www.firstranker.com

Code :RR310302

RR

III B.Tech I Semester(RR) Supplementary Examinations, May 2011
HYDRAULIC MACHINERY & SYSTEMS
(Mechanical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Find an expression for the force exerted by a jet on stationary curved plate, when the jet strikes the curved plate at the center.
   (b) A jet of water of diameter 5 cm moving with a velocity of 40 m/s strikes a curved fixed symmetrical plate at the center. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120^0 at the outlet of the curved plate.
2. (a) Explain various types of water wheels.
   (b) Differentiate between radial flow and parallel flow turbine.
3. A model of a Francis turbine one-fifth of full size, develops 30.8 KW at 305 rpm, under a head of 2.5 m. Find the speed and power of full size turbine operating under a head of 6 m.
4. (a) Differentiate between
      i. A single acting and double acting reciprocating pumps
      ii. A single cylinder and double cylinder reciprocating pumps.
   (b) A double acting reciprocating pump running at 50r.p.m is discharging 900 litres of water per minute. The pump has a stroke of 400 mm. The diameter of piston is 250 mm. The delivery and suction heads are 25m and 4m respectively. Find the slip of the pump and power required to drive the pump.
5. (a) What are the mechanical losses in the working of a centrifugal pump?
   (b) The impeller of a centrifugal pump has outer diameter of 40 cm and inner diameter of 20 cm. The blade angle at outlet is 30^0. The speed of the impeller is 1450 rpm. The velocity of flow at inlet and out let is same at 2.2 m/ sec. Find head developed if manometric efficiency is 75%, absolute velocity at out let and blade angle at inlet.
6. (a) Determine the number of impellers of a multi stage pump to lift $4.2m^3$/ sec to a height of 185 m running at 700 rpm. The specific speed need not exceed 700.
   (b) Derive the equation for limiting suction lift of a centrifugal pump.
7. The intensity of pressure of water supplied to a hydraulic crane is 5 Mpa. The load lifted by the crane is 50 KN through a height of 9m. The efficiency of the crane is 50%. The stroke to diameter ratio of the ram is 5:1. Find
   (a) Volume displaced by the ram
   (b) the diameter of the ram.
8. Classify different types of valves and explain the working of any one with a neat sketch.

⋆ ⋆ ⋆ ⋆ ⋆

FIRSTRANKER

www.firstranker.com