

CT.SigmaLogic7.01.eLM.SL7_Modbus.CertificationTest

Test Date: _____

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Certification Test



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Taking the Test

- The purpose of this test is to validate the learning experience corresponding to the applicable eLearning Module. It is recommended to preview the questions before viewing the module, and answer them as the module progresses.
- The test is open book. You may use any website, manuals, software, demo, etc. The test must be taken individually; you may not contact another person for help.
- Each question has only one correct answer unless otherwise noted. Please clearly record all answers on the answer sheet. All questions are equally weighted. A passing score is 90%.

Returning the Test

- Please return **only the first page** of the test (the answer sheet) with completed answers and contact information.

Option 1: Fax the answer sheet to **Yaskawa Technical Training Services** at **(847) 887-7185**.

Option 2: e-mail a scan, photo, or edited pdf of the answer sheet with all answers and contact information to training@yaskawa.com.

Receiving Your Score

You may review your answers only if a passing score is received. You will receive a system-generated email with your score. Please allow up to 5 business days.

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Note: For byte swapping conversions between Little-Endian and Big-Endian, this quiz uses the method to swap bytes within words, but NOT words within double words. Technically, this is a *Mid-Big-Endian* conversion. For bytes A, B, C, D of a 32-bit register, [the conversion used in this quiz is DCBA <-> CDAB](#).

For this quiz, the bit numbering is always referenced from the right: DCBA → bit 31..0. The Low word is always bits 0-15, the High word is always bits 16-31.

For reference, a *full* little-to-big 32-bit conversion would be DCBA<->ABCD. The actual conversion that takes place may differ depending on the host controller.

- 1) The SigmaLogic7 Modbus unit used which data type to exchange information in the Modbus/TCP registers?
 - a. 64 bit Floating point
 - b. 32-bit Floating point
 - c. 32-bit unsigned integer
 - d. 16-bit Signed integer
- 2) Negative numbers placed in the Modbus/TCP registers are expressed using which notation?
 - a. 1's complement
 - b. 2's complement
 - c. 3's complement
 - d. Flipped
- 3) The SigmaLogic7 Modbus unit stores data in memory using Big-Endian format (T/F)?
 - a. True
 - b. False
- 4) A status bit from the SigmaLogic7 Modbus node is sent to the host using Input Register 30045, bit 3. If the host uses Big-Endian format for data storage, where will this status bit appear?
 - a. Bit 3
 - b. Bit 45
 - c. Bit 9
 - d. Bit 11

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- 5) What is the decimal equivalent of this 16-bit register: 0010 1100 1011 0001 ?
- a. 11441
 - b. 177
 - c. -271
 - d. 110001
- 6) What is the decimal equivalent of this 16-bit register: 1101 0011 0111 1011 ?
- a. -159982
 - b. 54139
 - c. -11397
- 7) Express the number 45125 as 32-bit binary
- a. 1011 0000 0100 0101 0000 0000 0000 0000
 - b. 0000 0000 0000 0000 1011 0000 0100 0101
 - c. 0000 0000 0000 0000 0100 0101 1011 0000
 - d. 0100 0101 1011 0000 0000 0000 0000 0000
- 8) Express the number -45125 as 32-bit binary, 2's complement notation.
- a. 1111 1111 1111 1111 1011 1011 0100 1111
 - b. 0100 1111 1011 1011 1111 1111 1111 1111
 - c. 1111 1111 1111 1111 0100 1111 1011 1011
 - d. 1011 1011 0100 1111 1111 1111 1111 1111
- 9) Split the 32-bit value -123456789 into a low and high word. What are the decimal values of the Low Word and High Word?
- a. Low = 13035, High = -1884
 - b. Low = 1884, High = 5326
 - c. Low = -13035, High = 1884
 - d. Low = 5326, High = 23304
- 10) If the host processor uses Big-Endian format, How should the Low and High Word values from Question 9 be changed prior to sending to the SigmaLogic7 Modbus node?
- a. No change
 - b. Low = EB32h , -5326dec : High = A4F8h, -23304dec
 - c. Low = F8A4h, -1884 : High = EB32h, -5326dec
 - d. Low = A4F8h, -23304 : High = 32EBh, 13035

- 11) Scenario: The host controller has sent a move command with a target position of 95.625 degrees. The move completes, but the position feedback displays only 95.000 degrees. A trace of the position during the move shows the feedback only changing at whole number of degrees (i.e. 45.000, 46.000, 47.000...). What has caused this issue?
- a. Cumulative position error
 - b. Bug in SigmaLogic7 Modbus embedded code
 - c. Lost data over Ethernet connection
 - d. Resolution has not been set properly
- 12) Scenario: The SigmaLogic7 Modbus node sends the following position feedback data to a Little-Endian-type host at Input Registers 30049-30050. Resolution is set to 3. What position is being reported?
- MB30049 = -1403
MB30050 = -3
- a. -209.855
 - b. -91.881
 - c. -132.475
 - d. -204.714
- 13) Scenario: The SigmaLogic7 Modbus node sends the following position feedback data to a Big-Endian-type host at Input Registers 30049-30050. Resolution is set to 3. What position is being reported?
- MB30049 = -31882
MB30050 = 256
- a. 95.875
 - b. 168.108
 - c. -208.941
 - d. 19.883
- 14) Scenario: The SigmaLogic7 Modbus node is sending a Ready signal at Input Register 30045 bit 3 and is toggling a Heartbeat signal at bit 0 of the same register. All other bits are off. The host is Little-Endian. What is the decimal value of Input Register 30045?
- a. Toggling between 8 and 9
 - b. Constant 8
 - c. Constant 128
 - d. Toggling between 4 and 5

- 15) What Modbus Function Codes are supported by SigmaLogic7 Modbus?
- a. FC4 and FC5
 - b. FC6 and FC16
 - c. FC3 and FC4
 - d. FC16 and FC4
- 16) Scenario: The host controller is Big-Endian type. The heartbeat reflection signal is toggled by the host and arrives at the SigmaLogic7 Modbus node at Holding Register 40003 bit 0. The host turns on another bit which arrives at Holding Register 40003 bit 2. What is the decimal value of Register 40003 to be sent to the node?
- a. Constant 5
 - b. Toggling between 1280 and 1024
 - c. Constant 1280
 - d. Toggling between 4 and 5