

## ELECTRICITY PRACTICE

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

#### CHARGE INTERACTIONS PROBLEM:

Use the the information below to answer the questions that follow:

A is neutral, B attracts A, C attracts B, C attracts D, D repels E, C attracts F, B attracts E, E is negative, F attracts A, F attracts D

1. In the charge interactions problem above, what is the charge of B?  
A) positive B) negative C) positive or negative D) neutral E) positive or neutral
2. In the charge interactions problem above, what is the charge of C?  
A) positive B) negative C) positive or negative D) neutral E) positive or neutral
3. In the charge interactions problem above, what is the charge of D?  
A) positive B) negative C) positive or negative D) neutral E) positive or neutral
4. In the charge interactions problem above, what is the charge of F?  
A) positive B) negative C) positive or negative D) neutral E) positive or neutral
5. In the charge interactions problem above, what is the charge of E?  
A) positive B) negative C) positive or negative D) neutral E) positive or neutral

#### BALLOON AND HAIR

Use the information below to answer the questions that follow:

BEFORE CHARGING: A persons hair has 275 protons and 275 electrons. A balloon has 140 protons and 140 electrons.

AFTER CHARGING: A persons hair has 275 protons and 230 electrons. A balloon has 140 protons and 185 electrons.

6. In the ballon and hair problem above, AFTER charging, what is the charge of the SYSTEM?  
A) neutral B) + 45 C) - 45 D) - 30 E) + 30
7. In the ballon and hair problem above, AFTER charging, what is the charge of the BALLOON?  
A) neutral B) + 45 C) - 45 D) - 30 E) + 30
8. In the ballon and hair problem above, AFTER charging, what is the charge of the HAIR?  
A) neutral B) + 45 C) - 45 D) - 30 E) + 30
9. In the ballon and hair problem above, BEFORE charging, what is the charge of the SYSTEM?  
A) neutral B) + 45 C) - 45 D) - 30 E) + 30
10. In the ballon and hair problem above, BEFORE charging, what is the charge of the BALLOON?  
A) neutral B) + 45 C) - 45 D) - 30 E) + 30
11. In the ballon and hair problem above, BEFORE charging, what is the charge of the HAIR?  
A) neutral B) + 45 C) - 45 D) - 30 E) + 30

#### STEPS IN MAKING LIGHTNING

1) Moisture evaporates upward and ice crystals move downward within the cloud, cause the particles to become charged by rubbing.

2) Charges are separated within the cloud; positive charges on the top, negatives on the bottom.

3) The negatively charged bottom of the cloud repels negative charges on the surface of the Earth and on objects.

4) The cloud discharges as lightning.

12. In the steps of making lightning description above, what method of charging occurs in the 1st STEP of making lightning?  
A) conduction B) induction C) grounding D) friction E) polarization
13. In the steps of making lightning description above, what process is occurring in STEP 2 of making lightning where opposite charges are separated within the cloud?  
A) conduction B) induction C) grounding D) friction E) polarization
14. In the steps of making lightning description above, what process is occurring in the last step of making lightning where excess charge is removed by means of transferring electrons from the cloud to another object?  
A) conduction B) induction C) grounding D) friction E) polarization
15. A material that completely impedes the free flow of electrons from atom to atom is known as a(n)  
A) conductor B) insulator C) inductor D) polarizer E) ground
16. A material that easily allows the free flow of electrons from atom to atom is known as a(n)  
A) ground B) insulator C) inductor D) polarizer E) conductor
17. The process of separating charge within a neutral object or system is known as  
A) grounding B) insulation C) induction D) polarization E) conduction
18. The process of removing excess charge by means of transferring electrons to another object is known as  
A) grounding B) insulation C) induction D) polarization E) conduction
19. What list places materials in order according to their electron affinity?  
A) Periodic Table B) Mohl's Hardness Scale C) Triboelectric Series D) Electric Activity Series E) pH Scale
20. What describes the observation where in the charging process, the total amount of charge in the system is the same before the process starts as it is after the process ends.  
A) Law of Conservation of ENERGY B) Law of Conservation C) Law of Conservation of MOMENTUM D) Law of Conservation of MASS E) Law of Conservation of CHARGE
21. What method of charging involves two objects that make physical contact (touching)?  
A) grounding B) friction C) induction D) polarization E) conduction
22. What method of charging charges an object without touching the object?  
A) grounding B) friction C) induction D) polarization E) conduction
23. What method of charging involves two objects rubbing together?  
A) grounding B) friction C) induction D) polarization E) conduction
24. A closed loop through which charges can continuously move.  
A) voltage drop B) circuit C) current D) resistance E) Coulomb

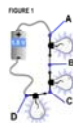
25. The electrical device into which electrical energy supplied to the charge carries its energy.  
A) circuit B) power C) battery D) polarizer E) load
26. The rate at which electrical energy is supplied to a circuit or consumed by a load.  
A) resistance B) current C) electric potential D) electric potential energy E) power
27. The loss in electric potential while passing through a circuit.  
A) voltage drop B) circuit C) current D) resistance E) Coulomb
28. The unit which equals 1 Joule per Coulomb and measures the amount of energy per charge in a circuit.  
A) volts B) amperes C) Joules D) Ohms E) Watts
29. The unit measuring the hinderance of the flow of charges through the circuit.  
A) volts B) amperes C) Joules D) Ohms E) Watts
30. The unit which equals 1 coulomb traveling past a point on a circuit per second, measuring the rate charges flow in a circuit.  
A) volts B) amperes C) Joules D) Ohms E) Watts
31. The unit which equals 1 Newton x 1 meter and measures the amount of work (force x distance) done.  
A) volts B) amperes C) Joules D) Ohms E) Watts
32. The rate at which charge flows past a point on a circuit.  
A) resistance B) current C) electric potential D) electric potential energy E) power
33. The hindrance to(blocking of) the flow of charge.  
A) resistance B) current C) electric potential D) electric potential difference E) power
34. The potential energy per charge.  
A) resistance B) current C) electric potential D) electric potential difference E) power

**PROBLEMS:**

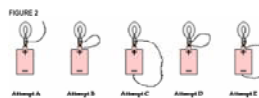
Use the formulas below to answer the questions to follow:

$$\begin{array}{lll} \Delta V = \Delta PE / Q & \Delta PE = \Delta V \times Q & Q = \Delta PE / \Delta V \\ P = \Delta V \times I & I = P / \Delta V & \Delta V = P / I \\ I = Q / t & Q = I \times t & t = Q / I \end{array}$$

35. A 1.5 volt battery will increase the potential energy of 8 coulombs of charge by \_\_\_\_\_ joules.  
A) 9.5 B) 5.33 C) 6.5 D) 10 E) 0.1875
36. A 9 volt battery will increase the potential energy of \_\_\_\_\_ coulombs of charge by 42 joules.  
A) 51 B) 4.67 C) 378 D) 0.214 E) 33
37. What is the power of a toaster that draws 5 amps of current when plugged into a 120-volt outlet.  
A) 24 B) 4.67 C) 0.42 D) 600 E) 125
38. What is the current in a 60 watt bulb plugged into a 110-volt outlet.  
A) 6600 A B) 1.83 A C) 0.55 A D) 50 A E) 160 A
39. When a charge of 8 C flows past any point along a circuit in 14 seconds, the current is \_\_\_\_\_ A.  
A) 112 B) 1.75 C) 22 D) 6 E) 0.57
40. If 12 C of charge flow past point A in 3 seconds, then 24 C of charge will flow past point E in \_\_\_\_\_ seconds.  
A) 4 B) 8 C) 3 D) 6 E) 2



41. In Figure 1 above, the voltage at point A equals \_\_\_\_\_ volts.  
A) 0 B) 1.5 C) .5 D) 1.0
42. In Figure 1 above, the voltage at point C equals \_\_\_\_\_ volts.  
A) 0 B) 1.5 C) .5 D) 1.0
43. In Figure 1 above, the voltage at point D equals \_\_\_\_\_ volts.  
A) 0 B) 1.5 C) .5 D) 1.0
44. In Figure 1 above, the voltage at point B equals \_\_\_\_\_ volts.  
A) 0 B) 1.5 C) .5 D) 1.0
45. In FIGURE 1 if you had **THREE 1.5 V batteries** stacked properly in the circuit, and but still had the same circuit (with three light bulbs), what would the voltage be at B?  
A) 0 B) 4.5 C) 1.5 D) 1.0 E) 3.0



46. In the diagram above (FIGURE 2), which attempt(s) would produce a light bulb that is lit?  
A) A B) B C) C D) D E) E
47. In the diagram above (FIGURE 2), which attempt(s) would be considered circuits?  
A) D and C B) C and E C) B and C and E D) C and B E) E and D

**RESISTANCE PROBLEM:**

Use the formulas and information below to answer the three related problems that follow:

$$\begin{array}{lll} \Delta V = I \times R & R = \Delta V / I & I = \Delta V / R \\ P = I \times \Delta V & \Delta V = P / I & I = P / \Delta V \\ \Delta PE = P \times t & P = \Delta PE / t & t = \Delta PE / P \end{array}$$

A wire has a resistance of 3 Ohms with a current of 15 Amperes.

48. In the resistance problem above, the potential difference in the wire equals \_\_\_\_\_ volts.  
A) 5 B) 45 C) 0.2 D) 18 E) 12
49. In the resistance problem above, the power given off by the appliance equals \_\_\_\_\_ Watts.  
A) 3 B) 15 C) 135 D) 675 E) 18
50. In the resistance problem above, how much energy in kW • hours would be used if the device ran for 12 hours?  
A) 36 B) 180 C) 1.62 D) 2.16 E) 8.1

**FIGURE 3:**



51. At position A, the test charge's energy is  
A) high B) low C) 0 D) unable to be determined
52. At position B, the test charge's energy is  
A) high B) low C) 0 D) unable to be determined
53. For a negative test charge (with a conventional test charge), the electric field vectors would be pointing \_\_\_\_\_.  
A) outward B) inward C) upward D) downward E) unable to be determined

**ELECTRICITY PRACTICE**  
**Answer Section****MULTIPLE CHOICE**

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