

# **CMPE2150 SA 05**

## **Relay and SSR Circuits**

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#### **Omron G2R-2-DC12**

The first set of questions in this assessment are based upon your knowledge of transistor-controlled relay circuits and information provided in the manufacturer's datasheet for the relay in your kit, the [Omron G2R-2-DC12](#).

Note that this datasheet covers a number of devices, so you need to make sure you're accessing the correct part number when accessing the specifications.

1. Dielectric strength refers to \_\_\_\_\_
  - a. the strength of a dielectric material, expressed as a function of aging due to repetitive arcing between terminal contacts.
  - b. the maximum voltage that may be applied across the terminals of a relay while they are open.
  - c. the maximum voltage that may be applied between the coil and the contacts before a resulting electric current will flow between them.
  - d. a measure of the capacitance of the polarizing electrostatic field that develops between switch contacts while they are open.
2. What is the basic dielectric rating of the G2R-2-DC12 relay, in volts? \_\_\_\_\_

3. The G2R-2-DC12 relay in your kit has a fully-sealed enclosure.  
\_\_\_\_\_ (True or False)
4. What type of protection does the enclosure of the G2R-2-DC12 relay provide? \_\_\_\_\_
  - a. prevents ingress of solder flux during soldering
  - b. prevents damage due to corrosive atmospheric gases
  - c. prevents protection from electromagnetic field flux
  - d. prevents influx of cleaning solvent during immersion cleaning
5. How many circuits can the G2R-2-DC12 control simultaneously?  
\_\_\_\_\_
6. For the G2R-2-DC12 relay, how many circuit elements can each relay switch be connected to? \_\_\_\_\_
7. Which statement describes the operation of the contacts in the G2R-2-DC12 relay?
  - a. all contacts are normally open
  - b. all contacts are normally closed
  - c. each switch has a normally-open contact and a normally-closed contact
8. What is the nominal coil voltage for the G2R-2-DC12 relay?  
\_\_\_\_\_
9. For the G2R-2-DC12 relay, what type of power should be supplied to the relay coil? \_\_\_\_\_ (AC or DC)
10. For the G2R-2-DC12 relay, once the relay is activated, what can the voltage be reduced to without the relay releasing, in volts?  
\_\_\_\_\_
11. What is the coil current rating of the G2R-2-DC12 relay, in milliamps? \_\_\_\_\_
12. What is the rated coil resistance of the G2R-2-DC12 relay?  
\_\_\_\_\_
13. The specified coil voltage and current accurately reflect the expected coil resistance for the G2R-2-DC12 relay. \_\_\_\_\_ (True or False)
14. If a 2N3904 is used to activate the 2GR-2-DC12 relay, in microamps, the Base current must be greater than \_\_\_\_\_  $\mu A$ .

15. If a ZVN2110A FET transistor is used to activate the coil of a G2R-2-DC12 relay \_\_\_\_\_:
  - a. a diode should be placed, reverse biased, across the coil
  - b. a series resistor should be installed at the Gate
  - c. a pull-down resistor should be installed at the circuit input
  - d. all of the above
16. If a ZVN2110A FET is used to activate a G2R-2-DC12 relay, the series Gate resistor should be designed to handle the coil current. \_\_\_\_\_ (True or False)
17. What is the rated current-carrying capacity for the contacts of the G2R-2-DC12, in amps, with a resistive load? \_\_\_\_\_
18. From the performance graphs for the G2R-2-DC12, what is the current handling capacity of the contacts, in millamps, for a resistive load, if the supply voltage is  $100V_{DC}$ ? \_\_\_\_\_
19. If a G2R-2-DC12 relay is used to switch a 120 V circuit, the transistor used should be rated to over 120 V. \_\_\_\_\_ (True or False)
20. The G2R-2-DC12 can be used as a switch for both DC and AC circuits. \_\_\_\_\_ (True or False)

### **PR3BMF41NSKF Solid-State Relay**

The second set of questions concerns the [PR3BMF51NSLH Solid-State Relay](#) in your kit.

1. How many pins are present on the PR3BMF41NSKF?  
\_\_\_\_\_
2. The PR3BMF41NSKF SSR can be used to control \_\_\_\_\_:
  - a. DC circuits only
  - b. AC circuits only
  - c. both DC and AC circuits
3. For the PR3BMF41NSKF SSR, what test current, in milliamps, was used to determine the Input Forward Voltage?  
\_\_\_\_\_
4. For the PR3BMF41NSKF, what is the Input Forward voltage, typically? \_\_\_\_\_
5. For the PR3BMF41NSKF SSR, if five-volt logic is being used to activate the input, what would be a suitable 10% standard resistor to put in series with the LED? \_\_\_\_\_

6. When using a transistor to activate the PR3BMF41NSKF SSR, you must protect the transistor with a reverse-biased diode.  
\_\_\_\_\_ (True or False)
7. For the PR3BMF41NSKF SSR, what is the maximum recommended Load Supply Voltage? \_\_\_\_\_
8. For the PR3BMF41NSKF SSR, which pins would you use in the load circuit? \_\_\_\_\_:
  - a. 1 and 2
  - b. 2 and 3
  - c. 5 and 6
  - d. 5 and 8
  - e. 6 and 8
9. For the PR3BMF41NSKF SSR, what is the Absolute Maximum continuous ON-state current, in amps? \_\_\_\_\_
10. For the PR3BMF41NSKF SSR, at a temperature of 100°C with no heat sink, what is the maximum continuous ON-state current limit, in milliamps? \_\_\_\_\_