



c09-c-304

**3220**

**BOARD DIPLOMA EXAMINATION, (C-09)**

**APRIL/MAY—2015**

**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. Define atmospheric pressure and state the value of standard atmospheric pressure in terms of head and pressure of mercury.
3. Name the components of venturi meter.
4. An internal mouthpiece of dia. 50 mm is discharging water under a constant head of 8 m. Find the discharge in  $\text{m}^3/\text{sec}$ , if the mouth-piece is—
  - (a) running-free;
  - (b) running-full.
5. Define weir.
6. How do you differentiate between broad-crested and sharp-crested weirs?
7. Define HGL and TEL.

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8. What do you understand by the term 'most economical section' of a channel?
9. What is reaction turbine? Give any two examples of reaction flow turbines.
10. State the component parts of a hydro-electric 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 m × 4 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. An orifice, in one side of a large tank is rectangular in shape 2 m broad and 1 m depth. The water level on one side of the orifice is 4 m above the top edge. The water level on the other side of the orifice is 0.5 m below its top edge. Calculate discharge through the orifice. Take  $C_d = 0.625$ .
14. A rectangular channel of 1.5 m width is used to carry 0.2 cum of water. The rate of flow is measured by placing a 90° V-notch weir. If the maximum depth of water is not to exceed 1.2 m, find the position of the apex of the notch from the bed of the channel. Assume  $C_d = 0.6$
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 most economical trapezoidal channel has an area of flow  $3.33 \text{ m}^2$ . Find the discharge in the channel when running 1 m deep. Take  $C = 60$  and bed slope 1 in 800.
- 17.** Describe different parts of a single-acting reciprocating pump with the help of a neat sketch.
- 18.** (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  $C = 50$ .

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