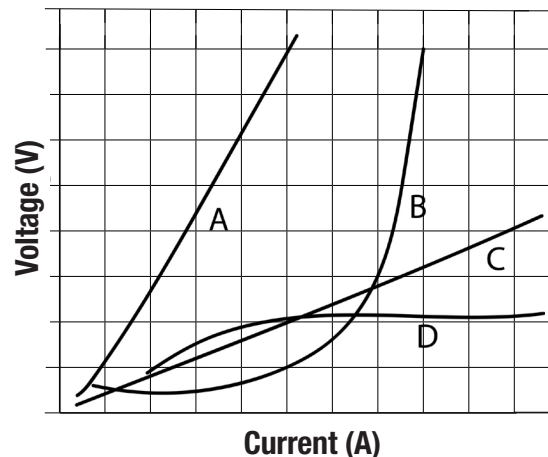


Work each of the following problems. SHOW ALL WORK.

4. To help keep cool during the summer months, you decide to design and build your own hand-held fan. The fan's electrical circuit will run on four AA batteries (1.5 V each) and must not exceed 50 mA of current. You search online and find that resistors are sold in five varieties: 5 Ω , 10 Ω , 12 Ω , 20 Ω , and 50 Ω . Each resistor costs 8 cents. What set of resistors should you buy to minimize cost?
5. As part of a SpaceX engineering team that is designing microcircuitry to control rocket launch angle, you must assess the power budget needed to operate four fin-control systems. Each system requires 0.16 mA for circuits with 3.4 m Ω of resistance. How much total voltage is needed to supply these circuits?
6. Which of the following materials (A, B, C, D) are Ohmic? Circle all that apply.

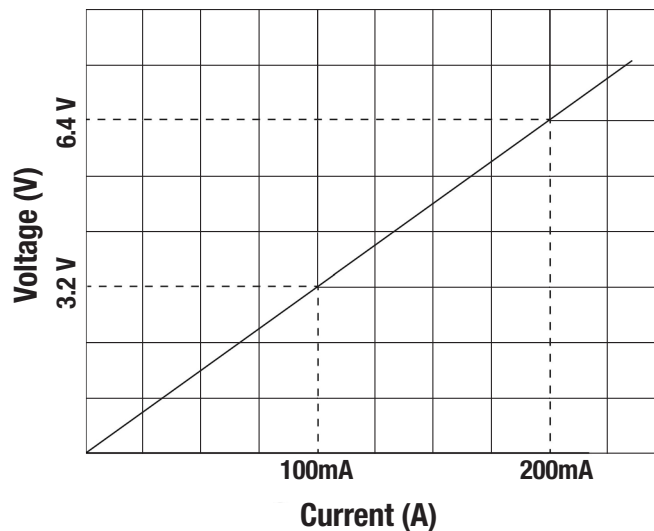
- a. A
 b. B
 c. C
 d. D



Work each of the following problems. SHOW ALL WORK.

7. In an electrical circuit, what happens to the current flowing through the wire if the initial voltage of 18 V is doubled, and the initial resistance of 35Ω is reduced by a factor of four?

8. This graph shows the relationship between current and voltage for an unknown metal. What is the resistance of the metal?



9. If a current of 1.1 A flows through a 7Ω resistor of length 3 m, what is the electric field strength inside the resistor?