09

Code: 9A01308

B.Tech II Year I Semester (R09) Supplementary Examinations June 2016
FLUID MECHANICS & HYDRAULIC MACHINERY
(Electrical & Electronics Engineering)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1   (a)   Explain Newtonian and Non-Newtonian fluids, vapour pressure, and compressibility.
    (b)   A piston 796 mm diameter and 200 mm long works in a cylinder of 800 mm diameter. If the annual space is filled with lubrication oil of viscosity 5 cp (centi-poise), calculate the speed of descent of the piston in vertical position. The weight of the piston and axial load are 9.81 N.

2   (a)   What is the significance of Bernoulli's theorem? What are its limitations and practical applications?
    (b)   A pipe 300 m. long has a slope of 1 in 100 and tapers from 1.2 m diameter at the high end to 0.6 m diameter at the low end. The rate of flow of water through the pipe is 0.10 m^3/sec. If the pressure at the high end is 73.575 kPa, find the pressure at the low end. Neglect losses.

3   (a)   What do you mean by "Equivalent pipe" and "Flow through parallel pipes"?
    (b)   Two pipes of lengths 2500 m each and diameters 80 cm and 60 cm respectively, are connected in parallel. The co-efficient of friction for each pipe is 0.006. The total flow is equal to 250 liters/s. Find the rate of flow in each pipe.

4   A jet of water having a velocity of 15 m/sec strikes a curved vane which is moving with a velocity of 5 m/sec. The vane is symmetrical and it is so shaped that the jet is deflected through 120^0. Find the angle of the jet at inlet of the vane so that there is no shock. What is the absolute velocity of the jet at outlet in magnitude and direction and the work done per second per kg of water? Assume the vane to be smooth.

5   (a)   Enumerate principal components of a hydroelectric scheme along with their locations and purposes.
    (b)   Explain in detail, how do you assess the water potential of a hydroelectric scheme.

6   (a)   Write a detailed note on different efficiencies of a turbine.
    (b)   Explain in detail, how you find the efficiency of draft tube.

7   (a)   What are the conditions for the kinematic similarity to exist between model and prototype?
    (b)   How do you compare the performance of a turbine under different working conditions?

8   (a)   Discuss the concept of multistage pumps in detail.
    (b)   A centrifugal pump has three stages discharging 120 lit/s, working against a head of 45 m, running at 1400 rpm. Calculate the specific speed of the pump.

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