

INQUIRY PHYSICS TEST REVIEW

Electrostatics and Electrical Circuits

Name _____

Write a "P" in the blank by each statement that describes a parallel circuit. Write a "S" in the blank by each statement that describes a series circuit.

- _____ 1. When more light bulbs are added, they all still remain bright.
- _____ 2. Different voltages are dropped across each resistor.
- _____ 3. Different currents flow through each resistor.
- _____ 4. If one part of the circuit fails, the other parts still work.
- _____ 5. The total resistance is equal to the sum of the individual resistances.

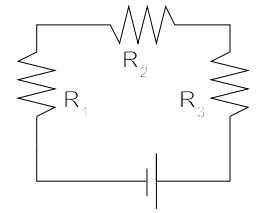
Write the letter corresponding to the best answer in the blank by each question.

- _____ 6. The total resistance of a parallel circuit is always...
 - A) greater than the sum of all the individual resistances.
 - B) greater than any of the individual resistances.
 - C) equal to the smallest of the individual resistances.
 - D) less than any of the individual resistances.
- _____ 7. When another resistor is added to a parallel circuit, the total **current**...
 - A) goes up.
 - B) goes down.
 - C) is unaffected.
- _____ 8. If a short occurs in one room of a house and it goes dark, but all the other rooms stay lit, it is because...
 - A) all of the fuses have blown.
 - B) the short has only blown one fuse and the rest of the house is still lit because it is in **series**.
 - C) the short has only blown one fuse and the rest of the house is still lit because it is in **parallel**.
 - D) the short has not blown any of the fuses.
- _____ 9. Circuit "S" has three 10 Ω resistors in series with a 10 V battery. Circuit "P" has three 10 Ω resistors in parallel with another 10 V battery. Which statement is **NOT** true?
 - A) The total voltage of circuit "S" is greater than the total voltage of circuit "P".
 - B) The total current in circuit "S" is less than the total current in circuit "P".
 - C) The total resistance of circuit "S" is greater than the total resistance of circuit "P".
- _____ 10. An ammeter should have a very...
 - A) low resistance, since it is hooked in series.
 - B) low resistance, since it is hooked in parallel.
 - C) high resistance, since it is hooked in series.
 - D) high resistance, since it is hooked in parallel.
- 11. A series circuit is composed of a 10.0 V battery and three resistors, which are 2.00 Ω , 6.00 Ω , and 12.0 Ω . How much current flows through the 12.0 Ω resistor?
- 12. A space heater has a current of 12.0 A flowing through it and an effective resistance of 9.00 Ω .
 - A) Calculate the power of the heater.
 - B) How many kilowatt-hours of heat energy could this heater produce if it operated for an hour?
 - C) How many joules of energy is that?
 - D) If PSO charges 6.00 cents per kWh, how much would it cost to run the heater for 8.00 hours?

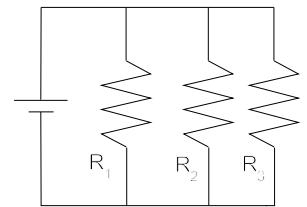
Answers
1. P
2. S
3. P
4. P
5. S
6. D
7. A
8. C
9. A
10. A
11. 0.500 A
12a. 1300 W
b. 1.30 kWh
c. 4,670,000 J
d. 62.2 cents

13. Fill in the table for each circuit, using 3 significant figures.

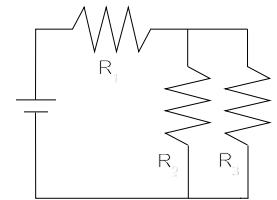
Series Position	Voltage (V)	Current (A)	Resistance (Ω)
1			5.00
2			10.0
3			15.0
Total	5.00		



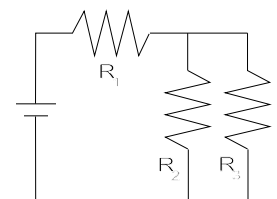
Parallel Position	Voltage (V)	Current (A)	Resistance (Ω)
1			5.00
2			10.0
3			15.0
Total	5.00		



Complex #1 Pos.	Voltage (V)	Current (A)	Resistance (Ω)
1			5.00
2			10.0
3			15.0
Total	5.00		



Complex #2 Pos.	Voltage (V)	Current (A)	Resistance (Ω)
1			9.00
2			30.0
3			30.0
Total	12.0		



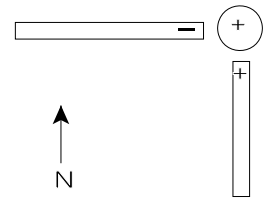
COMPLEX #2			COMPLEX #1			PARALLEL CIRCUIT			SERIES CIRCUIT			
R (Ω)	I (A)	V (V)	R (Ω)	I (A)	V (V)	R (Ω)	I (A)	V (V)	R (Ω)	I (A)	V (V)	
9.00	0.500	4.50	5.00	0.455	2.27	5.00	1.00	5.00	5.00	0.167	0.833	1
30.0	0.250	7.50	10.0	0.273	2.73	10.0	0.500	5.00	10.0	0.167	1.67	2
30.0	0.250	7.50	15.0	0.182	2.73	15.0	0.333	5.00	15.0	0.167	2.50	3
24.0	0.500	12.0	11.0	0.455	5.00	2.73	1.83	5.00	30.0	0.167	5.00	Total

ANSWERS:

- _____ 14. When the distance between two charges is halved, the electrical force between them...
 A) quadruples. B) doubles. C) halves. D) reduces to one fourth.
- _____ 15. If you comb your hair and the comb becomes negatively charged, ...
 A) electrons were transferred from the comb onto your hair.
 B) electrons were transferred from your hair onto the comb.
 C) protons were transferred from the comb onto your hair.
 D) protons were transferred from your hair onto the comb.
- _____ 16. Which statement correctly describes how to charge something **negatively** by **conduction**?
 A) Touch it with a positively charged object.
 B) Touch it with a negatively charged object.
 C) Momentarily ground it with a positively charged object nearby.
 D) Momentarily ground it with a negatively charged object nearby.
- _____ 17. If a neutral conductor is touched by a rubber rod with a negative charge on it, what will happen?
 A) Electrons will flow from the conductor onto the rubber rod.
 B) Electrons will flow from the rubber rod onto the conductor.
 C) Protons will flow from the conductor onto the rubber rod.
 D) Protons will flow from the rubber rod onto the conductor.
- _____ 18. Protons and electrons...
 A) repel each other. B) attract each other. C) have no effect on each other.
- _____ 19. Coulomb's law says that the force between any two charges depends...
 A) inversely on the product of the charges.
 B) directly on the square of the distance between the charges.
 C) directly on the product of the charges.
 D) inversely on the square root of the distance between the charges.
- _____ 20. In a good insulator, electrons are usually...
 A) free to move around.
 B) free to move around after an impurity has been added.
 C) semi-free to move around.
 D) tightly bound in place.
- _____ 21. A leaf electroscope is neutral. As a negative charge is brought close to the electroscope, the leaves spread apart because the approaching negative charge...
 A) attracts and pulls electrons away from them.
 B) attracts and pulls protons away from them.
 C) pushes electrons down onto them.
 D) pushes protons down onto them.
- _____ 22. The reason a pith ball will be attracted to a charged rubber rod is that...
 A) the rod is positive and attracts electrons in the pith ball.
 B) the rod is negative and repels electrons in the pith ball, attracting the nearer protons.
 C) the rod is positive and repels electrons in the pith ball, attracting the nearer protons.
 D) the rod is negative and attracts electrons in the pith ball.
- _____ 23. A girl accidentally touches a partially plugged-in lamp plug one day. If the voltage from the wall outlet was 120 V and her skin's resistance was 120,000 Ω , how much current passed through her body?
 A) 12,000,000 A B) 1,000 A C) 120 A D) 0.0010 A

Answers:
14. A
15. B
16. B
17. B
18. B
19. C
20. D
21. C
22. B
23. D

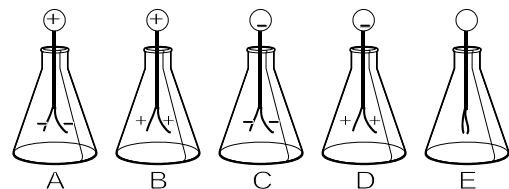
- _____ 24. A positively charged metal ball was motionless on a flat table. Two charged rods were brought up the ball as shown in the diagram. In what compass direction did the ball move?
 A) southwest
 B) southeast
 C) northwest
 D) northeast



- _____ 25. Circuit "S" has three users in series with a cell. Circuit "P" has the same circuit elements as circuit "S", but they are connected in parallel. Which statement is true?
 A) The total current in "P" is greater than the total current in "S".
 B) The total voltage of "P" is greater than the total voltage of "S".
 C) The total resistance of "P" is greater than the total resistance of "S".
- _____ 26. Which statement correctly describes a short circuit?
 A) Too many users are plugged into the circuit, lowering its total resistance, causing high currents.
 B) Too many users are plugged into the circuit, raising the total resistance, causing low currents.
 C) Wires in the circuit become crossed, making it a series circuit and thus causing high currents.
 D) Wires in the circuit become crossed, making it "shorter" and thus causing high currents.
- _____ 27. When another user is activated in a parallel circuit...
 A) the total resistance rises.
 B) the total current falls.
 C) the total resistance falls.
 D) the total voltage increases.
- _____ 28. Which statement correctly describes an ammeter?
 A) It has high resistance because it hooks into a circuit in parallel.
 B) It has high resistance because it hooks into a circuit in series.
 C) It has low resistance because it hooks into a circuit in parallel.
 D) It has low resistance because it hooks into a circuit in series.

For each of the procedures described below, place the letter of the diagram that best represents the resulting charge arrangements on the electroscope.

- _____ 29. A negatively charged rod is brought near, but not touching an uncharged electroscope.
- _____ 30. A negatively charged rod is used to charge the scope by **induction**.
- _____ 31. A positively charged rod is used to charge the scope by **conduction**.
- _____ 32. A negatively charged electroscope is grounded.



33. A $5.00\ \Omega$ resistor, $10.0\ \Omega$ resistor, and a rheostat are connected in parallel and placed across a $12.0\ \text{V}$ source. What amount of resistance should be set for the rheostat in order to draw a total current of $4.20\ \text{A}$ from the source?

Answers:
24. C
25. A
26. D
27. C
28. D
29. A
30. B
31. B
32. E
33. $20.0\ \Omega$