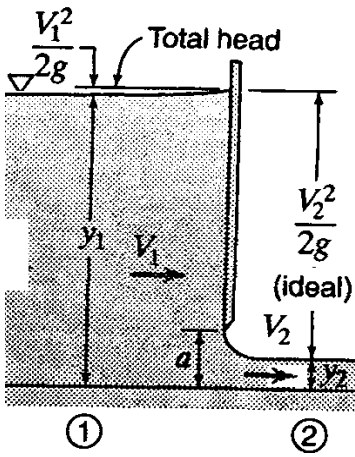
Sohag University **curse : Hydraulic (2)**
Faculty of Eng. **Exercise sheet (4)**

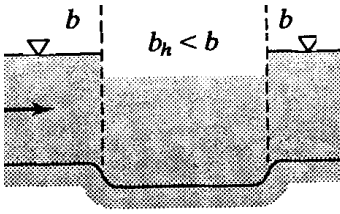
Q1 *In a rectangular channel 10 ft wide with a flow of 200 cfs the depth is 1 ft. If a hydraulic jump is produced,*
(a) what will be the depth immediately after it?
(b) What will be the loss of energy?



Q2 *A wide and shallow rectangular channel with bed slope $S_0 = 0.0004$ and roughness $n = 0.022$ carries a steady flow of 65 cfs/ft of width. If a sluice gate (Fig.) is adjusted as to produce a minimum depth of 1.6 ft in the channel, determine whether a hydraulic jump will form downstream,*

Q3 *A rectangular channel 12 ft wide carries 24 cfs in uniform flow at a depth of 0.80 ft. Find the local change in water-surface elevation caused by a frictionless hump 0.12 ft high across the floor of the channel.*

Q4 *Suppose that the depth of uniform flow in a 4-ft-wide rectangular channel is 1.10 ft. Find the change in water-surface elevation caused by a 1-ft- wide bridge pier placed in the middle of the channel. The flow rate is 50 cfs.*



Q5 *Fifty cubic feet per second of water flows uniformly in a 6-ft-wide rectangular channel at a depth of 2.5 ft (Fig.).What is the change in water-surface elevation at a section contracted to a 4-ft width with an 0.2-ft depression in the bottom?*

Q6

flow is uniform in a 20-ft-wide rectangular channel and ($y_o = 2.0$ ft) for flow rate is 90 cfs.

(a) Is it subcritical or supercritical?

(b) If a hump of height $\Delta z = 0.30$ ft is placed in the bottom of the channel, calculate the water depth on the hump, and the change in the water surface level at the hump.

(c) If the hump height is raised to $\Delta z = 0.60$ ft, what then are the water depths upstream and downstream of the hump?

(d) If the 0.30-ft hump is accompanied by a local contraction to 18 ft, find the water depth on the hump.

In all cases neglect head losses over the hump and through the contraction.