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BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2013

DCE—THIRD SEMESTER EXAMINATION

HYDRAULICS

Time : 3 hours]

[Total Marks : 80

PART—A

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. Define capillarity and write the formula and name the terms.
2. Briefly explain U-tube differential manometer with a neat sketch.
3. What are streamline flow and turbulent flow? Give one example to each.
4. State the classification of mouthpieces according to shape and according to position.
5. What is a notch? Classify the notches based on the shape of opening.
6. State the classification of notches according to (a) shape of the crest and (b) the effect of sides on issuing nappe.

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7. State the Darcy-Weisbach equation for head loss due to friction in pipes and name the terms.
8. State Chezy's formula and Manning's formula and explain the terms.
9. Explain about airlift pump.
10. Write any three functions of a surge tank.

PART—B

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 triangular gate which has a base of 2.5 m and an altitude of 3.2 m lies in a vertical plane. The vertex of the gate is 1 m below the surface of the tank which contains oil of specific gravity 0.8. Find the force exerted by oil on the gate and its position.
12. A pipe 340 m long has a slope 1 in 100 and tapers from 1.25 m diameter at the higher and to 625 mm diameter, at the lower end. Determine the pressure at the lower end if the pressure at the higher end is 0.14 N/sq mm and the discharge through the pipe is 108 lit/sec of water.
13. Water flows through a circular orifice of 25 mm diameter; provided in the side of a tank discharging water under a constant head of 800 mm. The coordinates at a certain point of the jet are 300 mm from the vena contracta horizontally and 32 mm vertically below the centerline of the orifice. The water is collected in a tank of size 600 mm 600 mm and collected water rises by 33 mm in 10 seconds. Find C_c , C_v and C_d .

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14. Water flows over a rectangular notch of 1.1 m length over a depth of 14 cm. The same quantity of water passes through a triangular right-angled notch. Find the depth of water through the notch. Take coefficient of discharges for the rectangular and triangular notches as 0.62 and 0.59 respectively.
15. Calculate how much heads would be saved in a pipe of 40 m length, 80 mm diameter of the central 20 m length is replaced by 120 mm diameter pipe. The change of section being sudden. The quantity of water flowing is 12.5 lit/sec. Assume $f = 0.01$ in each case and consider all losses of head, take $C_c = 0.062$.
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 has 50 sq m area. If the channel section is to be most economical, calculate the bed width and depth.
17. A rectangular channel carries water at the rate of 400 lit/sec when bed slope is 1 in 2000. Find the most economical dimensions of the channel if Manning's constant n as 0.012.
18. Briefly explain the principle and working of a Pelton wheel.

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