

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

HYDRAULICS

[Maximum Marks : 100]

[Time : 3 hours]

PART – A

(Maximum Marks : 10)

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

1. Define (a) Specific Weight (b) Specific Gravity
2. List the different types of Mouth pieces.
3. Distinguish among rectangular, triangular notches.
4. Explain the function of (a) Surge tank (b) Penstock
5. Differentiate uniform and non uniform flows. (5x2=10)

PART – B

(Maximum Marks : 30)

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

1. Distinguish among atmospheric pressure, gauge pressure and absolute pressure.
2. List and Describe about the fluid pressure measuring instruments.
3. Explain the difference between orifices and mouth pieces.
4. State the working of impulse and reaction turbines.
5. Water flows over a rectangular notch of 1 metre length over a depth of 25 cm. Then the same quantity of water passes through a right angled triangular notch. Find the depth of the water through the notch. Take co-efficient of discharges for rectangular and triangular notches as 0.60 and 0.55 respectively.
6. Sketch a typical hydro electric power plant installation.
7. Define an Open Channel and explain about: (a) Depth of flow (b) Wetted Perimeter (c) Wetted area (d) Top width (e) Hydraulic depth of an Open Channel. (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 working of pilot tube, orifice meter. (5)
(b) Compute the discharge of a flowing liquid using pitot tube, orifice meter. (10)

OR

- IV.** (a) State Bernoulli's theorem. List assumptions of Bernoulli's theorem. (7)
- (b) A Venturi meter placed in a 7.5 cm. dia. horizontal pipe has a throat diameter of 3 cm. Determine the flow rate through the pipe in litres/minute when the Venturi head is 42 cm. of water. Assume co-efficient of the meter is 0.95. (8)

UNIT – II

- V.** (a) Explain the term : Vena contracta. (5)
- (b) With the sketch explain the working of Pelton Wheel. (10)

OR

- VI.** (a) Derive the relationship between C_c , C_v and C_d . (7)
- (b) In performing an experiment to determine the different co-efficients of a sharp edged orifice; a jet of water issuing horizontally from an orifice of 4 cm dia. Under a constant head of 6.0 m fell 3 m vertically and struck ground at 8.2 m horizontally from vena contracta. The time required to discharge 250 litres of water was 50 sec. Find the hydraulic co-efficients C_c , C_v and C_d . (8)

UNIT –III

- VII.** (a) List the different classification of weirs. (5)
- (b) A broad crested weir 12 m long has a max discharge of $10 \text{ m}^3/\text{sec}$. Determine the head of water on the upstream side of the weir for this discharge if co-efficient of discharge is 0.65. (10)

OR

- VIII.** (a) Define the term : Hydro electric Turbine. (5)
- (b) Explain the classification of hydraulic turbines. (10)

UNIT – IV

- IX.** (a) Write the Darcy's equation for determining head loss due to friction in flow through pipes. (5)
- (b) A cast iron pipe 15 cm. dia. and 500 metres, long connects two reservoirs. If the difference of water level in the two reservoirs is 30 metres, find the discharge through the pipe. Ignore all other losses except friction. $f = 0.01$. (10)

OR

- X.** (a) Derive the conditions for most economical section of rectangular channels. (7)
- (b) A rectangular channel is 3.6 m. deep and 6 m. wide. Find the discharge through the channel when it runs full. Take slope of the bed as 1 in 1000 and Chezy's constant as 50. (8)
