

General

1. What is Automation?

Automation is delegation of human control functions to technical equipment for increasing productivity, better quality, reduce cost & increased in safety working conditions.

2. What are the different components used in automation?

The components of automation system include

- Sensors for sensing the input parameters
- Transmitters for transmitting the raw signal in electrical form
- Control system which includes PLC, DCS & PID controllers
- Output devices/ actuators like drives, control valves.

3. What are the different control systems used in Automation?

- PID Controller based control system
- PLC based control system
- DCS based Control system
- PC Based automation system

4. Explain PID based control system.

PID (Proportional Integral Derivative) is the algorithm widely used in closed loop control. The PID controller takes care of closed loop control in plant. A number of PID controller with single or multiple loop can be taken on network. PID Controllers are widely for independent loops. Although some logic can be implemented but not much of sequential logic can be implemented in PIDs.

5. Difference between PLC & Relay?

- PLC can be programmed whereas a relay cannot.
- PLC works for analog I/Os such a PID loops etc. whereas a relay cannot.
- PLC is much more advanced as compared to relay.

6. Difference between PLC & DCS?

DCS: The system uses multiple processors, has a central database and the functionality is distributed. That is the controller sub system performs the control functions, the history node connects the data, the IMS node gives reports, the operator station gives a good HMI, the engineering station allows engineering changes to be made.

PLC: The system has processor & I/O's and some functional units like basic modules and so on. Uses a SCADA for visualization. Generally the SCADA does not use a central database.

7. What is Encoder?

A feedback device which converts mechanical motion into electronic signals. Usually an encoder is a rotary device that outputs digital pulses which correspond to incremental angular motion. The encoder consists of a glass or metal wheel with alternating clear and opaque stripes that are detected by optical sensors to produce the digital outputs.

Instrumentation System

8. What types of sensors are used for measuring different parameters?

- Temperature sensors – RTD, Thermocouple, Thermistor
- Pressure Sensor – Borden Tube, Bellows, Strain gauge
- Flow – sensor – Pitot tube
- Level, Conductivity, Density, Ph

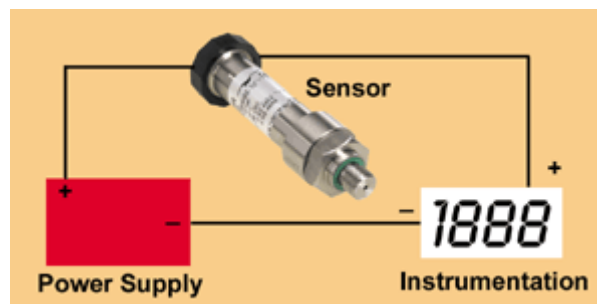
9. What is transmitter?

A transmitter is an electronic device that is generally mounted in the field in close proximity to a sensor. The sensor (also known as a transducer) measures a physical variable such as temperature or pressure and outputs a very low level electronic signal. The basic function of the transmitter is to provide the correct electrical power to turn on (or excite) the sensor then to read the low level sensor *signal*, *amplify it to a higher level* electrical signal and send that signal a long distance to a control or read-out device.

Since low-level electrical signals do not transmit long distances with great accuracy, installing a transmitter generally gives a tremendous improvement in the accuracy of the information delivered to a larger control system. Typically the output from the transmitter is 4-20 mA or 0-10 V

10. Why 4-20 mA preferred over 0-10 V signal?

The 0-10 V signal has tendency to drop because of line resistance. If the distance between sensor and input card is more the signal will not properly represent the field value. The 4-20 mA will travel a long distance without dropping signal value.



11. Why 4-20 mA preferred over 0-20 mA signal?

With 0-20 mA you can not distinguish between minimum field value and connection break. With 4-20 mA, internal circuit can distinguish between connection break of minimum value. Normally when the value is minimum the transmitter will give you 4 mA while in case of connection breakage it will give 0 mA.

12. Difference between 2 wire, 3 wire and 4 wire transmitter.

In 2 wire transmitter the power and signal are transmitted through same cable.

In 3 wire transmitter the data signal and power are with respect to common ground.

In 4 wire transmitter two wires for power supply and two for signals.

Only current transmitters can be used as 2 wire transmitters.

13. What is a “Smart” Transmitter?

A “Smart” transmitter is a transmitter that uses a microprocessor as the heart of the electronics. In addition, a “Smart” transmitter will output some type of remote digital communications allowing you to read and set-up the device from a remote position.

14. What is Field bus?

Field bus is a general term for a digital only, high speed communications protocol. The key attribute to Field bus communications is higher speed communications with the possibility of addressing multiple transmitters all on the same field wiring. The foundation Field bus is a specific digital protocol that is often shortened to just be called field bus. Other digital only communications such as Profibus are also Field bus protocols.

15. What is Actuator?

In a closed-loop control system, the part of the final control element that translates the control signal into action by the control device.

16. Explain Working of RTDs

Resistance Temperature Device works on the principles that the resistance of the material changes as its temperature changes. Temperature is determined by measuring resistance and then using the RTD Resistance vs Temp characteristic to detect temperature. Typical elements used for RTD are Nickel, copper and Platinum, Platinum is widely used in RTDs because of accuracy. PT 100 means at 0 deg temp 100 ohms resistance. A typical RTD consists of a fine platinum wire wrapped around a mandrel and covered with a protective coating (glass or ceramic).

17. Temperature measurement range supported by RTDs?

The RTD works on temperature range between -250 to 850 deg C.

18. Explain Working of Thermocouple

Thermocouple consists of two strips or wires made up of different metals and joined at one end. The temperature at that juncture induces an electromotive force (emf) between the other ends. As the temperature goes up the emf also increases. Through standard charts and tables the corresponding temperature can be found out.

The relationship between the thermocouple output and the temperature is quite non-linear. Different metallurgies produce different outputs. The different metallurgies and different linearities result in different thermocouple designations as “J” “K” “N” “L”, etc.

19. What is Cold junction compensation?

The industry accepted standard for the temperature at open end is 0 deg C. Therefore tables and charts make the assumption that the temp open end is 0 deg C. In industry the open ends are always at actual room temperature and not 0 deg C. The emf adjustment because of difference between the temp and 0 deg C is referred to as Cold Correction (CJ Correction).

20. Temperature measurement range supported by thermocouple?

The thermocouple works on temperature range i.e. -270 to 2300.

21. Can split my one T/C signal to two separate instruments?

No. The T/C signal is a very low-level millivolt signal, and should only be connected to the device. Splitting to two devices may result in bad readings or loss of signal. The is to use a “dual” T/C probe, or convert one T/C output to a 4-20 mA signal by using a transmitter or signal conditioner, then the new signal can be sent more than one instrument.

22. What are the flow measuring instruments used in flow measurement?

- Different pressure meters
- Positive displacement
- Velocity meters

23. Explain working of differential pressure measurement ?

Suitable restriction placed in flow stream causes a different pressure across it. As flow depends upon different pressure (Head) & area so any of them or both can be varied for varying flow.

24. What are the components of different flow sensor?

For creating different pressure: Orifice plate, Venturi Tube, flow Nozzle, pitot tube For measuring pressure: U- Tube Manometers, Ring- Balance Manometer, P. Cell

25. What type of pressure sensors used in pressure measurement?

- Manometers
- Bourdon tubes
- Bellow elements
- Diaphragm elements
- DP transmitters

26. Explain working of different pressure transmitters.

Process pressure is transmitted through isolating diaphragms and oil fill fluid to a sensing diaphragm. The sensing diaphragm is a stretched spring element that deflects in response to differential pressure across it. The displacement of the sensing diaphragm, a maximum deflection of 0.004 inch (0.10mm), is proportional to the applied pressure, Capacitor plates on both sides of the sensing diaphragm detect the position of the diaphragm. The transmitter electronics convert the different capacitance between the sensing diaphragm and the capacitor plates into a two-wire mA signal and a digital output signal.

27. What is Control Valves?

The control valve, commonly named the final control element of control contains a pneumatic device that converts the control signal from the controller in action, regulation the flow.

28. What type of control valves used in the industry?

- ON – OFF SERVICES:- Gate, Ball, Diaphragm, Plug, Butterfly valves.
- THROTTILING SERVICES:- Globe, Butterfly, Diaphragm, Pinch valves.
- NON – REVERSE FLOW:- Check valves.

29. What are specifications of the control valve?

Following specifications are used for control valve

- Flow medium and operating temperature

- Flow rate kg/hr or Nm³/hr Max/Min/Normal
- Inlet and Outlet pressure : kg/cm² Max/Min/Normal
- Max. allowable diff. Pressure : kg/cm²
- Density of medium : kg/m³
- Viscosity
- Cv: Valve Flow Coefficient

30. What are the components of control valve?

- Actuator, Body, Trim, Diaphragm, Diaphragm plate, Actuator stem
- Actuator spring, Seat, Travel Indicator, Valve stem, Gaskets, Yoke, Hand wheel

31. What is flow coefficient?

It is the flow of water (G=1, T=6 to 34 deg. C) through the valve at full lift in U.S. gallon per minute with a pressure drop across the valve of 1 psi.

Supervisory Control and Data Acquisition Software : Wonderware In Touch

32. What is SCADA ? Role of MMI/HMI/SCADA in Industrial Automation

SCADA : Supervisory control and data acquisition

MMI : Man Machine Interface

HMI : Human machine Interface

This acts as an operator station. The operator can monitor as well as control the process parameters from this stations. Apart from online process data the operator will have access to historical and real-time trends, alarms and reports. The operator can give commands to control hardware for opening the valve, change the set point, start the pump etc.

33. What are Features of SCADA software?

The common features of SCADA include Dynamic process mimic, Trends, alarm, Connectivity with hardware, Recipe management etc.

34. Applications of SCADA.

SCADA systems has many applications right industrial automation, power distribution to water management.

35. Some of the leading SCADA companies

- Invensys Wonder ware In Touch
- Siemens WinCC (Earlier COROS)
- Allen Bradley RS View (Earlier Control View)
- Intellution ifix (Earlier Fix DMAPS)
- GE Fanuc Simplicity

36. Types of Wonder ware SCADA packages

- No. of I/Os- Wondeware In Touch comes is 64, 128,256,1000, and 64,000 tags package.
- Development+ Runtime + Network (DRN)/ Runtime + Network (R+N) and View Node

D+R+N: With this packers development and editing of the application is possible, Runtime monitoring and control of the plant is possible and Networking is possible.

R+N: With this package development and editing of the application is NOT possible, Runtime monitoring and control of the plant is possible and Networking is possible.

Factory Focus: With this package developments and editing of the application is NOT possible, Runtime monitoring is possible but control of the plant is NOT possible and Networking is possible. This package is used a view node

37. What type of licensing patterns used in the SCADA software

Typically two types of licenses are used in the SCADA software

- Dongle Key : It is a hardware lock which can be put on the communication port of the PC.
- Software Lock: Here the software code is the license. Typically can put the code while installation or transfer the code from Floppy to hard- disk.

38. Various EXE files used in Touch Software and their role

InTouch : It is an application manager. Using this you can create new application. Move between various application.

View: Window viewer. This will start Runtime application. From this you can monitor and control the plant.

WM: WM.XE is Window maker. This will start the development package in InTouch. Using you can you can develop the application.

39. Types of Window?

Replace: Automatically closes any window (s) it intersect when it appears on the screen including popup other replace type windows.

Overlay: Appears on top of currently displayed window (s) and can be larger than the window (s) it is overlaying. When an overlay window is closed, any window (s) that were hidden behind it will reappear. Clicking on any on any visible portion of a window behind an overlay window will bring that window to the foreground as the active window.

Popup: Similar to an overlay window except, it always stays on top of all other open windows (even if another window is clicked) Popup window usually require a response from the user in order to be removed.

40. What is Symbol Factory?

Symbol Factory contains symbols which can be readily used in the application. The symbol is contains include various Tanks, Reactor, Pipes Icons, and Flags.

41. What type of user input in InTouch?

User inputs include data entry Discrete, Analog, String/ Message, Sliders and Pushbuttons.

42. What type of animation can be given in InTouch?

Colour fill, % Fill Blinding, Size Control, Location, Orientation, Visibility, Action, Hide Show window

43. What are trends?

Trends means graphical representation of data.

“Real- time and “ Historical. You can configure both trend objects to display graphical representations of multiple tag names over time. Real- time trends allow you allow you to chart up to four pens (data values). While Historical trends allow to chart up to pens.

Real-time trends are dynamic. They are updated continuously during runtime with whatever time span given in configuration. You can not scroll the real- time trends to see previous data.

Historical trends provide you with a “ snapshot” of data from a time and data in the past. They are not dynamic Unlike real- time trends historical trends are only updated when they instructed to do so either through the execution of a Quick- Script or an action by the operator, for example, clicking a button, You can zoom in/ zoom out the trends. You can also access the pervious data.

44. What are Alarm and Events in InTouch?

Alarms and Events are the notifications used to inform operator of process activity. Alarms represent warnings of process conditions that could cause problems, and require an operator response. A typical Alarms is triggered when a process value exceeds a user defined limit. InTouch uses for types of alarm LOLO LO HI and HIHI.

Events represent normal system status message, and do not require an operator response. A typical event is triggered when a certain system condition takes place, such as an operator logging into InTouch.

45. Security management

Security provides the ability to control whether or not specific operators are allowed to perform specific functions within an application. Security is based on the concept of the operator “logging on” to the application and entering a “User Name” and “Password.” (The application developer sets up each operator with a “User Name,” a pre-assigned “Password” and an “Access Level” via the Special/Security/Configure Users command wither in WindowMaker or Windows Viewer).

When a new application is created, the default “User Name” is “Administrator” with an access level of 1999 (which allows access to all security commands).

46. What is the use of Scripts in InTouch?

Is a way of writing logic in InTouch. InTouch has its own instructions and way of writing program.

Application	: Linked to the entire application.
Windows	: Linked to a specific window.
Key	: Linked to a specific key or key combination on the keyboard.
Condition	: Linked to a discrete tagname or expression.
Data Change	: Linked to a tagname and/or tagname field only.

47. What is driver?

A software which allows a computer to access the external devices using com ports or communication cards.

48. What is DDE?

Dynamic Data Exchange is the facility developed by Microsoft for exchanging the data between various programs.

DDE has three important settings

Application / Server name, Topic Name and Item Name

49. Communication with software (Excel)

DDE settings for Excel

- App. Name – Excel,
- Topic Name – [book.xls]sheet1
- Item Name – Cell Address ie (R1C1)

DDE settings for InTouch

- App. Name – View
- Topic Name – TAGNAME
- Item Name – Name of tag

50. How to monitor the data from InTouch to Excel? ie One way communication from InTouch to Excel.

In Excel worksheet write a formula ie = View [TAGNAME A1

A1 is name of tag in InTouch

51) How to have two way communication between Excel and InTouch?

Programmable Logic Controller – General

51. What is PLC?

PLC means Programmable Logic Controller. It is a class of industrially hardened devices that provides hardware interface for input sensors and output control element. The field I/p include element like limit switches, sensors, push button and the final control elements like actuator, solenoid/control valves, drives, hooters etc.

PLC Senses the input through I/p modules, Processes the logic through CPU and memory and gives output through output module.

52. Applications of PLC

PLC can be used in almost all industrial application solutions right from small machine to large manufacturing plants. Even it caters applications of redundant systems at critical process plants.

53. Role of PLC in Automation?

PLC plays most important role in automation. All the monitoring as well as the control actions are taken by PLCs. PLC Senses the input through I/P modules, Processes the logic through CPU and memory and gives output through output module.

54. Role of CPU ?

This component act as a brain of the system.

CPU consist of Arithmetic Logic Unit, Program memory, Process image memory, Internal timers and counters, flags.

It receives information from I/P device, makes decisions depending upon the information and logic written and sends information through the O/P devices.

The CPU's are distinguished with following features

Memory capacity, Instruction set supported, communication option, time required to execute the control program.

55. Role of Power supply in PLC system?

Power supply provides system power requirement to processor, I/O and communication modules. Typically the power supply has input voltage 120 V – 230 V AC or 24 V DC and back plane output current 2 A to 5 A at 5 V DC

56. Role of Rack or Chassis in PLC system?

A hardware assembly, which houses the processor, communication and I/O modules. It does following functions.

- Power distribution
- Containment of I/O modules
- Communication path between I/O module and CPU

The chassis are available in different slots in various PLC systems. Additional chassis can be connected using chassis interconnecting cable.

57. What is role of I/O modules?

Electronic plug in units used for interfacing the i/p and o/p device in the machine or process to be controlled.

I/P module receives data from i/p devices (Pushbutton, Switches, Transmitters) and send it to processor. The O/P module receives data from processor and send it to output device (Relay, Valves).

Digital/Discrete:- Sends and Receives On/Off signal

Analog:- Sends and receives variable input or output signals

58. Role of EEPROM memory module?

This module is inserted into processor system for maintaining a copy of project (PLC program). This is helpful in case of memory corruption or Extended power loss.

59. Communication module

communication modules are used either for communication between external hardware or software. The hardware can be PLCs (same or other make), Controller, I/O module, smart transmitters. The software can be SCADA software, MIS system or programming software.

60. Difference Between Fixed and Modular PLCs?

In non modular PLCs the processor will have inbuilt power supply and I/Os in one unit.

The modular PLC, will have separate slots for components like Power supply, I/O modules. You can select the I/Os or power supply as per the need.

61. What are the Types of I/Os?

- Local – These are the I/Os placed in the PLC main rack containing CPU. These I/Os are connected to CPU through jackplane.

Distributed – These are the I/O placed at remote location from the main rack containing the CPU. These I/O's are to be connected on communication bus like control net, device net or FIP I/O.

62. What is meaning of resolution in I/O cards in PLCs?

It is the minimum change in i/p parameter which can sensed by the i/p card. As far as Digital I/O is concerned it takes only one bit for operation. In case of analog input the resolution determines how much bits are used for input or output. For example a 12 bit resolution card means the input will come as 0 to 4095 count (2^{12}). For 16 bit data the counts will be from 0 – 65536(2^{16}). More the resolution the data will be more accurate.

63. What is an Analog Input Module?

An I/O module that contains circuits that convert analog input signals to digital values that can be manipulated by the processor. The signals for pressure, flow, level, temperature transmitters are connected to this module. Typically the input signal in 4-20 mA, 0-10 V

64. What is Analog Output Module?

An I/O module that contains circuits that output an analog dc signal proportional to a digital value transferred to the module from the processor. By implication, these analog outputs are usually direct (i.e., a data table value directly controls the analog signal value).

65. What is meaning of universal analog input card?

Normally there are different cards for different signals. But in universal input card the same channels can be configured for RTD, Thermocouple, Current or voltage input.

66. Give examples of I/P and Output connected to PLCs

- Digital I/P (Pushbutton, Switches)
- Analog I/P (Temp, Pressure, Flow, Level)
- Digital O/P (Solenoids valves, Contactors)
- Analog O/P (Control Valves, Speed)

67. Explain Source and Sink Concept?

Sinking Source type modules gives out the current to the field digital devices while sins type modules draw current when the device is in high sate.

Sinking – When active the output allows the current to flow to a common ground.

Sourcing – When active, current flows from a supply, through the output device and to ground.

68. What is forcing of I/O?

Forcing the I/Os means making the desired status of I/O in PLCs irrespective of its status coming from the field.

In certain cases when there is problem in receiving field input/ output, we can force the i/Os so that the logic takes desired state.

69. Scan cycle of PLC

PLC's can cycle follows following path Scan cycle of PLC

- Input Image Updation

➤ Process Logic Execution
Output Updation

70. What is meaning of scan time in PLC?

Scan time is the Time required to read the I/P, Process the logic and update the output in one cycle.

71. What is typical scan time in PLCs? What effects scan time?

Typically it is less than 10 ms. It depends on the complexity of logic, PID algorithm etc.

72. How to program PLCs?

Every PLC manufacturer have their own software for programming the PLC. For example Siemens uses Simantic S7 Manager, Allen Bradley uses RS Logix and Modicon uses PLC pro programming software. The programming language used is Ladder Logic (LD), Statement List (STL), Functional Block Diagram (FBD), Sequential Foundation Chart (SFC), Instruction List (IL) etc.

73. What is ladder diagram?

This is a programming language, which expresses a program as a series of “coils” and “contacts”, simulating the operation of electromechanical relays. The resultant program is the equivalent of an equation, which is executed continuously in a combinatorial manner. The advantage of this language is the familiarity many electricians have with the simple operation of relays. Disadvantages include the complexity of large, cross-connected programs, and the difficulty of expressing such non-binary functions as motion control and analog I/P.

74. What is redundancy?

The capacity to switch from primary equipment to standby equipment automatically without affecting the process under control. Redundancy means provision for standby module. In case of failure of one module is running process, the standby module takes over. Hot redundancy means the changeover of control from active processor to standby processor in less than 1 scan time.

75. Need of redundancy

in critical processes, it is important to run the plant without failure. In such case it is important to have redundancy so that even in one system fails the redundant system can take care without affecting plant.

76. Types of redundancy

CPU redundancy : In case of CPU failure the standby CPU takes care of the plant.

Power Supply redundancy : In case the power supply fails the standby power supply takes control of the situation.

Communication : Multiple communication channels are provided to take care of communication failure.

I/O Redundancy : Multiple I/O channels are provided to take care of input or output failure.

77. What are components of redundant PLC system?

Typical component on Schneider Redundant PLCs

The backplane used is either 4 slot or 6 slot with

- Power Supply
- Controller with built-in Modbus Plus and Modbus ports
- Optional dual cable Modbus Plus
- Optional fiber optic Modbus Plus
- CHS Hot Standby module
- Dual cable Remote I/O Head

The master and Standby configuration must be identical

78. Commonly used Instructions in PLCs

Examine if Closed (XIC):- -	Examines if the bit is in ON condition. If the bit is ON the instruction is true.
Examine if Open (XIO):- / -	Examines if the bit is in OFF condition. If the bit is OFF the instruction is true.
One shot rising (OSR):- [OSR]-	When the conditions preceding the instruction is true, makes the rung run for one program scan.

Note retentive Output instruction

Output Energies (OTE):-- ()--	If the rung is true, it turns on the bit. If the rung goes or a power cycle occurs the bit turns off.
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Retentive Output instruction

Output Latch (OTL):-- (L)---	If the rung is true, turns ON a bit. The bit stays ON until the rung containing an OUT with the same address goes true.
Output Latch (OUT):-- (U)---	If the rung is true, turns OFF a bit. The bit stays OFF until the rung containing an OTL with the same address goes true.

79. Timers

Timer and Counter are used to control operation based on time or number of events

Types of timers

TON – (Timer ON delay)	An output instruction that can be used to turn an output ON or OFF after the timer has been timing for a preset time interval.
TOF – (Timer OFF delay)	An output instruction used to turn an output ON or OFF after its rung has been off for a preset time interval.
RTO – (Retentive Timer)	An output instruction that can be used to turn an output ON or OFF after the timer has been timing for a preset time interval. Once it has begun timing, it holds the count of time even when the rung continuity is lost.

Timer Status Bit

DeviceNet: A low-cost communication link that connects industrial devices to a network. It is based on broadcast – oriented communication protocol- the Controller Area Network (CAN).

Ethernet: The standard for local communications network developed jointly by Digital Equipment Corp, Xerox, and Intel. Ethernet base band coaxial cable transmits data at speed up to 10 megabits per second. Ethernet is used as the underlying transport vehicle by several upper-level protocols, including TCP/ IP.

90. What is latency in communication?

The delay time between the end of one communication and the start of another. During this time, the processes associated with the communication are hung up and cannot continue. The latency to be minimum.

91. How the communication protocols are distinguished?

The protocols are distinguished with following specifications

- No. of nodes supported, total network length, speed of communication.

92. Comparison between various Protocols used with AB

	DH+	DH485	Device Net	Control Net
Baud rate max	230.4 kbits/s	19.2 kbit/s	500 kbit/s	5 Mbit/s
No. of max. nodes	64	32	64	99
Network Length	3.048 Km	1.2 km	0.487 Km	30 km

Programmable Logic Controller- Siemens

93. What are the various PLC system in SIMATIC range?

Siemens has broadly 3 PLC ranges ie Siemens S7 200, 300 and 400

94. What are the software used with Siemens?

For S7 200 PLC programming Micro win

For S7 300 and 400 system: Simantic S7 manager

The SCADA software used by Siemens is Win CC. Earlier Siemens use to supply COROS LS /B

95. Components of Siemens S7 300 Series PLC system?

CPUs (312 IFM, 313,314,IFM,314,315,2DP,316-2DP,318

Single Modules (SM), Digital I/O (SM321/322/323), Analog I/O (SM 331/332/334)

Function modules (FM) ex Positioning Modules, Closed Loop

Communication Processor ex CP 342-5 DP for Profibus

Interface module- For interconnecting individual racks (IM 360/361, IM 365 S/R)

96. What are the Communication Protocol used in Siemens?

Multi- Point Interface (MPI):

Data Transfer-187,5 kbits to 15 Mbit/ s,

Distance-50 m without RS 485 repeater /10 Km with repeater

Number of nodes- up to 32

Profibus

Data Transfer-12 Mbit/s,
Distance-23 Km with fibre optic cable
Number of nodes – up to 125

97. What are the blocks used in Siemens?

Simantic S7 manager uses DB, OB, FC, PB, and FB

Obs: Determine the structure of the user program

Data Block: These are the blocks used by logic blocks in CPU program for storing the data. DB's does not contain any instructions and it take up space in the user memory. The user program and access a data block with bit, byte, word or double word operations. Global data block: These contain information that can be accessed by all the logic block in the user program.

Instance data block: These DBs are always assigned to a particular FB.

UN : (enable) Specifies whether or not the timer instruction is enabled

DN : (Done) Specifies whether or not the accumulated value of the timer equals to the preset value of the timer.

Programming instruction (Advance)

MCR, Compute, PID, STI, Sequencer, Register, RTC

Programmable Logic Controller – Allen Bradley

80. What are the PLC ranges available in Rockwell?

- Pico : Non modular small PLCs
- Micrologix 1000, 1200 and 1500 Series
- SLC : SLC 5/01, 5/02, 5/03
- Control Logix Flex Logic and Soft PLC

Diff b/w Micro Logic and SLC

Micrologix

- | | |
|--------------------|-----------------------|
| 1. Has limited I/O | Large capacity of I/O |
| 2. Use DFI only | Use PID , DH+ |

81. What are the software Used with AB?

For Pico soft for Pico PLC programming

RS Logix 500 for Micrologix and SLC PLCs programming

RS Logix 5000 for Control Logix PLCs programming

SCADA – RS View earlier Control View

82. What is use of RS Linx software?

RS Linx software is used to perform following tasks.

- Configure communication drivers
- View configured drivers and active nodes
- Enable communication tasks such as uploading, downloading, going online, updating firmware and sending messages.

83. What is use of RS Logix Software?

RS Logix is a PLC programming software. It contains all the instructions needed for PLC programming. We can develop the program, download/upload the program, work on line/off line and force the I/Os using the software.

RS Logix 500 is used for Micrologix and SLCs

RS Logix 5000 is used for Control Logix PLCs

84. What file gets created in PC for RS Logix PLC program?

The extension of the file will be .rss. So if you create an application with "Reliance" name the file created will be "Reliance.rss". By default it will be stored in "c:\Program Files\Rockwell Software\RS Logix 500 Eng" location.

85. How to creating linkage between PLCs and PLC programming software?

The RS Linx software is used for linking the PLC and software

Either you can manually configuration the communication settings or By using Auto Configure facility the software will detect the communication settings automatically.

86. Hardware configuration (PLC and I/Os)

- Manual configuration
- Auto detect

87. What is the meaning of Upload and Download?

Upload means transferring the program data from PLC to PC

Download means transferring the program data from PC to PLC

88. What are the various communication interfaces supported by AB?

The commonly used communication protocol in AB includes DH+, DH485, ETH, Modbus, Device Net and Control Net.

89. Give information about DH, Control Net, DeviceNet and Ethernet protocol.

Data Highway : The proprietary data network used by Allen Bradley PLCs to communicate information to and from other PLCs on the network or to and from host computers attached to the network.

ControlNet : A real-time, control-layer network providing high-speed transport of both time-critical IO data and messaging data, including upload/download of programming and configuration data and peer-to-peer messaging, on a single physical media link.

FC Functions : It is a logic block without memory. An FC is always executed by calling in another block. FC is used either for returning a function value to a calling function or executing a technological function. Temporary variable belonging to FC are saved in local stack and this data is lost when the FC has been executed.

Function Blocks (FBs) : A function block is block with a memory. A FB contains a program that is always executed when a different logic block calls the FB. FB make it much easier to program frequently occurring complex functions.

98. What are SFCs and SFBs?

SFBs and SFCs are integrated in the S7 CPU and allow you access to some important system functions.

99. What is Statement List?

Statement List (STL) is a textual programming language that can be used to create the code section of logic blocks. Its syntax for statements is similar to assembler language and consists of instructions followed by addresses on which the instructions act.