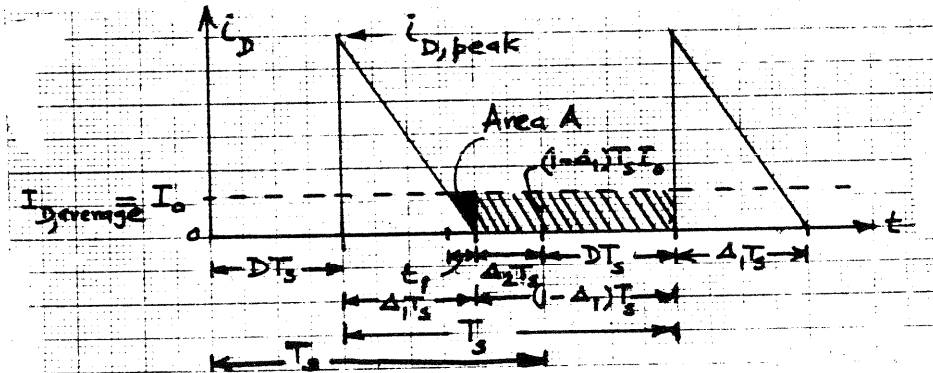


Problem 7-15



7-9

$$\Delta Q = (1-\Delta_1)T_s I_o + \text{Area A}$$

From the figure above,

$$\frac{t_1}{\Delta_1 T_s} = \frac{I_o}{i_{D,\text{peak}}} ; t_1 = \frac{\Delta_1 T_s I_o}{i_{D,\text{peak}}}$$

$$i_{D,\text{peak}} = i_{L,\text{peak}} = \frac{V_d}{L} D T_s ; \text{ From Eq. 7-52, } \Delta_1 = \frac{V_d}{V_o} \cdot D$$

$$\therefore t_1 = V_o \frac{I_o}{L} = \frac{L I_o}{V_o} = \frac{L}{R} \text{ where } R = \text{load resistance}$$

$$\therefore \text{Area A} = \frac{1}{2} I_o t_1 = \frac{1}{2} \frac{L I_o}{R}$$

$$\therefore \Delta V_o = \frac{\Delta Q}{C} = \frac{1}{C} \left[(1 - D \frac{V_d}{V_o}) T_s I_o + \frac{1}{2} L \frac{I_o}{R} \right]$$