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BICSI Registered Communications Distribution Designer - RCDD

BICSI RCDD-001

Version Demo

Total Demo Questions: 37

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Topic Break Down

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QUESTION NO: 1

Which of the following covers lightning protection systems and defines as exposed anything above ground and outside the zone of protection?

A. NTSB-12

B. IEEE 1100

C. NFPA 780

D. NEC 47

E. ANSI J/STD-607-A

ANSWER: C

Explanation:

NFPA 780 is correct because it is the recognized installation standard specifically addressing lightning protection systems. Its scope covers the design, installation, inspection, and maintenance of systems intended to protect structures and associated systems from the effects of lightning. In telecommunications-distribution design, this is directly relevant when assessing whether exterior or elevated equipment, metallic components, antennas, conductors, or pathways are subject to direct lightning exposure and therefore require protection measures.

The standard uses lightning-protection concepts such as zones of protection created by air terminals and other lightning-protection methods. Items located above ground and outside the protected volume are considered exposed to a possible direct lightning strike. This assessment drives the need for appropriately designed air terminals, down conductors, bonding, grounding, and surge-protective measures coordinated with the building's overall lightning-protection system. NFPA identifies NFPA 780, Standard for the Installation of Lightning Protection Systems as the governing document for these requirements. The standard's role is also reflected in the NFPA 780 code information page, which describes its focus on lightning-protection-system installation.

QUESTION NO: 2

You are designing a cabling containment system installed overhead in a new data center. The main or prime purpose of the system will be to manage fiber optic cabling between cabinets. You have a choice of designs of the containment system. In view of the prime purpose of containment system, your first choice of design will be one that:

A. Has a bottom design with a web spacing of less than 203 mm (8 in)

B. Has a bottom design with a web spacing of less than 152 mm (6 in)

C. Is manufactured with a soft cloth type material

D. Has a solid bottom design

E. The design is not important as long as the client pre approves the manufacturer

ANSWER: D

Explanation:

Has a solid bottom design is the appropriate first-choice containment design when the primary application is overhead management of fiber-optic cabling. Optical-fiber cables, particularly high-fiber-count trunk cables and preterminated assemblies, benefit from continuous support across the containment pathway. A solid bottom prevents unsupported spans between transverse wires or rungs, helping to avoid localized pressure points, sagging, and changes in cable shape that can increase attenuation or compromise the cable's long-term mechanical performance. It also provides a smooth surface for placing and routing fiber bundles while maintaining the bend-radius control practices required for optical fiber. In a data center, the pathway should be selected and installed so that cables remain supported, protected, accessible, and segregated as needed throughout moves, additions, and changes. A solid-bottom system directly supports these objectives for fiber routes between cabinets, provided its fill, grounding/bonding, firestopping, support, and access provisions are designed in accordance with the applicable standards and the manufacturer's installation instructions. BICSI's data-center design guidance emphasizes physical-layer infrastructure that protects and manages cabling over its life cycle; see BICSI Standards. General telecommunications cabling pathway and space requirements are also addressed by TIA standards.

QUESTION NO: 3

Composite conductors, although not generally recommended, may be used in special circumstances because they provide all of the following advantages EXCEPT:

A. Have good digital transmission characteristics

B. Lightweight

C. Inexpensive

D. Easy to produce

E. Easily embedded into other materials

ANSWER: A

Explanation:

“Have good digital transmission characteristics” is the exception. Composite conductors are generally selected for specialized physical or manufacturing applications rather than as a preferred medium for high-performance communications transmission. Their construction can offer useful practical properties, including low weight and the ability to be formed or incorporated into other materials. However, reliable digital cabling depends on stable, well-characterized electrical properties, including conductor resistance, attenuation, impedance control, and predictable high-frequency behavior. These are central considerations in structured-cabling design and are why conventional copper conductors remain the normal choice for balanced communications cabling. BICSI’s RCDD body of knowledge emphasizes applying recognized telecommunications standards and transmission-performance requirements when selecting media and pathways for a design. The suitability of a conductor must therefore be evaluated against the application’s required channel performance, not merely its mechanical convenience. See BICSI’s standards and publications information at https://www.bicsi.org/standards and the Telecommunications Industry Association standards overview at https://tiaonline.org/standards/.

QUESTION NO: 4

What does ANSI/TIA 942 recommend as the MINIMUM height for overhead cable tray above finished floor within a data center?

A. 2.14 m (7 ft)

B. 2.44 m (8 ft)

C. 2.75 m (9 ft)

D. 3.05 m (10 ft)

E. 3.36 m (11 ft)

ANSWER: C

Explanation:

2.75 m (9 ft) is the recommended minimum installation height for overhead cable tray above the finished floor in a data center. This elevation provides a practical overhead distribution zone while preserving sufficient space below the pathway for personnel access, equipment movement, and the operation and maintenance activities that occur in white-space areas. It also supports orderly coordination of telecommunications pathways with other building services, such as power distribution, fire protection, lighting, and mechanical systems.

The recommendation is intended to promote a maintainable, accessible cabling infrastructure rather than merely achieve physical clearance. Designers should still coordinate the tray layout and final elevations with the facility's structural constraints, ceiling and plenum conditions, equipment clearances, applicable electrical and building codes, and the required separation from power systems. The data-center telecommunications-infrastructure requirements are maintained in the ANSI/TIA-942 series; consult the project-adopted edition and any applicable local requirements when producing construction documents. See the Telecommunications Industry Association's ANSI/TIA-942-C standard information and BICSI's standards resources for current standards context and design guidance.

QUESTION NO: 5

The propagation and path loss of radio signals in the target environment can be sampled using:

A. Propagation software

B. Radio power meters

C. Directional antenna

D. Mesh antennas

ANSWER: B

Explanation:

Radio power meters are used to sample the actual received radio-signal power at locations throughout the target environment. By taking measurements at known distances and positions relative to a transmitter, the designer can document how much signal level declines along the propagation path. Those measured received-power levels provide field evidence of path loss and reveal the effects of the specific building environment, including walls, floors, furnishings, and other obstructions. This is particularly valuable during a wireless site survey because radio-frequency behavior is dependent on the installed environment rather than on free-space assumptions alone.

The resulting measurements can be compared across locations to establish coverage boundaries, identify attenuation patterns, and support access-point placement and power-level decisions. In wireless design practice, received signal strength is commonly expressed in dBm, allowing the survey team to quantify the signal available to client devices at each sampling point. Cisco's wireless design guidance describes using site-survey measurements to assess received signal strength and coverage in the actual deployment area: Cisco Radio Resource Management White Paper. BICSI recognizes wireless design and site-survey planning as part of communications-distribution design practice: BICSI Standards.

QUESTION NO: 6

If you are working on a physical security plan for a data center and focusing on building and access control, what layer of the plan would this relate to?

A. Layer 1

B. Layer 2

C. Layer 3

D. Layer 4

E. Layer 5

ANSWER: C

Explanation:

Layer 3 is correct because it addresses security at the building and controlled-entry level within a layered data-center physical-security design. This layer concerns the measures used to control and document who can enter the facility or protected building areas, such as credential readers, visitor processing, guard or reception controls, electronically controlled doors, and access-management procedures. Its objective is to establish an effective controlled boundary between publicly accessible areas and the facility's protected operational environment.

Building access control is not merely a device selection exercise. The designer must coordinate the access-control approach with the facility layout, entrances, security operations, emergency egress requirements, and the organization's authorization and visitor policies. A layered approach is important because each successive boundary increases the protection of critical information-technology spaces and infrastructure. BICSI data-center design guidance treats physical security as an integrated design discipline that includes secure access and appropriate protection of data-center facilities. See BICSI's data center standards and the U.S. Cybersecurity and Infrastructure Security Agency's physical security guidance.

QUESTION NO: 7

Using Ohms law, a circuit of 120 volts and a resistance of 15 ohms will have a current of ________ amps.

A. 5

B. 8

C. 10

D. 12

E. 15

ANSWER: B

Explanation:

The correct answer is **8**. Ohm's law expresses the relationship among voltage, current, and resistance as $I = V \div R$, where current (I) is measured in amperes, voltage (V) in volts, and resistance (R) in ohms. Substituting the stated circuit values gives 120 volts ÷ 15 ohms = 8 amperes. Therefore, the circuit current is 8 A, assuming the circuit is a simple resistive circuit and the supplied 120 V is the voltage across the 15-ohm resistance. This basic calculation is important when evaluating electrical loading and power requirements for telecommunications spaces and associated equipment. It also supports related calculations, such as determining power using $P = V \times I$; in this case, the resistive load would consume 960 watts. The National Institute of Standards and Technology provides the SI-unit context for the ampere, volt, and ohm in its Guide for the Use of the International System of Units (SI). For a concise statement and application of Ohm's law, see All About Circuits: Ohm's Law.

QUESTION NO: 8

What is the connector of choice for Series 59, Series 6, and Series 11 applications?

A. F-Style

B. Bayonet Neill-Concelman (BNC-Style)

C. N-Style

D. SMA

E. Ultra high frequency (UHF)

ANSWER: A

Explanation:

F-Style is correct because the F connector is the standard 75-ohm connector family used with the common Series 59, Series 6, and Series 11 coaxial cable sizes. These cables are widely used for broadband video, cable television, satellite distribution, and related RF applications in premises cabling. The connector's threaded coupling provides a secure mechanical connection and dependable shielding continuity, while its impedance characteristics support the 75-ohm systems associated with these coaxial series. In practice, F connectors are available in versions sized specifically for the cable's outside diameter and construction, including crimp, compression, and twist-on designs; compression connectors are generally favored for consistent termination quality and environmental reliability. The center conductor of the coaxial cable serves as the mating contact in the customary F-connector design, simplifying termination while maintaining the electrical path needed for broadband signals. BICSI designers should specify an F-style connector compatible with the exact cable series, cable dimensions, and installation environment, including indoor, outdoor, and grounding/bonding requirements. See the Belden RG-6 coaxial cable information and the CommScope F-connector product information.

QUESTION NO: 9

Assume the following:

- An equipment room (ER) consists of 16 racks arranged in 4 equal rows

- The first 4 racks are numbered R1-1 though R1-4

- The second 4 racks are numbered R2-1 through R2-4

- A new equipment shelf with 12 slots is to be installed in the bottom of the third rack in the second row- Each slot has 2 ports

What would be the identifier of the two ports on the eighth slot of the new equipment shelf?

A. R2-3-1-8-1 and R2-3-1-8-2

B. R3-2-1-8-1 and R3-2-1-8-2

C. R2-3-1-12-1 and R2-3-1-12-2

D. R3-2-1-12-1 and R3-2-1-12-2

E. R2-3-12-8-1 and R2-3-12-8-2

ANSWER: A

Explanation:

The correct identifiers are **R2-3-1-8-1 and R2-3-1-8-2**. This follows a structured, hierarchical administration convention in which each element of the identifier narrows the physical location of the connection. **R2-3** identifies the third rack in the second row: the rack is in row 2 and is numbered 3 within that row. The equipment shelf is installed at the bottom of that rack, so it is identified as the first shelf location, represented by **1**. Within that shelf, the required position is slot **8**. Because each slot contains two ports, the final identifier element distinguishes the individual ports as port **1** and port **2**. The resulting labels therefore provide a unique, traceable identifier for each port while retaining the location information needed for operations, documentation, moves, additions, and changes. This hierarchical approach is consistent with telecommunications infrastructure administration practices described by the TIA-606 series, which addresses identification and administration of telecommunications infrastructure, and with BICSI's structured-cabling design and administration guidance. See the TIA-606 standard overview and BICSI Standards.

QUESTION NO: 10

What is the insertion loss guideline for a multimode mechanical splice?

A. 0.05 dB

B. 0.1 dB

C. 0.3 dB

D. 0.5 dB

E. 1.0 dB

ANSWER: C

Explanation:

The applicable guideline is **0.3 dB** for a multimode mechanical splice. A mechanical splice aligns and retains two prepared fiber ends using a precision alignment mechanism and index-matching material rather than permanently joining the glass by fusion. Its loss allowance is therefore typically higher than the allowance used for a properly completed fusion splice. In structured-cabling design, this value is included as a discrete-event loss in the optical loss budget: each mechanical splice contributes up to 0.3 dB to the calculated link attenuation. The designer should account for every planned splice, along with cable attenuation, connector-pair loss, and any other passive components, so the completed channel remains within the application's supported loss budget. This is a planning and acceptance guideline, not a substitute for field verification. Installation workmanship—especially clean end-face preparation, accurate cleaving, correct fiber alignment, and proper use of the splice hardware—remains essential to achieving a low measured loss. After installation, the link should be tested using the project's required Tier 1 methodology and, where specified, investigated with an OTDR. BICSI design guidance is intended to be applied with the applicable telecommunications-cabling standards and manufacturer instructions; see BICSI Standards and the Fiber Optic Association's fiber-optic testing reference.

QUESTION NO: 11

The average power consumption in a telecommunications room (TR) is 2260 watts per hour. What is the heat dissipation in BTUs?

A. 7096 BTU

B. 7713 BTU

C. 8104 BTU

D. 8511 BTU

ANSWER: B

Explanation:

7713 BTU is the correct selection. For telecommunications-room thermal planning, nearly all electrical power consumed by active equipment is ultimately converted to heat within the room. The standard design conversion is 1 watt = approximately 3.412 BTU per hour. Multiplying the stated 2,260 watts by 3.412 gives 7,711.12 BTU per hour. Depending on the conversion-factor precision and rounding convention used in the source material, this is commonly reported as approximately 7,713 BTU per hour, matching the available selection.

Strictly speaking, watts already express a rate of energy use, so "watts per hour" is imprecise phrasing; the calculation appropriately treats the stated load as 2,260 W. Likewise, heat dissipation should be expressed as BTU/h rather than simply BTU, because cooling equipment must be sized for a continuing heat rate. This conversion is fundamental to determining the sensible cooling load for a TR and supports early coordination of HVAC capacity, equipment growth allowances, and environmental reliability. BICSI's RCDD credential encompasses telecommunications distribution design considerations, including spaces and their supporting infrastructure; see the BICSI RCDD certification overview. A published electrical-to-heat conversion reference is also available from Engineering ToolBox.

QUESTION NO: 12

You are designing the cabling infrastructure for a lab office building that will frequently change tenants. The owner will be responsible for all of the infrastructure that feeds each floor to include the telecommunication rooms. Which firestop method will best suit the owners needs?

A. Cable transit system

B. Factory fabricated sleeve system

C. Firestop pillow system

D. Silicone foam system

ANSWER: C

Explanation:

Firestop pillow system is correct because it provides a practical, re-enterable firestop solution for cable pathways that will experience frequent moves, additions, and changes. Firestop pillows are installed by tightly packing listed, intumescent pillows into an appropriately sized opening around the cable bundle. When a tenant change requires cables to be added, removed, or rerouted, the pillows can be removed, adjusted, and reinstalled without destroying a cured firestop seal. This supports the owner's need to maintain the floor-feeding and telecommunications-room infrastructure over multiple tenant turnovers while preserving a maintainable pathway for future cabling work.

The final installation must follow the specific tested and listed firestop system, including the permitted opening size, cable fill, pillow arrangement, backing requirements, and fire-resistance rating of the penetrated barrier. Proper identification and documentation are also important so future contractors can restore the penetration to its listed configuration after work is completed. Firestop pillow products are specifically intended for re-enterable cable penetrations; see Specified Technologies Inc. firestop pillows. The applicable firestop assembly should be selected from a tested system listing, such as those provided through UL Solutions firestop systems.

QUESTION NO: 13

Assuming the total fill capacity of a pathway is 100 cables (all of the same cable type and size), the MAXIMUM number of cables to be installed during the initial installation, without exceeding the fill ratio is:

A. 25

B. 40

C. 50

D. 60

ANSWER: B

Explanation:

40 is correct because BICSI structured-cabling pathway design practice applies a 40 percent maximum initial fill ratio. With a pathway capacity expressed as 100 identical cables, the allowed initial installation is calculated by multiplying the total capacity by 0.40: 100 × 0.40 = 40 cables. The use of identical cable types and sizes removes the need to calculate individual cable areas or account for differing diameters; the stated 100-cable capacity can therefore be used directly.

Maintaining this initial-fill limit is an important part of designing a usable telecommunications pathway. It preserves physical space for subsequent cable additions and changes, supports practical cable pulling and removal, and helps avoid conditions that can cause excessive congestion or handling stress. The calculation concerns the initial installed quantity, not the pathway's theoretical absolute capacity. This approach aligns with the pathway and space planning principles addressed in BICSI telecommunications-distribution design guidance and the telecommunications pathways-and-spaces requirements published by TIA. See BICSI Standards and TIA Standards for standards-program information and applicable pathway guidance.

QUESTION NO: 14

Active video converters are required for what type of CATV distribution system?

A. Video over balanced twisted-pair

B. Trunk and tap

C. Home run

D. Video over optical fiber

ANSWER: A

Explanation:

Video over balanced twisted-pair is correct because CATV signals are traditionally distributed as unbalanced, radio-frequency signals on 75-ohm coaxial cable, whereas balanced twisted-pair cabling has a different impedance and transmission behavior. An active video converter provides the required signal conversion and conditioning so the video signal can be launched onto, carried across, and recovered from balanced-pair cabling with usable quality. Depending on the application and distance, the active units may provide amplification, equalization, impedance matching, and compensation for cable loss. This is especially important for broadband video because attenuation rises with frequency and because maintaining the required signal level and picture quality at the receiver is essential. In structured-cabling implementations, active transmitter/receiver equipment is therefore used when the design calls for CATV/video transport over balanced twisted-pair rather than conventional coaxial distribution. The underlying distinction between balanced and unbalanced transmission is also the reason balun and active conversion equipment is used for these interfaces. See Fluke Networks' discussion of balanced twisted-pair cabling at Fluke Networks and the SCTE standards catalog for cable-telecommunications engineering resources at SCTE.

QUESTION NO: 15

A(n) ________ system is considered a mechanical firestop.

A. Cementitious

B. Cable transit

C. Firestop block

D. Intumescent sheet

ANSWER: B

Explanation:

A cable transit system is considered a mechanical firestop because it creates and maintains a fire-resistance-rated seal by mechanical means rather than relying solely on field-applied sealants or mortars. These systems typically use a rigid frame, compression hardware, and purpose-designed rubber or elastomeric modules sized around individual cables or cable bundles. Tightening the compression assembly produces the required seal around the penetrants and within the opening. The resulting assembly can be tested and listed for fire, smoke, and, where applicable, water-pressure performance for a specific wall or floor construction and penetration arrangement.

This approach is particularly valuable in telecommunications spaces and pathways because modules can be removed, added, or resized as cable capacity changes while retaining the system's intended firestop configuration. Proper installation remains essential: the selected transit frame, modules, compression components, opening dimensions, penetrant fill, and supporting construction must match the applicable tested and listed firestop system. The mechanical design also supports more orderly future moves, adds, and changes than many permanently cured firestop materials. Manufacturer information describing cable transit sealing systems is available from Roxtec, and firestop-system listing and certification resources are available from UL Solutions.

QUESTION NO: 16

In the ceiling zone method of distribution, the usable floor area should be divided into zones each measuring:

A. 9.3 sq m (100 sq ft) to 23 sq m (250 sq ft)

B. 23 sq m (250 sq ft) to 56 sq m (600 sq ft)

C. 23 sq m (250 sq ft) to 84 sq m (904 sq ft)

D. 56 sq m (600 sq ft) to 84 sq m (904 sq ft)

E. 56 sq m (600 sq ft) to 100 sq m (1,100 sq ft)

ANSWER: C

Explanation:

The correct zone size is **23 sq m (250 sq ft) to 84 sq m (904 sq ft)**. In the ceiling zone method, horizontal distribution pathways are arranged above the work area so that a zone can be served efficiently from an accessible ceiling-based consolidation or distribution point. BICSI design guidance uses zones of approximately 23 m² to 84 m² (250 ft² to 900 ft²); 84 m² converts to about 904 ft², so the stated metric and imperial values are consistent. This range provides a practical balance between service flexibility, pathway accessibility, cable-length management, and the ability to accommodate future moves, adds, and changes without requiring extensive rework of the telecommunications distribution system.

Ceiling-zone planning is particularly useful for open-office environments and other spaces with changing furniture layouts, because it places distribution infrastructure near the area it serves while retaining access from above the ceiling. The zone dimensions support orderly coverage of the usable floor area and help the designer coordinate telecommunications pathways with building systems and accessible ceiling space. This approach aligns with BICSI's structured-cabling design principles and with telecommunications-pathway standards that address the planning and administration of pathways and spaces. See BICSI Standards and TIA Standards.

QUESTION NO: 17

A tapped trunk topology uses ________ cabling to support a DAS.

A. Shielded twisted pair

B. Balanced twisted pair

C. Unbalanced twisted pair

D. Optical fiber

E. Coaxial cabling

ANSWER: E

Explanation:

Coaxial cabling is used in a tapped-trunk topology for a distributed antenna system (DAS). In this architecture, a coaxial trunk cable carries RF energy along the coverage path, and RF taps (or directional couplers, as appropriate to the design) are installed at calculated points to feed antenna branches. The taps divide a specified portion of the signal toward each antenna while allowing the remaining signal to continue along the trunk. This arrangement supports orderly RF distribution and enables the designer to manage loss, antenna output levels, and coverage throughout the served area. The coaxial cable, taps, connectors, splitters, and antennas form part of the RF distribution network; their attenuation and frequency performance must be accounted for in the link budget. Proper component selection and installation are essential because DAS performance depends on maintaining the designed RF levels and impedance characteristics across the operating bands. BICSI's wireless-design resources address DAS as telecommunications infrastructure requiring coordinated pathways, spaces, power, grounding, and distribution-system planning. See BICSI Standards Development and CommScope's overview of distributed antenna systems.

QUESTION NO: 18

You have been asked to design a backbone cable connecting two large campus buildings. Your pathways will include using conduits, maintenance holes, and one section of 100 m (328 ft) of direct buried optical fiber cable. Your choice of fiber optic cable type recommendation is a:

A. Distribution cable

B. Loose tube cable

C. Loose tube cable containing a water blocking compound

D. Distribution cable with an armored coating

E. Distribution cable with a water blocking compound

ANSWER: C

Explanation:

Loose tube cable containing a water blocking compound is the appropriate recommendation for this interbuilding campus backbone because the route includes an outdoor direct-buried segment as well as conduit and maintenance-hole environments. Outdoor cable installations can be exposed to ground moisture, water migration, temperature variation, and intermittent flooding in underground structures. Loose-tube construction is designed for outside-plant service: the fibers have room to move independently of cable-jacket stresses caused by installation tension and thermal expansion or contraction. This construction is particularly well suited to longer campus routes and outdoor pathway conditions.

Water blocking is essential because moisture entering at a damaged jacket, splice, or termination must not be able to travel longitudinally through the cable and affect a substantial length of the backbone. Water-blocking compounds or equivalent water-blocking elements limit that migration and support reliable long-term operation in wet locations. The direct-buried portion establishes the governing environmental requirement for the cable selection, even though other portions are installed in conduit. The final design should also specify a cable rated for direct burial and installed in accordance with the manufacturer's pulling-tension, bend-radius, depth, protection, and grounding/bonding requirements where applicable. See Corning Optical Communications fiber-optic cable resources and CommScope outside-plant fiber-optic cable resources.

QUESTION NO: 19

Which of the following is NOT a design consideration for broadband video distribution?

A. Amplifier link budgets

B. Adhering to the 90 meter (295 feet) rule for horizontal distribution

C. Amplifier cascade limitations

D. Environmental factors

E. Drop length

ANSWER: B

Explanation:

Adhering to the 90 meter (295 feet) rule for horizontal distribution is not a broadband video-distribution design consideration because that distance is associated with standards-based balanced twisted-pair horizontal cabling. In structured cabling, 90 m is the maximum permanent-link length between the telecommunications room and work-area outlet; patch and equipment cords may be added within the applicable channel-length limit. Broadband video distribution is instead designed around the RF transmission characteristics and architecture of the video network, commonly including coaxial cable attenuation at operating frequencies, signal levels, passive-device loss, amplification, and distribution topology. Its cable runs and drops must be engineered to maintain suitable signal performance at each serving location, rather than being governed by the horizontal permanent-link limit used for balanced cabling. This distinction is important when a premises system supports both telecommunications cabling and broadband/CATV-style video services: they are evaluated using their respective media, performance parameters, and design rules. The Telecommunications Industry Association describes the standards framework for premises telecommunications cabling at TIA Standards. SCTE standards and recommended practices provide the cable-telecommunications context for broadband distribution systems at SCTE Standards.

QUESTION NO: 20

Which layer of the OSI model covers physical cable connections?

A. Layer 1

B. Layer 3

C. Layer 5

D. Layer 7

ANSWER: A

Explanation:

Layer 1 is correct because the Physical layer defines the transmission of raw bits across the physical communications medium. In structured cabling and telecommunications-distribution work, this includes the physical media and interfaces that make a link possible: copper and optical-fiber cabling, connectors, pin assignments, patch cords, outlets, pathways as they affect the media installation, signaling characteristics, and electrical or optical transmission specifications. A physical cable connection is therefore a Layer 1 concern because it concerns how devices are physically interconnected and how signals are represented and carried over that medium.

The OSI reference model is a conceptual framework in which the Physical layer is the lowest layer and provides the underlying medium on which higher-layer communications depend. For an RCDD, distinguishing this layer is important when coordinating cabling infrastructure, media selection, connector compatibility, and the physical interface requirements of active equipment. The ISO/IEC 7498-1 overview identifies the OSI basic reference model and its layered architecture; practical networking references likewise identify the Physical layer as responsible for transmitting bits through the medium. See ISO/IEC 7498-1: OSI Basic Reference Model and Cisco cabling guidance.

QUESTION NO: 21

Based on documentation contained within the Insulated Cable Engineers Association (ICEA) standard P32-382, Short Circuit Characteristics of Insulated Cable, a copper conductor is capable of safely carrying one ampere for ________ second(s) for every 42.25 circular mils.

A. One

B. Five

C. Twelve

D. Twenty

E. Thirty

ANSWER: B

Explanation:

Five is correct. ICEA P-32-382 presents short-circuit guidance that relates conductor area, fault current, and fault-clearing duration under specified thermal conditions. The stated rule of thumb for copper is that 42.25 circular mils of conductor area can carry one ampere for five seconds during a short-circuit event. Thus, multiplying the prospective short-circuit current by 42.25 circular mils provides the required copper conductor area for the five-second basis described in the question.

This relationship is a short-duration thermal-withstand calculation, not a normal ampacity value for continuously loaded conductors. During a fault, conductor heating is predominantly adiabatic over the brief clearing interval, so the conductor’s ability to withstand current depends on its cross-sectional area and the duration of current flow. Design practice therefore requires the designer to use the actual available fault current and the protective device’s clearing time, while ensuring that applicable installation and product requirements are also met. ICEA identifies its cable standards and publications through its official website; BICSI’s standards resources are available at BICSI Standards.

QUESTION NO: 22

Two sinusoidal signals have the same amplitude (A) and the same frequency (f). They differ in phase by 180 degrees. If these two signals are added together, the result is a sinusoidal signal having an amplitude of:

A. Zero

B. 0.707A and a frequency of f

C. A and a frequency of 2f

D. 2A and a frequency of f

E. 2A and a frequency of 2f

ANSWER: A

Explanation:

Zero is correct. Two sinusoids with equal amplitude and equal frequency can be represented as $A\sin(2\pi ft)$ and $A\sin(2\pi ft + 180^\circ)$. A phase displacement of 180 degrees is equivalent to π radians, and $\sin(x+\pi)=-\sin(x)$. Therefore, the second waveform is the exact negative of the first: $-A\sin(2\pi ft)$. Adding the instantaneous values produces $A\sin(2\pi ft)-A\sin(2\pi ft)=0$ at every point in time. The resultant is consequently a null signal, with zero amplitude. This is destructive interference, also called complete cancellation. In communications and signal analysis, the result illustrates why phase is essential when combining AC signals: amplitude and frequency alone do not determine the sum; relative phase determines whether equal signals reinforce or cancel. The same relationship is commonly expressed with phasors: two equal-magnitude phasors separated by 180 degrees point in opposite directions, so their vector sum is zero. See OpenStax, Energy and Power of Waves and Engineering LibreTexts, Phasors.

QUESTION NO: 23

You are designing an interactive patient television system (IPTS) that will provide internet, nurse call and LCD television services. From the following, which medium will NOT support these services in a backbone cabling system?

A. Balanced twisted pair

B. Coaxial 1/2 inch hard-line cable

C. Multimode optical fiber cable

D. RG-11 coaxial cable

ANSWER: A

Explanation:

Balanced twisted pair is the medium that will not support this combination of services when it is used as the backbone medium for the described IPTS. Although balanced twisted-pair cabling is fundamental to structured cabling and is well suited to Ethernet-connected devices and many low-voltage control applications, it is not the appropriate broadband backbone transport for the television-distribution portion of a conventional patient television system. These systems commonly require carriage of broadband RF television signals in addition to interactive and clinical-service signaling. Backbone selection must therefore accommodate the applicable signal bandwidth, distribution distances, attenuation limits, and the system's active distribution architecture—not merely basic data connectivity.

Balanced twisted-pair horizontal and backbone requirements are defined around balanced telecommunications transmission and recognized application support; they do not make the cable a general-purpose broadband CATV distribution medium. In a healthcare environment, the designer must also coordinate the television platform, nurse-call system, network architecture, pathway capacity, and separation requirements with the responsible system vendors and the facility's project requirements. The Telecommunications Industry Association provides standards information at TIA Standards, while BICSI's structured-cabling design resources and standards information are available at BICSI Standards.

QUESTION NO: 24

An active video converter is used in what type of CATV cable distribution system?

A. Trunk and tap

B. Video over balanced twisted-pair

C. Video over optical fiber

D. Home run

ANSWER: B

Explanation:

Video over balanced twisted-pair is correct because this distribution approach needs equipment that interfaces conventional video/CATV signaling with a balanced copper-pair transmission path. An active video converter performs the required signal conversion and, where needed, provides amplification, equalization, and compensation for attenuation across the balanced-pair cabling. This allows video signals originating in a conventional 75-ohm CATV environment to be transported reliably over structured cabling based on balanced twisted pairs, rather than requiring a continuous coaxial path.

In an ICT design, the converter selection must match the video service and frequency range being carried, the cable category and length, the number of endpoints, and the required signal quality at the receiver. Active units are particularly important when passive conversion alone cannot maintain adequate signal level or performance over the intended channel. This is consistent with the RCDD designer's responsibility to select pathways, media, and supporting electronics that deliver the required application performance across the telecommunications infrastructure. BICSI describes the RCDD credential and its design focus at BICSI RCDD Certification. General structured-cabling standards resources are available from the Telecommunications Industry Association.

QUESTION NO: 25

A furniture cluster with 26 requires a MINIMUM of how many multiuser telecommunications outlet assembly (MUTOA)?

A. 1

B. 2

C. 3

D. 4

E. 5

ANSWER: C

Explanation:

The correct answer is **3**. For this calculation, the 26 is understood to represent work areas within the furniture cluster. A multiuser telecommunications outlet assembly (MUTOA) is intended to provide a common telecommunications outlet location for a limited group of work areas in an open-office or modular-furniture environment. Telecommunications cabling standards limit a MUTOA to serving no more than 12 work areas. Therefore, divide 26 work areas by the 12-work-area maximum: two MUTOAs can support up to 24 work areas, which does not cover the full cluster. Rounding up to the next whole assembly is required, so three MUTOAs are the minimum needed. Three assemblies provide capacity for up to 36 work areas and ensure that every work area can be served while remaining within the MUTOA work-area limitation. This approach is important during distribution design because MUTOA placement and quantity affect horizontal-cable routing, outlet accessibility, furniture reconfiguration flexibility, and compliance with the applicable commercial-building cabling requirements. The MUTOA concept and work-area cabling practices are addressed in the ANSI/TIA-568.1 commercial-building cabling standard and BICSI's Telecommunications Distribution Methods Manual.

QUESTION NO: 26

What is the MINIMUM distance from the edge of a pool or other water hazards for a weatherproof enclosure?

A. 1 m (3 ft)

B. 2 m (7 ft)

C. 4 m (13 ft)

D. 6 m (20 ft)

E. 10 m (30 ft)

ANSWER: D

Explanation:

A weatherproof enclosure should be located at least 6 m (20 ft) from the edge of a pool or other water hazard. This separation is a safety-oriented siting requirement for exterior telecommunications infrastructure. Although a weatherproof enclosure is designed to resist environmental exposure, its location must also limit the likelihood that water, splash, flooding, wet users, or maintenance activities near the water create an electrical or equipment-access hazard. The 6 m (20 ft) clearance provides a practical buffer for equipment installation, operation, inspection, and servicing while keeping the enclosure outside the immediate poolside environment. In a communications-distribution design, this clearance should be considered early in site planning along with the pathway route, grounding and bonding provisions, equipment accessibility, physical protection, drainage, and any authority-having-jurisdiction requirements. The final installation must also comply with applicable electrical and building codes, since pool-area rules may impose additional constraints based on the equipment supplied, voltage, and installation method. NFPA maintains information on the National Electrical Code and its electrical-safety framework at NFPA 70. BICSI standards and best-practice resources are available at BICSI Standards.

QUESTION NO: 27

Which of the following refers to the increase in the nominal voltage for a duration of 3600 cycles?

A. Swell

B. Overvoltage

C. Transient

D. Sag

ANSWER: B

Explanation:

Overvoltage is the correct term for an increase in RMS voltage above the nominal level that persists for 3600 cycles. In the commonly used 60 Hz power system context, 3600 cycles equals 60 seconds (one minute). Power-quality event classifications distinguish sustained voltage increases from shorter-duration events by using duration as well as magnitude. A sustained increase beyond the short-duration threshold is categorized as an overvoltage condition. This classification is important to communications-distribution design because the electrical environment can affect connected equipment, power supplies, surge-protective devices, grounding and bonding considerations, and the selection of protective measures for telecommunications spaces.

IEEE power-quality terminology, including voltage-event duration categories, is established in IEEE 1159, IEEE Recommended Practice for Monitoring Electric Power Quality. The relationship between electrical frequency and cycles also follows directly from the definition of hertz: one hertz is one cycle per second; see the NIST SI units reference for time and frequency. Therefore, at 60 Hz, a 3600-cycle voltage increase represents a one-minute sustained condition and is identified as an overvoltage.

QUESTION NO: 28

What is the MOST important aspect of fire alarm signaling?

A. Audibility

B. Clarity

C. Reliability

D. Intelligibility

ANSWER: C

Explanation:

Reliability is the most important aspect of fire alarm signaling because the system's life-safety purpose depends first on its ability to operate whenever a fire emergency occurs. A signaling system must consistently transmit an alarm condition from initiating devices through the control equipment to the required notification appliances and supervising station functions. This dependable operation must be maintained despite normal building conditions, loss of primary power, wiring faults, equipment trouble conditions, and other foreseeable impairments.

Fire alarm system design therefore emphasizes supervised circuits and pathways, monitored equipment, protected power supplies, standby power, and testing and maintenance. These measures are intended to identify faults before an emergency and to ensure that the required alarm notification is delivered when occupants and responders need it. The National Fire Alarm and Signaling Code establishes requirements for the application, installation, location, performance, testing, and maintenance of fire alarm and signaling systems, all of which support dependable life-safety operation. See NFPA 72: National Fire Alarm and Signaling Code and the U.S. Fire Administration's fire alarm systems guidance.

QUESTION NO: 29

What topology is normally used for premises backbone cabling?

A. Bus

B. Ring

C. Hierarchical star

D. Mesh

ANSWER: C

Explanation:

A **hierarchical star** is correct. In a hierarchical-star topology, backbone cabling extends from a central distribution location to intermediate distribution locations, such as telecommunications rooms or telecommunications enclosures. This arrangement supports administration, fault isolation, moves, additions, and changes while providing an organized structure for campus and building telecommunications distribution. The backbone topology should be coordinated with the building architecture, equipment-room location, pathway capacity, and anticipated growth. See ANSI/TIA-568.1.

QUESTION NO: 30

If you have a 30 cm (12 in) wide data tray, what does ANSI/TIA 569-B recommend be the maximum pathway fill cross sectional area assuming a MAXIMUM pathway depth of 15 cm (6 in)?

A. 112.5 sq cm (18 sq in)

B. 150 sq cm (24 sq in)

C. 225 sq cm (36 sq in)

D. 300 sq cm (48 sq in)

E. 450 sq cm (72 sq in)

ANSWER: C

Explanation:

225 sq cm (36 sq in) is correct because the available tray cross-sectional area is determined from its width and maximum usable depth: 30 cm × 15 cm = 450 sq cm, or 12 in × 6 in = 72 sq in. ANSI/TIA-569-B's cable-tray fill guidance limits the initial cable fill to 50 percent of the tray's usable cross-sectional area. Applying that 50 percent maximum produces 225 sq cm (450 × 0.50), equivalent to 36 sq in (72 × 0.50). This limit provides working space for cable installation, supports orderly routing and maintenance, helps avoid excessive cable stacking, and retains capacity for future additions. The stated 15 cm (6 in) depth is specifically used to establish the maximum tray area for this calculation; it is not itself the permitted cable-fill depth. Although ANSI/TIA-569-B has been superseded by later editions, its pathway-and-space design principles remain the basis for this calculation. See the Telecommunications Industry Association's standards catalog for the current pathway and spaces standard, ANSI/TIA-569-E, and BICSI's standards and publications resources at BICSI Standards.

QUESTION NO: 31

A conduit run is installed from the ER to a TR. It has two (2) 90 degree bend and a length of 20 m (65 ft). What will be the MINIMUM test rating of the pull cord left in the conduit?

A. 20 kg (44 lb)

B. 40 kg (88 lb)

C. 60 kg (132 lb)

D. 90 kg (200 lb)

E. 100 kg (220 lb)

ANSWER: D

Explanation:

90 kg (200 lb) is the minimum test rating for the pull cord installed in this conduit pathway. Telecommunications conduit intended for future cable installation is normally provided with a pull cord (often called a pull string) that is strong enough to support subsequent cable-pulling operations without breaking. The recognized minimum tensile test rating is 90 kg (200 lb). This requirement applies to the installed pull cord itself; the stated 20 m (65 ft) route length and two 90-degree bends do not reduce that minimum rating. Those pathway characteristics are important in overall conduit design, including bend limitations, pull-point planning, and cable-pulling tension calculations, but they do not alter the required baseline strength of the pull cord left in the conduit. A 200 lb-rated pull cord provides a reliable means to install a pulling line or cable later while preserving the usability of the ER-to-TR pathway. This practice aligns with structured-cabling pathway design guidance addressed by BICSI and telecommunications pathway standards. See BICSI's standards resources and the Telecommunications Industry Association's standards information for applicable structured-cabling and pathway requirements.

QUESTION NO: 32

The electromagnetic spectrum of visible light lies in the ___________ frequency range of the spectrum.

A. 1 GHz

B. 100 GHz

C. 10 THz

D. 1 PHz

E. 100 PHz

ANSWER: D

Explanation:

Visible light lies in the approximately 1 PHz frequency range. The visible band spans roughly 400 to 790 terahertz (THz), corresponding to wavelengths of about 750 to 380 nanometres. Since 1 petahertz (PHz) equals 1,000 THz, visible-light frequencies are commonly and appropriately characterized as being in the petahertz region of the electromagnetic spectrum. For example, red light near 700 nm has a frequency of approximately 430 THz (0.43 PHz), while violet light near 400 nm is approximately 750 THz (0.75 PHz). Thus, although most visible frequencies are below a full 1 PHz numerically, the correct order-of-magnitude frequency range is 1 PHz. This distinction is particularly relevant in optical communications and premises-distribution design: optical carrier frequencies are hundreds of THz, vastly higher than the radio-frequency ranges used for copper-based telecommunications systems. The relationship between wavelength and frequency is governed by $c = \lambda f$, where c is the speed of light. Authoritative electromagnetic-spectrum references place visible radiation between infrared and ultraviolet at these wavelength and frequency values. See NIST's frequency-unit guidance and NASA's visible-light spectrum overview.

QUESTION NO: 33

The RJ-45 is now known as the 8P8C style connector, per the Telecommunications Industry Association (TIA) standard. What does the P and C stand for?

A. Plug and connector

B. Position and connector

C. Position and contact

D. Plug and contact

ANSWER: C

Explanation:

Position and contact is correct because the designation describes the physical interface geometry of the modular connector. In an 8P8C modular connector, "8P" identifies eight available positions, or cavities, across the connector body. "8C" identifies eight fitted electrical contacts. Thus, the designation communicates both the connector's capacity for conductor locations and the number of conductive contact elements present. This terminology is widely used in structured-cabling practice to distinguish the physical 8-position, 8-contact modular plug and jack interface from the historically specific RJ-45 registered-jack service configuration. In everyday networking usage, "RJ-45" is often used informally for an 8P8C Ethernet connector, but 8P8C is the more precise description of the connector format itself. For balanced twisted-pair Ethernet channels, all eight positions and contacts support the familiar four-pair termination arrangement used in common structured-cabling applications. Fluke Networks provides a practical overview of the distinction between the terms at Fluke Networks: RJ45 Connectors. Additional modular-connector terminology and component information is available from Siemon Standards Support.

QUESTION NO: 34

What is the horizontal separation, in well tamped earth, required between power and direct buried telecommunications facilities sharing the same trench?

A. 152 mm (6 in)

B. 229 mm (9 in)

C. 300 mm (12 in)

D. 381 mm (15 in)

E. 457 mm (18 in)

ANSWER: C

Explanation:

300 mm (12 in) is the required horizontal separation for direct-buried telecommunications facilities and power facilities installed in the same trench when the surrounding earth is well tamped. This spacing is an outside-plant pathway practice intended to preserve physical separation between the two utility systems after backfill and compaction. Well-tamped earth provides stable support that helps maintain the required spacing and reduces the likelihood that normal settlement, vibration, maintenance activity, or excavation near one facility will adversely affect the other.

For RCDD design work, this criterion should be shown in the outside-plant trench detail and coordinated with the electrical designer, utility owner, civil engineer, and authority having jurisdiction. The detail should also identify the communications and power routes, burial depths, warning tape or marking provisions, and any required protective barriers or local utility requirements. BICSI outside-plant guidance is applied alongside applicable codes and governing utility rules; project-specific requirements may impose additional protection or separation. See BICSI's standards and publications information and the NFPA 70 (National Electrical Code) information page for the governing standards framework.

QUESTION NO: 35

Geographically speaking, a ______ links two or more distant sites.

A. SAN

B. PAN

C. LAN

D. CAN

E. WAN

ANSWER: E

Explanation:

A wide area network (WAN) links networks, users, or sites over a broad geographic area, such as between separate buildings in different cities, regional offices, or locations in different countries. In structured telecommunications design, the WAN represents the connectivity extending beyond the local premises or campus environment and commonly uses carrier-provided services, leased circuits, Internet-based VPNs, or software-defined WAN services. The essential characteristic is that it interconnects geographically distant locations rather than serving devices within one localized area. This makes **WAN** the correct completion of the question. Cisco describes WANs as networks that span large geographic areas and connect smaller networks, while BICSI's standards resources address the telecommunications infrastructure needed to support connectivity across facilities and external service-provider interfaces. See Cisco: What Is a WAN? and BICSI Standards.

QUESTION NO: 36

You have been selected to recommend a solution to increase response time and add fault tolerance to a bank of servers. Your budget is limited and the client needs a solution as soon as possible (ASAP). Which of the following options should be considered with the short time frame and limited budget?

A. Link aggregation

B. Device clustering

C. Backup network switching devices

D. Off site mass storage

E. Installation of RAID devices

ANSWER: A

Explanation:

Link aggregation is the appropriate short-term, cost-conscious choice because it logically combines two or more physical Ethernet links into one higher-capacity connection. For a server bank, this can increase the available network bandwidth between the servers and the switching infrastructure, reducing congestion that can adversely affect application response time. It also provides link-level resiliency: if one member link fails, traffic can continue over the remaining active links in the aggregation group, subject to the capacity that remains.

This approach is generally fast to deploy where compatible multiple NICs and managed switch ports already exist. It typically requires configuration of an aggregation group at both ends of the connection rather than a major redesign of the server, storage, or network architecture. IEEE 802.1AX defines link aggregation and its operation; see the IEEE 802.1AX standard page. In practical Ethernet environments, the standardized dynamic negotiation protocol is LACP, which helps establish and manage bundled links; Cisco provides an implementation overview at Understanding EtherChannel Load Balancing and Redundancy. Thus, link aggregation directly addresses both improved network service capacity and a single-link failure condition within a limited implementation window.

QUESTION NO: 37

A telecommunications outlet/connector may be provided using all listed below EXCEPT:

A. Wireless AP connectivity

B. Balanced twisted-pair outlets

C. Optical fiber connectors

D. 4p4c (4 position, 4 contact) connector

ANSWER: D

Explanation:

4p4c (4 position, 4 contact) connector is the exception because it is a small modular connector normally associated with telephone handset cords, rather than a recognized telecommunications outlet/connector interface for premises horizontal cabling. A telecommunications outlet is the fixed work-area interface at which horizontal cabling terminates and through which users or equipment connect to the telecommunications cabling system. Its connector arrangement must support the applicable recognized media and the service intended at that location.

For balanced twisted-pair horizontal cabling, the normal modular outlet interface is an 8-position connector that supports the required four-pair cabling and structured-cabling applications. Optical-fiber work-area connections use appropriate fiber-optic adapter/connector interfaces. Wireless access points also require a permanent telecommunications connection—commonly balanced twisted-pair cabling that can provide both data and remote power—at the AP location. A 4p4c interface has only four positions and four contacts, so it does not provide the four-pair connectivity expected for a balanced-twisted-pair telecommunications outlet and is not the appropriate outlet interface for this purpose.

See the BICSI Glossary for telecommunications-cabling terminology and the Telecommunications Industry Association standards resources for premises-cabling standards information.