Sohag University **curse : Hydraulic (2)**
Faculty of Eng. **Exercise sheet (5)**

Q1

The flow in a 15-ft-wide rectangular channel that has a constant bottom slope is 1400 cfs. A computation using Manning's equation indicates that the normal depth is 6.0 ft. At a certain section the depth of flow in the channel is 2.8 ft. Does the depth increase, decrease, or remain the same as one proceeds downstream from this section? Sketch a physical situation where this type of flow will occur.

Q2

A laboratory flume (n = 0.012) is 10 inches wide and set on a slope of 0.0003. With a measured flow of 0.1516 cfs the depth is observed to vary between 0.361 and 0.366 ft. Classify the water-surface profile as one of the forms of Fig. 10.20. Show all necessary calculations, and sketch the profile.

Q3

A rectangular channel 10 ft wide carries 120 cfs in uniform flow at a depth of 2.00 ft. Suppose that an obstruction such as a submerged weir is placed across the channel, rising to a height of 8 in above the bottom. (a) Does this obstruction cause a hydraulic jump to form upstream? Why or why not? (b) Find the water depth over the obstruction, and just upstream of it. Classify the surface profile, if possible, to be found upstream from the weir. Sketch the resulting water surface profile and energy line, showing y_c *and* y_0*.*

Q4

Analyze the water-surface profile in a long rectangular channel (n = 0.014). The channel is 12 ft wide, the flow rate is 480 cfs, and there is an abrupt change in slope from 0.0019 to 0.018. Make a sketch showing normal depths, critical depths, and water surface profile types.

Q5

In an 8-ft-wide rectangular channel (n = 0.015) water flows at 300 cfs. A low dam (broad-crested weir) placed in the channel raises the water to a depth of 8.0 ft. Analyze the water-surface profile upstream from the dam back to uniform depth if the channel slope is (a) 0.0006, (b) 0.0009, and (c) 0.006.