CVG3120-FALL 2015 – Assignment 4

PROBLEM 1

Assuming a routing time increment, Δt, of 30 min, determine the routing coefficient *x* and *K* for the Muskingum Method and the flowing hydrograph

I (ft^3/sec)	0	210	530	840	920	870	610	380	190	80	20
O (ft^3/sec)	0	10	90	230	480	620	710	690	540	440	190

PROBLEM 2

A portion of a river is modeled with two reaches, A and B. Reach A extends from section1 to section 2 and has a length of 20,000 ft, n = 0.07, S = 1 %, and Rh = 4 ft. Reach B extends from section 2 to section 3 and has a length of 15,000 ft, n = 0.05, S = 1% and Rh = 7 ft. The hydrograph at Section 1 is (200, 300, 700, 600, 500, 400, 350, 300, 250, 225, 210, 205, 200), with a time increment, Δt of 10 min. Assume the initial discharge at downstream sections is 200. Using the Convex Routing Method, (a) route the hydrograph from section 1 to section 2 and then from section 2 to section 3.

PROBLEM 3

A surface-storage facility has a rectangular bottom *(L* = 300 ft, *W* = 100 ft), with vertical ends (i.e., the length remains constant) and the sides with slopes of 20:1(h:v). The facility is used to control runoff from a residential area. Determine the stage-storage-discharge relationship assuming that outflow from the basin is controlled by a weir with a 9-ft length and C = 3.5. The weir invert is the same as the elevation of the bottom of the storage basin.

Assuming that the initial storage and discharge are zero, route the following hydrograph through the structure using the storage-indication method.

t (min)	0	15	30	45	60	75	90	105	120	135	150	165
q (ft3/sec)	0	30	75	120	175	160	125	85	55	35	20	10