(b) A trapezoidal channel with bottom width of 3 m and side slope of 2 H to 3 V. It carries a discharge of 9 m³/s with the flow depth of 1.5 m. Find the Froude number of the flow. **7**

Unit IV

7. (a) Show that the force exerted by a jet of water on an moving inclined fixed plate in the direction of the jet is given by : **8**

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

(b) Describe the discharge, work done and power required to drive a double acting pump : **7**

8. Write short notes on the following : **15**

(i) Bazin's formula

(ii) Static head

(iii) Specific speed

(iv) Cavitation of turbine

(v) Types of casing.

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B. Tech. EXAMINATION, May 2019

(Fourth Semester)

(B. Scheme) (Main & Re-appear)

(CE)

CE204B

OPEN CHANNEL FLOW

Time : 3 Hours]　　　　　　[*Maximum Marks : 75*

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 *Five* questions in all, selecting at least *one* question from each Unit. Assume any data if missing.

Unit I

1. Differentiate between (any *three*) : **15**
   (i) Bed Slope and Side slope
   (ii) Laminar and Turbulent flow
   (iii) Steady and Unsteady flow
   (iv) Critical, subcritical and super critical flow.

2. (a) Drive an expression over a triangular notch. **10**
   (b) Find the distance over a triangular notch of angle 60° when the head over the V-Notch is 0.3 m. Assume $C_d = 0.6$. **5**

Unit II

3. (a) The distance of water through a rectangular channel of width 8 m, is 15 m³/s when depth of flow of water is 1.2 m. Calculate : **10**
   (i) Specific Energy
   (ii) Critical depth and critical velocity
   (iii) Value of minimum specific energy.
   (Assume any data if missing)

(b) Write down the application of hydraulic jump. **5**

4. (a) Explain the following terms :
   (i) Pre jump and post jump
   (ii) Energy Dissipation
   (iii) Surges **6**
   (b) Derive an expression of minimum specific energy in terms of critical depth. **9**

Unit III

5. (a) A trapezoidal channel with side slopes of 3 H to 2 V has to be designed to convey 10 m³/s at a velocity of 1.5 m/s, so that the amount of concrete lining for the bed is minimum. Find the wetted parameter and slope of bed by assuming Manning's N = 0.014. **10**
   (b) What do you understand by surges ? Explain it's types. **5**

6. (a) Deduce the condition for most economical section of a rectangular channel. Derive the condition for the same. **8**