the plunger is 100 mm find the distance travelled by the weight in 100 strokes. Determine the work done.   10

Or

10. (a) What is the function of a hydraulic accumulator ? Define its capacity in terms of pressure p, area A, d stroke of ram L.   10

(b) Explain the working of fluid coupling with neat sketch. How its efficiency is varied with speed ratio ?   10

Total No. of Questions : 10] [Total No. of Printed Pages : 4

Roll No. ....

ME–502(N)

B. E. (Fifth Semester) EXAMINATION, June, 2010
(New Scheme)
(Mechanical Engg. Branch)
TURBO MACHINERY
[ME–502(N)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all questions.

Unit—I

1. (a) Define turbomachines and explain the different types of turbomachines.   10

(b) "The energy transfer as work per unit mass flow numerically equal to change in stagnation enthalpy of the fluid between the turbomachine inlet and outlet". Discuss the above in the light of laws of thermodynamics for turbomachine.   10

Or

2. (a) Derive an equation for the degree of reaction in a radial flow machine.   10

(b) Show that the maximum value of utilization factor for an axial flow impulse turbine is (single stage) $\varepsilon_{max} = \cos^2 a_1$, where a_1 is the nozzle angle at inlet. 10

P. T. O.

3. (a) What do you mean by Governing ? Discuss the various methods of steam turbine governing. 10

(b) A turbine is supplied with steam at 35 bar and a temperature of 435°C. It is expanded in four stages to the condenser pressure of 0·04 bar. The pressure at the end of stages are 5, 12 and 0·25 bar respectively. Loss due to friction throughout the expansion is 24%. Determine : 10

(i) The isentropic enthalpy drop in each stage

(ii) The enthalpy drop for the turbine if friction is neglected

(iii) The work done in kJ/kg of flow neglecting all losses other than the one stated above

(iv) The reheat factor

Or

4. (a) Draw and explain briefly the velocity and force diagrams for impulse-reaction turbines. 10

(b) Explain reheat factor. Why is its magnitude always greater than unity ? 10

Unit – III

5. (a) Explain the characteristic features of the cup of a Pelton wheel. What are the limitations in keeping the deflection angle of the cup as 180° ? 10

(b) A centrifugal pump is required to deliver 50 litres of water per second to a height of 30 m through a 100 m long pipe of 15 cm diameter. The inlet losses in the suction pipe are estimated to be 0·35 m. Assuming an overall efficiency of 70% and taking Darcy's friction

required to drive the pump. 10

Or

6. (a) Explain briefly in what way a hydraulic reaction turbine differs fundamentally from an impulse turbine. 10

(b) Explain the terms manometric efficiency, mechanical efficiency and overall efficiency as applied to centrifugal pumps. 10

Unit – IV

7. (a) Define the following : 10

(i) Slip factor

(ii) Power input factor

(iii) Pressure coefficient in the centrifugal compressor

(b) Explain the basic principle of centrifugal blower. 10

Or

8. (a) What are the factors that affect the performance of an axial compressor ? 10

(b) Draw the enthalpy-entropy diagram for the centrifugal compressor and briefly plain the same. 10

Unit – V

9. (a) What are the elements of torque converter ? Explain with neat sketch. 10

(b) A hydraulic press has a ram of 200 mm diameter and a plunger of 30 mm diameter. It is used for lifting a weight 3 kN. Find the force required at the plunger. How much force will be required at the end of a lever, if used, having the ratio $l/L = 1/10$. If the stroke of

P. T. O.