4227

BOARD DIPLOMA EXAMINATION, (C-14)
JUNE-2019
DCE - THIRD SEMESTER EXAMINATION

HYDRAULICS

Time: 3Hrs   Max.Marks: 80

PART-A

10x3=30M

Instructions: 1) Answer all the questions Each question carries 3 marks
2) Answer should be brief and straight to the point and shall not exceed five simple sentences.

1) Define (a) Capillarity (b) Viscosity

2) Define (a) Atmospheric Pressure (b) Absolute Pressure

3) Define (a) Laminar flow (b)uniform flow.

4) Water is discharged through an external cylindrical mouthpiece under a constant head of 4m. Find the discharge through it if the diameter of mouthpiece is 40mm.

5) Calculate the discharge over a rectangular notch whose length is 2 m and head over the notch is 0·3 m. Take, Cd = 0.62.

6) State the formulae for discharge over sharp crested and broad crested weirs.

7) Define (a) Critical velocity (b) Reynold's Number.

8) Write Kutter's and Bazin's formulae to evaluate 'C'.

9) State use of (a) Foot valve and (b) strainer in centrifugal pump.

10) Sketch typical layout of Hydro -Electric Power Plant.

PART - B

Instructions: 1) Answer any five questions. Each questioncarries10marks

2) Answer should comprehensive and they criterion for valuation is the content but not length of the Answer.

11) A rectangular plate 3 m long and 1·5 m wide is immersed vertically in water in such a way that its 3 m side is parallel to water surface and its top edge is 2·5 m below the free surface. Find the total pressure and depth of centre of pressure on one side of the plate.

12) A 200mm × 100 mm venturimeter is mounted in a vertical pipe carrying water, the flow being upwards. The throat section is 300mm above the entrance section of venturi meter. For a certain flow through the meter, the differential gauge between the throat and entrance indicates a gauge deflection of 300mm. Assuming the coefficient of meter is 0·95, find the discharge.

13) Water flows through a sharp-edged circular orifice 75mm dia in the side of a tank. The head of water above the centre of the orifice is 1·22 m. The jet passes through a ring whose centre is 1·22 m horizontally and 33 mm vertically from the centre of vena contracta. The time required to discharge 400N of water was 5 min. Find the hydraulic coefficients Cc, Cv and Cd.

14) Water passing over a rectangular notch flows subsequently over a right-angled triangular notch. The length of the rectangular notch is 1m and its coefficient of discharge is 0·62 if the coefficient of triangular notch is 0.59. What will be the head through the triangular notch when the head over rectangular notch is 0·15 m?

15) A horizontal pipe 150 mm in diameter is suddenly reduced to 75 mm diameter. Water is flowing through the largest to smaller pipe at the rate of 10 lit/sec. What is the loss of energy at the sudden contraction in N-m per minute? Take the coefficient of contraction as 0·64.

16) a) Water is flowing through a pipe 1.5km long and 1m dia. with a velocity of 1m/sec. Find the head loss due to friction using Chezy's formula. Take C=65.

b) A rectangular channel having the most economical section is 4m wide. Find the discharge if the gradient is 1 in 1500.

17) A rectangular channel carries water at the rate of 400 litres/sec and the bed slope is 1 in 2000.Find the most economical dimensions of the channel. Take Manning's constant 'n' as 0.012.

18) Explain component parts of centrifugal Pump with a sketch.

* * *