

B.Tech 5th Semester F-Scheme (ME)

Examination, December-2017

FLUID MACHINE

Paper-ME-305-F

Time allowed : 3 hours *[Maximum marks : 100]*

Note: Attempt five questions. Question number one is compulsory and attempt at least one question from each section.

1. Write short notes on following: 4×5
- (a) Governing of impulse turbines.
 - (b) Draft tube-its function.
 - (c) Model analysis.
 - (d) Hydraulic Lift.

Section-A

2. Find force exerted by Jet on a stationary inclined Flat Plate with mathematical derivation and sketch. 20
3. The penstock supplies water from a reservoir to the Pelton Wheel with a gross head of 500m. One third of the gross head is lost in friction in the Penstock. The rate of flow of water through the Nozzle fitted at the end of the Penstock is $2\text{m}^3/\text{s}$. The angle of deflection of the Jet is 165° . Determine the power given by the water to the runner and also hydraulic efficiency of the Pelton Wheel. Take Speed Ratio = 0.45 and $C_v = 1.0$. 20

Section-B

4. Explain the construction and operation of a Kaplan turbine and discuss the governing mechanism used in the Kaplan turbine with sketch. 20
5. An Inward flow reaction turbine has external and internal diameter as 1.0 m and 0.6 m resp. The hydraulic efficiency of the turbine is 90%. When the head on the turbine is 36 m, the velocity of flow at outlet is 2.5m/s and discharge at outlet is radial. If the vane angle at outlet is 150 and width of the wheel is 100 mm at inlet. Determine
 - (i) The guide blade angle
 - (ii) Speed of Turbine
 - (iii) Vane angle of the runner at Inlet
 - (iv) Volume flow rate
 - (v) Power developed

Section-C

6. Explain the Rayleigh's method and Buckingham's theorem. 20
7. Discuss the classification of Centrifugal Pump. Also discuss the performance characteristics of centrifugal pump. 20

Section-D

8. Write short notes on gear pump, vane pump and air vessels and their utility along with its application. 20
9. Explain in detail construction and working of hydraulic accumulator and hydraulic intensifier with neat sketch. 20