CE376 HYDROMECHANICS
HOMEWORK-V
DUE DATE: 14.05.2020

Q1) Consider a rectangular channel with a constant width b,

a) Obtain the equation of water surface profile (dy/dx) as function of Froude number and channel bottom slope in a channel transition assuming that over a short distance Δx, the energy losses can be neglected.
b) Using the equation you have obtained, draw the water surface profile if flow is supercritical and if there is a downward step at the channel bed and show your results on the graph of specific energy curve (E versus y curve).

Q2) a)Derive the equation of critical flow.

$$\frac{Q^2}{g} = \frac{A^3}{T}$$

c) If channel cross section is rectangular, obtain the minimum specific energy and critical flow depth as a function of unit discharge rate (q)

Q3) There occurs no change in the state of fluid flow in a rectangular channel having a constant channel width b=3 m. in a channel transition with an upward step of Δz=0.2 m. The constant discharge rate in the channel is Q=18 m^3/s. Calculate the followings;

a) Minimum specific energy E_c and y_c
b) The water depth after the step y_2, if water depth before the step is y_1=2 m.
c) The water depth after the step y_2, if water depth before the step is y_1=1 m.
d) Draw the graph of specific energy curve (E versus y curve) for b and c, y_c, y_1 and y_2 on the graph
e) Draw the water surface profile for b and c, indicating y_c, y_1 and y_2 on the graph