

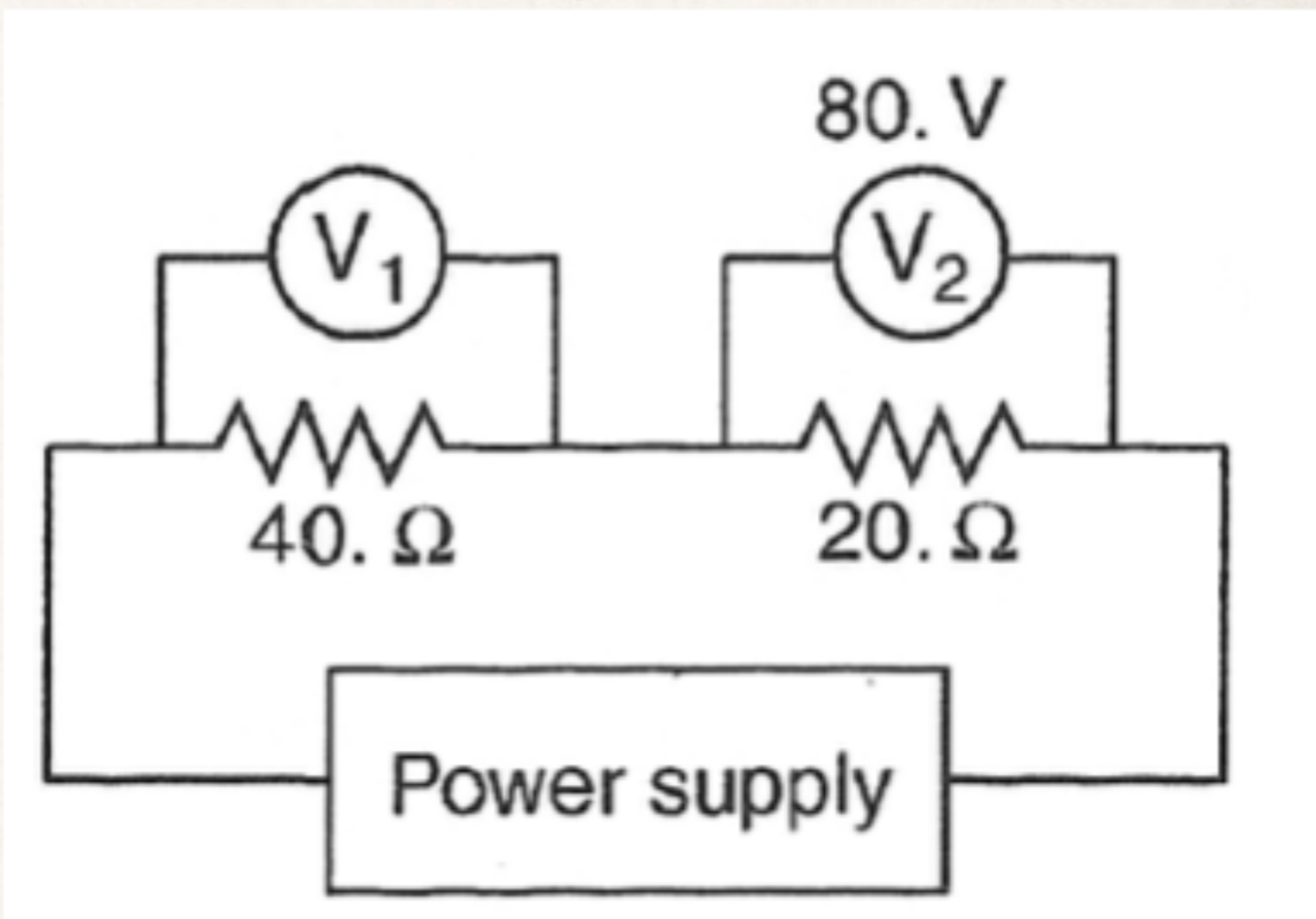


Electricity Review

Honors Physics

Question 1

- ◆ In the circuit shown below, voltmeter V_2 reads 80 V
- ◆ What is the reading of voltmeter V_1 ?
- ◆ *Answer: $V_1 = 160 \text{ V}$*

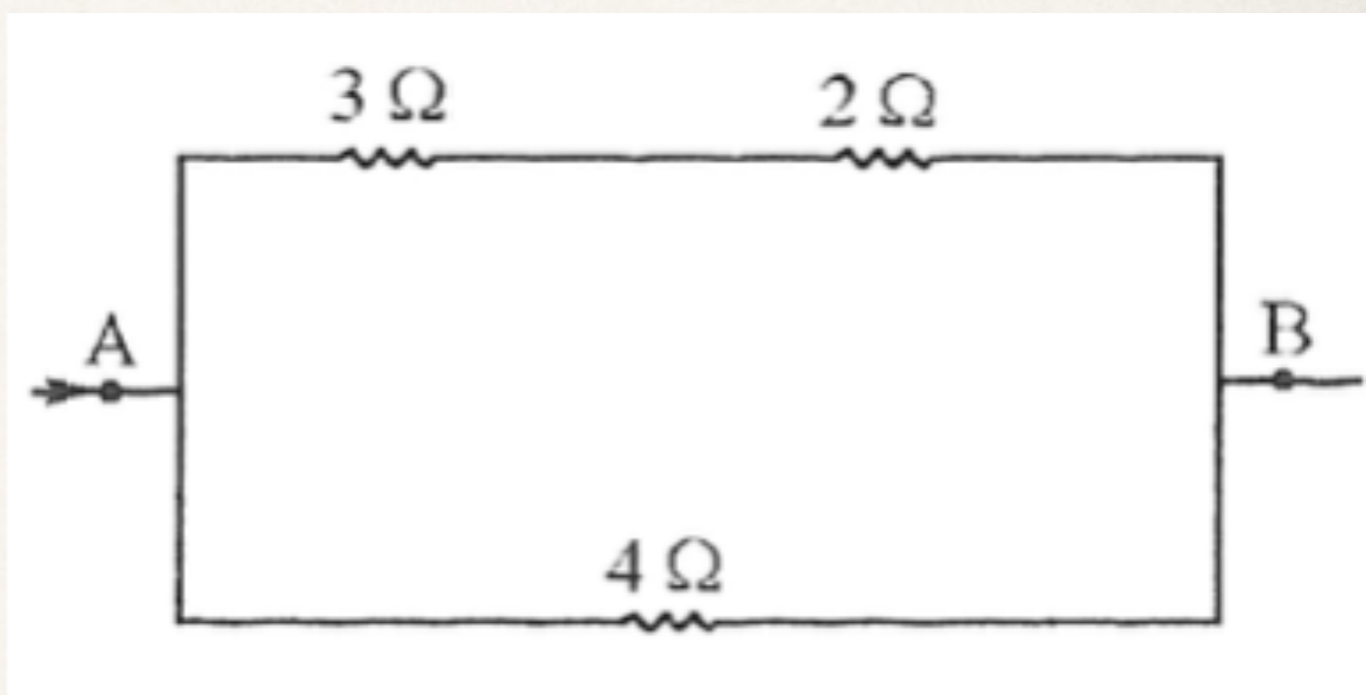


Question 2

- ◆ If you wanted to measure the current through and voltage across a resistor, would you attach your voltmeter in series or parallel with that resistor? What about an ammeter? Why?
- ◆ *Answer: Voltmeter in parallel. Voltage is equal in parallel. Ammeter in series. Current is equal in series.*

Question 3

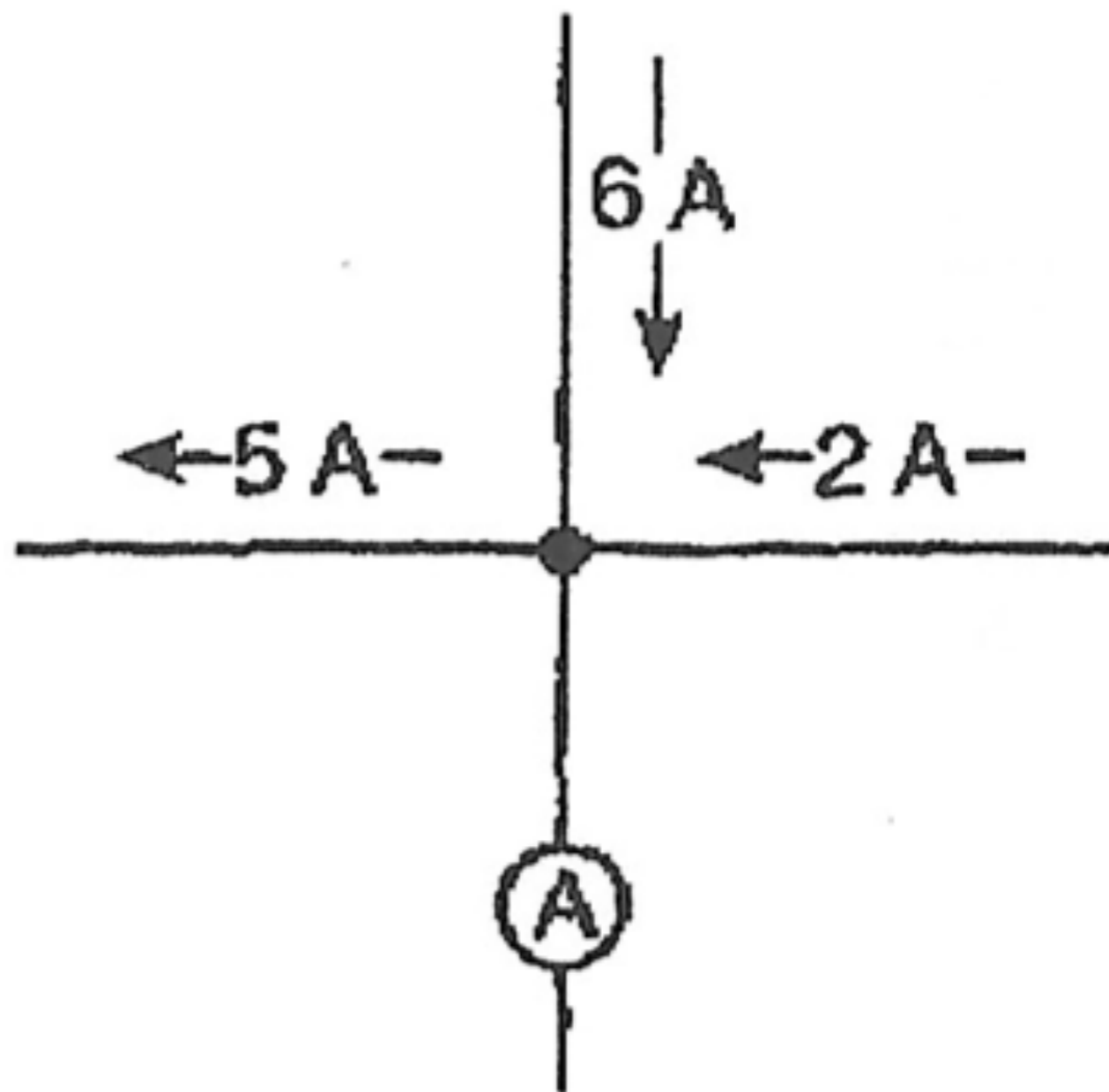
- ◆ If the potential difference between A and B is 4 V , how much charge will pass through the $4\ \Omega$ resistor in 5 seconds?



- ◆ *Answer: 5 C*

Question 4

- ◆ The diagram below shows currents in a segment of an electric circuit. What is the reading of the ammeter A ?



- ◆ *Answer: 3 A*

Question 5

- The following is a table which gives the dimensions of several resistors.

	ρ (Ωm)	L (mm)	A (mm^2)
A	2.8×10^{-8}	0.6	0.075
B	3.5×10^{-8}	1.0	0.18
C	4.9×10^{-7}	1.55	0.38
D	5.8×10^{-8}	2.0	0.54

- Which two resistors have the same resistance?

Answer: B and D

Question 6

- ◆ The following is a table which gives the dimensions of several parallel plate capacitors.

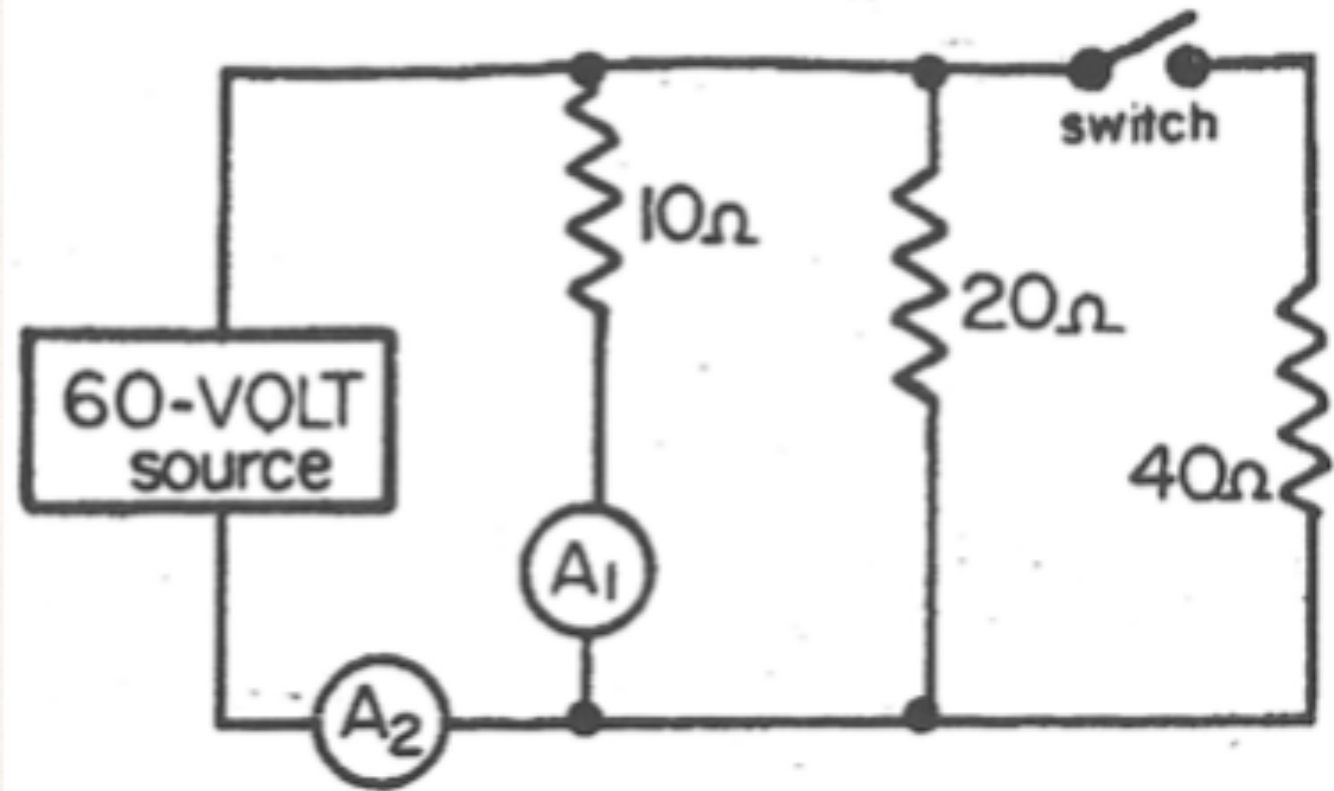
Capacitor	Plate Length	Plate Width	Separation Between Plates
A	l	w	d
B	$2l$	w	d
C	$2l$	$2w$	d
D	$2l$	$2w$	$2d$
E	l	w	$2d$

- ◆ Which capacitor has the greatest capacitance?

◆ **Answer: C**

Question 7

- ◆ The switch is in the open position.
- ◆ Compared to the potential drop across the $10\ \Omega$ resistor, is the potential drop across the $20\ \Omega$ resistor greater, less, or equal?

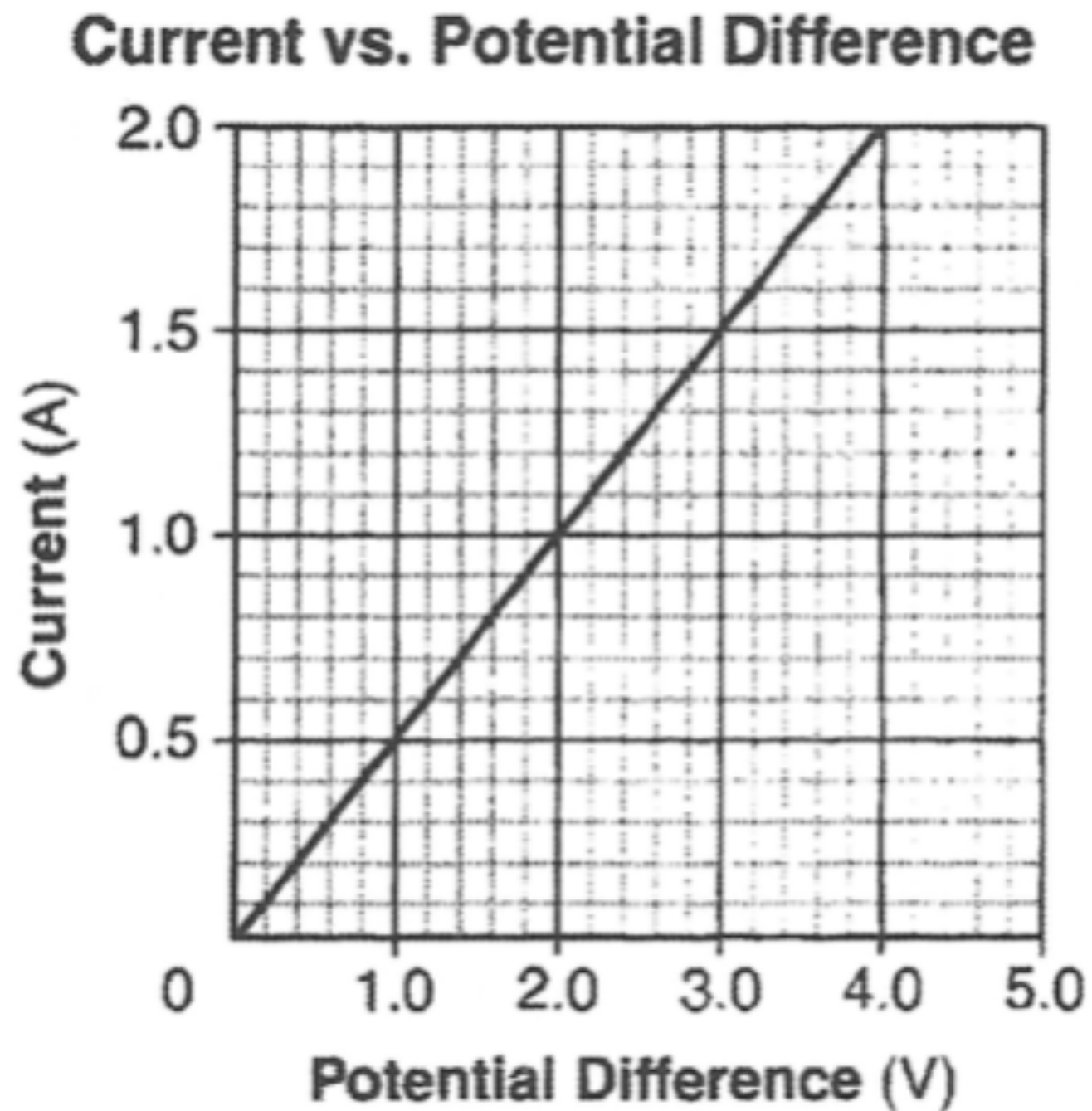


- ◆ *Answer: equal*

Question 8

- ◆ The graph below represents the relationship between the current in a metallic conductor and the potential difference across the conductor at constant temperature.
- ◆ What is the resistance of the conductor?

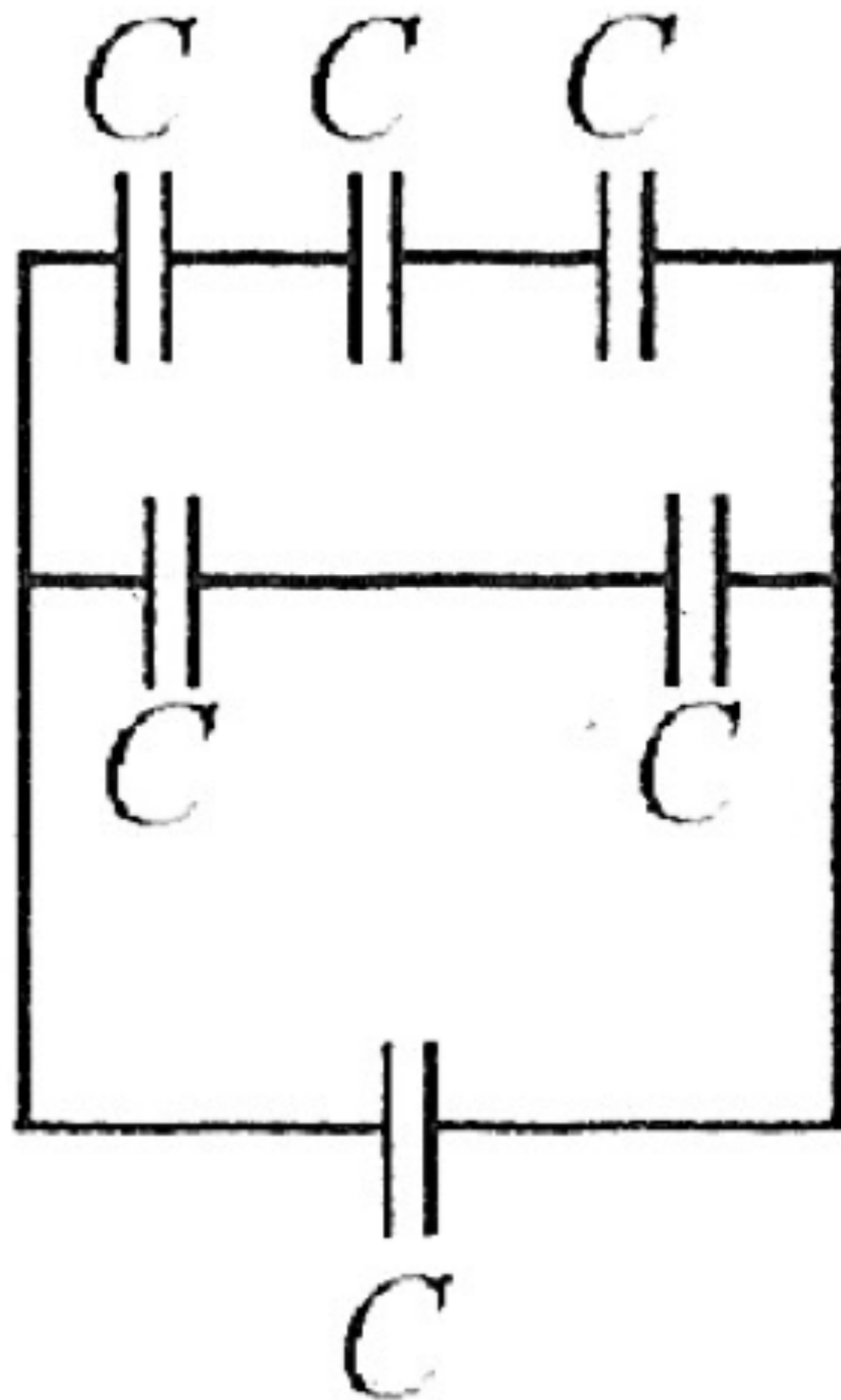
◆ *Answer: 2 Ω*



Question 9

- ◆ In the diagram below, if the capacitance of each capacitor is C , what is the equivalent capacitance of the circuit?

- ◆ *Answer:* $C_T = 11C/6$



Question 10

- ◆ In a voltmeter, would it be more effective to have a high or low internal resistance? What about in an ammeter? Why?
- ◆ *Answer: Voltmeters have high internal resistance ($\sim 10 \text{ M}\Omega$). Ammeters have low internal resistance ($\sim 0.5 \Omega$).*

Question 11

- ◆ How much time is required for an operating 100 W light bulb to dissipate 10 J of electrical energy?
- ◆ *Answer: 0.1 seconds*

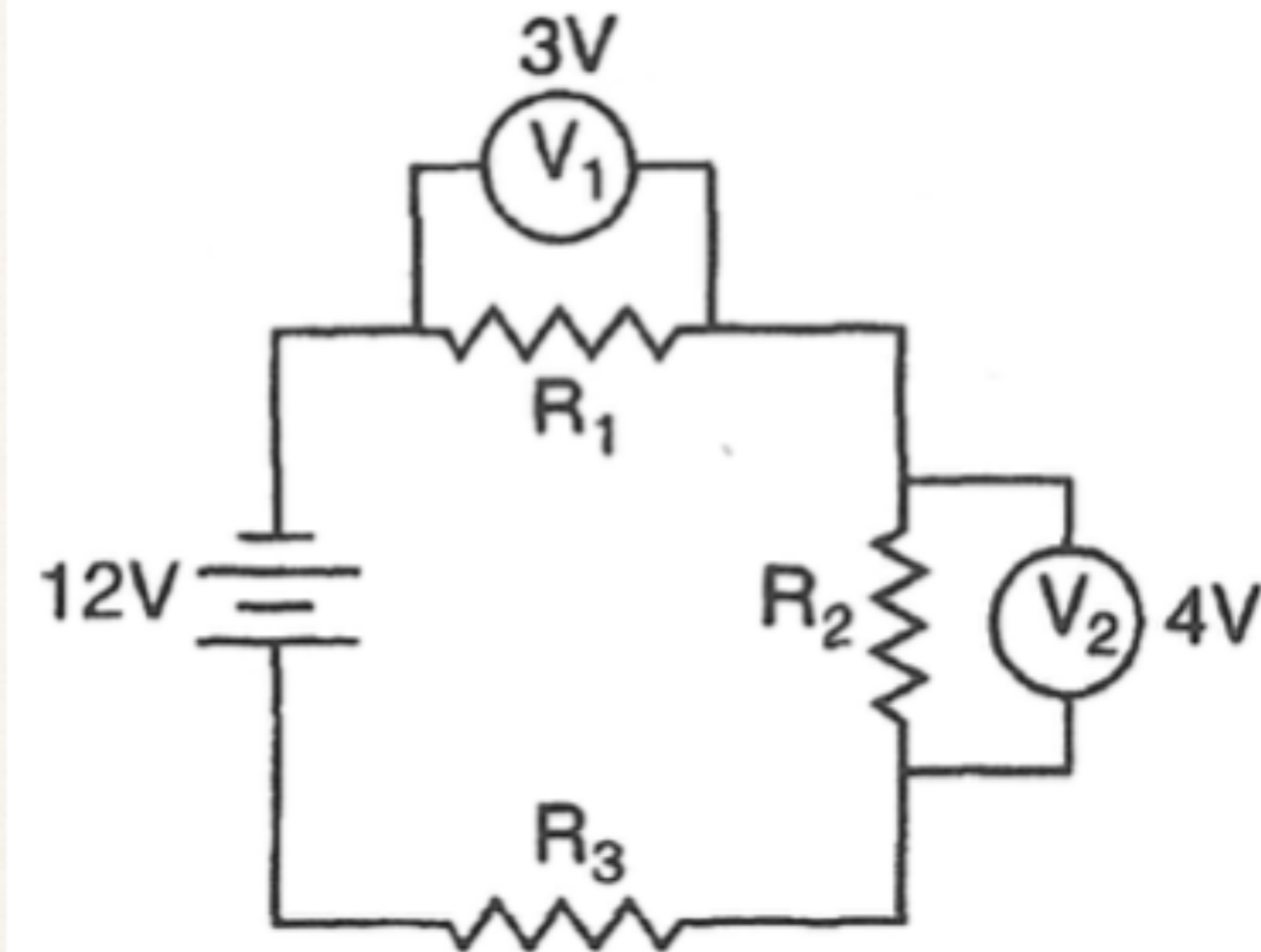
Question 12

◆ The current traveling from the cathode to the screen in my grandparents' television picture tube is 5×10^{-5} A. How many electrons strike the screen in 5.0 seconds?

◆ *Answer: 1.6×10^{15}*

Question 13

- ◆ In the diagram below, if the voltmeter V_1 reads 3 V and voltmeter V_2 reads 4 V, what is the potential drop across resistor R_3 ?



- ◆ *Answer: $V_3 = 5\text{ V}$*

Question 14

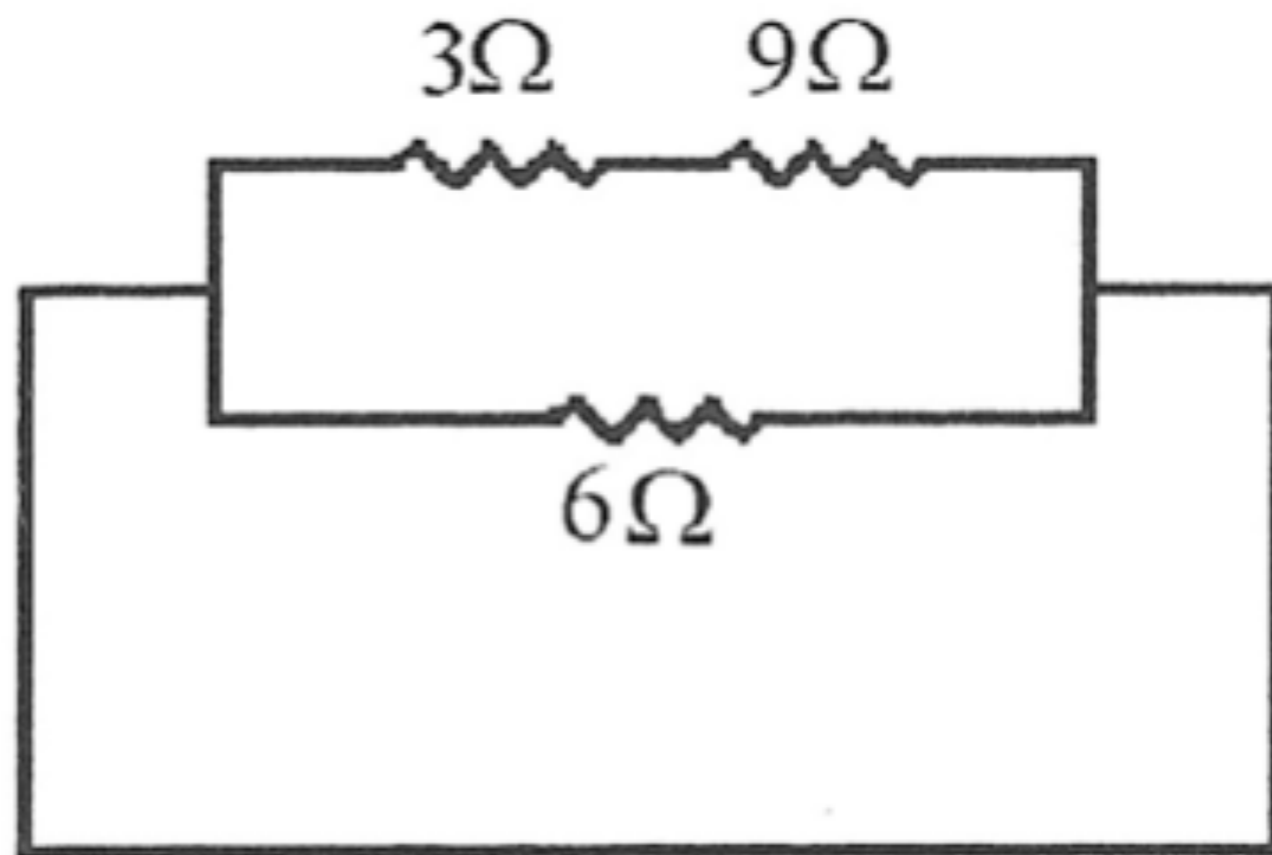
- ◆ What is a superconductor? Do they work better at high or low temperatures?
- ◆ *Answer: A superconductor is any material with exactly no resistance to the flow of current. They only work at low temperatures.*

Question 15

- ◆ Determine the equivalent resistance of the circuit below. If you hooked up a 12 V battery to this circuit, what would be the current through each of the resistors?

◆ *Answer: $R_T = 4 \Omega$;*

◆ *$I_{3\Omega} = 1 \text{ A}, I_{9\Omega} = 1 \text{ A}, I_{6\Omega} = 2 \text{ A}$*



Question 16

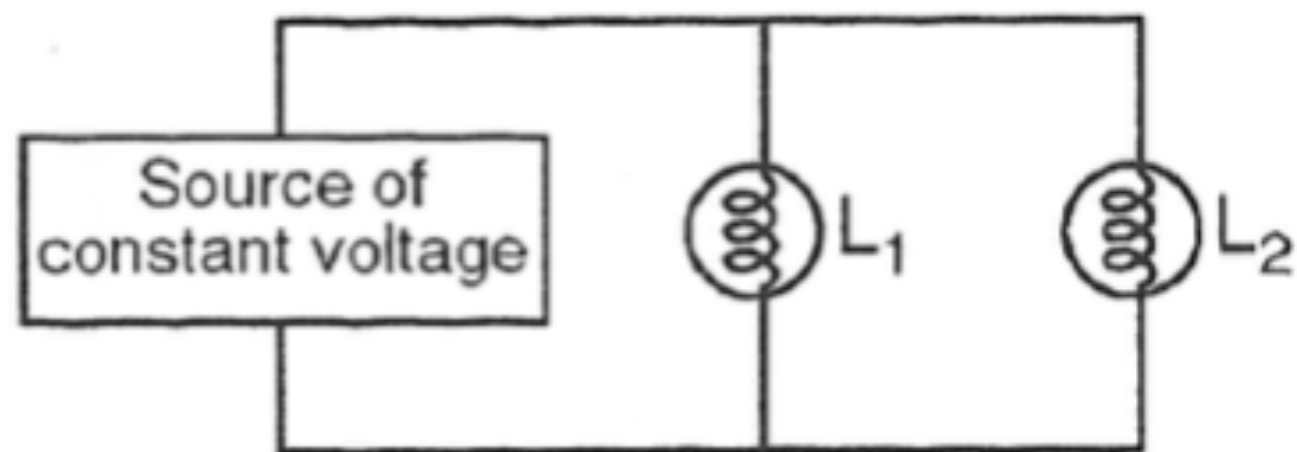
- ◆ What is the power dissipated by a circuit that consists of three $2\ \Omega$ resistors connected in parallel with a $12\ \text{V}$ battery?
- ◆ *Answer: $P = 216\ \text{W}$*

Question 17

- ◆ A $20\ \Omega$ resistor has $40\ \text{C}$ passing through it in 5.0 seconds. What is the potential difference across the resistor?
- ◆ *Answer: $V = 160\ \text{V}$*

Question 18

- ◆ In the diagram below, lamps L_1 and L_2 are connected to a constant voltage power supply.
 - ◆ If lamp L_1 burns out, will the brightness of L_2 increase, decrease, or stay the same? Why?



- ◆ *Answer:* The brightness of L_2 will stay the same because the voltage across it will not change.

Question 19

- ◆ A 50 W lightbulb and a 100 W light bulb are each operated at 100 V. What is the resistance of the 50 W bulb compared to the 100 W bulb?
- ◆ *Answer: half as great*

Question 20

- ◆ An electrical appliance draws 9.0 A of current when connected to a 120 V source of potential difference. What is the total amount of power dissipated by this appliance?
- ◆ *Answer: $P = 1100 \text{ W}$*