



Low Voltage Tech

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Practice Questions

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1. What is the primary purpose of an access control system?

- A. To monitor and record all employee activities throughout the day
- B. To provide electrical power backup during outages
- C. To restrict entry to authorized individuals while denying access to unauthorized persons
- D. To control the heating and cooling systems in a building

2. Which category of unshielded twisted-pair (UTP) cable is the minimum required to support Gigabit Ethernet (1000BASE-T)?

- A. Cat 3
- B. Cat 5
- C. Cat 5e
- D. Cat 6

3. What is the primary function of a Fire Alarm Control Unit (FACU)?

- A. To monitor initiating devices and activate notification appliances
- B. To suppress fires using chemical agents
- C. To provide backup power to all building systems
- D. To communicate directly with the fire department

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4. Under NEC Article 725, Class 1 remote-control circuits are permitted to operate at a maximum voltage of:

- A. 600 volts
- B. 150 volts
- C. 300 volts
- D. 1000 volts



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5. How many layers does the OSI reference model have?

- A. 5
- B. 7
- C. 4
- D. 6

6. Which minimum voltage rating is required for insulated gloves used when working on low-voltage electrical equipment?

- A. 1000 V AC
- B. 500 V AC
- C. 250 V AC
- D. 100 V AC

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7. What does the acronym CCTV stand for?

- A. Central Camera Television Viewfinder
- B. Closed Channel Tele-Video
- C. Closed-Circuit Television
- D. Centralized Control Television Vision

8. A circuit has a voltage of 12 V and a resistance of 4 Ω . What is the current?

- A. 48 A
- B. 0.33 A
- C. 3 A
- D. 8 A

9. Which type of credential stores data on a microchip embedded in the card?

- A. Smart card
- B. Magnetic stripe card
- C. Barcode card
- D. Wiegand card

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10. Which cable category introduced a spline separator (cruciform) inside the cable to reduce alien crosstalk?

- A. Cat 5e
- B. Cat 6
- C. Cat 3
- D. Cat 5

11. According to NFPA 72, what is the minimum sound pressure level a audible notification appliance must produce at the pillow level in a sleeping room?

- A. 55 dB(A)
- B. 75 dB(A)
- C. 85 dB(A)
- D. 90 dB(A)

12. NEC Article 725 defines a Class 2 circuit primarily based on its:

- A. Conductor color
- B. Power and voltage limitations
- C. Conduit fill percentage
- D. Wire gauge

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13. Which OSI layer is responsible for the physical transmission of raw bits over a network medium?

- A. Physical (Layer 1)
- B. Data Link (Layer 2)
- C. Network (Layer 3)
- D. Transport (Layer 4)

14. Under OSHA 29 CFR 1910.147, what is the first step of the lockout/tagout procedure before beginning work on energized equipment?

- A. Apply the lockout device
- B. Notify affected employees
- C. De-energize the equipment
- D. Verify zero energy state



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15. Which component in a CCTV system converts light into an electrical video signal?

- A. Image sensor (CCD or CMOS)
- B. Digital video recorder
- C. Video multiplexer
- D. Coaxial cable

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16. A 24 V source drives 0.8 A through a resistor. What is the resistance?

- A. 19.2 Ω
- B. 30 Ω
- C. 0.033 Ω
- D. 1.92 Ω

17. A proximity card reader typically operates at which frequency?

- A. 2.4 GHz
- B. 125 kHz
- C. 900 MHz
- D. 13.56 MHz

18. What frequency bandwidth does Cat 6A support?

- A. 100 MHz
- B. 200 MHz
- C. 500 MHz
- D. 600 MHz

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19. What color are fire alarm notification appliances (horns/strobes) typically required to be?

- A. Green
- B. Blue
- C. Yellow
- D. Red or white



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20. NEC Article 800 governs which type of low-voltage system?

- A. Fire alarm circuits
- B. Class 2 control circuits
- C. Communications circuits (telephone, DSL)
- D. Solar photovoltaic systems

21. How many bits make up an IPv4 address?

- A. 32
- B. 64
- C. 128
- D. 48

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22. After de-energizing equipment and applying a lockout device, what must a technician do BEFORE touching any conductors?

- A. Sign the lockout log
- B. Inform the supervisor
- C. Remove stored mechanical energy
- D. Test with a meter to verify zero energy

23. What is the standard video impedance used for analog CCTV systems?

- A. 50 ohms
- B. 75 ohms
- C. 100 ohms
- D. 120 ohms

24. What is the electrical power consumed by a 120 V device drawing 2 A?

- A. 60 W
- B. 122 W
- C. 118 W
- D. 240 W

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25. Which of the following is an example of a biometric credential?

- A. PIN code
- B. Proximity card
- C. Key fob
- D. Fingerprint scan

26. Which cable category is defined in ISO/IEC 11801 as 'Class FA' and supports frequencies up to 1000 MHz?

- A. Cat 6A
- B. Cat 7
- C. Cat 7A
- D. Cat 8

27. A fixed-temperature heat detector activates when the surrounding air temperature reaches what type of threshold?

- A. A pre-set maximum temperature
- B. A rate-of-rise greater than 12°F per minute
- C. Any temperature above 32°F
- D. A temperature drop below ambient

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28. Which NEC article specifically addresses the installation of fire alarm systems?

- A. Article 725
- B. Article 800
- C. Article 820
- D. Article 760

29. Which of the following IP address ranges is reserved for private use according to RFC 1918?

- A. 172.32.0.0 – 172.63.255.255
- B. 192.169.0.0 – 192.169.255.255
- C. 10.0.0.0 – 10.255.255.255
- D. 128.0.0.0 – 191.255.255.255



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30. When more than one technician works on the same locked-out equipment, which practice is required?

- A. Each technician applies their own personal lock
- B. One senior technician holds a single lock for everyone
- C. A tagout replaces the lockout when multiple workers are present
- D. The foreman applies one lock and keeps all keys



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Answer Key & Explanations

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1. C — To restrict entry to authorized individuals while denying access to unauthorized persons

Access control systems are designed to allow only authorized individuals to enter specific areas while keeping out unauthorized persons. This protects assets, personnel, and sensitive information.

2. C — Cat 5e

Cat 5e (enhanced) is the minimum category rated for 1000BASE-T. It reduces crosstalk compared to standard Cat 5 and meets the performance requirements for Gigabit Ethernet over 100 m.

3. A — To monitor initiating devices and activate notification appliances

The FACU monitors all connected initiating devices (detectors, pull stations) for alarm conditions and, when triggered, activates notification appliances (horns, strobes) and performs other programmed functions. Suppression, backup power to all systems, and direct fire-department communication are separate functions.

4. A — 600 volts

Article 725.41 limits Class 1 remote-control and signaling circuits to 600 V or less. Class 2 and Class 3 circuits have lower voltage ceilings.

5. B — 7

The OSI (Open Systems Interconnection) model defines 7 layers: Physical, Data Link, Network, Transport, Session, Presentation, and Application. This standardized framework describes how data travels across a network.

6. A — 1000 V AC

OSHA and NFPA 70E require Class 00 or higher rubber insulating gloves rated at least 1000 V AC for work on energized low-voltage (up to 1000 V) circuits. Lower-rated gloves do not provide adequate protection.

7. C — Closed-Circuit Television

CCTV stands for Closed-Circuit Television, meaning the video signal is transmitted to a limited set of monitors rather than broadcast publicly. It is used in security and surveillance applications.

8. C — 3 A

Ohm's Law: $I = V / R = 12 / 4 = 3$ A. Dividing voltage by resistance gives current.

9. A — Smart card

Smart cards contain an embedded microchip that stores and processes data. Unlike magnetic stripe or barcode cards, smart cards can hold more data and support cryptographic operations for enhanced security.

10. B — Cat 6

Cat 6 cables often include a plastic spline or cross-separator between the four pairs to physically separate them, reducing crosstalk and improving high-frequency performance.

11. B — 75 dB(A)

NFPA 72 requires audible appliances to produce at least 75 dB(A) at the pillow level in sleeping areas to



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ensure they can awaken occupants. The general ambient-plus-15 rule applies elsewhere, but the sleeping-area floor is 75 dB(A) measured at the pillow.

12. B — Power and voltage limitations

Class 2 circuits are characterized by their inherent power and voltage limits (≤ 30 V, ≤ 100 VA), which reduce fire and shock hazards without requiring the same wiring methods as general wiring.

13. A — Physical (Layer 1)

Layer 1 (Physical) handles the transmission of raw binary data over physical media such as copper cable, fiber optic, or wireless. It defines electrical, optical, and mechanical characteristics.

14. B — Notify affected employees

OSHA's control of hazardous energy standard requires that affected employees be notified before the lockout procedure begins so they are aware equipment is being taken out of service.

15. A — Image sensor (CCD or CMOS)

The image sensor—either a CCD (Charge-Coupled Device) or CMOS (Complementary Metal-Oxide Semiconductor)—converts incoming light into an electrical signal that becomes the video image. The DVR records that signal; it does not create it.

16. B — 30 Ω

$R = V / I = 24 / 0.8 = 30 \Omega$. Dividing voltage by current yields resistance.

17. B — 125 kHz

Traditional proximity cards operate at 125 kHz (low frequency). This distinguishes them from high-frequency smart cards (13.56 MHz) used in more modern contactless systems.

18. C — 500 MHz

Cat 6A is specified to 500 MHz, doubling Cat 6's 250 MHz limit and enabling 10 Gbps transmission over the full 100 m horizontal channel.

19. D — Red or white

NFPA 72 and ADA/ANSI standards require visible notification appliances to be red or white so they are readily identifiable as fire alarm devices. Green and blue are used for other building systems; yellow/amber is sometimes used for non-fire alert systems.

20. C — Communications circuits (telephone, DSL)

Article 800 covers communications circuits such as telephone, DSL, and similar network wiring. Fire alarms are covered under Article 760 and Class 2/3 under Article 725.

21. A — 32

An IPv4 address is 32 bits long, typically written in dotted-decimal notation as four 8-bit octets (e.g., 192.168.1.1). IPv6 addresses are 128 bits.

22. D — Test with a meter to verify zero energy

Verification with an appropriate voltage tester confirms that the circuit is de-energized. Without testing, a miswired or back-fed circuit could still be live even after the intended source has been locked out.

23. B — 75 ohms

Analog CCTV systems use 75-ohm impedance, which matches standard coaxial cable (RG-59, RG-6) and



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BNC connectors. Mismatched impedance causes reflections and picture ghosting.

24. D — 240 W

Power $P = V \times I = 120 \times 2 = 240 \text{ W}$. Power equals voltage times current.

25. D — Fingerprint scan

Biometric credentials are based on unique physical or behavioral characteristics of an individual, such as fingerprints, iris patterns, or facial recognition. PINs, cards, and key fobs are not biometrics.

26. D — Cat 8

Cat 8 (Class I/II in ISO/IEC 11801) supports frequencies up to 2000 MHz; Cat 7A maps to Class FA at 1000 MHz. Cat 7A / Class FA is specified to 1000 MHz, enabling 40GBASE-T over short distances.

27. A — A pre-set maximum temperature

A fixed-temperature heat detector trips when the local air temperature reaches the rated threshold (e.g., 135°F or 194°F). A rate-of-rise detector responds to rapid temperature change; fixed-temperature devices ignore slow rises until the set point is reached.

28. D — Article 760

Article 760 covers fire alarm systems including power-limited and non-power-limited fire alarm circuits. Article 725 covers remote-control and signaling circuits more broadly.

29. C — 10.0.0.0 – 10.255.255.255

RFC 1918 defines three private address blocks: 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16. These addresses are not routable on the public internet and are used for internal networks.

30. A — Each technician applies their own personal lock

OSHA requires each authorized employee to apply their own personal lock so that equipment cannot be re-energized until every worker has removed their lock, protecting each individual independently.



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