Exam. Code: 0941
Sub. Code: 7057

1079

B. Engg. (Mechanical Engg.)

5th Semester

MEC-506: Fluid Machinery

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt* ***five*** *questions in all, including Q. No. 1 which is compulsory and selecting atleast* ***two*** *questions from each Unit-I & II.*

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I. (a) Force exerted by jet of water on a moving inclined plate, in the direction of the motion of the plate is given by.....

(b) What is difference between axial flow and mixed flow turbine?

(c) What is use of splitter in Pelton wheel turbine?

(d) What are constant efficiency curves?

(e) Degree of reaction for Pelton turbine is.....

(f) What are different types of casing in Centrifugal pump?

(g) What is Weber's number?

(h) What is Slip & Negative Slip of Reciprocating pump?

(i) What are different types of draft tubes?

(j) What is D'Aubuisson efficiency? (10×1)

UNIT-I

II. A Jet of water having a velocity of 15 m/s, strikes a curved vane which is moving with a velocity of 6 m/s in the same direction as that of the jet at inlet. The vane is so shaped that the jet is deflected through 135°. The diameter of the jet is 150 mm. Find (1) the force exerted by the jet on the vane in the direction of motion, (2) power of the vane, and (3) efficiency of the vane. Assume the vane to be smooth. (10)

III. (a) Determine the power given by the Jet of water to the runner of a Pelton wheel which is having tangential velocity as 20 m/s. The net head on the turbine is 50 m and discharge through the jet of water is $0.03 m^3/s$. The side clearance angle is 15° and take Cv= 0.975.

(b) What do you understand by design of Pelton wheel? (7+3)

IV. (a) What is Governing of the turbine. Explain with a neat sketch the working of an oil pressure governor.

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(b) A Kaplan turbine runner develops 24647.6 Kw power at an average head of 39 meters. Assuming a speed ratio of 2, flow ratio of 0.6, overall efficiency of 90 % and diameter of the boss equal to 0.35 times the diameter of the runner. Find the diameter of the runner, its speed and specific speed of the turbine. (4+6)

UNIT-II

V. (a) Derive an expression for the minimum speed for starting a centrifugal pump.

(b) A Centrifugal pump is to discharge 0.12 m^3 at a speed of 1400 r.p.m. against a head of 30 m. The diameter and width of the impeller at outlet are 25 cm and 5 cm respectively. If the manometric efficiency is 75 %, determine the vane angle at outlet. (5+5)

VI. What is an air vessel? What are it's functions. Calculate the amount of work saved, against friction in the delivery pipe of single acting reciprocating pump, by fitting an air vessel. (10)

VII. (a) The variables controlling the motion of a floating vessel through water are the drag force F, the speed V, the length L, the density p, dynamic viscosity u and acceleration due to gravity g. Derive an expression for F by dimensional analysis.

(b) Explain with a neat sketch, the working of air lift pump. Mention its advantages. (6+4)

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