3220

BOARD DIPLOMA EXAMINATION, (C–09)
MARCH/APRIL—2016
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. Calculate the specific mass, specific weight and specific gravity of one liter of liquid, of weight 12 N.

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. Write and explain equation of continuity.

4. List the classification of mouthpieces.

5. State the classification of weirs.

6. Calculate the discharge over a rectangular notch whose length is 2 m and head over the notch is 0·3 m. Take C_d 0·62.

7. Explain the reason for connecting two tanks wth 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 of each.

10. What are the component parts of a hydroelectric power plant?

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 $102 \, \text{kN} / \text{m}^2$ into *(i)* meters of water, *(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. Find the discharge flowing through a venturi meter of inlet diameter 30 cm and throat diameter 15 cm. The pressure difference between inlet and throat as read with the help of differential manometer is found to be 20 cm of mercury. Specific gravity of liquid is 0·8 and that of mercury is 13·6. C_d coefficient of venturi meter is 0·97.

13. Derive discharge equation for large rectangular orifice.

14. A weir 2·5 m long has 60 cm head of water over the crest of the weir. Using Francis formula, find the discharge over the weir, if the channel approaching the weir is 6 m wide and 1·2 m deep. Also determine the new discharge considering the velocity of approach.

15. *(a)* Determine the rate of flow of water through a pipe of diameter 20 cm and length 50 m when one end of pipe is connected through a tank and other end is opened. The pipe is horizontal and the height of water in the tank is 4 m above the centre of pipe. Consider all minor losses and take f 0 009.

(b) State the formula for loss of head at entrance.

16. A trapezoidal channel has side slopes 2 V : 3 H. It is discharging water at the rate of 25 cumecs with a bed slope 1 in 2000. Design the channel for its best form. Use Manning's formula taking $N = 0·01$.

17. Explain the working of a single-acting reciprocating pump with the help of a neat sketch.

18. *(a)* Differentiate between laminar and turbulent flows.

(b) A trapezoidal channel, 5 m wide at the bottom and 1·5 m deep, discharges 1500 lit/sec. The side slopes are 2 H : 1 V. Given N for the channel surface as 0·03, find the longitudinal slope.

★ ★ ★