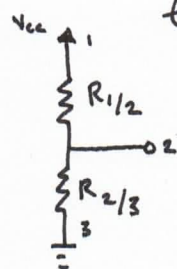


HW: Potentiometers

7.21.14

- ① Refer to the pot. diagram below to answer a) through e). Fill out the table throughout this question.



$R_{1/2}$	$R_{2/3}$	θ
		$0 \cdot \theta_f$
		$\frac{1}{2} \cdot \theta_f$
		$\frac{3}{4} \cdot \theta_f$
		θ_f
$\frac{1}{4} R_p$		

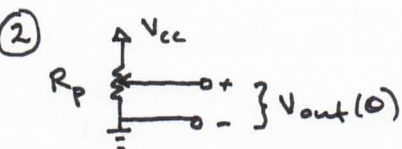
a) What does $R_{1/2}$ plus $R_{2/3}$ equal?

b) What is $R_{1/2}$ a function of?
 $R_{1/2} = f(?)$

c) With $\theta = 0$, what is $R_{1/2}$? ($R_{1/2}(\theta = 0) = ?$)

d) What is the range of θ ? $\theta \in [_, _]$
 ↑
 "has range"

e) In symbols, what does $R_{1/2}(\theta)$ equal? Write the formula in the format of $R_{1/2}(\theta) = ?$



Given that: $V_{cc} = 20V$, $R_p = 5k\Omega$, and $V_{out}(\theta = 0) = 0V$;

a) What is V_{out} when $\theta = \frac{1}{2}\theta_f$? ($V_{out}(\theta = \frac{1}{2}\theta_f) = ?$)

b) What is V_{out} when $\theta = \frac{2}{3}\theta_f$?

c) What is V_{out} as a function of θ_f ? Write the general formula.

③ Is V_{out} a function of θ ? With equations and words, show why or why not.



- ④ θ can go from 0° to 60° , for a $5\text{ k}\Omega$ pot. ($R_p = 5\text{ k}\Omega$).
What is C (the constant) for our pot, including UNITS?
- ⑤ Use an analogy between water and electricity to think about a motor.
- Draw a system diagram for a motor, with at least one input and one output.
 - Draw a system diagram for a "waterland" motor (thinking about what the component would be), using a one-to-one replacement of the diagram you drew for part a.
 - Describe in at least one sentence what the output of your water analogous motor is.
 - What could the water analogous device be? List at least one device and explain your rationale.