



(REVISION — 2015)

Signature

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019

HYDRAULIC MACHINES

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Write the principle of impact of Jet.
2. Define Hydraulic Machine.
3. Write the function of a Governor.
4. Write the classifications of reaction turbines.
5. Differentiate turbine and pump.

(5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Derive an equation of Jet impinging on a stationary curved vane.
2. Water is flowing through a pipe at the end of which a nozzle is fitted.
The diameter of the nozzle is 100 mm and head of water at the centre of nozzle is 100m. Find the force exerted by the jet of water on a fixed vertical plate.
The coefficient of velocity is given as 0.95
3. Briefly explain about the main components of pelton wheel turbine.
4. Compare impulse turbine and reaction turbine.
5. Explain the working of double acting reciprocating pump.
6. Explain the working of Jet pump.
7. Explain the working Principle of Kaplan Turbine with sketch.

(5×6 = 30)

PART — C

Marks

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

- III (a) Derive an equation for work done for a curved plate when the plate is moving in the direction of the jet. 8
- (b) Explain the propulsion of ships by water jets. 7

OR

- IV (a) Derive an equation for force exerted by a jet of water on a series of vanes. 8
- (b) A jet of water of dia. 7.5 cm strikes a curved plate at its centre with a velocity of 20 m/s. The curved plate is moving with a velocity of 8 m/s in the direction of the jet. The jet is deflected through an angle of 165 degree. Assuming the plate is smooth, find (i) the force exerted on the plate in the direction of jet, (ii) Power of the jet, (iii) efficiency of the jet. 7

UNIT — II

- V (a) Explain governing of pelton wheel. 8
- (b) A pelton wheel develops 2000 KW under a head of 100 metres and with an overall efficiency of 85 %. Find the diameter of the nozzle, if the coefficient of velocity of nozzle is 0.98. 7

OR

- VI (a) Define water power, brake power, shaft power and overall efficiency of turbine. 8
- (b) A pelton wheel is supplied water under a head of 200 m through 100 mm diameter pipe. If the quantity of water applied is 1.25 cubic metre per second. Find number of jets. Assume coefficient of velocity is 0.97. 7

UNIT — III

- VII (a) Explain different types of draft tubes. 8
- (b) Explain the working of radial flow reaction turbine with neat sketch. 7

OR

- VIII (a) Draw a neat sketch of Francis turbine and explain its working. 8
- (b) A turbine is to operate under a head of 25m at 200 RPM. The discharge is 9 M cube per second. If the overall efficiency is 90 %, determine (i) power generated (ii) specific speed of the turbine (iii) type of turbine. 7

UNIT — IV

- IX (a) Sketch and explain piping system of centrifugal pumps. 8
- (b) A centrifugal pump is required to lift 0.05 M cube per second of water from a well with a depth of 40 m. If rating of the pump motor is 32 kilowatt, find the overall efficiency of the pump. 7

OR

- X (a) Explain the terms Priming and Cavitation in centrifugal pump. 8
- (b) Sketch an airlift pump and explain its working. 7