

This is a sample document. Your instructor will give you a physical printout in lab during the week of 3/8-12. You may use this document to begin working on the answers. Your Quiz Pack will have the same questions.

Grade SAMPLE

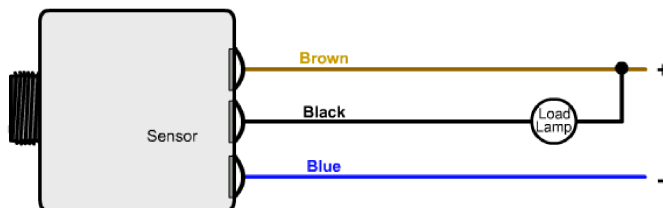
Please answer these questions from the Eaton Sensors Packet and class discussions. This assignment is due on or before 5:00 p.m. on either Tuesday, March 30th (Tuesday lab) or Thursday, April 1st (Thursday lab).

## Eaton Sensors Quiz Pack

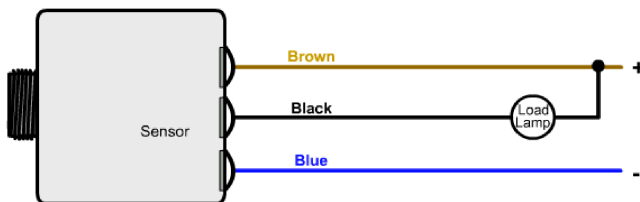
### True/False

Indicate whether the statement is true or false.

- \_\_\_ 1) A sensor output is either sinking or sourcing.
- \_\_\_ 2) A sinking sensor is one in which (conventional) current flows out of the output terminal.
- \_\_\_ 3) A load powered sensor is also known as a three-wire sensor.
- \_\_\_ 4) When two inductive proximity sensors are to be mounted side-by-side, the use of an alternate frequency head on one of the sensors will not prevent the sensors' sensing fields from interacting.
- \_\_\_ 5) A sensor with a *One-Shot Logic* output can only detect one object until it is manually reset.
- \_\_\_ 6) The sensor shown below is an example of a three-wire sinking sensor.

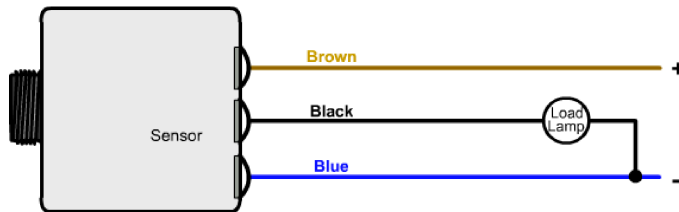


- \_\_\_ 7) A target with a rough surface may have an impact on the sensing range of an inductive proximity sensor.
- \_\_\_ 8) In an inductive proximity sensor, the *oscillator* is used to create a signal applied to the coil to create a magnetic field.
- \_\_\_ 9) The sensor shown below is an example of a three-wire sourcing sensor.



- \_\_\_ 10) Hysteresis is the gap between the operate point and the release point to smooth the operation of the sensor.
- \_\_\_ 11) A sensor with *One-Shot Logic* will produce an output pulse for a set period of time regardless of how long the target is in the detection zone.

- \_\_\_ 12) A sensor which will be used in a food processing plant which may have flour dust present should have a *Group G* enclosure rating.
- \_\_\_ 13) A straight on approach of a target to a sensor is called an axial approach.
- \_\_\_ 14) The sensor shown below is an example of a three-wire sourcing sensor.



- \_\_\_ 15) When using a capacitive proximity sensor to detect the level of contents in a container, the transparency of the container has no effect on the sensing.
- \_\_\_ 16) The *output* of an inductive proximity sensor alerts the electrical circuit that an object has been detected.
- \_\_\_ 17) A sensor with *ON Delay Logic* will only turn on after the target has been detected for a predetermined period of time.
- \_\_\_ 18) The ability of a switch to repeat its characteristics from one operation to the next is called the switch's *repeat accuracy*.
- \_\_\_ 19) A slide-by approach to the sensor is also known as a drive-by approach.
- \_\_\_ 20) FET switches are independent of voltage and current phase and can be used to control either AC or DC voltages.
- \_\_\_ 21) A sensor with a *NEMA Type 1* enclosure rating can safely replace a sensor with a *NEMA Type 3* enclosure rating.
- \_\_\_ 22) A typical rotary lever actuator operates when a cam or plate hits the end of the lever arm, which rotates a shaft and operates the contacts in the switch.
- \_\_\_ 23) The operation of a capacitive proximity sensor is based on dielectric capacitance.
- \_\_\_ 24) When using a capacitive proximity sensor to detect metal targets, a derating factor must be applied.
- \_\_\_ 25) A two-wire sensor is also known as a load powered sensor.
- \_\_\_ 26) A sensor with a PNP transistor output will be a current-sinking sensor.
- \_\_\_ 27) Three wire sensors are also known as line-powered sensors.
- \_\_\_ 28) The target size rule of thumb is: the size of the sensor's diameter, or three times the sensor's sensing range, whichever is greater.
- \_\_\_ 29) Sensors which incorporate *ON Delay Logic* or *ON/OFF Delay Logic* cannot be used for jam detection.
- \_\_\_ 30) Sensors and switches are rated to indicate their ability to be used in various environments and hazardous locations.
- \_\_\_ 31) A *Group D* enclosure rated sensor may be used in the presence of gasoline, propane & alcohol.

- \_\_\_ 32) A sensor with an NPN transistor on the output will be a current-sinking sensor.
- \_\_\_ 33) In an inductive proximity sensor, the *sensor coil* looks for a change in frequency.
- \_\_\_ 34) *Retriggerable One-Shot Logic* is often used in detecting underspeed conditions on conveyor lines.
- \_\_\_ 35) There is no classification for sensor/switch enclosures which would allow them to be used in the presence of hydrogen.
- \_\_\_ 36) In an inductive proximity sensor, the *detector* is used to shape the magnetic field.

### Multiple Choice

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

- \_\_\_ 37) The load is connected to the \_\_\_\_\_ wire of a two-wire sourcing sensor.  
A. yellow D. green  
B. brown E. None of the above.  
C. blue
- \_\_\_ 38) A limit switch is a(n) \_\_\_\_\_ device that relies on physical contact with the target.  
A. microprocessor controlled D. optical  
B. auditory E. None of the above.  
C. electromechanical
- \_\_\_ 39) Inductive proximity sensors work best with \_\_\_\_\_ metals.  
A. non-ferrous D. ferrous  
B. shiny E. None of the above.  
C. expensive
- \_\_\_ 40) In a typical two wire sensor, the \_\_\_\_\_ wire is connected to the positive power supply.  
A. blue D. red  
B. yellow E. None of the above.  
C. brown
- \_\_\_ 41) The \_\_\_\_\_ wire of a three wire sensor is the output connection.  
A. white D. black  
B. blue E. red  
C. brown
- \_\_\_ 42) When a two wire sensor does not detect a target, there is (a) \_\_\_\_\_ current through it.  
A. 4-20mA D. no  
B. maximum E. None of the above.  
C. small leakage
- \_\_\_ 43) The proximity sensor which can only detect metal targets is the \_\_\_\_\_.  
A. photoelectric type D. capacitive type  
B. green type E. None of the above.  
C. inductive type
- \_\_\_ 44) The brown wire of the \_\_\_\_\_ three wire sensor is always connected to the +VDC of the power supply.  
A. sinking D. both A & B  
B. sourcing E. capacitive  
C. inductive

- \_\_\_\_ 45) The \_\_\_\_\_ wire of a three wire sensor is the common connection.  
A. blue D. black  
B. white E. brown  
C. green
- \_\_\_\_ 46) The sensor type that uses a broken beam of light to detect objects is commonly referred to as a \_\_\_\_\_ sensor.  
A. Green D. capacitive proximity  
B. photoelectric E. None of the above.  
C. inductive proximity
- \_\_\_\_ 47) Which of the following NEMA Non-Hazardous location enclosure ratings could be used safely indoors in a clean, dust-free & dry environment.  
A. Type 3 D. Type 6  
B. Type 1 E. All of the above.  
C. Type 3R
- \_\_\_\_ 48) The proximity sensor which can detect both metallic and non-metallic objects is the \_\_\_\_\_.  
A. capacitive type D. inductive type  
B. yellow type E. None of the above.  
C. photoelectric

### Multiple Response

Identify **one or more choices** that best complete the statement or answer the question.

- \_\_\_\_ 49) The three main components of a limit switch are the \_\_\_\_\_ , \_\_\_\_\_ and \_\_\_\_\_.  
A. Differential D. Operating Head,  
B. Contactors E. Switch Body  
C. Receptacle
- \_\_\_\_ 50) A limit switch with a *Class I Group C* enclosure rating cannot be used in the presence of which materials?  
A. carbon monoxide D. butane  
B. coal dust E. hydrogen sulfide  
C. gasoline
- \_\_\_\_ 51) The three main sensor categories discussed so far are:  
A. proximity sensor D. limit switch  
B. ultrasonic sensor E. photoelectric sensor  
C. haptic sensor
- \_\_\_\_ 52) Three factors that can effect *excess gain* are:  
A. Sensor Power Supply Voltage D. Case style (plastic, steel, brass)  
B. Target size/color/texture E. Contamination (dust, humidity, debris)  
C. Load Connection (PLC, microcontroller) F. Application (distance, background, reflectivity)
- \_\_\_\_ 53) Limit, proximity & photoelectric sensors can detect the \_\_\_\_\_ or \_\_\_\_\_ of objects.  
A. color D. mass  
B. absence E. presence  
C. volume

**ID: B**

- \_\_\_\_ 54) A capacitive sensor with a *NEMA Group D* enclosure rating can be used in the presence of which hazardous materials?
- A. Propane
  - B. Gasoline
  - C. Alcohol
  - D. Butane
  - E. None of the above.

**Problem**

- 55) Using the through beam gain curve below, determine the approximate excess gain at a distance of
- a.) 10 feet
  - b.) 20 feet.

Be as accurate as possible.

