B.Tech-VIEP CIVIL ENGINEERING

Term-End Examination

December, 2011

BICE-025 : HYDRAULICS AND HYDRAULIC MACHINES

Time : 3 hours *Maximum Marks : 70*

Note : *(i) Answers to be written in English only.*

*(ii)Answer **any seven** questions.*

1. (a) What is the difference between open 4
channel flow and pipe flow ?

   (b) Derive Chezy's formula for discharge 6
through an open channel for uniform flow.

2. Design the most economical cross-section of a 10
rectangular channel to carry water at the rate of
2.75 m^3/s. Take Chezy's combat and bed slope
as 55 and 1 in 800 respectively.

3. A rectangular channel 6 m wide discharges 1440 10
litres of water into a 6 metre wide apron, with no
slope, with a mean velocity of 6 m/s. What is the
height of the jump ? How much energy is
absorbed in the jump ?

4. (a) Define Hydraulic jump and phenomena occur after hydraulic jump. 5

   (b) A trapezoidal channel having bed width of 6 m and side slope of 1 : 1 is discharging water at the rate of 8 m^3/s. To calculate the specific energy of water, if the depth of flow in channel is 2 m. 5

5. (a) Discuss the condition which may lead to the formation of surge waves in open channel. 6

   (b) What are the applications of Hydraulic jump ? 4

6. A 25 mm diameter jet exert a force of 1 kN in the direction of flow against a flat plate, which is held inclined at an angle of 30° with the axis of the stream. Find the rate of flow. 10

7. A petron wheel is to be designed for the power = 9560 kW, head = 350 m, speed = 750 RPM. over all efficiency 85%, jet dia not to exceed 1/6 th of the wheel dia. 10

   Determine :

   (a) Wheel diameter

   (b) Diameter of jet

   (c) The number of jet required

8.   In an inward flow reaction turbine, the internal   **10**
     and external diameters are 0.80 m and 1.20 m
     respectively. The width of wheel impeller at inlet
     and outlet is 150 mm. The turbine is working
     under a head of 10 m and hydraulic efficiency is
     92%. If the vane angle at outlet is 20°. Find the
     discharge at outlet is radial and velocity of flow is
     3 m/s.

9.   Write short notes on :   **5+5**

     (a)   Kaplan Turbine.

     (b)   Specific energy diagram for flow in channel.

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