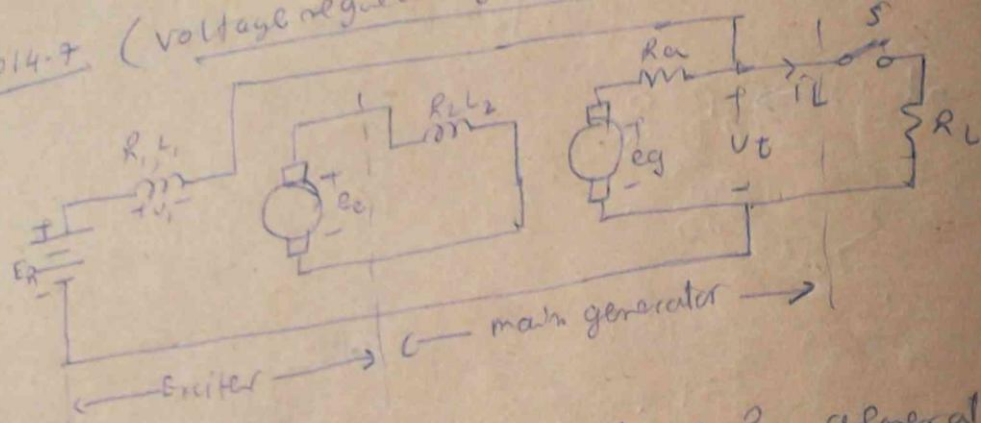


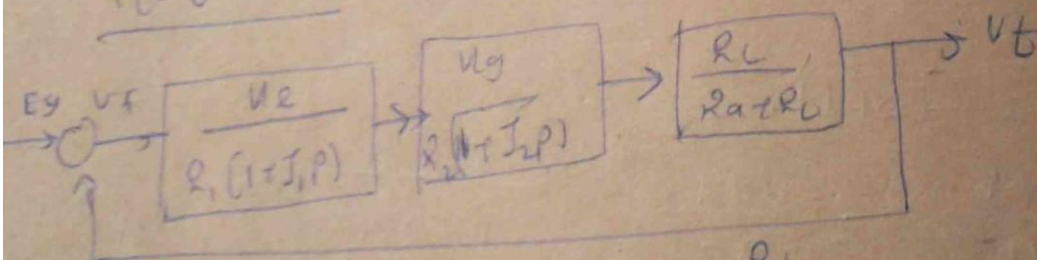
Prob 14-7 (Voltage regulation)



Exciter \rightarrow field inductance L_1 , field resistance R_1 , generated voltage E_e

main generator \rightarrow field inductance L_2 , field resistance R_2 , generated voltage E_g
armature resistance.

a) at 100% load: $V_t = 250V$, $R_L = 10\Omega$, $R_a = 0.2\Omega$, $R_1 = 0.5\Omega$, $R_2 = 0.5\Omega$
Find E_g ? {steady state - $p=0$ }



$$\frac{V_t}{E_g} = \frac{\frac{V_e}{R_1(1+j\omega L_1 p)} \cdot \frac{V_g}{R_2(1+j\omega L_2 p)} \cdot \frac{R_L}{R_a + R_L}}{1 + \frac{V_e}{R_1(1+j\omega L_1 p)} \cdot \frac{V_g}{R_2(1+j\omega L_2 p)} \cdot \frac{R_L}{R_a + R_L}}$$

100% load $E_g = 250V$