1st Question:

A pumping station working 12 hours a day is pumping water to a distribution reservoir through a transmission line of length 2500 m in order to supply the water demand of a population of 21600. The water level of supply reservoir is 25 m and distribution reservoir is 100 m. Neglecting the local head losses, calculate the required power of pump (mean $q_{day} = 150 \text{ l/ind./day}$, $\alpha = 1.5$, $f = 0.03$, $\eta = 0.65$, also $D = D_e$).

2nd Question:

The transmission line (seen in the figure) having 40 cm pipe diameter is used to transmit water from supply reservoir A to distribution reservoir D. It is originally planned for 30 000 people, but its capacity is reached and a new planning is necessary for 50 000. If it is not possible to reconstruct the transmission line, find the power and location of a pumping station which is to be made on the transmission line (max $q_{day} = 200 \text{ l/ind./day}$, $f = 0.03$, $\eta = 0.65$).