

## Chapter 26

### Term083

Q17. A 10-ohm resistor has a constant current. If 1200 C of charge flow through it in 4 minutes what is the value of the current?

A) 5.0 A

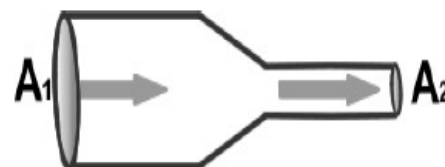
Q18. Two cylindrical resistors R1 and R2 are made from the same material and have the same length. When connected across the same battery, R1 dissipates twice as much power as R2. The ratio of diameter of resistor R1 to that of R2 is:

A)  $\sqrt{2}$

Q19. A carbon resistor has a resistance of 18  $\Omega$  at a temperature of 20°C. What is its resistance at a temperature of 120 °C? (The temperature coefficient of resistivity for carbon is  $-5.0 \times 10^{-4} / \text{C}^\circ$ .)

A) 17  $\Omega$

Q20. Electric charges flow through a wire shaped as shown in Fig. 5. The cross-sectional areas are  $A_1 = 4 \text{ mm}^2$  and  $A_2 = 1 \text{ mm}^2$  respectively. What is the drift speed of the electrons in the narrow section of the wire if their speed is 0.08 m/s in the wider region?



A) 0.32 m/s

### Term082

Q18. A certain resistor dissipates 0.500 W when connected to a 3.00 V potential difference. When connected to a 1.00 V potential difference, this resistor will dissipate:

A) 0.0556 W

Q19. How much would the temperature of a copper wire have to be increased to raise its resistance by 20% over the value it had at 20 °C? The temperature coefficient of resistivity of copper is  $0.0040 (\text{C}^\circ)^{-1}$ .

Neglect any change in length or cross sectional area due to the change in temperature.

A)  $50\text{ C}^{\circ}$

Q20. Two light bulbs operate from a 120-V voltage source. Bulb A has a power rating of 25.0 W and bulb B has a power rating of 100 W. Which of the following statements is CORRECT?

A) Resistance of A is larger than resistance of B.

B) Resistance of A is smaller than resistance of B.

C) The current through A is higher than the current through B.

D) The resistances of the two bulbs are the same.

E) The currents through the two bulbs are the same.

### Term081

Q19. A current of 0.300 A is passed through a lamp (light bulb) for 2.00 minutes using a 6.00 V power supply. The energy dissipated by this lamp during the 2.00 minutes is:

A) 216 J

Q20. A certain wire has resistance R. Another wire, of the same material, has half the length and half the diameter of the first wire. The resistance of the second wire is:

A) 2R

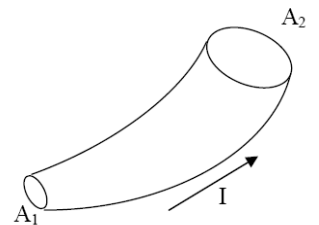
### Term073

Q17. A coffee maker, which draws 12.0 A of current, has been left on for 8.0 min. What is the net number of electrons that have passed through the coffee maker?

A)  $3.6 \times 10^{22}$

Q18. The figure represents a section of a circular conductor of non-uniform diameter carrying a current of 10.0 A. The cross-sectional area A1 has a radius of 0.400 cm. If the cross-sectional area A2 has a radius twice of that of cross-sectional area A1, then what is the current density at A2?

A)  $4.97\text{ A/cm}^2$ .



Q19. What would be the uniform cross-sectional area of a wire made out of 1.50 g of a metal having a resistance of  $0.600\ \Omega$ , and all of the metal was used to make the wire? Take the density of the metal to be  $8.92\ \text{g/cm}^3$  and resistivity  $1.69 \times 10^{-8}\ \Omega\text{-m}$ .

A)  $6.88 \times 10^{-8}\ \text{m}^2$ .

Q20. A light bulb is rated at 0.40 A and 3.0 V. At  $20\ ^\circ\text{C}$ , the bulb filament has a resistance of  $2.0\ \Omega$ . If the filament is made of tungsten, what is the temperature of the filament when bulb is on? The temperature coefficient of resistivity for tungsten is  $4.5 \times 10^{-3}\ \text{K}^{-1}$ .

A)  $630\ ^\circ\text{C}$

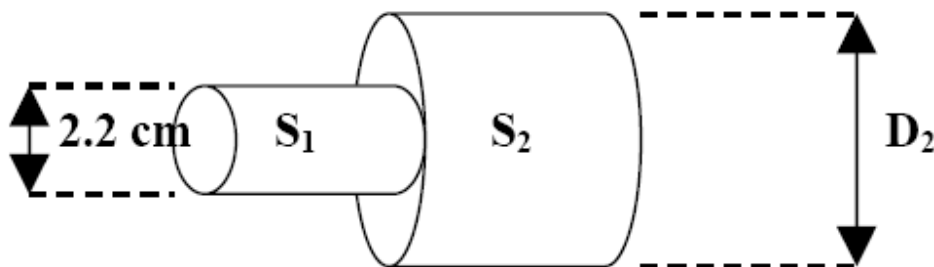
### Term072

Q17. An air-filled parallel-plate capacitor is connected across a 24 V battery. When the battery is disconnected and then a dielectric slab is inserted into and fills the region between the plates, the voltage across the capacitor drops to 8 V. What is the dielectric constant of the slab?

A) 3.0

Q18. Two wires, as shown in the figure below, are made of same material. If the current density through segment S1 is  $J_1 = 6400\ \text{A/m}^2$  and the current density through segment S2 is  $J_2 = 1239\ \text{A/m}^2$ , then the diameter  $D_2$  of segment S2 is:

A) 5.0 cm



Q19. Wires A and B are made from same material. Wire A has twice the diameter and half the length of wire B. If the resistance of wire A is  $20\ \Omega$ , the resistance of wire B is:

A)  $160\ \Omega$

Q20. A  $10\ \text{V}$  battery is applied across a  $15\ \text{W}$  device. How much charge goes through the device in 4.0 hours?

A)  $2.2 \times 10^4\ \text{C}$

### Term071

Q11. The resistivity of copper at  $20\ ^\circ\text{C}$  is  $1.7 \times 10^{-8}\ \Omega\cdot\text{m}$ . A copper wire has a length of  $5.0\ \text{m}$  and a cross sectional area of  $7.9 \times 10^{-7}\ \text{m}^2$ . What is the resistance of the wire at  $100\ ^\circ\text{C}$ . Assume that the area and length of the wire do not change. The temperature coefficient of resistivity for copper is  $\alpha = 4.1 \times 10^{-3}\ (\text{C}^\circ)^{-1}$ .

A)  $0.14\ \Omega$

Q12. A conducting wire has a length of  $3.0\ \text{m}$  and a resistance of  $0.35\ \Omega$ . When a potential difference is applied to the ends of the wire, a current of  $1.8\ \text{A}$  is produced in it. What is the magnitude of the electric field inside the wire?

A)  $0.21\ \text{V/m}$

Q17. The figure below shows 3 identical light bulbs connected to a battery. What happens to the power of light bulb 1 when the switch S is closed?

A) The power increases.

B) The power will increase momentarily then returns to its initial value.

C) The power will decrease momentarily then returns to its previous value.

D) The power remains the same.

E) The power decreases.

