



C-09-C-304

3220

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH / APRIL - 2019

DCE - III 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.

- 1 What is meant by surface tension? Give two examples for surface tension. **3**
- 2 Convert a pressure head of 6m of liquid of specific gravity of 0.98 into pressure head of mercury. **3**
- 3 Define Uniform flow and Non-Uniform flow. **3**
- 4 Determine the discharge through a Borda's mouth piece 5cm dia. in the vertical side of a tank containing water. The jet is running free and the head above the centre of the mouth piece is 60cm. **3**
- 5 Define weir State the classification of weirs based on shape of the opening and shape of the crest. **3**
- 6 How do you calculate discharges over submerged weir? **3**
- 7 Explain the reason for connecting two tanks with a pipe in parallel. **3**

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- 8 What do you understand by the term 'most economical section' of a channel? 3
- 9 What is the difference between single-stage and multi-stage pumps? 3
- 10 Explain with neat sketches Surge Tank and Pen Stock. 3

PART - B**10×5=50**

Instructions :

- (1) Answer any **FIVE** questions.
- (2) Each question carries **TEN** marks.
- (3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

- 11 A triangle gate which has a base of 2m and an altitude of 3m lies in a vertical plane. The vertex of the gate is 1m below the surface of a tank which contains oil of specific gravity 0.8. Calculate the total pressure and centre of pressure. 10
- 12 A 20 cm × 12 cm venturimeter is mounted in a vertical pipe carrying water, the flow being upwards. The throat section is 20 cm above the entrance section of the venturimeter. For a certain flow through the meter, the differential gauge between the throat and entrance indicates a gauge deflection of 28 cm. Assuming the coefficient of discharge of venturimeter as 0.98, find the discharge. 10
- 13 Derive an expression for discharge through a rectangular orifice. 10
- 14 Water flows over a rectangular notch 1.25m wide with a head of 0.10m. The same discharge passes through at 90° notch. Find the head of water in the V-notch. Assume coefficient of discharge for rectangular and triangular notches as 0.62 and 0.59 respectively. 10

- 15 A siphon of diameter 20 cm connects two reservoirs having a difference in elevation of 20 m. The length of the siphon is 500 m and the summit is 3 m. above water level in the upper reservoir. The length of the pipe from upper reservoir to the summit is 100m. Determine the discharge through the siphon and also pressure at summit. Neglect minor losses. The co-efficient of friction $f = 0.005$. 10
- 16 A trapezoidal channel has side slopes 2V to 1H. It is discharging water at the rate of $22.0\text{m}^3/\text{sec}$ with a bed slope 1 in 2000. Design the channel for the most economical cross section using Manning's formula. Take $N = 0.01$. 10
- 17 Explain. the different parts of Pelton wheel with a neat sketch. 10
- 18 (a) Calculate the discharge through a pipe of diameter 15 cm when the difference of pressure head between the two ends of a pipe 600 m apart is 4.5m. of water. Assume $f = 0.009$. 5
- (b) A trapezoidal channel 5m wide at the bottom and 1.5m deep discharge 1500 lit/sec. The side slopes are 2H: 1V. Given N for the channel surface as 0.03, find. the longitudinal slope. 5
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