C09-C-**304**

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BOARD DIPLOMA EXAMINATION, (C–09)

MARCH/APRIL—2017

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. Calculate the specific mass, specific weight and specific gravity of one liter of liquid having weights 12 N.

2. A rectangular tank 14·2 m long and 1·5 m wide contains water up to depth of 2 m. Find the intensity of pressure on the base of tank and total pressure on the side.

3. What is a venturi meter? How is it useful in hydraulic measurements?

4. Define internal mouthpiece. State the equation for discharge through it for different conditions.

5. A broad crested weir 10 m long has a maximum discharge of 10 m^3/sec. Determine the head of water on the upstream side of wier. [Take, C_d　0　62]

6. Calculate the head over a rectangular notch, if the length of the notch is 1·6 m and discharge is equal to 5 m^3/sec. [Take, C_d 0 623]

7. Explain the reason for connecting two tanks with a pipe in parallel.

8. What do you understand by the term 'most economical section' of a channel?

9. State the classification of turbines according to direction of flow along with an example each.

10. Explain the functions of intake works and trash rack with neat sketches.

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PART—B   10×5=50

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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)* Convert the pressure of 102 kN/m^2 into *(i)* meters of water and *(ii)* cm of mercury.

     (b) A U-tube manometer is used to measure pressure of oil flowing in a pipe. The level of mercury in left leg is 0·7 m below the center of pipeline and right leg is open to atmosphere. The level of mercury in right leg is 0·5 m above that in the left leg. Find the oil pressure in the pipe. [Take, oil specific gravity as 0·8]

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 an expression for discharge through a rectangular orifice.

14. Find the discharge through a Cippolletti weir discharging under a head of 0·8 m, if the velocity of approach is 1·8 m/sec. [Take, C_d 0 62]

15. A pipe 1 km long 25 cm is discharging water at a velocity of 2·5 m/sec. Find the loss of head due to friction using *(a)* Darchy's formula and *(b)* Chezy's formula. [Take, f 0 018]

16. A trapezoidal channel has side slopes 2 V to 1 H. It is discharging water at the rate of 22·0 m^3/sec with a bed slope 1 in 2000. Design the channel for the most economical cross-section using Manning's formula. [Take. N 0 01]

17. With the help of a sketch, briefly explain the working of an airlift pump.

18. *(a)* Water is flowing through a pipe 1500 m long with a velocity of 0·8 m/s. What should be the diameter of the pipe, if the loss of head due to friction is 8·7 m? [Take, f for the pipe as 0·01]

(b) The bed slope of a river was found to be 0·000148. If the hydraulic mean depth was 2·5 m and the velocity as determined by vertical floats is 0·88 m/sec, find the value of Chezy's constant.

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