

active buzzer
 $I_{max} = 30 \text{ mA}$
 $V = 3.5 - 5.5 \text{ V}$



Want to operate at 20 mA

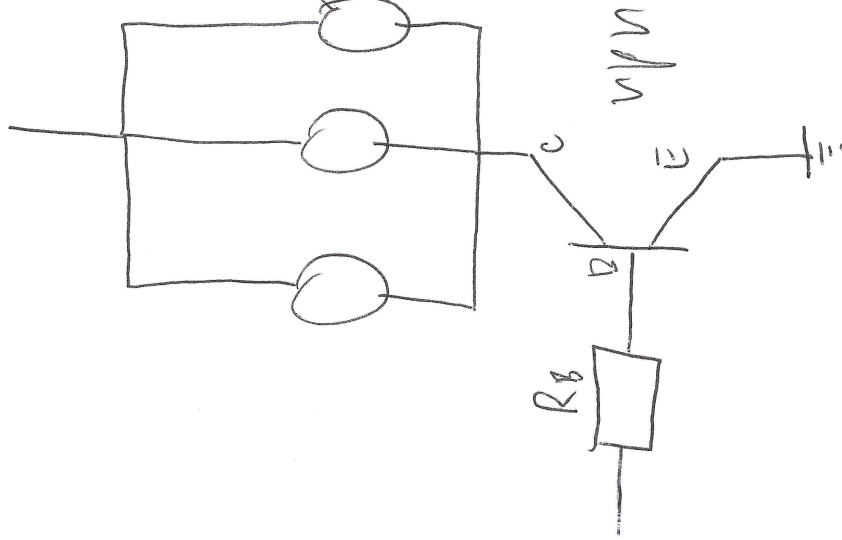
$$\Rightarrow \underline{I_C = 60 \text{ mA}}$$

$$\alpha \approx 1 \Rightarrow I_E = \frac{I_C}{\alpha} = \underline{60 \text{ mA}}$$

$$R_E = \frac{V_{BMS} - V_{BE}}{I_E} = \frac{5 - 0.7}{60 \cdot 10^{-3}} = 71.7 \Omega$$

$$\underline{\underline{\text{take } R_E = 70 \Omega}}$$

5V



Digital pin
out Arduino
(5V)

active buzzer
 $I_{max} = 30mA$
 $V = 3.5 \sim 5.5$



Want to operate at $20mA$

$$\therefore I_C = 60mA \quad \beta \approx 100$$

$$I_B = \frac{I_C}{\beta} = \frac{60 \cdot 10^{-3}}{100} = 600\mu A$$

$$R_B = \frac{V_{DD} - V_{BE}}{I_B} = \frac{5 - 0.7}{600 \cdot 10^{-6}} = 7.2k$$

take $R_B = 7k$