



c09-c-304

3220

BOARD DIPLOMA EXAMINATION, (C-09)

SEPTEMBER/OCTOBER - 2020

DCE—THIRD SEMESTER EXAMINATION

HYDRAULICS

Time : 3 hours]

[Total Marks : 80

PART—A

3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answer should be brief and straight to the point and shall not exceed *five* simple sentences.

1. List out different properties of fluid.

2. A rectangular tank of plan dimensions 6 m×4 m holds water up to a height of 3 m. Calculate the total pressure on the base.

3. State Bernoulli's theorem and express it in the equation form.

4. List the classification of mouthpieces.

5. State the classification of weirs.

6. What is notch? Classify the notches based on the shape of opening.

7. Define HGL and TEL.

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8. A rectangular channel has 50 m^2 area. If the channel section is to be most economical, calculate the bed width and depth.
9. State the use of a foot valve and a strainer in a centrifugal pump.
10. State the component parts of a hydroelectric power plant.

PART—B

10×5=50

Instructions : (1) Answer *any five* questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. A rectangular body $2 \text{ m} \times 4 \text{ m}$ is immersed inclined to free surface of liquid such that the greatest and least heights are 3 m and 1 m respectively. Calculate the total pressure and centre of pressure.
12. A pipe 5 m long is inclined at an angle of 30° with the horizontal. The smaller section of pipe which is at lower level is 8 cm in dia and the larger section of the pipe is 24 cm dia. Determine the difference of pressure between two sections if the pipe is uniformly tapering and the velocity at the smaller end is 1 m/sec.
13. Derive discharge equation for large rectangular orifice.
14. The catchment area of a tank is $5 \times 10^6 \text{ m}^2$. The maximum rainfall in the catchment is 50 mm per hour. Out of this, 80% will reach the tank. Find the length of the weir if the head of water is not to exceed 1 m. The weir has to carry piers 1 m wide and 5 m clear span for supporting a superstructure.
15. Water is discharged through a pipe 1220 m long which is 400 mm in diameter for 610 m length and 250 mm for the rest of its length. Calculate the flow, taking only friction into account, end of the pipe is 30.5 m below the reservoir level. Take $f = 0.004$ for 400 mm pipe and $f = 0.006$ for the 250 mm pipe.

- * 16. (a) A horizontal pipe of diameter 500 mm is suddenly contracted to a diameter of 250 mm. If the discharge through the pipe is 270 lit/sec, find the practical loss of head due to sudden contraction of pipe.
- (b) A rectangular channel 4 m wide and 2 m deep is laid at a slope of 1 in 2000. Find the discharge using Kutter's formula taking $N = 0.025$.
17. (a) What is compound pipe? How do you determine equivalent size of a compound pipe?
- (b) A rectangular channel of width 4 m and depth of water 3 m is having a bed slope of 1 in 1500. Find the maximum discharge through the channel. Take value of $C = 50$.
18. Describe different parts of a single-acting reciprocating pump with the help of a neat sketch.
