

6224

BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

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. Define capillarity, surface tension and kinematic viscosity.
2. Define the following :
  - (a) Center of pressure
  - (b) Total pressure
3. Define steady and unsteady flow. Give one example of each.
4. Define mouthpiece. Differentiate between orifice and mouthpiece.
5. State the formulae for the discharge over sharp crested weir and broad crested weir.
6. Calculate the discharge over a rectangular notch having width 2 m and a constant head of 30 cm. Assume  $C_d = 0.62$ .
7. Write down the formulae for loss of head due to sudden contraction and explain the notations.

8. State the conditions for most economical section of trapezoidal channel.
9. What is draft tube? List the different types of draft tube.
10. List the component parts of hydroelectric 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 criterion for valuation is the content but not the length of the answer.

11. An annular plate of 3 m external dia. and 1 m internal dia. is immersed in an oil of specific gravity 0·8 with its greatest and least depths below the oil surface of 3 m and 1 m respectively. Determine the total pressure and depth of Centre of pressure on face of the plate.
12. A venture meter placed in a 7·5 cm dia. horizontal pipe has a throat dia. 2·5 cm. Determine the flow rate through the pipe in liters/minute when the venture head is 41·2 cm of water. Assume coefficient of meter as 0·97.
13. An internal mouthpiece of dia 60 mm is discharging water under a constant head of 9 m. Find the discharge in liters/sec. If the mouthpiece is (a) running free and (b) running full. Take  $C_d$  values for running free as 0·5 and running full as 0·707.
14. Find the discharge through a triangular notch under a constant head of 0·25 m if the angle of the notch is  $120^\circ$ . Take  $C_d = 0·62$
15. 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 center of pipe. Consider all minor losses and take  $f = 0·009$ .

- 16.** A pipe 1 km\*long and 25 cm in diameter is discharging water at a velocity of 2.5 m/sec. Find the loss of head due to friction using :  
(a) Darcy's formula and (b) Chezy's formula. [Take  $f = 0.018$ ].
- 17.** A rectangular channel 6 m wide carries water at a velocity of 1.535 m/sec. The depth of flow in the channel is 3 m. Find the bed slope of the channel. Assume manning's coefficient  $n = 0.027$ .
- 18.** Distinguish between impulse turbines and reaction turbines.

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