1. What is the primary advantage of a closed-loop control system in industrial automation?

A. Simpler to program

B. Less hardware required

C. Feedback improves accuracy and stability

D. Eliminates the need for sensors

2. In a 6-axis articulated robot, which axis typically allows wrist rotation?

A. Axis 1

B. Axis 3

C. Axis 5

D. Axis 6

3. What does the ?teach pendant? typically allow an operator to do?

A. Monitor sensors only

B. Calibrate servo motors

C. Program and jog the robot manually

D. Record production times

4. What is a typical signal voltage range for an analog sensor in industrial automation?

A. 0?10 V or 4?20 mA

B. 12?24 V

C. 5?15 mA

D. 3?6 V

5. What happens when a proximity sensor falsely detects an object due to electromagnetic interference (EMI)?

A. The PLC will reboot

B. The robot will stop permanently

C. A false input signal may trigger an unintended action

D. It improves cycle time

6. What is meant by the term ?end-of-arm tooling? (EOAT)?

A. The robot?s programming console

B. A system shutdown protocol

C. Attachments used to perform work at the robot?s wrist

D. A measuring tool

7. What type of robot is most suitable for high-speed pick-and-place operations?

A. Cartesian robot

B. Articulated robot

C. SCARA robot

D. Delta robot

8. A PLC is controlling a motor using ladder logic. What would an ?interlock? rung typically prevent?

A. Power surge

B. Sensor failure

C. Mechanical drift

D. Conflicting operations (e.g., forward/reverse running at the same time)

9. In robot safety standards, what does a Category 3 or 4 safety circuit indicate?

A. Fire resistance

B. Low voltage application

C. High diagnostic coverage and fault tolerance

D. Basic protection only

10. Which sensor type is best suited for detecting transparent objects like glass bottles on a conveyor?

A. Ultrasonic sensor

B. Inductive proximity sensor

C. Capacitive sensor

D. Retro-reflective photoelectric sensor

11. What is an HMI used for in an industrial control system?

A. To calibrate power supplies

B. To manually override circuit breakers

C. To provide visual interaction between operator and machine

D. To cool the system

12. How does a servo motor differ from a standard stepper motor in automated systems?

A. Servo motors are slower

B. Servo motors provide closed-loop feedback and precise torque control

C. Stepper motors are more accurate

D. Servo motors can only rotate one direction

13. What is a typical result of poor PID tuning in a motion control loop?

A. Cleaner sensor readings

B. Faster boot-up times

C. Oscillation or overshoot of the system response

D. Improved CPU usage

14. What communication protocol is most likely used to connect PLCs to HMIs in industrial Ethernet environments?

A. USB

B. RS-232

C. Modbus TCP or EtherNet/IP

D. Wi-Fi

15. Which robot configuration gives the most flexibility for complex path movements such as welding or painting?

A. SCARA

B. Cartesian

C. Articulated 6-axis

D. Cylindrical

16. What is meant by ?jogging? a robot?

A. Running it at full speed

B. Programming a full cycle

C. Manually moving the robot a small step at a time

D. Turning it off safely

17. A photoelectric sensor operates based on what principle?

A. Magnetic flux

B. Light interruption or reflection

C. Voltage drop

D. Air pressure change

18. What?s the purpose of a programmable safety controller in automation?

A. To replace the HMI

B. To increase cycle time

C. To enforce and monitor safety logic across zones

D. To handle power distribution

19. What happens if two robots in a shared cell are not properly interlocked or synchronized?

A. They shut down immediately

B. Their speed increases

C. They may collide or interfere with each other's operations

D. Nothing?this is normal

20. Which is a key benefit of using collaborative robots (cobots)?

A. They replace PLCs

B. They are unsafe in human environments

C. They can safely work alongside humans without safety fencing

D. They cost more than traditional automation