MTech 2nd sem. Civil---Water Resources Systems

Tutorial Sheet Number--04

Q.1. Consider two crops 1 and 2. One unit of crop 1 brings four units of profit and one unit of crop 2 brings five units of profit. The demand of production of crop 1 is A units and that of crop 2 is B units. Let *x* be the amount of water required for A units of crop 1 and *y* be the same for B units of crop 2.

The linear relations between the amounts of crop produced (i.e., demands A and B) and the available water (i.e., x and y) for two crops are shown below. $A = 0.5(x - 2) + 2$ $B = 0.6(y - 3) + 3$ Minimum amount of water that must be provided to 1 and 2 to meet their demand is two and three units respectively. Maximum availability of water is ten units. Find out the optimum pattern of irrigation.

Q2. A construction contractor has three options to purchase a dump truck for transportation and dumping of soil at a construction site. All the alternatives have the same useful life. The cash flow details of all the alternatives are provided as follows;

Option-1: Initial purchase price = Rs.2500000, Annual operating cost Rs.45000 at the end of 1st year and increasing by Rs.3000 in the subsequent years till the end of useful life, Annual income = Rs.120000, Salvage value = Rs.550000, Useful life = 10 years.

Option-2: Initial purchase price = Rs.3000000, Annual operating cost = Rs.30000, Annual income Rs.150000 for first three years and increasing by Rs.5000 in the subsequent years till the end of useful life, Salvage value = Rs.800000, Useful life = 10 years.

Option-3: Initial purchase price = Rs.2700000, Annual operating cost Rs.35000 for first 5 years and increasing by Rs.2000 in the successive years till the end of useful life, Annual income = Rs.140000, Expected salvage value = Rs.650000, Useful life = 10 years.

Using present worth method, find out which alternative should be selected, if the rate of interest is 8% per year.