



c09-c-304

**3220**

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

**MARCH/APRIL—2014**

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

1. State the values of specific weight, mass density and specific gravity values for water and mercury.
2. Briefly explain piezometer with a sketch.
3. What is uniform flow and non-uniform flow? Give one example to each.
4. What is vena contracta? State the various hydraulic coefficients.
5. State the classification of notches according to (a) shape of the crest and (b) the effect of sides on issuing nappe.
6. What is velocity of approach? Write the expression for the discharge over a rectangular notch (or) weir and explain the terms.
7. What is hydraulic gradient line?

- \* 8. Define wetted perimeter and hydraulic mean depth.
9. Explain briefly about jet pump.
10. Write any three functions of a surge tank.

**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 circular plate 2.1 m in diameter is immersed in water so that its plane makes an angle of 30 degree to the water surface and highest point of the plate is 2 m below the surface. Calculate the total pressure and centre of pressure.
12. A vertical tapering pipe has top dia 0.70 m and bottom dia 0.90 m the water is flowing down in full. The pipe is 6 m long. The frictional loss between top and bottom points may be taken as  $0.15 \times$  velocity head at inlet. The velocity at the inlet is 6 m/sec. Determine the pressure at the top in N/sq mm when the pressure head at the bottom is 8.8 m of water.
13. A sharp orifice of 20 mm dia is discharging water under a constant head of 4 m. The jet drops 1 m in a horizontal distance of 3.9 m. The measured rate of discharge is 1.725 L/sec, find the three hydraulic coefficients.
14. (a) A right-angled V-notch was used to measure the discharge of a centrifugal pump. If the depth of water at V-notch is 240 mm, calculate the discharge over the notch in liters per minute. Take  $C_d$  as 0.62.
- (b) A rectangular notch has a discharge of 24 cum/min, when the head of water is half the length of the notch. Find the length of the notch. Take  $C_d = 0.61$

- \* 15. Water flows through a pipe 200 mm diameter, 60 m long with a velocity of 2.5 m/sec. Find the head loss in friction by using (a) Darcy's formula and (b) Chezy's formula. Assume Chezy's constant as 55.
16. (a) A 2 km long water main has to carry a discharge of 0.5 cum/sec. If the maximum allowable loss of head due to friction is 25 m, find the minimum diameter required. Use Darcy's equation. Assume  $f = 0.008$  neglect minor losses.
- (b) A rectangular channel is of 9 m wide and 3 m deep. Find the bed slope to be maintained to carry a discharge of 65 cum/sec. Take Chezy's constant as 60.
17. Derive the conditions for a trapezoidal channel section to be most economical.
18. Compare between impulse turbine and reaction turbine, write any 10 points.

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