2123
B. E. (Mechanical Engineering)
Fifth Semester
MEC-506: Fluid Machinery

Time allowed: 3 Hours   **Max. Marks: 50**

NOTE: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Part. Assume any missing data.

x-x-x

1. (a) What is Guide blade angle.

   (b) What is Specific speed of turbine.

   (c) What is Performance estimation in case of Turbo-machinery.

   (d) What is degree of reaction.

   (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 Ideal Indicator diagram in case of Reciprocating pump.

   (j) What are differences between Gear pump and Piston pump.   (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° with the tangent to wheel at inlet and leaves the wheel with a velocity of 4 m/s at an angle of 120° 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 propeller reaction turbine of runner diameter 4.5 m is running at 40 r.p.m. The guide blade angle at inlet is 145° and the runner blade angle at outlet is 25° to the direction of vane. The axial flow area of water through runner is 25 m^2. If the runner blade angle at inlet is radial. Determine: (i) Hydraulic efficiency of the turbine (ii) Discharge through turbine (iii) Power developed by the runner, and (iv) Specific speed of the turbine.   (10)

4. (a) Write a short note on

   (i) Compressor and Turbine noise   (2.5)

   (ii) Machine selection from vendor data   (2.5)

   (b) Explain Governing of impulse turbine with a neat sketch.   (5)

PART - B

5. 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)

6. (a) A Centrifugal pump with 1.2 m diameter runs at 200 r.p.m. and pumps 1880 litres/s, the average lift being 6 m. The angle which the vanes make at exit with the tangent to the impeller is 26° and the radial velocity of flow is 2.5 m/s. Determine the manometric efficiency and the least speed to start pumping against a head of 6 m, the inner diameter of the impeller being 0.6 m. (8)

(b) What is significance of using Multi-stage Centrifugal pump. (2)

7. (a) Explain the construction & working of Torque converter. (5)

(b) Write Short note on

(i) Characteristic curves of Pelton turbine (2.5)

(ii) Repeating Variables in Buckingham's Π- theorem (2.5)

x-x-x