

Exam.Code:0941

Sub. Code: 6726

2063

B.E. (Mechanical Engineering)

Fifth Semester

MEC-506: Fluid Machinery

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1. (a) What is velocity of whirl and velocity of flow.
- (b) What is Guide blade angle.
- (c) What is Cordier Diagram.
- (d) What are different types of Draft tubes
- (f) What is Thomas cavitation factor.
- (g) What are differences between Centrifugal pump & Reciprocating pump.
- (h) Explain Sound power and Sound pressure.
- (i) What is Slip and negative slip of Reciprocating pump.
- (j) What are differences between fluid coupling and Torque converter. (1\*10= 10)

**PART-A**

2. A jet of water having a velocity of 30 m/s, strikes a series of radial curved vanes mounted on a wheel which is rotating at 300 r.p.m. The jet makes an angle of  $30^\circ$  with the tangent to wheel at inlet and leaves the wheel with a velocity of 4 m/s at an angle of  $120^\circ$  to the tangent to the wheel at outlet. Water is flowing from outward in a radial direction. The outer and inner radii of the wheel are 0.6 m and 0.3 m respectively. Determine: (i) vane angles at inlet & outlet, (ii) work done per second per kg of water, and (iii) efficiency of the wheel. (10)

3. (a) A Kaplan turbine runner is to be designed to develop 9100 Kw. The net available head is 5.6 m. If the speed ratio = 2.09, flow ratio = 0.68, overall efficiency = 86 % and diameter of the boss is one-third the diameter of the runner. Find the diameter of the runner, its speed and specific speed of the turbine. (6)

(b) What do you understand by Governing of turbine. Draw Neat Sketch. (4)

P.T.O.

(2)

4. (a) Write a short note on Pump Noise, Compressor and Turbine noise (5)
- (b) What do you understand by indoor propagation and outdoor propagation in relation to turbomachinery noise. (5)

**PART-B**

5. (a) A Centrifugal pump is running at 1000 r.p.m. The outlet vane angle of the impeller is  $30^\circ$  and velocity of flow at outlet is 3 m/s. The pump is working against a total head of 30 m and the discharge through the pump is  $0.3 \text{ m}^3/\text{s}$ . If the manometric efficiency of the pump is 75 %. Determine (i) diameter of the impeller, (ii) width of the impeller at outlet. (5)
- (b) What are Repeating variables. What is the method to select repeating variables in Buckingham's  $\Pi$ - theorem (5)
6. What is an Air vessel? Show that the work saved, against friction in the delivery pipe of a single-acting reciprocating pump by fitting an air vessel is 84.8%. (10)
7. (a) Explain the construction & working of Hydraulic Ram. (5)
- (b) Draw Characteristic curves of Pelton turbine (5)

x-x-x