

**FINAL EXAM Review Package - PHYSICS**  
**Answer Section****COMPLETION**

1. shock
2. discharged
3. neutral
4. gained  
excess
5. negatively
6. induced
7. electron
8. electron
9. negative
10. positive
11. friction
12. induction
13. insulator
14. conductor
15. amp  
ampere
16. series
17. ammeter
18. series
19. series
20. series
21. 50  
fifty
22. stored
23. Nuclear
24. height  
position
25. change
26. chemical
27. rating
28. non-renewable
29. renewable
30. renewable
31. renewable
32. renewable
33. non-renewable
34. joule
35. kW•h

- 36. year
- 37. kW•h
- 38. electrical energy
- 39. change
- 40. time

**MATCHING**

- 41. A
- 42. E
- 43. D
- 44. B
- 45. C
  
- 46. C
- 47. A
- 48. B
- 49. D
- 50. E
  
- 51. C
- 52. D
- 53. B
- 54. A
- 55. E
  
- 56. B
- 57. C
- 58. E
- 59. D
- 60. A
  
- 61. E
- 62. A
- 63. C
- 64. B
- 65. D
  
- 66. C
- 67. E
- 68. D
- 69. A
- 70. B
  
- 71. B

- 72. D
- 73. A
- 74. F
- 75. C
- 76. E

**PROBLEM**

77. Data:  
 $V = 120 \text{ V}$   
 $I = ?$   
 $R = 52 \Omega$

Formula:

$$V = I \times R$$

$$120 \text{ V} = I \times 52 \Omega$$

$$\frac{120 \text{ V}}{52 \Omega} = I$$

$$I = 2.3 \text{ A}$$

**The current required for the crockpot is 2.3 A.**

78. Data:  
 $V = 120 \text{ V}$   
 $I = 7.5 \text{ A}$   
 $R = ?$

Formula:

$$V = I \times R$$

$$120 \text{ V} = 7.5 \text{ A} \times R$$

$$\frac{120 \text{ V}}{7.5 \text{ A}} = R$$

$$R = 16 \Omega$$

**The resistance of the coffee maker is 16  $\Omega$ .**

79. Data:  
 $V = 7.0 \text{ V}$   
 $I = 0.5 \text{ A}$

Formula:

$$V = I \times R$$

$$70 \text{ V} = 0.5 \text{ A} \times R$$

$$\frac{70 \text{ V}}{0.5 \text{ A}} = R$$

$$R = 140 \Omega$$

**The cell phone has a resistance of 140 ohms when someone is talking on it.**

80. Data:  
 $V = 7.0 \text{ V}$   
 $I = 50 \text{ mA}$   
 $= 0.05 \text{ A}$

Formula:

$$V = I \times R$$

$$7.0 \text{ V} = 0.05 \text{ A} \times R$$

$$\frac{7.0 \text{ V}}{0.05 \text{ A}} = R$$

$$R = 140 \Omega$$

**The cell phone has a resistance of 140 ohms when someone is talking on it.**

## ESSAY

81. Wood, rubber, and leather are all nonconductors or insulators. As the powder monkeys ran along the wooden deck, the rubber or leather would produce static electric charges. Since the boys were not grounded, their bodies would become charged and so would the wooden kegs containing the gunpowder. A discharge of their boots could produce sparks. The sparks could ignite the gunpowder and cause an explosion. When the powder monkeys were bare-footed, they were at least partially grounded since human skin is a fair conductor rather than a nonconductor. A static electric charge would not build up on their bodies. In addition, because they were not wearing boots, there were no nails to produce sparks.
82. As particles in the air and clouds pass by one another, electrons are transferred from the rising particles to the falling particles, creating a separation of charge in the clouds. The large number of electrons in the lower part of the cloud create an induced charge in the nearest object on the ground below (perhaps in a tree, or a lightning rod) by causing electrons to be moved away from the surface. The excess electrons then discharge to that object, creating a flash of light in the air.

83. The Van de Graaff generator creates a large static charge. When the person stands on an insulating material and touches the generator, the person begins to share the build-up of static charge created by the generator. As the build-up increases, the person will notice hair standing up all over their body.

The hair stands up because the negative charges are repelling each other and gathering on the outsides of all parts of the body, including the hair. Since the hair now has like charges, the individual hairs repel each other and stand up.

The person will experience the most dramatic effect when standing on an insulating substance since the excess charge will not be able to be transferred to the ground easily.

84. Essay should contain discussion of:

Atom

- nucleus (protons, neutrons)
- electrons (around the nucleus)
- protons positive, electrons negative, neutrons neutral
- excess electrons create negative charge
- deficit of electrons create positive charge

85. *Answer may vary, but should include the following details:*

The circuit appears to not work because the lamps do not go on. The first thing that should be done is to open the switch and measure the potential difference across the battery; perhaps the battery is dead. If the battery is good, reconnect the circuit with an ammeter in series with the battery to determine if there is current flowing in the circuit at all. If there isn't, there is an open circuit somewhere in series with the battery; all connections should be checked (if available, a continuity tester could be used to check all of the connections with the switch open). If current is flowing from the battery when the switch is closed, then the circuit is complete. There may be a short circuit in the setup so that little current flows through bulbs due to the tiny resistance of a short circuit path. If this is not the case, it is possible that the bulbs are not suited for the voltage supply and that the current is not sufficient to cause the filaments to heat up and glow.

86. *Answer should include the following details:*

Ammeters should be connected in series with a circuit resistance to measure the current flowing through the resistance. Voltmeters should be connected in parallel with the resistance to measure the potential difference across the resistance. A graphical comparison of the voltage lost across the resistance and the current through the resistance will result in a graph, the slope of which will give the resistance of the device.

87. The Law of Conservation of Energy states that within a closed system, the total amount of energy is constant or that energy cannot be created or destroyed, only changed from one form to another.

In society, we depend on many types of energy that originate from other types of energy. During the transformation of energy from one kind to another, there are often losses to the environment due to inefficiencies of the transformation and use of the energy. Limiting these inefficiencies might help to save the environment from unnecessary harm and save some money in the process.