

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, NOVEMBER - 2025**

HYDRAULICS

[Maximum marks: 100]

[Time: 3 Hours]

PART – A

Maximum marks: 10

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

1. Define specific gravity of a fluid.
2. Define the term absolute pressure.
3. What is meant by notch?
4. What is meant by coefficient of contraction?
5. What is an open channel flow?

(5 x 2 = 10)

PART – B

Maximum marks: 30

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

1. Differentiate laminar and turbulent flow.
2. Explain simple manometer and differential manometer.
3. Explain about water hammer and its effects.
4. Differentiate between notch and weir.
5. Draw the hydroelectric installation layout.
6. Circular plate 3m diameter is immersed vertically in water such that its centre is 2.5m below the free surface of water. Calculate the total pressure on the plate.
7. Explain the different forms of energy possessed by liquid particle in motion.

(5 x 6 = 30)

PART – C

Maximum marks: 60

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

UNIT – I

III. A rectangular opening in a vertical reservoir wall is 1 m wide and 3.5 m deep and its top edge is 9.5 m below water level. Find the total pressure on the gate and its point of application.

(15)

OR

- IV. (a) A simple U-tube manometer with mercury is used to measure pressure of oil of specific gravity 0.8 flowing in a pipe line which is above atmospheric pressure. Right limb is open to air and left limb is connected to pipe line. Depth of oil in left limb is 6cm while deflection in mercury levels in both limbs is 15cm. Find the pressure of oil in KPa. (8)
- (b) With a neat figure explain the working of bourdons pressure gauge. (7)

UNIT – II

- V. A venturimeter has an area ratio of 9 to 1, the large section being 300 mm. During the flow the recorded pressure head in the large section is 6.5 m and that at the throat is 4.25 meters. If the meter coefficient $C = 0.99$, compute the discharge through the meter. (15)

OR

- VI. (a) Explain the difference between impulse turbine and reaction turbine. (8)
- (b) Compare centrifugal pump and reciprocating pump. (7)

UNIT – III

- VII. (a) Derive an expression to find the discharge over rectangular notch. (8)
- (b) A rectangular notch 2.5m wide has a constant head of 40cm. Find the discharge over notch if coefficient of discharge is 0.62. (8)

OR

- VIII. (a) 30m long weir is divided into 10 equal bays by means of vertical posts each 0.6m wide. Using Francis formula, calculate the discharge over weir under an effective head of 1.2m. (8)
- (b) Water is flowing over a Cippoletti of length 4m at sill level under a head of 1.25m. Find the discharge if coefficient of discharge is 0.6. (7)

UNIT – IV

- IX. (a) Derive Darcy's equation to find head lost due to friction in an uniform flow in a pipe. (8)
- (b) Find the loss of head due to friction in a pipe of 1m diameter and carries water for 15 kilometers. The velocity of water is 1.2m/s. Coefficient of friction is 0.005. (7)

OR

- X. (a) A rectangular channel has a cross section of 50m^2 . Determine the dimensions and discharge through most economical section if bed slope is 1 in 1000. Take $C=52.5$. (8)
- (b) A trapezoidal channel with base 3m wide and side slope 1:1 carries water with a depth of 1m. Find the discharge if bed slope is 1 in 1600. Take $N = 0.04$ in Manning's formula. (7)
