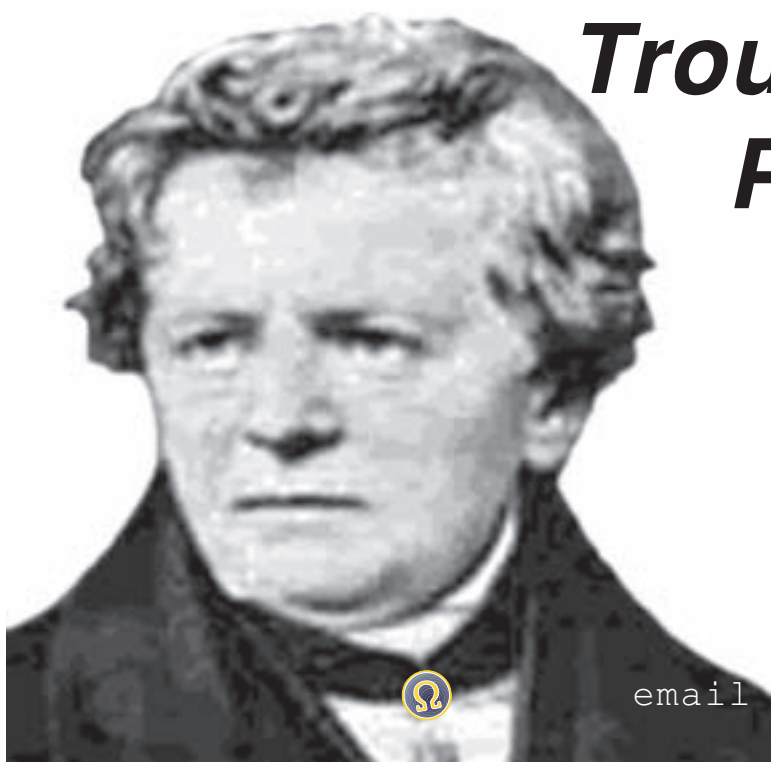




Fundamental Electrical Troubleshooting Pretest / Test



Sullivan Training Solutions

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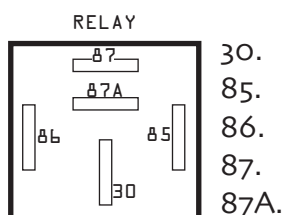
See last page for scoring information

Fundamental Electrical Troubleshooting Pretest/Test

This test is designed to determine your knowledge of the fundamentals of electrical troubleshooting. In the spaces provided, answer the questions as best you can. Spelling is not important. Do your best to answer as completely as possible. ***Getting help on this test will only hurt you - there is no grade.***

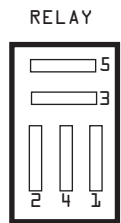
1. Which of the electrical elements below represents “opposition to electrical flow”?
Voltage, Resistance, Current, Watts
2. Which of the electrical elements below represents “electrical pressure”?
Voltage, Resistance, Current, Watts
3. Which of the electrical elements below represents “the flow of electricity”?
Voltage, Resistance, Current, Watts
4. Which of the components below is an “electromagnetic switch”?
Solenoid, Relay
5. Which of the components below is an “electromagnetic actuator”?
Solenoid, Relay
6. According to Ohm’s law, if voltage increases, does current increase or decrease?
7. According to Ohm’s law, if resistance decreases, does current increase or decrease?
8. Which meter function within the multimeter is the safest — voltmeter, ohmmeter or ammeter?
9. Which meter function within the multimeter is the most dangerous — voltmeter, ohmmeter or ammeter?
10. On the multimeter, what **word and number** does the “m” represent, as in mA, or mV?

11. On the multimeter, what **word and number** does the “K” represent, as in K Ω , or KV?
12. On the multimeter, what **word and number** does the “M” represent, as in M Ω ?
13. Which scale (range) should a multimeter be on to get the most accurate reading?
14. What circuit **fault** has: low current, a poorly operating component, and an extra voltage drop?
15. What circuit **fault** has: zero current, and the component doesn’t work at all?
16. What circuit **fault** has: excessive current and the fuse blows?
17. Does a diode conduct in “forward bias” or “reverse bias”?
18. If a circuit has a short-to-ground and you’re testing the circuit with an ohmmeter, what ohm reading will the meter show that confirms the short-to ground?
19. What indication does the voltmeter give, to tell you that you’re reading an OPEN?
20. What must be done to a multimeter to use the **ammeter** function, in addition to setting the meter on AMPS on the range selector?
21. If you add all of the voltage drops in a circuit what will they add up to?
22. Label the functions of all of the terminals on the relay shown below:




- 30.
- 85.
- 86.
- 87.
- 87A.

23. Label the functions of all of the terminals on the relay shown below:



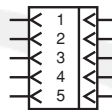
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
24. Indicate the polarity of the “anode” and “cathode”.
25. What electronic component works like an “electrical check valve”?
26. Name the two electrically isolated circuits inside a relay.
27. What indication will the multimeter give you if the leads are reversed?
28. In which direction should you read a schematic — positive to negative (+) to (-), or negative to positive (-) to (+)?
29. What part of the circuit does the fuse actually protect?
30. Where should you place the leads of the voltmeter to read a “voltage drop”?
31. What must be done to a **circuit** before using the ohmmeter, in addition to turning off the power?
32. Is the main voltage in an alternator in the rotor or the stator?
33. What does ECM stand for?

34. Name one of the two general types of components that will always be found in an ECM "input".
35. What does PWM stand for?
36. If you read voltage across a closed switch in a normally functioning circuit, what voltage should you read?
37. What type(s) of switch(es) can be used as a limit switch?
38. Label the functions of the terminals on the switch below:
- 
1.
2.
3.
39. What is inside a capacitor?
40. What indication(s) on an ohmmeter usually represents a reading of **infinite ohms** ($\infty\Omega$)?

Continue on Next Page

Write the name of each of the following schematic symbols in the space provided to the right. *In the case of switches, indicate how many "poles" and "throws" there are.*

49.



50.



51.



52.



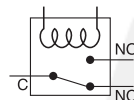
53.



54.



55.



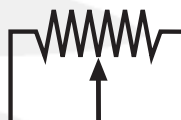
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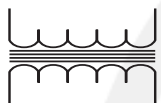
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58.



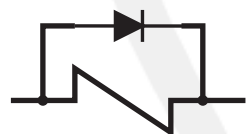
41.



42.



43.



44.



45.



46.

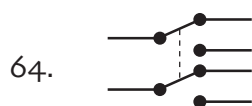


47.



48.





Fundamental Electrical Troubleshooting Pretest/Test

Answers

1. Resistance
2. Voltage
3. Current
4. Relay
5. Solenoid
6. Current increases
7. Current increases
8. Voltmeter
9. Ammeter
10. m = milli = 0.001
11. K = Kilo = 1000
12. M = Mega = 1,000,000
13. One range above the last OL reading
14. High resistance or corrosion
15. Open circuit
16. Short-to-ground or ground
17. Forward bias
18. Zero ohms (0 Ω)
19. Ghost reading (meter will float)
20. Move the leads
21. System or applied voltage
22. 30 — Common
85 & 86 — Coil
87 — Normally open (NO)
87A — Normally closed (NC)
23. 1 & 2 — Coil
3 — Common
4 — Normally closed (NC)
5 — Normally open (NO)
24. Anode — positive
Cathode — negative
25. Diode
26. Coil & switch
27. Negative sign (—)
28. Negative to positive
29. The wire
30. Across the component
31. Isolate the circuit
32. Stator
33. Engine control module
34. Switch or sensor
35. Pulse width modulation
36. Zero volts (0 V)
37. Microswitch, Reed Switch, Hall Effect
38. 1 — Common
2 — Normally closed (NC)
3 — Normally open (NO)
39. Two sheets of foil separated from each other by a dielectric
40. OL
41. Transformer
42. 2P1T (double pole single throw)
43. Solenoid (coil) with diode suppression
44. Normally open (NO) contacts
45. Ground
46. Fuse
47. Fuse
48. Coil (relay)
49. Connector
50. Float or level switch (think toilet)
51. Pressure switch (think oilcan)
52. Temperature switch
53. Flow switch (think flag)
54. Circuit breaker
55. Relay
56. Solenoid
57. Light
58. Sender/sensor (potentiometer)
59. Horn or speaker
60. Light
61. Motor
62. Resistor
63. Coil
64. 2P2T (double pole double throw)
65. Battery
66. Coil (relay)
67. Capacitor (condenser)
68. Normally closed (NC) contacts
69. Transistor
70. Diode
71. Resistor
72. Circuit breaker
73. Wires connected, junction or splice
74. Pin and socket or connector
75. LED

Scoring The Tests

If you want to have Sullivan Training Solutions score the tests for you, please do the following:

1. **Make sure that all tests have a name on them.** We will not single people out for their scores, but if you want to redistribute them for discussion, you'll need the names.
2. Make sure you include the name and exact mailing instructions for returning the tests to YOU when we finish scoring them.
3. Mail them to:
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Nashville, Tennessee 37204
4. If you have questions, please call toll-free: 1-877-WRENCH2 (877-973-6242)
5. **If you choose to score the tests yourself, think twice.** This test is written to not only test general knowledge, but to also determine basic literacy, understanding of terminology and to try and determine the skill level and training level of the test-taker. If you decide to score the test yourself, you will only be able to use the exact answer given on the answer sheet, but we can interpret and give partial or considered credit for a question you may mark incorrect. If you do this, you may have to deal with the hard feelings and irritation this might cause.