Chapter 23 Electric Current

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Just as in hydraulic circuits there is water pressure, in electric circuits there is 1) _____
A) current. B) voltage. C) resistance.

2) Just as a sustained flow of water in a hydraulic circuit needs a pump, in electric circuits the flow of charge needs 2) _____
A) current. B) voltage. C) resistance.

3) A suitable electric pump in an electric circuit is a 3) _____
A) chemical battery. B) generator.
C) both of these D) neither of these

4) It is correct to say that in electric circuits 4) _____
A) charge flows through a circuit.
B) flowing charge is current.
C) voltage is applied across a circuit.
D) voltage is the ratio of energy per charge.
E) all of the above

5) If two copper wires of the same length have different thickness, then the thicker wire has 5) _____
A) more resistance. B) less resistance. C) both the same

6) Heat a copper wire and its electric resistance 6) _____
A) decreases. B) remains unchanged. C) increases.

7) Two light bulbs are connected to a battery, one at a time. The bulb that draws more current has the 7) _____
A) lower resistance, and is brightest.
B) lower resistance, but is dimmer.
C) higher resistance, and is brightest.
D) higher resistance, but is dimmer.
E) none of the above

8) When you turn on a lamp, the initial current in its filament is greater at first, rather than a moment later, which indicates 8) _____
A) something is faulty.
B) a time delay for current attaining its average speed.
C) increased temperature means increased resistance.
D) nothing of interest

9) Ohm's law tells us that the amount of current produced in a circuit is 9) _____
A) directly proportional to voltage. B) inversely proportional to resistance.
C) both of these D) neither of these

10) The voltage across a 10-ohm resistor carrying 5 A is 10) _____

A) 5 V.
B) 10 V.
C) 15 V.
D) 20 V.
E) more than 20 V.

11) The resistance of a filament that carries 2 A when a 10-V potential difference across it is 11) _____

A) 2 ohms.
B) 5 ohms.
C) 10 ohms.
D) 20 ohms.
E) more than 20 ohms.

12) Two lamps with different filament thicknesses, and therefore different resistances, are connected in series. Greater current is in the lamp with the 12) _____

A) thick filament. B) thin filament. C) same in each

13) If an electric toaster rated at 110 V is accidently plugged into a 220-V outlet, the current drawn by the toaster will be 13) _____

A) half its normal value. B) the same as its normal value.
C) twice its normal value. D) none of the above

14) The current in two identical light bulbs connected in series is 0.25 A. The voltage across both bulbs is 110 V. The resistance of a single light bulb is 14) _____

A) 22 ohms.
B) 44 ohms.
C) 220 ohms.
D) 440 ohms.
E) none of the above

15) Direct current is normally produced by a 15) _____

A) battery. B) generator.
C) both of these D) neither of these

16) Current that is typically 60 hertz is 16) _____

A) direct current. B) alternating current.
C) either of these D) neither of these

17) A capacitor is useful in 17) _____

A) boosting the energy output of a circuit.
B) increasing the current in a resistor.
C) smoothing pulsed current.
D) changing dc to ac in a circuit.
E) increasing or decreasing voltage.

18) An electric diode is useful for 18) _____
A) storing electrical energy.
B) boosting voltage.
C) limiting current.
D) voltage modification.
E) changing ac to dc.

19) The source of electrons in a simple electric circuit is 19) _____
A) the voltage source.
B) energy stored in the voltage source.
C) energy released by the voltage source.
D) the electrical circuit itself.
E) none of the above

20) The source of electrons that illuminate a common lamp in your home is 20) _____
A) the power company.
B) the electrical outlet.
C) atoms in the lamp filament.
D) the wires leading to the lamp.
E) the source voltage.

21) The source of energy that illuminates a lamp in your home is 21) _____
A) the power company.
B) the electrical outlet.
C) atoms in the bulb filament.
D) the wire leads to the lamp.
E) the source voltage.

22) The cause of electrical shock is predominantly 22) _____
A) excess current.
B) excess voltage.
C) reduced resistance.
D) none of the above

23) Electrons flow in an electrical circuit by 23) _____
A) being bumped by other electrons.
B) colliding with molecules.
C) interacting with an established electric field.
D) none of the above

24) Although electrons in metal move in haphazard directions at many times the speed of sound, the *drift speed* of electrons that compose electric current is 24) _____
A) a fraction of a centimeter per second.
B) many centimeters per second.
C) the speed of a sound wave.
D) the speed of light.
E) none of the above

25) The electric field established by a battery in a dc circuit 25) _____
A) increases via the inverse–square law.
B) changes magnitude and direction with time.
C) acts in one direction.
D) is non–existent.
E) none of the above

26) The electric field established by a generator in an ac circuit 26) _____
A) increases via the inverse–square law.
B) changes magnitude and direction with time.
C) acts in one direction.
D) is non–existent.
E) none of the above

27) Power is defined as the energy expended per unit of time. When translated to electrical terms, power is equal to 27) _____
A) current multiplied by resistance.
B) current multiplied by voltage.
C) current divided by time.
D) voltage divided by time.
E) none of the above

28) One kilowatt–hour is a unit of 28) _____
A) energy.
B) power.
C) voltage.
D) current.
E) resistance.

29) The electric power supplied to a lamp that carries 2 A at 120 V is 29) _____
A) 1/6 watts.
B) 2 watts.
C) 60 watts.
D) 20 watts.
E) 240 watts.

30) A 100–W lamp glows brighter than a 25–W lamp. The electrical resistance of the 100–W lamp is 30) _____
A) less. B) greater. C) the same.

31) A 60–W light bulb connected to a 120–V source draws a current of 31) _____
A) 0.25 A.
B) 0.5 A.
C) 2.0 A.
D) 4.0 A.
E) more than 4 A.

32) A power line with a resistance of 2 ohms carries a current of 80 A. The power dissipated in the line is 32) _____

A) 40 W.
B) 160 W.
C) 320 W.
D) 12,800 W.
E) none of the above

80 * 80 * 2

33) A 60–W and a 100–W light bulb are connected in *series* to a 120–V outlet. Which bulb draws more current? 33) _____

A) 60–W bulb B) 100–W bulb C) both the same.

34) A heater draws 20A when connected to a 110–V line. If the electric power costs 20 cents per kilowatt hour, the cost of running the heater for 10 hours is 34) _____

A) $0.44.
B) $1.10.
C) $4.40.
D) $11.00.
E) none of the above

35) When two lamps are connected in series to a battery, the electrical resistance that the battery senses is 35) _____

A) more than the resistance of either lamp.
B) less than the resistance of either lamp.
C) none of these

36) When a pair of identical lamps are connected in parallel 36) _____

A) voltage across each is the same. B) current in each is the same.
C) power dissipated in each is the same. D) all of the above

37) On some early automobiles both headlights failed when one bulb burned out. The headlights were likely connected in 37) _____

A) parallel. B) perpendicular.
C) series. D) haste.

38) Compared to a single lamp connected to a battery, two identical lamps connected in *series* to the same battery will carry 38) _____

A) more current. B) less current. C) the same current.

39) Compared to a single lamp connected to a battery, two lamps connected in *parallel* to the same battery will carry 39) _____

A) more current. B) less current. C) the same current.

40) The safety fuse in an electric circuit is connected to the circuit in 40) _____

A) series.
B) parallel.
C) either series or parallel.

41) The equivalent resistance of any parallel branch in a circuit is 41) _____

A) often less than the resistance of the lowest resistor.
B) always less than the resistance of the lowest resistor.
C) usually half the value of the lowest resistor.
D) none of the above

42) When a pair of 1–ohm resistors are connected in series, their equivalent (combined) resistance is 2 ohms, and when connected in parallel is 42) _____

A) ½ ohm. B) none of the above C) also 2 ohms.

43) The equivalent (combined) resistance of 1–ohm, 2–ohm, and 3–ohm in series is about 43) _____

A) 1 ohm B) 1.8 ohms. C) 6 ohms. D) 9 ohms.

44) A 4–ohm and 6–ohm resistor connected in parallel have an equivalent resistance of 44) _____

A) 2.4 ohms.
B) 4 ohms.
C) 5 ohms.
D) 5.5 ohms.
E) 10 ohms.

Answer Key
Testname: CHAPTER 23 PRACTICE ELECTRIC CURRENT

1) B
2) B
3) C
4) E
5) B
6) C
7) A
8) C
9) C
10) E
11) B
12) C
13) C
14) C
15) A
16) B
17) C
18) E
19) D
20) C
21) A
22) B
23) C
24) A
25) C
26) B
27) B
28) A
29) E
30) A
31) B
32) D
33) C
34) C
35) A
36) D
37) C
38) B
39) A
40) A
41) B
42) A
43) C
44) A