C09–C–304

3220

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2014

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. At a point in a layer of oil, the shear stress is 0·2 N/m^2 and velocity gradient is 0·25 m/sec/m. Calculate the coefficient of dynamic viscosity.

2. Convert an intensity of pressure of 1 N/mm^2 into pressure head in 'm' of water. Sp.wt. of water is 10 kN/m^3.

3. Define uniform flow and non-uniform flow.

4. What is an orifice? State the classification of orifices according to size and shape.

5. Define velocity of approach. State the formulas for calculating the velocity of approach.

6. State the various classification of notches.

7. Define laminar flow and turbulent flow in pipe flow.

8. Define the following :

(a) Hydraulic radius

(b) Hydraulic depth in open channel flow

9. Name the parts of a reciprocating pump.

10. Explain the function of a surge tank.

PART—B 10×5=50

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 sluice gate of breadth 2 m and depth 1·2 m contains a liquid of specific gravity 1·45 on the U/s of it up to a height of 1·5 m above the top edge of the gate. There is water on the D/s up to the top edge of the gate. Find the resultant pressure and centre of pressure.

12. A 20 cm 10 cm venturi meter is mounted in a vertical pipe carrying water the flow being upwards. The throat section is 30 cm above the entrance section of the venturi meter. For a certain flow through the meter, the differential gauge between the throat and entrance indicates a gauge deflection of 30 cm assuming the coefficient of orifice meter is 0·95. Find the discharge.

13. *(a)* Water is discharged through an external cylindrical mouthpiece under a constant head of 4 m. Find the discharge through it, if the dia of the mouthpiece is 4 cm.

(b) Distinguish between mouthpiece running full and mouthpiece running free.

14. The catchment area of a tank is 5 10^6 sq.m. The max rainfall in the catchment is 5 cm per hour. Out of this 80% will reach the tank. Find the length of waste weir, if the depth of the water is not to exceed 1 m.

Assume C_d 0 6

15. Water flows through a pipe 250 cm diameter, 80 m long with a velocity of 3·5 m/sec. Find the loss in friction using

(a) Darcy's formula;

(b) Chezy's formula.

Assume Chezy's constant as 55.

16. Derive the expression for condition of most economical section of a trapezoidal channel.

17. Explain Francis turbine with a neat sketch.

18. *(a)* An old water supply distribution pipe of 250 mm diameter of 1 m length is to be replaced by two parallel pipe of equal diameter having equal length and identical values of coefficient of friction. Find the diameter of the pipes.

(b) Find the most economical cross-section of a rectangular channel to carry 0·25 m^3/sec of water when the bed slope is 1 in 1000, assume C = 60

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