Lab Meeting Dec 9, 2021

- Plans for the break
- Lab access
- Group meetings for next semester

Optical Power Meter

- Goal - design parameters
  - Wavelength range: 405 nm – 800 nm
  - Power range: 0.1 mW up to 400 mW
  - Precision: 3 sig figs
    - Up to 400 mW with micro-watt precision…. 400,000 = 19 bits
    - 16 bits plus ~~10x attenuator~~ 60 2
  - Hand held, battery powered, with display
  - Controller and wand
  - Home
  - USB interface???
  - Input for wavelength, calibrate
- Design (Electrical)
- Breadboard, calibrate, and test
- Revise
- Mechanical Design
- Tests

$R(\lambda) = 0.1 \text{ to } 0.6 \frac{A}{W}$

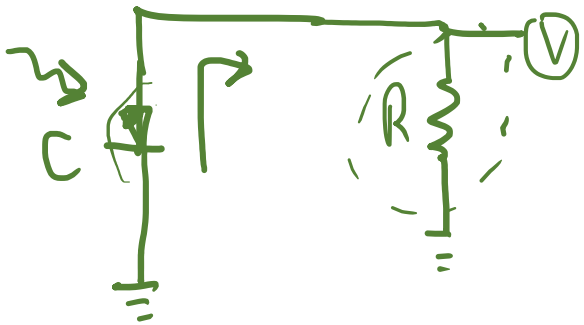
$I_{min} = 0.1 \frac{A}{W} \cdot 10^{-4} W = 10^{-5} A$

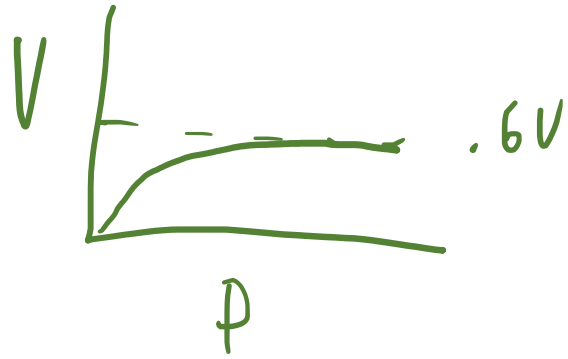
$I_{max} = 0.6 \frac{A}{W} \cdot 0.4 W = 0.24 A$

$10^{-5} A$ 3 sig figs $10^{-7} A$ $10^{-7} A$ 2.4×10^{-1}

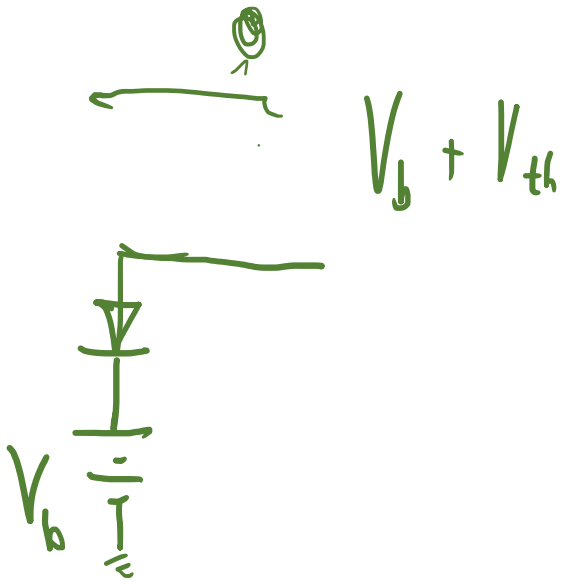
$0.24 A$

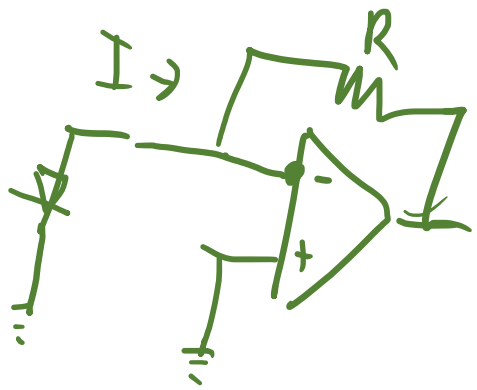
$2^{16} = 65,000,100$



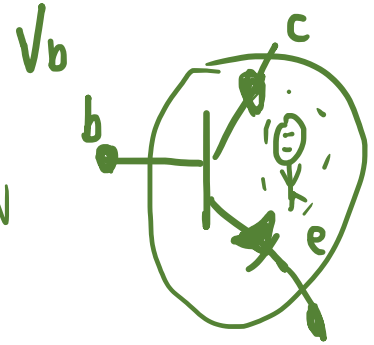


RC

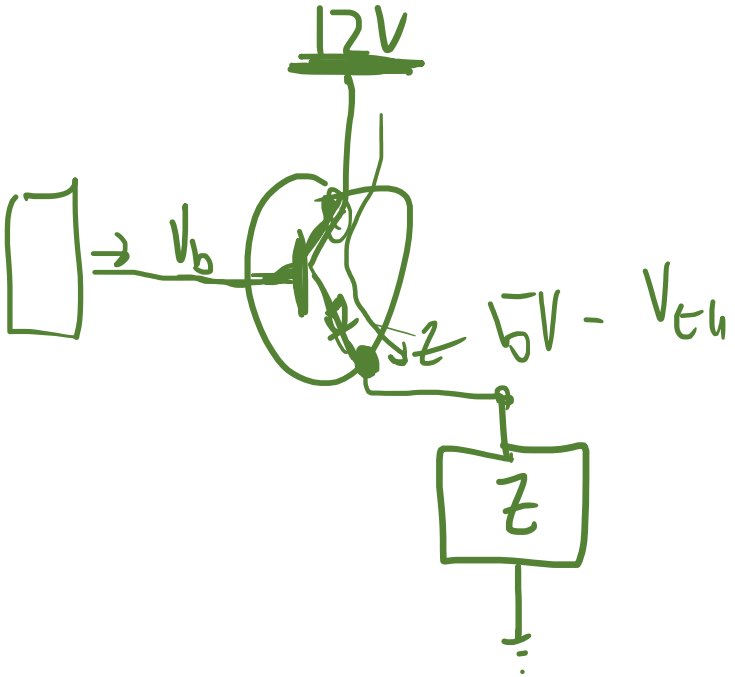


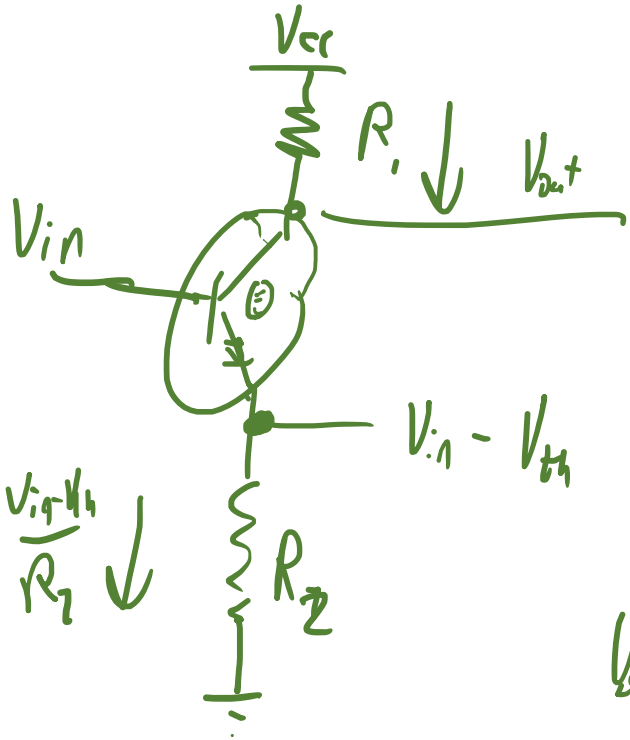


$V = -IR$



$$V_e = V_b - V_{th}$$

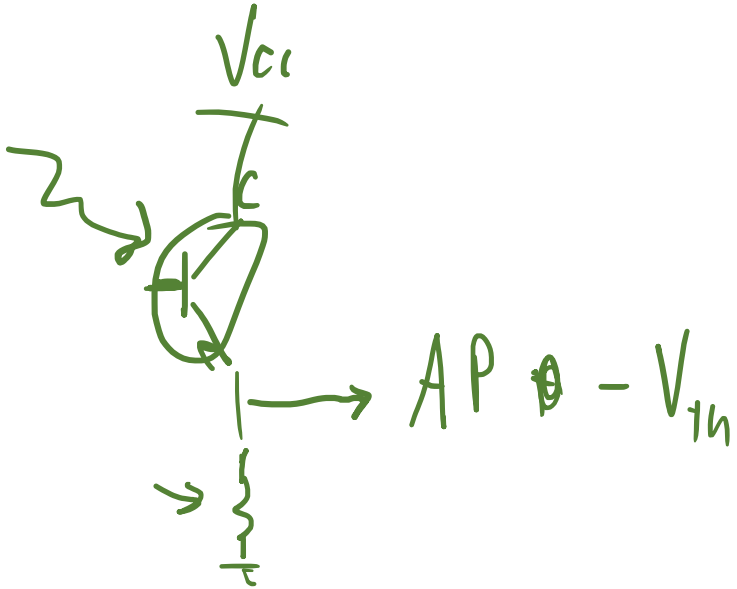


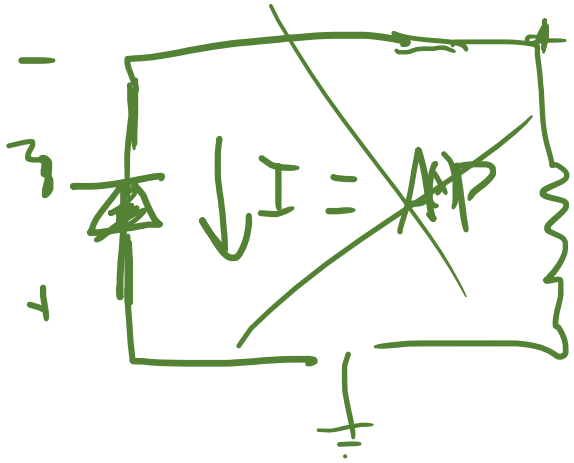


$$V_{cc} - \frac{V_{in} - V_{th}}{R_2} R_1$$

$$I = \frac{V_{in} - V_{th}}{R_1}$$

$$V_{out} = V_{cc} + \frac{V_{Th} R_1}{R_2} - V_{in} \frac{R_1}{R_2}$$





$10^{-7}A$ — 1 bit $\quad \frac{5V}{65{,}000} = 10^{-4}$

$$G = \frac{10^{-4}V}{10^{-7}A} = 1000\ \Omega$$