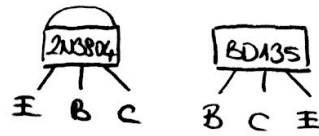
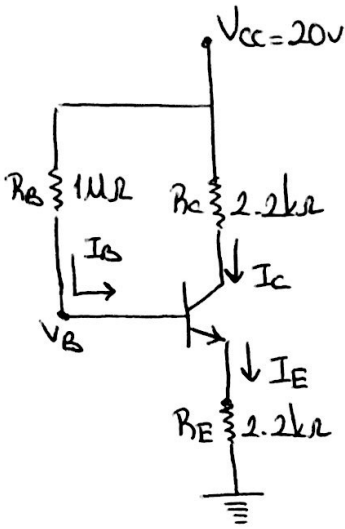


Part 1



2)



$$I_B = \frac{20 - V_B}{1M\Omega}$$

$$V_B = 20 - I_B \cdot 1M\Omega$$

$$I_B = \frac{I_E}{\beta + 1}$$

$$V_E = V_B - 0.7V$$

$$I_E = \frac{V_E}{2.2k\Omega} = (\beta + 1) \cdot I_B$$

$$I_B = \frac{(V_E / 2.2k\Omega)}{\beta + 1} = \frac{(V_B - 0.7)}{(2.2k\Omega)(\beta + 1)} \Rightarrow V_B - 0.7 = 20 - I_B \cdot 1M\Omega - V_{BE}$$

$$I_B = \frac{20 - I_B \cdot 1M\Omega - V_{BE}}{(2.2k\Omega)(\beta + 1)} \rightarrow I_B \cdot (2.2k\Omega)(\beta + 1) = 20 - I_B \cdot 1M\Omega - V_{BE}$$

$$I_B \cdot (2.2k\Omega)(\beta + 1) + I_B \cdot 1M\Omega = 20 - V_{BE}$$

$$I_B (1M\Omega + (2.2k\Omega)(\beta + 1)) = 20 - V_{BE}$$

$$I_B = \frac{20 - V_{BE}}{1M\Omega + (2.2k\Omega)(\beta + 1)}$$

$$V_B = 20 - I_B \cdot 1M\Omega$$

$$V_C = 20 - I_C \cdot (2.2k\Omega)$$

$$V_E = V_B - 0.7V$$

$$V_{BE} = 0.7V$$

$$V_{CE} = V_C - V_E$$