R16

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular & Supplementary Examinations May 2019
HYDRAULICS & HYDRAULIC MACHINERY
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 **a** A concrete lined circular channel of diameter 3m has abed slope of 1 in 500. Find out velocity and flow rate for conditions of a) Max.Velocity b) Max. Discharge. Assume chezys constant C=50.   **8M**

   b Explain specific force curve in detail.   **4M**

OR

2 **a** In a rectangular channel 3.5m wide laid at a slope of 0.0036, uniform flow occurs at a depth of 2m. Find how high can the hump be raised without causing afflux? If the upstream depth of flow is to be raised to 2.5m. What should be the height of hump? Take n= 0.015 in manning's formula.   **7M**

   b What is meant by most economical section?   **5M**

UNIT-II

3 **a** Determine the length of back water curve caused by an afflux of 2m in a rectangular channel of width 40m and depth 2.5 m. The slope of bed is given as 1 in11000.Take manning's N=0.03.   **6M**

   b What is hydraulic jump and what are the assumptions of hydraulic jump?   **6M**

OR

4 **a** What are the classifications of channel bottom slopes and briefly explain characteristics of surface profiles?   **6M**

   b What is back water curve and afflux?   **6M**

UNIT-III

5 **a** Find the force exerted by a jet of water of diameter 75mm on a stationary flat plate, when the jet strikes the plate normally with velocity of 20m/s.   **7M**

   b Derive the equation for force exerted by a jet on stationary inclined flat plate.   **5M**

OR

6 A jet of water having a velocity of 30m/s strikes a series of radial curved vanes mounted on a wheel which is rotating at 200r.p.m. The jet makes an angle of 20 degrees with the tangent to the wheel at inlet and leaves the wheel with a velocity of 5m/s at an angle of 130 degrees 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 0.5m and 0.25m respectively. Find vane angles at inlet and outlet. Work done per unit weight of water and efficiency of the wheel.   **12 M**

UNIT-IV

7 **a** Define (i)speed ratio (ii) Flow ratio (iii) Diameter of turbine (iv)Radial discharge   **7M**

   b What are the uses of draft tube? Describe with sketches different types of draft tube.   **5M**

OR

8 **a** Define the term unit power, unit speed and unit discharge with reference to a hydraulic turbine. And also derive the expression for these terms.   **6M**

   b Draw the velocity triangles, work done and maximum hydraulic efficiency of a pelton wheel turbine.   **6M**

UNIT-V

9 a A three stage centrifugal pump has impeller 40 cm in diameter and 2 cm wide at outlet. The vanes are curved back at the outlet at 450 and reduce the circumferential area by 10%.The manometric efficiency is 90% and overall efficiency is 80%. Determine the head generated by the pump when running at 1000r.p.m. delivering 50 litres per second. What should be the shaft horse power   7M

b What are different types of dimensionless numbers? Explain them.   5M

OR

10 a A model 1/10 of prototype of a flying boat is towed in fresh water ($\rho m = 1000$ kg/m3). The prototype is moving in a sea water ($\rho p = 1030$ kg/m3) with a speed of 72 km/hr. Find the corresponding speed of the model. Also find out the resistance due to waves on model if the wave resistance experienced by prototype is 750 N.   7M

b What is meant by dimensional analysis? What are the uses?   5M

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