

# Yashwantrao Chavan College of Science, Karad

## Question Bank

Subject Code : 81713 Subject Name : DSE-F20: Industrial Automation and PLC  
Programming

Common subject Code (if any) \_\_\_\_\_  
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1. Automatic sprinkler is an example of ----- system.
  - a) Closed-loop
  - b) Open-loop
  - c) Adaptive
  - d) Feed forward
  
2. Automatic toaster is an example of ----- system.
  - a) Closed-loop
  - b) Open-loop
  - c) Adaptive
  - d) Feed forward
  
3. A human being driving a bike is an example of ----- system.
  - a) Closed-loop
  - b) Open-loop
  - c) Adaptive
  - d) Feed forward
  
4. In proportional controller the control signal output varies.
  - a) In the direction of the error
  - b) In the opposite direction of the error
  - c) Varies with the time only
  - d) None of the above
  
5. Integral controller is also called as -----.
  - a) Reset controller
  - b) Integral
  - c) Adaptive
  - d) Derivative
  
6. Derivative controller is also called as -----.
  - a) Rate controller
  - b) Reset controller
  - c) Proportional
  - d) Time controller

7. Two position control is a type of -----
- a) Discrete control
  - b) Continuous control
  - c) Time controller
  - d) Space control
8. Three position control has -----control regions
- a) Four
  - b) Two
  - c) One
  - d) Three
9. Op-amp as a comparator can be called as -----.
- a) Closed-loop
  - b) Open-loop
  - c) Adaptive
  - d) Feed forward
10. Op-amp can be used as -----
- a) ON/OFF controller
  - b) Proportional controller
  - c) Derivative controller
  - d) All of the above
11. Op-amp as comparator is a -----controller
- a) Proportional controller
  - b) ON/OFF controller
  - c) Integral controller
  - d) Derivative controller
12. Op-amp as inverting amplifier is a -----
- a) Proportional controller
  - b) ON/OFF controller
  - c) Integral controller
  - d) Derivative controller
13. In PLC stands for.
- a) Programmable logical controller
  - b) Program Logic control
  - c) Program ladder control
  - d) Performance Logic control
  - e)

d)

14. In PLC is specially designed ----- for industries.

- a) Computer
- b) FPGA
- c) microcontroller  
microprocessor

15. An isolator provides a -----isolation.

- a) power
- b) Galvanic isolation
- c) Ground
- d) Resistive

16. Scan time is a time to -----.

- a) Scan all the inputs
- b) Update all the outputs
- c) Ground
- d) Resistive

17. RS-485 can communicate up to -----.

- a) 100 meters
- b) 1200 meters
- c) 10000 meters
- d) 12000 meters

18. DCS stands for -----.

- a) Discrete control system
- b) Distributed control system
- c) Digital control system
- d) Digit control system

19. If the two, NO switches are connected in series then it's a -----logic.

- a) AND
- b) OR
- c) NAND
- d) NOR

20. If the two, NC (Normally Connected) switches are connected in series then it's a ---  
---

-----logic.

- a) AND
- b) OR

- c) NAND
  - d) NOR
21. Time OFF delay timers means-----.
- a) The output will be deactivated predefine time
  - b) The output will be deactivated before predefine time
  - c) The output will be activated predefine time
  - d) The output will be activated before predefine time
22. Limit switches are used as a -----.
- a) Sensor
  - b) Amplifier
  - c) Impedance matching
  - d) Output device
23. Programming of PLC generally -----used.
- a) Java program
  - b) Ladder program
  - c) JavaScript program
  - d) BASIC program
24. In the PLC programming ----- allows the programmer to count the number of events.
- a. T flip flops
  - b. JK Flip Flops
  - c. counter
  - d. RS Flip flops
25. In oscilloscope Volt/Div and Time/Div switches are examples of-----.
- a. selector switches
  - b. momentary switches
  - c. push button
  - d. relays
26. Using PLC programming user can design -----
- a. RS Flip flops
  - b. Logic Gates
  - c. JK Flip flops
  - d. All of the above
27. ----- are not accessible to the user.
- a. Push buttons
  - b. Selector switches
  - c. Limit switches

d)

d. None of the above

28. -----are the memory elements which store the single bit information. a.

Flip Flops

b. Switch

c. AND gates

d. NOT gates

29. -----are used for emergency stop.

a) Push button

b) Selector

c) Limit switch

Indicator lamp

30. In ladder programming -----contacts are used.

a) Normally open

b) Normally closed

c) Both a and b

d) None of the above

e)

31. -----is having self-learning capability.

a) Closed-loop

b) Open-loop

c) Adaptive

d) Feed forward

32. ---- control system the error is calculated before it introduces in the system.

a) Closed-loop

b) Open-loop

c) Adaptive

d) Feed forward

33. The most common used controller used in industries is -----.

a) PID controller

b) Integral controller

c) Derivative controller

d) PD controller

34. ON/OFF controller is also called as -----

a) Three position control

b) Two position control

c) Proportional control

d) Integral control

35. Which system doesn't require the time to time calibration.
- a) Closed-loop
  - b) Open-loop
  - c) Adaptive
  - d) Feed forward
36. Which system is having large error bandwidth.
- a) Closed-loop
  - b) Open-loop
  - c) Adaptive
  - d) Feed forward
37. Open loop control systems are -----.
- a) Time dependent
  - b) Time independent
  - c) Output is related with time
  - d) Input is related with time
38. Which system is prone to the environmental changes.
- a) Closed-loop
  - b) Open-loop
  - c) Adaptive
  - d) Feed forward
39. Zero crossing detector can be used as a ----- controller
- a) Three position control
  - b) Two position control
  - c) Proportional control
  - d) Integral control
40. Op-amp with capacitor as feedback element works as a -----
- a) Integrator
  - b) Differentiator
  - c) Comparator
  - d) Amplifier
41. Redundant PLC means -----.
- a) Input/output Modules are extra
  - b) Software modules
  - c) PLC with two CPU
  - d) PLC with power backup

d)

42. RS-485 is a -----.
- a) Parallel communication
  - b) Serial communication
  - c) Ring communication
  - d) None of the above
43. DCS has control -----loops.
- a) One
  - b) Many
  - c) Two
  - d) Three
44. SCADA stands for -----.
- a) Discrete control system
  - b) Distributed control system
  - c) Supervisory control and data acquisition system
  - Digit control system
45. If the two, NC (Normally Connected) switches are connected in parallel then it's a -  
-----logic.
- a) AND
  - b) OR
  - c) NAND
  - d) NOR
46. Time OFF delay timers means-----.
- a) The output will be deactivated predefine time
  - b) The output will be deactivated before predefine time
  - c) The output will be activated predefine time
  - d) The output will be activated before predefine time
47. Limit switches are used as -----.
- a) Feedback for instruments
  - b) Amplifier
  - c) Impedance matching
  - d) Output device
48. In ladder programming -----contacts are used.
- a) Normally open
  - b) Normally closed
  - c) Both a and b

- d) None of the above
49. In PLC consists ----- block/section.
- a) Input
  - b) CPU
  - c) Memory
  - d) All of the above
50. The Advantages of the Modular PLC is/are-----.
- a) more memory
  - b) greater I/O modulus
  - c) scaling
  - d) all of the above
51. To indicate the status of the machine -----is used
- a) Push button
  - b) Selector
  - c) Limit switch
  - d) Indicator lamp
52. In JK flip flop a toggle condition occurs if -----.
- a)  $J=0$  and  $K=0$
  - b)  $J=1$  and  $K=1$
  - c)  $J=1$  and  $K=0$
  - d)  $J=0$  and  $K=1$
53. A simple OR logic can be achieved by connecting switches in -----.
- a) series
  - b) parallel
  - c) series and parallel
  - d) None of the above
54. Proximity sensors are -----sensors
- a. Contact
  - b. Non-contact
  - c. Resistive
  - d. Piezo electric
55. Inductive proximity sensors are based on the principal of -----
- a. Eddy current
  - b. Mutual inductance
  - c. Self-inductance
  - d. Hall effect



d)

56. ----- type sensors are used to measure the position of the object

- a. Proximity sensor
- b. Temperature sensor
- c. Piezo electric sensor
- d. Color sensor

57. -----are the type of proximity sensor

- a. Inductive
- b. Hall effect
- c. Light
- d. All of the above

58. encoders are used to measure-----

- a. Linear position
- b. Angular position
- c. Presence of object
- d. Both a and b

59. With the help of the optical encoder the -----of the motor can be measured

- a. Voltage
- b. Current
- c. Power
- d. RPM

60. With the help of the magnetic encoder the -----of the motor can be measured

- a. Voltage
- b. Current
- c. Power
- d. RPM

61. With the help of the magnetic encoder we can measure the -----

- a. Voltage
- b. Current
- c. Length
- d. Angle

62. With the help of the optical encoder we can measure the -----

- a. Voltage
- b. Current
- c. Length
- d. Angle

63. Which sensor can detect the presence of the object

- a. Proximity sensor
- b. Touch sensor
- c. Temperature sensor
- d. Pressure sensor

64. Which sensor can only detect the metallic objects

- a. Optical sensor
- b. Inductive sensor
- c. Ultrasonic sensor
- d. Capacitive sensors

65. Which sensor can only detect the objects in vicinity

- a. Optical sensor
- b. Inductive sensor
- c. Hall effect
- d. All of the above

66. Which sensor can only detect the magnetic objects

- a. Optical sensor
- b. Inductive sensor
- c. Hall effect sensor
- d. Capacitive sensors

67. In pneumatic technology ----- is used
- a. Water
  - b. Oil
  - c. Air
  - d. None of the above
68. Single actuating cylinder has ----- to return home position
- a. chamber
  - b. spring
  - c. magnet
  - d. electric coil
69. double actuating cylinder can perform -----motion
- a. liner
  - b. angular
  - c. transverse
  - d. tendon
70. telescopic cylinders provide -----
- a. liner and long output
  - b. angular and long output
  - c. tendon output
  - d. transverse output
71. multi position cylinder has ----- air inlets
- a. one
  - b. two
  - c. three
  - d. four
72. single actuating cylinder has ----- air inlets
- a. one
  - b. two
  - c. three
  - d. four
73. double actuating cylinder has ----- air inlets/outlets
- a. one
  - b. two
  - c. three
  - d. four
74. reed relay can be actuated by -----field

- a. electric
- b. magnetic
- c. charges
- d. piezo electric

75. solenoids are used in-----

- a. motors
- b. relays
- c. valves
- d. pneumatics

76. ----- are used to generate the rotational motion

- a. Solenoid
- b. Motor
- c. Relay
- d. Servomotor

77. ----- motor has good angular accuracy

- a. AC motor
- b. DC motor
- c. Servomotor
- d. Stepper motor

78. Electric ON/OFF control valves uses -----

- a. Solenoid
- b. Motor
- c. Relay
- d. Servomotor

79. ----- works on the digital sequence

- a. AC motor
- b. DC motor
- c. Servomotor
- d. Stepper motor

80. ----- motor works on the principal of PWM

- a. AC motor
- b. DC motor
- c. Servomotor
- d. Stepper motor

81. The positional accuracy of the servo motor depends upon the
- PWM signal
  - Voltage
  - Current
  - Power
82. Solenoid can perform the motion in -----direction
- One
  - two
  - three
  - multiple
83. Solenoid is a ----- device
- Magnetic
  - Electric
  - Capacitive
  - Electromagnetic
84. --- are used as a semiconductor switch
- SCR
  - TRIAC
  - Both a and b
  - Relay
85. ----- is not a final controlling element
- Limit switch
  - Motor
  - Relay
  - Solenoid valve
86. Pneumatic is used to generate force because, -----
- It generates the more force than the electrical
  - These systems are more efficient than electrical system
  - Pollution free performance
  - Less noisy
87. ---- is used between the operator and machine to control the machine
- Control panel
  - Human machine interface
  - Safety rails

- d. Control box
88. RS-485 can communicate upto -----maximum
- a. 5000 meters
  - b. 1200 meters
  - c. 500 meters
  - d. 120 meters
89. RS-485 protocol uses the ----- signals
- a. Unipolar
  - b. Bipolar
  - c. Special sequence
  - d. None of the above
90. RS 485 is -----type of communication
- a. Full duplex
  - b. Half duplex
  - c. Simplex
  - d. Full full duplex
91. We can connect maximum of ----- devices with RS 485
- a. 64
  - b. 128
  - c. 32
  - d. 10
92. Maximum baud rate with RS485 is ----- MBPS over 10 meter distance
- a. 100
  - b. 20
  - c. 35
  - d. 9600
93. RS485 is specially used for -----communication
- a. Mobile
  - b. Industrial
  - c. Medical
  - d. Defense
94. Advantage of PLC over the relay logic is, -----device
- a. Expensive
  - b. Static wiring

- c. Programmable
  - d. Slower response time
95. For the PLC the input devices are -----
- a. Push button switch
  - b. Limit switch
  - c. Selector switch
  - d. All of the above
96. Find the odd man out
- a. Push button switch
  - b. Limit switch
  - c. Selector switch
  - d. Indicating lamp
97. The main Advantage of using the MODBUS protocol is-----
- a. Bipolar signal
  - b. Long distance
  - c. Error detection and correction mechanism
  - d. Less number of devices can be connected
98. Profibus is mainly used for -----
- a. Time critical application
  - b. Complex communication protocol
  - c. Faster communication
  - d. All of the above
99. Profibus can connect the maximum -----number of devices
- a. 127
  - b. 64
  - c. 32
  - d. 256
100. Profibus can work up to maximum of -----meter of distance
- a. 1000
  - b. 2000
  - c. 5000
  - d. 100

101. The maximum baud rate with the profibus is -----MBPS
- 10
  - 100
  - 12
  - 9600
  - e.
102. The Profit net can use the -----communication
- LAN wire
  - Twisted pair wire
  - Coaxial cable
  - Optical fiber
103. The main advantages of the HART protocol is-----carries the signals.
- Digital signal
  - Analog signal
  - Analog and digital signals
  - Modulated signal
104. Using HART protocol, we can connect -----number of devices.
- 32
  - 63
  - 128
  - 100
105. In HART Protocol the analog signal level ranges from----- to -----
- 0 to 20mA
  - 4 to 20 Ma
  - 0 to 5V
  - 0 to 10V
106. -----protocol uses the ring topology
- Profibus
  - EtherCAT
  - HART
  - MODBUS
107. -----protocol mostly don't use the bus topology.
- Profibus
  - EtherCAT
  - HART
  - MODBUS



108. In -----protocol the device has separate input and output port for communication
- Profibus
  - EtherCAT
  - HART
  - MODBUS
109. -----protocol uses the time synchronized frame for the communication.
- Profibus
  - EtherCAT
  - HART
  - MODBUS
110. ----- are used to mount any device inside the control panel
- Sockets
  - DIN rails
  - Screws
  - Brackets
111. ----- is used to route the wire inside the control panel
- DIN rails
  - Brackets
  - Wire ducts
  - Clips
112. In the construction of the control panel ---- is used
- DIN rails
  - Wire ducts
  - Circuit breakers
  - All of the above
113. In PLC control panel most of the devices works on-----.
- 230 VAC
  - 440 VAC
  - 24 VDC
  - 5 VDC
114. Direct digital control is type of-----
- Distributed control system
  - Supervisory control system
  - Adaptive control system

- d. Centralized control system
115. ---- control system is also called as self-learning system
- Distributed control system
  - Supervisory control system
  - Adaptive control system
  - Centralized control system
116. ----- control system can adjust the control parameters on its own.
- Distributed control system
  - Supervisory control system
  - Adaptive control system
  - Centralized control system
117. ----- control system uses the mathematical model to automatically tune the control parameters.
- Distributed control system
  - Supervisory control system
  - Adaptive control system
  - Centralized control system
118. PLC stands for-----.
- Process Logic Control
  - Proportional Logic Control
  - Process Ladder Control
  - Programmable Logic Controller
119. In PLC consists ----- block/section.
- Input
  - CPU
  - Memory
  - All of the above
120. ----- is the central control portion of the PLC.
- Input
  - CPU
  - Memory
  - Output
121. ----- is used to store the program.

- a. RAM
  - b. ROM
  - c. Input section
  - d. Output section
122. During the program execution ----- is used to store the temporary variables.
- a. RAM
  - b. ROM
  - c. Input section
  - d. Output section
123. SCADA stand for-----
- a. Supervisory control and data acquisition
  - b. Super control and data analysis
  - c. Super control and data add-ons
  - d. Soft control and data acquisition
124. The Advantages of the Modular PLC is/are-----.
- a. more memory
  - b. greater I/O modulus
  - c. scaling
  - d. all of the above
125. ----- type redundant type PLC is used for the critical applications at which failure not acceptable.
- a. cold
  - b. warm
  - c. hot
  - d. none of the above
126. ----- type redundant type PLCs are suitable to used in simple applications.
- a. cold
  - b. warm
  - c. hot
  - d. all of the above
127. The DAC unit present at the PLC section is used for -----
- a. analog to digital conversion
  - b. digital to analog conversion
  - c. low voltage to high voltage conversion
  - d. high voltage to low voltage conversion
128. ----- maintains the connection between two devices or component without any direct conduction.
- a. Isolator/Optocoupler

- b. DAC
  - c. Transistor
  - d. TRIAC
129. A human machine interface (HMI) is employed to interact people for-----.
- a. configuration
  - b. alarm reporting
  - c. everyday control
  - d. All of the above
130. ----- PLCs are designed to perform basic functions.
- a. Fixed
  - b. Modular
  - c. redundant
  - d. None of the above
131. ----- topology is used in the RS485 protocol.
- a. Bus
  - b. Star
  - c. Ring
  - d. All of the above
132. ----- is the open and the most widely used network protocol in the industrial manufacturing environment.
- a. RS485
  - b. MODBUS
  - c. PROFIBUS DA
  - d. PROFIBUS PA
133. ----- communication protocol is used in many computer and automation systems.
- a. RS485
  - b. MODBUS
  - c. PROFIBUS DA
  - d. PROFIBUS PA
134. -----is an open digital communication system with a wide range of applications, particularly in the fields of factory and process automation.
- a. RS485
  - b. MODBUS
  - c. PROFIBUS
  - d. RS422
135. -----protocol is used to communicate with PLC
- a. Profibus
  - b. RS232
  - c. Parallel port
  - d. SPI

136. Adding time delay in PLC is possible by using -----.
- Fuse
  - Switch
  - Pushbutton
  - Time Delay Relay
137. ----- is useful for protection PLC from short circuit.
- Fuse
  - Switch
  - Pushbutton
  - Relay
138. -----prevents damage to the internal circuitry in the case of short or overload. a.
- Fuse
  - Switch
  - Pushbutton
  - Relay
139. -----are used for emergency stop.
- Push button
  - Selector
  - Limit switch
  - Indicator lamp
140. To indicate the status of the machine -----is used
- Push button
  - Selector
  - Limit switch
  - Indicator lamp
141. To add warm-up time before machine normal operation----- is used.
- Push button
  - Selector switch
  - Time delay relay
  - Limit switch
142. -----are the memory elements which store the single bit information. a. Flip
- Flops
  - Switch
  - AND gates
  - NOT gates
143. In the PLC programming ----- allows the programmer to count the number of events.

- a. T flip flops
  - b. JK Flip Flops
  - c. counter
  - d. RS Flip flops
144. During PLC programming for bottle filling plant, to make motor ON for some time ----  
--  
----- is essential.
- a. Timer
  - b. counter
  - c. JK Flip flops
  - d. RS Flip flops
145. The relay with the preset time is called as -----relay.
- a. Time delay
  - b. Normally open
  - c. Timer
  - d. Normally closed
146. In oscilloscope Volt/Div and Time/Div switches are examples of-----.
- a. selector switches
  - b. momentary switches
  - c. push button
  - d. relays
147. ----- are not accessible to the user.
- a. Push buttons
  - b. Selector switches
  - c. Limit switches
  - d. None of the above
148. ----- are useful during the PLC ladder programming.
- a. Push buttons
  - b. Selector switches
  - c. Indicator lamp
  - d. All of the above
149. Using PLC programming user can design -----
- a. RS Flip flops
  - b. Logic Gates
  - c. JK Flip flops

- d. All of the above
150. A simple AND logic can be achieved by connecting switches in -----, a.  
series  
b. parallel  
c. series and parallel  
d. None of the above
151. A simple OR logic can be achieved by connecting switches in -----, a. series  
b. parallel  
c. series and parallel  
d. None of the above
152. A simple NOT logic can be achieved by connecting switch in ----- mode.  
a. normally open  
b. normally closed  
c. normally open as well as closed  
d. None of the above
153. In JK flip flop a toggle condition occurs if -----.  
a.  $J=0$  and  $K=0$   
b.  $J=1$  and  $K=1$   
c.  $J=1$  and  $K=0$   
d.  $J=0$  and  $K=1$

### Short Answer Questions

1. Compare open-loop and closed-loop control system.
2. Define control system and exam the block diagram of closed loop control system.
3. Explain the open-loop control system with some examples.
4. Explain the open-loop control system and discuss its advantages
5. Explain the block diagram of PLC.
6. Explain the working of a proportional controller using OPAMP.
7. Explain the working of two position controller using OPAMP.
8. Explain the working of PI controller using OPAMP.

9. Explain the working of a single actuating cylinder.
10. What is pneumatic system? Explain the working of double actuating cylinder.
11. Explain the working of relay and reed relay.
12. With the neat diagram explain the working of DC motor.
13. Explain the working of stepper motor.
14. With the neat diagram explain the working of AC motor.
15. Explain the working of telescopic cylinder.
16. Write a short note on push button switches.
17. Write a short note on Profibus and Modbus.
18. Write a short note on RS485 communication protocol
19. Describe the working of principal and protocol of MODBUS.
20. What id HART protocol and explain the working of HART Protocol.
21. Write a short note on relays and TDR.
22. Construct a ladder for SR and D flip-flop.
23. Write a short note on feedforward control system.
24. Write a short note on adaptive control system.
25. Write a short note on SCADA.
26. Write a short note on distributed control system (DCS).
27. Describe the construction of the control panel.

### Long Answer Questions

1. Define control system. Explain the open-loop and closed loop control system with suitable example. Discusses advantages and disadvantages.
2. Explain the working of two and multi position control algorithm.
3. Explain the working of P, PI and PID controller.
4. Draw the circuit and explain the working of PID controller using OPAMP.
5. Construct the ladder program for washing machine control.
6. Construct the ladder program for bottle filling plant.
7. Construct the ladder program for Boolean logic functions.
8. Construct the ladder program and explain the working of SR, JK and D flip-flop.
9. Draw the circuit diagram and explain the working of inverting and non-inverting comparator as two position controllers.
10. Write a sort note on 1. RS-485 and 2. MODBUS
11. What is pneumatic system? Explain the working of single actuating cylinder and double actuating cylinder.
12. Write and explain the Ladder program for the bottle filling plant. Write the necessary diagram.
13. Write and explain the Ladder program for color mixing plant. Write the necessary diagram.
14. Explain the working of single shot monostable and holding contact configuration in ladder programming.
15. Write a short note on timers and counters in ladder programming. Draw and explain an example program for each.



16. Write a Ladder program for Boolean functions AND, OR, NOT, NAND and NOR.  
explain its working with help of ladder diagram.