KATIHAR ENGINEERING COLLEGE, KATIHAR
CIVIL ENGINEERING, 2nd Year (Semester-IV)

Subject: Hydraulics & OCF   **Instructor: Rashid Mustafa**
Assignment 2

Q.1 The velocity distribution in a rectangular channel of width B and depth of flow y is approximated as $v = k_1 \sqrt{y}$ in which k_1 is a constant. Calculate the average velocity for the cross section and correction coefficients α and β.

Q.2 What is critical depth in open channel flow and derives the expression for critical depth, specific energy, and specific force for triangular channel.

Q.3 A triangular channel has apex angle of 60° and carries a flow with a velocity of 2.0 m/s and depth of 1.25 m. What is the specific energy at critical depth? Is the flow subcritical or supercritical?

Q.4 A lined channel of trapezoidal section has one side vertical and other side having a slope 1H: 1V.The Channel has to deliver 8m^3/s when laid on a slope of 0.0002.What would be the dimension of efficient section which requires minimum lining? Also calculate the corresponding mean velocity if Manning's n is 0.015.

Q.5 If y_1 and y_2 are alternate depth in a rectangular channel show that $y_c{}^3 = \frac{2y_1^2 y_2^2}{(y_1 + y_2)}$ Where y_c is the critical depth and also prove that $E = \frac{y_1^2 + y_1 y_2 + y_2^2}{(y_1 + y_2)}$

Q.6 A rectangular channel 2.4 m wide carries uniform flow of 7 m^3/sec at a depth of 1.5 m. If there is a local rise of 0.15 m in bed level, calculate the change of water surface elevation. What can be the maximum rise in the bed elevation such that the upstream depth is not affected?

Q.7 A concrete lined trapezoidal channel (n=0.015) is to have a side slope of 1H: 1V. The bottom slope is to be 0.0004. Find the bottom width of channel necessary to carry 100 m^3/s of discharge at a normal depth of 2.5 m.

Q.8 A triangular channel with an apex angel of 75^0 carries a flow of 1.2 m^3 /s at a depth of 0.80 m. If the bed slope is 0.009, find roughness coefficient of the channel.

Q.9 A trapezoidal channel has side slope of 1H: 1V carries a discharge of 28m^3/s. Determine the longitudinal slope and cross sectional dimensions for best hydraulic efficiency, if Manning's coefficient n=0.014.