CWR 5235 Open Channel Hydraulics
Homework 3
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Name of Student: _____

1. The initial flow conditions in an estuary are given by a velocity V_o = 3ft/s (0.914 m/s) and depth y_o = 8ft (2.44 m), as shown in the figure below. The boundary condition at the mouth of the estuary (x = 0), is given by

$$\boldsymbol{y} = 8 - 2\,\mathbf{cos}\left(\frac{\pi \boldsymbol{t}}{6} - \frac{\pi}{2}\right) \qquad \text{For } 0 \le t \le 3 \text{ hr}$$

in which "t" is time in hours and $\boldsymbol{y}$ is the depth in feet at the estuary mouth (x = 0). Find (a) the water depth profile at t = 3 hr, (b) at t = 2 hr, how far upstream will the river level just begin to start falling? (Neglect bed slope and resistance effects: S_o = 0, S_f = 0), (c) determine the time in hours required for the water depth to drop to 6.50 ft at a distance of 25,000 ft upstream of the estuary mouth.