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(REVISION—2010)

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FOURTH SEMESTER DIPLOMA EXAMINATION IN CIVIL ENGINEERING—MARCH, 2014

HYDRAULICS

[*Time* : 3 hours

(Maximum marks : 100)

PART—A

(Maximum marks : 10)

Marks

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

1. Differentiate between cohesion and adhesion.
2. What do you meant by pressure head of a liquid ?
3. What is a drowned orifice ?
4. Briefly explain the term Tail race.
5. Differentiate between total energy line and Hydraulic gradient line. (5×2=10)

PART—B

(Maximum marks : 30)

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

1. With the help of a sketch explain the working of a Bourden's tube pressure gauge.
2. A pipe line 100 m long is placed on a level ground. It tapers from 40 cm diameter at the larger end to 20 cm diameter at the smaller end. Find the pressure difference between the two ends if the quantity of water flowing through the pipe line is $0.2 m^3/s$. Neglect losses.
3. How will you determine the co-efficient of velocity experimentally ?
4. A circular tank of diameter 4 m contains water up to a height of 5 m. The tank is provided with an orifice of diameter 0.5 m at the bottom. Find the time taken by water :
   (i) To fall from 5 m to 2 m
   (ii) For completely emptying the tank. Take $C_d = 0.6$.
5. For finding the discharge through a rectangular channel, a 90° triangular notch is used. If the mesured head above the apex of the notch is 0.49 m and co-effecient of discharge is 0.62, find the discharge.
6. What is a Syphon spilway ? With the help of a sketch explain its working.
7. A trapezoidal channel of 3 m base width and side slope 1 in 1 laid at a slope of 1 in 1000. Estimate the discharge in litres/day, when the depth of water in the channel is 0.5 m. Take the value of C in Chezy's fromula as 36. (5×6=30)

Marks

PART—C

(Maximum marks : 60)

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

UNIT—I

III (a) How will you find out the total pressure of water acting on the vertical sides of the container ? Draw the intensity of pressure diagram for a vertical side of the container. 8

(b) A 50 m long pipe is placed at an angle of 30° with the horizontal. At the higher end, the diameter of the pipe is 200 mm, which gradually increases 300 mm at the lower end where the pressure is 0.26 N/mm^2. If 150 litres of water per second passes through the pipe, find the pressure at the higher end. Neglect all the losses. 7

OR

IV With the help of a neat sketch, explain the working of a venturimeter and hence deduce the expression for rate of flow through a venturimeter. 15

UNIT—II

V (a) A pipe 100 mm in diameter has a nozzle attached to its discharge end, the diameter of the nozzle is 50 mm. The rate of discharge through the nozzle is 20 l/s and pressure at the base of the nozzle is 5.886N/cm^2. Calculate the co-efficient of discharge. Assume that the base of the nozzle and out let of the nozzle are at the same elevation. 8

(b) What is an air vessel ? Write its important functions. 7

OR

VI (a) Derive an expression for discharge through a large rectangular orifice. 8

(b) With the help of a neat sketch, explain the working of a single acting reciprocal pump. 7

UNIT—III

VII (a) Derive an equation for discharge over a rectangular notch. 8

(b) A rectangular weir of crest length 50 cm is used to measure the rate of flow of water in a rectangular channel of 80 cm wide and 70 cm deep. Determine the discharge in the channel if the water level is 80 mm above the crest of weir. Take velocity of approach into consideration and value of $C_d = 0.62$. 7

OR

VIII (a) Water flows over a rectangular notch 1 m wide at a depth of 150 mm and afterwards passes through a triangular right angled notch. Taking C_d for the rectangular and triangular notches as 0.62 and 0.59 respectively, find the depth of water over the triangular notch. 8

(b) Write all the components of a hydro electrical power plant. 7

Marks

UNIT—IV

IX (a) A tank contains water up to a depth of 2.5 m above the entrance of 200 mm diameter pipe, discharges into atmosphere. The pipe is laid at a slope of 1 in 100 and is 80 m long. Determine the discharge in ltr/s. Assume value of f = 0.01. 8

(b) A channel has vertical wall 1-5 m apart and a semi circular invert. If the centre line depth is 1 m and the bed slope is 1 in 2000, find the discharge using Chezy's formula with C = 50. 7

OR

X Derive all the three conditions for the most economical trapezoidal section of a channel. 15