

Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (ME) (Sem.-6)

FLUID MACHINERY

Subject Code : ME-306

Paper ID : [A0821]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Write briefly :**

- a. Explain the use of draft tube.
- b. Why jet pumps obsoleted?
- c. What is the Function spear in Pelton turbine?
- d. What are positive displacement pumps?
- e. Define impulse momentum equation.
- f. What is Cavitation, list down cavitation susceptible areas in turbines and pumps?
- g. Differentiate between fluid coupling and Torque converter.
- h. Define specific speed of a turbine.
- i. Define Net Positive Suction Head (NPSH) and write its expression.
- j. What is the need of Priming of a centrifugal pump?

SECTION-B

2. Derive Euler's equation for energy conversion through hydrodynamic rotor.
3. What is the function of Draft tube, derive an expression for efficiency of draft tube.
4. A Pelton wheel is to be designed for the following specifications : Power (BP) 9560 kW, Head = 350 m, speed = 750 *r.p.m.*, overall efficiency = 85%, jet diameter not to exceed 1/6th of wheel diameter. Determine :
 - a. wheel diameter,
 - b. diameter of jet,
 - c. number of jets required.
5. Discuss the factors for selection of turbines in a hydropower plant. What are various losses in such plants?
6. Derive an expression for the head lost due to friction in delivery pipe of a reciprocating pump with and without air vessel in a double acting pump.

SECTION-C

7. Write notes on the following :
 - a. Thoma Cavitation Number and its significance.
 - b. Performance characteristics of centrifugal pumps and Francis turbines.
8. A Kaplan turbine is to be designed for developing 9100 kW. The net head available is 5.6. The speed ratio is 2.09 and flow ratio is 0.68. The overall η is 86% and Boss diameter is 1/3 of runner diameter. Find diameter of runner, speed and specific speed of turbine.
9. What is negative slip in Reciprocating pump? Explain with sketches the function of an air vessel in a reciprocating pump.