

Code: 9A01308

B.Tech II Year I Semester (R09) Supplementary Examinations December 2015

FLUID MECHANICS & HYDRAULIC MACHINERY

(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions

All questions carry equal marks

- 1 (a) What is meant by vapour pressure? Explain its importance in liquid flow systems.
(b) A mist droplet is of 0.06 mm diameter. The atmospheric pressure is 101.04 KPa and the surface tension of water is 0.0736 N/m. Estimate the absolute pressure within the droplet.
- 2 (a) Integrate three-dimensional Euler's equations for steady flow condition and prove that each one of them yields Bernoulli's equation.
(b) A pipe of diameter 200 mm. conveys a discharge of 2250 lit of water per minute and has a pressure of 15.70 kPa at a certain section. Find the total energy head with respect to a datum of 5 m. below the pipe.
- 3 (a) Explain surface and body forces in detail.
(b) Two sharp ended pipes of diameters 60 mm and 100 mm respectively, each of length 150 m are connected in parallel between two reservoirs which have a difference of level of 15 m. If coefficient of friction for each pipe is 0.08, calculate the rate of flow for each pipe and also the diameter of a single pipe 150 m long which would give the same discharge if it were substituted for the original two pipes.
- 4 A jet of water of diameter 50 mm having a velocity of 20 m/sec strikes a curved vane which is moving with a velocity of 10 m/sec in the direction of the jet. The jet leaves the vane at an angle of 60° to the direction of motion of the vane at outlet. Determine:
(a) The force exerted by the jet on the vane in the direction of motion.
(b) Work done per second by the jet.
- 5 (a) Distinguish between run-of- river plants and storage plants.
(b) Write detailed notes on the selection of suitable type of turbine for a hydroelectric scheme.
- 6 Explain the principle and working of Pelton wheel with a neat sketch.
- 7 (a) What are the requirements of a good turbine governor? Explain with a sketch the governing mechanism of a reaction turbine.
(b) A 1:4 reduced scale model of a hydraulic turbine is tested under a head of 2 m. It develops a power of 4.4 kW and runs at 500 rpm. What is the power generated by the prototype when it works under a head of 10 m?
- 8 (a) Discuss in general the important operating characteristics of an axial flow pump.
(b) Define and derive an expression for the specific speed of a pump. How does specific speed help in pump selection?
