TED (10)–3027 Reg. No. .....

(REVISION—2010) Signature .....

FOURTH SEMESTER DIPLOMA EXAMINATION IN CIVIL ENGINEERING — MARCH, 2013

HYDRAULICS

[*Time* : 3 hours

(Maximum marks : 100)

Marks

PART—A

I Answer all questions in one or two sentences. Each question carries 2 marks.

1. Distinguish between density and specific weight.
2. What is meant by piezo meter tubes ?
3. Differentiate between small orifice and large orifice.
4. What is the difference between Notch and weir ?
5. Define the terms wetted perimeter and hydraulic mean depth. (5×2=10)

PART—B

II Answer *any five* of the following questions. Each question carries 6 marks.

1. A triangular plate of base 4 m and height 3m is immersed vertically in water. Its base is parallel to and at a depth of 5m from the free water surface. Determine the total pressure and centre of pressure if the apex is nearer to the free water surface.
2. A pipeline of varying cross section discharges $3m^3$/second. The diameters are 100 mm and 200 mm. Determine the velocities at the cross sections.
3. What are the minor losses occur in a pipe due to flowing of water ?
4. What is meant by draft tube ?
5. Explain tailrace.
6. What are the advantages of a triangular Notch ?
7. Write short note on : (i) Surge tank (ii) Water hammer. (5×6=30)

PART—C

(Answer one full question from each unit. Each question carries 15 marks.)

UNIT—I

III (a) A simple manometer is used to measure the pressure of oil of specific gravity 0.80 flowing in a pipeline. Its right limb is open to the atmosphere and left limb is connected to the pipe. The centre of pipe is 9 cm below the level of mercury in the right limb. If the difference of mercury level in the two limbs is 15cm, determine the absolute pressure of the oil in the pipe in pascal. 8

(b) State and explain different energies of a flowing liquid. 7

OR

Marks

IV (a) Derive an equation for discharge through a venturimeter. 8

(b) The discharge through a vertical water pipe, 100 mm diameter at top and 200 mm diameter at bottom is 78.54 lps. If the intensity of pressure at the bottom is 98.1×10^3 pascal and the length of pipe is 1m, find the pressure at the top. 7

UNIT—II

V (a) Explain the method to determine the coefficient of velocity in the laboratory. 8

(b) A large rectangular orifice, 1.2m height and 1.5m wide is provided in the vertical side of a tank. The constant water level in the tank is 1.2m above the upper edge of the orifice. If cd = 0.6, calculate the discharge. 7

OR

VI (a) Derive an equation for time of emptying a tank through an orifice at its bottom. 8

(b) Explain the working of a single acting reciprocating pump. 7

UNIT—III

VII (a) Derive an equation for discharge over a triangular Notch. 8

(b) A submerged weir is 3m long. The head of water on the upstream and down stream side of the weir are 0.5m and 0.25m respectively. If cd = 0.60, estimate the discharge over the weir. 7

OR

VIII (a) The discharge through a right angled V-Notch was found to be 50 lpm under a constant head of 0.05m. Find the coefficient of discharge of the Notch. 8

(b) A trapezoidal Notch has a base of 0.3m and side slope of 1 : 1. Taking cd=0.62, find the discharge through the Notch when the head over the Notch is 0.08m. 7

UNIT—IV

IX (a) Derive Chezy's formula for velocity of flow in pipes. 8

(b) A rectangular channel is 3m deep and 8 metre wide. Find the discharge through the channel when it runs full. Take slope of bed as 1 in 1000 and Chezy's constant as 55. 7

OR

X (a) Find the loss of head due to friction in a pipe of 1m diameter and 15 km long. The velocity of water in the pipe is 1m/second. Take coefficient of friction as 0.005. 8

(b) A trapezoidal channel of 3 m base width and side slope 1:1 laid at a slope of 1 in 1000. Estimate the discharge when the depth of water in the channel is 0.5m. Take C = 36. 7