

6. Explain the following terms : 20

(i) Critical depth

(ii) Critical velocity

(iii) Manning's formula

(iv) Wetted parameters

(v) Surges. 20

7. Show that the force exerted by a jet of water on moving inclined fixed plate in the direction of the jet is given by : 20

$$F_x = \rho A (V - u)^2 \sin^2 \theta$$

8. (a) Differentiate between : 12

(i) Single acting and double acting reciprocating pump

(ii) Single cylinder and double cylinder

(b) Explain various types of efficiencies of a centrifugal pump. 8

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Roll No.

W-473

B. Tech. (Weekend)

EXAMINATION, Dec. 2017

(Fourth Semester)

(Re-appear Only)

(CE)

CE-W-206

OPEN CHANNEL FLOW

Time : 3 Hours]

[Maximum Marks : 100

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt any *Five* questions. Assume any data if missing.

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P.T.O.

1. (a) What do you understand by :
 - (i) Sub critical, critical and super critical flow ?
 - (ii) Laminar and Turbulent Flow ? **10**
- (b) The pressure outside the droplet of water of diameter 0.04 mm is 10.32 N/cm². Calculate the pressure within the droplet if the surface tension is given as 0.0725 N/m of water. **10**

2. (a) Find the discharge through a trapezoidal channel of width 8 m and side slope of 1 H to 3V. The depth of flow of water is 2.4 m and Chezy's constant $C = 50$. The slope of the bed of the channel is given 1 in 4000. Assume any data if missing. **12**
- (b) State and explain all formulas for the values of C . **8**

3. A most efficient trapezoidal section is required to give a maximum discharge of 21.5 m³/s of water. The slope of the channel bottom is 1 in

2500. Taking $C = 70$, determine the dimensions of the channel. Also determine the value of Manning's N , taking the value of velocity of flow as obtained for the channel by Chezy's equation. Assume any data if missing.

4. (a) Discuss the momentum equation for an open channel flow. **8**
- (b) A jet of water of dia. 50 mm strikes a fixed plate in such a way that the angle between the plate and the jet is 30. The force exerted in the direction of the jet is 1471.5 N. Determine the rate of flow of water. **12**

5. (a) Explain the term hydraulic jump. Derive an expression for the depth of hydraulic jump in terms of the upstream Froude Number. **10**
- (b) Show that in a rectangular section the Critical depth is two-third of specific energy. **10**