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B.Tech. (Sem. - 6th)
FLUID MACHINERY
SUBJECT CODE : ME - 306
Paper ID : [A0821]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 × 2 = 20)

- a) What is an impulse turbine?
- b) Why is a notch cut off from the bottom portion of the bucket in case of pelton turbine?
- c) What is the function of a draft tube?
- d) What is priming and why it is necessary?
- e) What is meant by degree of reaction?
- f) What is a submersible pump?
- g) What is a fluid coupling?
- h) Define Thoma's cavitation parameter.
- i) What are the factors which influence the speed of reciprocating pump?
- j) What is meant by speed ratio of a pelton wheel?

Section - B

(4 × 5 = 20)

- Q2) Derive an expression for the specific speed of a turbine.
- Q3) Find the force exerted by a jet of water of diameter 100mm on a stationary flat plate, when the jet strikes the plate normally with a velocity of 30 m/s.
- Q4) What is cavitation? How it can be avoided in a reaction turbine? Discuss.
- Q5) A single acting reciprocating pump running at 50 rpm, delivers 0.01 m³/s of water. The diameter of the piston is 200mm and stroke length is 400mm. Determine :
- (a) The theoretical discharge of the pump.
 - (b) Coefficient of discharge.
 - (c) Slip and the percentage slip of the pump.
- Q6) What are factors which limit the suction head and what is the maximum value of height adopted in practice? Explain.

Section - C

(2 × 10 = 20)

- Q7) A pelton wheel is supplied with water under a head of 45m and at a rate of 48m³/min. The buckets deflect the jet through 165° and the mean bucket speed is 14m/s. Calculate the power delivered to shaft and overall efficiency of the machine. Assume coefficient of velocity 0.985 and mechanical efficiency 0.95.

Q8) The internal and external diameters of the impeller of a centrifugal pump are 200mm and 400mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20° and 30° respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water.

Q9) Write notes on :

- (a) Torque converter.
- (b) Surge tanks.

