

Register No.:

1432

October 2024

Time - Three hours
(Maximum Marks: 100)

- [N.B.]**
1. Answer all questions under Part-A. Each question carries 3 marks.
 2. Answer all the questions either (A) or (B) in Part-B. Each question carries 14 marks.]

PART - A

1. Define specific weight.
2. Calculate the pressure due to 0.2 m column of oil, if specific gravity of oil is 0.9.
3. Write down the three hydraulic co-efficients with formula.
4. List out any three minor losses in flow through pipes.
5. Write down the discharge formula for a rectangular notch.
6. Find the discharge over a rectangular weir 2m long under a head of 0.25 m by using Bazin's formula.
7. Find the critical depth of the water flowing through rectangular channel of width 6m when the discharge is $20\text{m}^3/\text{s}$.
8. List any three advantages of canal lining.
9. Differentiate between pump and turbine.
10. Mention the uses of air vessels fitted in reciprocating pump.

PART - B

11. (a) Simple manometer is used to measure the pressure of oil of specific gravity 0.8, flowing in a pipe. Its right limb is open to the atmosphere and the left limb is connected to the pipe. The centre of pipe is 150mm below the level of mercury in the right limb. If the difference of mercury levels in the two limbs is 250mm, determine the absolute pressure of the oil in the pipe in N/m^2 .

(Or)

[Turn over.....

- (b) A sluice gate is provided in a vertical wall. The gate is 2m wide and 3m deep. The water level on one side of the gate is 3 m above its top edge. Compute
(i) the total thrust on the gate (ii) the point of application of the thrust from the free surface.

12. (a) A jet issuing from an orifice of 30mm diameter under a head of 2m falls 1m vertically in a horizontal distance of 2.75m from the vena contracta. The actual discharge is 100 litres in 37 seconds. Find (i) coefficient of discharge (ii) coefficient of velocity (iii) coefficient of contraction.

(Or)

- (b) The diameter of a tapering pipe varies from 100mm to 150mm. It is inclined such that its larger end is 7m above the datum. The smaller end is 3 m below the larger end. The pressure of water at the larger section is $490.5 \times 10^3 \text{ N/m}^2$ and velocity at this section is 1.5 m/s. Assuming no loss between the sections, determine (i) velocity at smaller section (ii) pressure at the smaller section.

13. (a) Explain the various types of notches with neat sketches.

(Or)

- (b) A submerged weir 2.25 m long has upstream and downstream water levels above the crest of the weir at 1.5 m and 0.50 m, respectively. Find the discharge over the weir. Take C_d for free portion as 0.60 and that for submerged portion as 0.80.

14. (a) Design an economical rectangular channel to carry $90\text{m}^3/\text{s}$ with a bed fall of 1 in 1500. Take $C = 50$.

(Or)

- (b) Discuss the various methods of measurement of velocity in channels.

15. (a) A single acting reciprocating pump running at 30 rpm delivers $0.012 \text{ m}^3/\text{s}$ of water. The diameter of the piston is 250 mm and stroke length is 500 mm. Determine (i) theoretical discharge (ii) Co-efficient of discharge (iii) slip (iv) percentage slip.

(Or)

- (b) Explain the construction and working of a centrifugal pump with a neat sketch.
