SACA Programmable Controller Systems 1 (C-207) Certification Practice Exam (Sample)

Study Guide

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Questions

1. What is the most common method for controlling a motor with a PLC?

A. Integrated circuit

B. VFD (Variable Frequency Drive)

C. A motor starter

D. Relay switch

2. Which utility shows the layout of every network configured in RSLinx?

A. Network Tool

B. Device Manager

C. Who Active

D. Router Explorer

3. The tag name for the First Scan Flag is what?

A. S-START

B. S-FS

C. S-INIT

D. S-SET

4. What type of values can the sources for the DIV instruction include?

A. Use of only constants

B. Expressions only

C. Tags and constants

D. Strings only

5. What can Sources A and B of the DIV instruction contain?

A. Tags or constants

B. Only constants

C. Only tags

D. Both variables and literals

6. What device is used to download hardware configurations and programs to a PLC?

A. PC

B. Memory Card

C. Terminal Interface

D. Network Cable

7. Which type of timer accumulates the total amount of time the instruction has been energized and retains this value even when de-energized?

A. Retentive timer

B. Non-retentive timer

C. Interval timer

D. Delay timer

8. The specific order in which automatic machines perform actions is called a(n) _____.

A. Operation

B. Task

C. Sequence

D. Routine

9. A(n) _____ timer records the total amount of time the instruction has been energized and retains this value even during de-energization.

A. Retentive

B. Non-retentive

C. Static

D. Dynamic

10. Which value types can Sources A and B of the DIV instruction contain?

A. only constants

B. tags

C. arrays

D. strings

Answers

1. C
2. C
3. B
4. C
5. A
6. A
7. A
8. C
9. A
10. B

Explanations

1. What is the most common method for controlling a motor with a PLC?

A. Integrated circuit

B. VFD (Variable Frequency Drive)

C. A motor starter

D. Relay switch

The most common method for controlling a motor with a PLC is through the use of a motor starter. Motor starters serve the essential function of providing a safe and effective means of starting and stopping motors, as well as protecting them from overload and faults. They typically combine contactors to handle the high inrush current when a motor starts, with overload relays to prevent motor damage from running under overload conditions. In many industrial applications, especially those involving larger motors, a motor starter allows the PLC to control motor operation based on automated logic while ensuring the motor operates within safe limits. This setup is straightforward and reliable, making it widely adopted in various applications where PLCs are utilized. Other methods like Variable Frequency Drives (VFDs) are indeed used for more advanced control, particularly for speed modulation, but motor starters remain the prevalent choice for basic on/off control in many scenarios involving PLCs. Integrated circuits and relay switches may be parts of specific control circuits but are not first-line methods for PLC motor control in standard industrial practices.

2. Which utility shows the layout of every network configured in RSLinx?

A. Network Tool

B. Device Manager

C. Who Active

D. Router Explorer

The utility that displays the layout of every network configured in RSLinx is the Who Active tool. This tool provides a real-time view of all devices connected to a network and their status. It effectively shows you the devices that are currently active and communicating on the network, helping users to understand the network configuration and performance. By capturing this information, Who Active allows users to troubleshoot network issues, verify device connections, and monitor communication in real-time, making it an essential tool for managing complex automation setups. This capability is particularly useful in environments where multiple devices are connected, as it provides immediate feedback on device health and activity.

3. The tag name for the First Scan Flag is what?

A. S-START

B. S-FS

C. S-INIT

D. S-SET

The tag name for the First Scan Flag is represented as S-FS. This flag is crucial in programmable controller systems because it indicates when the controller is performing its initial scan after a power-up or reset condition. During this first scan, specific initialization and setup tasks often need to be completed before normal operation can begin. Understanding how the First Scan Flag functions is vital for designing effective control strategies, as it can trigger necessary actions such as resetting outputs or establishing communication with other devices at the startup phase. This ensures that the system is ready to operate under expected conditions, maintaining stability and reliability. In contrast, the other options represent different flags or system statuses, but S-FS specifically signifies the first scan event, making it the correct choice in this context.

4. What type of values can the sources for the DIV instruction include?

A. Use of only constants

B. Expressions only

C. Tags and constants

D. Strings only

The DIV instruction is designed to perform division operations within programmable controller systems. The sources for this instruction can include both tags and constants, which allows for versatile data manipulation. Tags refer to variables that are defined within the controller, meaning they can hold changing values important for dynamic operations. Constants are fixed values that remain unchanged during execution. By allowing both types of values, the DIV instruction can execute division calculations using real-time data (from tags) while also being able to incorporate static values (from constants) into those calculations. This flexibility enhances the instruction's utility in programming scenarios where operators need to work with varying inputs or defined parameters. In contrast, the other options are limited in scope. For instance, relying solely on constants restricts the process to unchanging values, making the division operation ineffective in situations where data input might fluctuate. Similarly, using only expressions would not accommodate direct references to variables (tags) or fixed values, limiting functionality even further. Finally, diverting focus entirely to strings is inappropriate because division operations are based on numerical values, not textual representations. Thus, the inclusion of both tags and constants maximizes the DIV instruction's practical application in programmable control logic.

5. What can Sources A and B of the DIV instruction contain?

A. Tags or constants

B. Only constants

C. Only tags

D. Both variables and literals

The DIV instruction in programmable controller systems is used for division operations, where the instruction divides one value by another. Sources A and B in this instruction can indeed contain tags or constants. Tags refer to variables that are defined within the program, which can store dynamic data, while constants are fixed values that do not change during program execution. When using the DIV instruction, providing flexibility in the types of inputs allows for a wider range of calculations. For example, if Source A is a tag (a variable that stores a value from a sensor) and Source B is a constant (a predetermined value), the instruction can be executed successfully. This versatility is crucial for effectively programming controllers, especially in applications where inputs may vary. Since both tags and constants can be utilized in this context, it confirms that the choice stating that Sources A and B can contain tags or constants is accurate. This understanding enables programmers to write more adaptable and robust code, enhancing the performance of the programmable controller systems.

6. What device is used to download hardware configurations and programs to a PLC?

A. PC

B. Memory Card

C. Terminal Interface

D. Network Cable

The device that is primarily used to download hardware configurations and programs to a Programmable Logic Controller (PLC) is a PC. A personal computer typically runs specific software applications designed for programming PLCs. This software allows users to create, modify, and download the configurations and logic programs necessary for the PLC to function as intended in an industrial automation system. Using a PC provides a user-friendly interface for programming and debugging, as well as access to a variety of resources and tools that can aid in the development of complex control strategies. The communication between the PC and the PLC can be facilitated through various means such as USB, serial ports, or network connections, depending on the PLC model. While other options like memory cards, terminal interfaces, and network cables can play roles in configuration and connections, the PC is the most versatile and widely used device specifically for downloading comprehensive hardware configurations and programming directly to PLCs.

7. Which type of timer accumulates the total amount of time the instruction has been energized and retains this value even when de-energized?

A. Retentive timer

B. Non-retentive timer

C. Interval timer

D. Delay timer

A retentive timer is designed to accumulate the total amount of time an instruction is energized while holding onto that value even after it is de-energized. This functionality is crucial in applications where it is important to measure time continuously over multiple cycles of operation. For example, if a process is interrupted and then restarted, a retentive timer will continue from the last accumulated time, allowing for accurate tracking without resetting. In contrast, a non-retentive timer resets its accumulated time to zero when the instruction is de-energized. This means it cannot provide a continuous measurement through interruptions. Interval and delay timers serve specific purposes related to timing operations, but they do not specifically retain the time value after deactivation in the same way a retentive timer does. Thus, the definition and functionality associated with a retentive timer make it the correct answer in this context.

8. The specific order in which automatic machines perform actions is called a(n) _____.

A. Operation

B. Task

C. Sequence

D. Routine

The term that describes the specific order in which automatic machines perform actions is referred to as a "sequence." A sequence outlines the precise steps that need to be followed for the machine to complete a task effectively. In automated processes, having a clearly defined sequence is crucial because it ensures that each action is executed in the correct order, which is necessary for the machine to function as intended. For example, in a manufacturing setting, a robotic arm may need to pick an item, move it, and place it down in a particular order to avoid errors and ensure efficiency. While operations, tasks, and routines are relevant terms in automation and machinery, they do not specifically define the order of actions. An operation refers to a single function or activity performed by the machine, a task is a broader term that could encompass multiple operations, and a routine generally implies a fixed or established way of doing something, which may not necessarily emphasize the order of individual actions. Thus, "sequence" is the most precise term in this context.

9. A(n) _____ timer records the total amount of time the instruction has been energized and retains this value even during de-energization.

A. Retentive

B. Non-retentive

C. Static

D. Dynamic

A retentive timer is designed to keep track of the accumulated time a particular instruction is energized, even if that instruction loses power or is de-energized. This means that once the timer is re-energized, it will continue counting from where it left off rather than starting from zero. This characteristic is crucial in applications where it is necessary to maintain an accurate total time record, such as in process control and machinery operation timing, where interruptions may occur. In contrast, other types of timers like non-retentive timers reset to zero when de-energized, so they do not retain any previous timing information. Static and dynamic refer to different concepts altogether, where "static" generally relates to unchanging conditions, and "dynamic" relates to changing conditions, which does not specifically address the functionality of timing within controller systems. Thus, the choice of a retentive timer is the correct answer as it directly addresses the requirement for maintaining time continuity across power cycles.

10. Which value types can Sources A and B of the DIV instruction contain?

A. only constants

B. tags

C. arrays

D. strings

The correct choice, which identifies that Sources A and B of the DIV instruction can contain tags, highlights an important aspect of working with programmable logic controllers (PLCs). Tags are symbolic representations of data stored in the controller's memory and can be used to reference various types of data, including integers, real numbers, and other numeric values. In the context of the DIV instruction, which is typically used for division, the sources need to represent values that can be mathematically manipulated. Tags provide this functionality because they can dynamically reference different values as the program executes. This allows for greater flexibility and ease of use in programming. Unlike constants, which are fixed values, or arrays and strings, which have specific data handling procedures, tags allow for a versatile means of defining operational input. The use of tags facilitates better organization and readability in code, making it easier for programmers to understand how data flows through their control systems.