54. (a) When switch S is just closed (case I), $V_1 = \mathcal{E}$ and $i_1 = \mathcal{E}/R_1 = 10\,\text{V}/5.0\,\Omega = 2.0\,\text{A}$. After a long time (case II) we still have $V_1 = \mathcal{E}$, so $i_1 = 2.0\,\text{A}$.

(b) Case I: since now $\mathcal{E}_L = \mathcal{E}$, $i_2 = 0$; case II: since now $\mathcal{E}_L = 0$, $i_2 = \mathcal{E}/R_2 = 10\,\text{V}/10\,\Omega = 1.0\,\text{A}$.

(c) Case I: $i = i_1 + i_2 = 2.0\,\text{A} + 0 = 2.0\,\text{A}$; case II: $i = i_1 + i_2 = 2.0\,\text{A} + 1.0\,\text{A} = 3.0\,\text{A}$.

(d) Case I: since $\mathcal{E}_L = \mathcal{E}$, $V_2 = \mathcal{E} - \mathcal{E}_L = 0$; case II: since $\mathcal{E}_L = 0$, $V_2 = \mathcal{E} - \mathcal{E}_L = \mathcal{E} = 10\,\text{V}$.

(e) Case I: $\mathcal{E}_L = \mathcal{E} = 10\,\text{V}$; case II: $\mathcal{E}_L = 0$.

(f) Case I: $di_2/dt = \mathcal{E}_L/L = \mathcal{E}/L = 10\,\text{V}/5.0\,\text{H} = 2.0\,\text{A/s}$; case II: $di_2/dt = \mathcal{E}_L/L = 0$.