TED (15/19) – 4011
(Revision – 2015/19)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, APRIL – 2024

HYDRAULICS

[Maximum Marks : 100] [Time : 3 hours]

PART – A
(Maximum Marks : 10)

Marks

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

1. Define the terms: a) specific gravity b) viscosity
2. Define the term orifice.
3. Define the term velocity of approach.
4. Define the term hydraulic mean depth.
5. Differentiate between uniform and non uniform flow. (5x2=10)

PART – B
(Maximum Marks : 30)

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

1. State Bernoulli's theorem, its assumptions and limitations.
2. Water is flowing into the horizontal tapered pipe of diameter 200 mm at the larger end and 100 mm at the smaller end. The velocity of water at the larger end is 4.5 m/s, determine the rate of discharge and velocity at the smaller end.
3. Differentiate between impulse turbine and reaction turbine.
4. Differentiate between centrifugal pumps and reciprocating pumps.
5. Discuss the advantages of rectangular notch over triangular notch.
6. Derive the formulae for discharge over a rectangular notch.
7. Discuss on the hydraulic gradient line and total energy line with a sketch.

(5x6=30)

PART – C
(Maximum Marks : 60)
(Answer **one full** question from each unit. Each full question carries 15 marks)

UNIT – I

III. (a) Describe the differences between manometer and differential manometers. (6)

(b) A simple U tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity 0.8 and having a vacuum pressure is flowing. The other

end of the manometer is open to the atmosphere. Find the vacuum pressure in pipe if the difference of Mercury level in the two limbs is 400 mm and the height of fluid in the left from the center of pipe is 150 mm below. (9)

OR

IV. (a) Write notes on the following devices a) Venturi meter b) Pitot tube (8)

(b) A pipe of diameter 200 mm conveys 2500 Liters of water per minute and has a pressure of 20 kN/m^2 at a certain section. Find the total energy head with respect to datom 5 metres below the pipe. (7)

UNIT – II

V. (a) The head of water over the centre of orifice of diameter 20 mm is 1m. The actual through the orifice is 0.85 litres/second. Find the coefficient of discharge. (8)

(b) Define mouthpiece and explain the classification of mouth pieces. (7)

OR

VI. (a) Explain the experimental determination of Cc, Cv and Cd. (8)

(b) Define draft tube and explain the purposes of draft tube. (7)

UNIT –III

VII. (a) Draw a general layout of a hydro-electric power plant and explain the following terms
(i) Penstock (ii) Gross Head (iii) Tail race. (7)

(b) Rectangular notch has a discharge of 233 litres per sec, when the head of water is 1/3 of the length of the notch. Find the length of the notch, assume the coefficient of discharge as 0.62. (8)

OR

VIII. (a) The head of water over a rectangular notch is 900 mm. The discharge is 300 litres per second. Find the length of the notch when coefficient of discharge is equal to 0.62. (7)

(b) Define notches and weirs. Also list the various classification of notches and weirs. (8)

UNIT – IV

IX. (a) Define water hammer and list the various effects of water hammer. (7)

(b) Water is flowing through a pipe of 250 mm in diameter and 100 M long with a velocity 2.5 m/s. Find the head loss due to friction using Darcy's formulae and Chezy's formulae. Assume f = 0.005 and C = 55. (8)

OR

X. (a) Explain the major and minor energy losses in pipe flow. Also write down the Darcy Weisbach equation for finding the head loss due to friction. (7)

(b) Find the velocity of flow and rate of flow of water through a rectangular channel of 6 m wide and 3 m deep when it is running full. The channel is having bed slope as 1 in 2000. Take Chezy's constant C = 55. (8)

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