

# PRACTICE EXAM 19: CTS-D

## SIMULATION (110 QUESTIONS)

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**Time Limit: 180 minutes | Passing Score: 70%**

1. A law firm is building a 28-seat boardroom with floor-to-ceiling glass on the south wall. Farthest viewing distance is 22 ft. The room will host confidential mergers-and-acquisitions strategy sessions with remote counsel joining via video conference. The architect proposes a 75-inch display. The first design concern is:

- A. Display resolution is insufficient
- B. Audio system selection
- C. Control system brand
- D. 75-inch display (37-inch height) fails BDM 44-inch minimum and south glass destroys projection ISCR

2. A 500-seat performing arts center is renovating its sound system. The hall hosts symphony concerts (unamplified), amplified contemporary shows, and spoken-word lectures. RT60 measured at 2.1 seconds. The acoustical consultant recommends variable treatment. The AV designer's coordination priority is:

- A. Speaker brand selection
- B. Verify variable treatment supports all three performance types while maintaining AV coverage patterns
- C. Amplifier sizing only
- D. Subwoofer placement

3. A hospital is deploying telemedicine across 15 examination rooms. The IT director says AV devices cannot join the corporate network. Patient consultations involve protected health information. The first two design requirements are:

- A. Dedicated AV network and HIPAA-compliant encrypted transport
- B. Consumer video platform and standard Wi-Fi
- C. Standard office codec and corporate network
- D. Cloud-only solution and public internet

4. A corporate campus with 5 buildings and 80 conference rooms needs a unified AV-over-IP deployment. Each building has independent IT infrastructure. The campus backbone design priority is:

- A. Room-level equipment selection first
- B. Display brand standardization
- C. Inter-building fiber backbone with 10+ Gbps capacity, VLAN architecture, and centralized management
- D. Per-building standalone systems

5. A broadcast news studio is migrating from SDI to SMPTE ST 2110 IP infrastructure. The facility operates 24/7 with zero tolerance for on-air interruption. The migration priority is:

- A. Equipment replacement schedule
- B. Staff retraining
- C. Cosmetic studio upgrade
- D. PTP grandmaster deployment with redundant network fabric before any signal migration

6. A museum is planning 12 interactive exhibits for a temporary 6-month exhibition. Budget is limited and the exhibits must be relocatable. The design approach is:

- A. Permanent commercial installation
- B. Portable modular equipment with reconfigurable infrastructure and temporary-duty ratings
- C. Consumer equipment throughout
- D. Fixed architectural integration

7. A university medical school is building a simulation laboratory with 8 simulation rooms, a central control room, and a debriefing theater. Each room requires multi-angle video capture of simulated procedures. The integration priority is:

- A. Multi-modality capture integrated with clinical simulators and debriefing playback systems
- B. Consumer camera recording
- C. Audio-only capture
- D. Single-camera per room

8. A 1,200-seat house of worship is experiencing intelligibility complaints in the balcony and under-balcony seating. Current system is 15 years old. STI measures 0.48 in the balcony and 0.42 under the balcony. The investigation priority is:

- A. Amplifier replacement
- B. Microphone upgrade
- C. Coverage uniformity analysis with delay-fill evaluation for balcony and under-balcony zones
- D. DSP replacement

9. A government agency is building a facility with both classified (SCIF) and unclassified conference rooms on the same floor. The security architecture requirement is:

- A. Shared AV infrastructure with software separation
- B. Single network with access controls
- C. Consumer equipment in both
- D. Physically separate AV systems with no cross-connection between classified and unclassified

10. A hotel is renovating its conference center with 25 meeting rooms, 2 ballrooms, and pre-function spaces. Events include corporate conferences, weddings, product launches, and galas. Room turnover between events averages 30 minutes. The operational design priority is:

- A. Premium equipment in every room
- B. Preset scene control with standardized user interface across all spaces and rapid reconfiguration capability
- C. Individual systems per room
- D. Consumer-grade simplicity

11. A data center company needs an operations center for 24/7 infrastructure monitoring. The room will have 6 operator positions and a 4×3 video wall displaying network status, security feeds, and incident dashboards. The reliability specification must include:

- A. Redundant control, UPS/generator backup, continuous-duty displays, and automatic failover capability
- B. Standard commercial equipment
- C. Consumer monitors
- D. Single-system architecture

12. A corporate headquarters is planning a complete AV renovation across 4 floors. The CEO mandates "invisible technology" throughout. The design approach affecting all trades is:

- A. Eliminate AV entirely
- B. Reduce equipment to minimum
- C. Concealed equipment, architectural integration, hidden speakers, and automated one-touch operation
- D. Standard visible installation

13. A financial trading floor requires 24/7 operation supporting traders across global time zones. Each position needs multiple displays for market data. The facility has experienced 3 power outages in 2 years. The power specification must include:

- A. Standard power strips
- B. Battery backup only
- C. Generator without UPS
- D. Online double-conversion UPS with generator backup and redundant power distribution

14. A sports arena is installing a new public address system. The venue seats 18,000 across bowl seating, club level, and suites. Game-day operations include music, announcements, and emergency evacuation paging. The design must address:

- A. Music reinforcement only
- B. Zoned coverage with emergency override, fire alarm integration, and varied SPL targets per seating area
- C. Single-zone coverage
- D. Consumer speakers

15. A school district is deploying hybrid learning technology across 200 classrooms in 12 buildings. Budget is constrained. The standardization approach is:

- A. Room-type-based standard configurations with centralized management and LMS integration
- B. Unique design per classroom
- C. Consumer equipment
- D. Teacher-purchased personal equipment

16. A cruise ship's main theater requires renovation. Environmental conditions include salt air, vibration, and temperature variation. The venue hosts Broadway-style productions and concerts for 800 passengers. The equipment specification must address:

- A. Standard land-based theater equipment
- B. Consumer-grade equipment
- C. Marine-rated equipment with motion-resistant rigging, salt-spray tolerance, and performance venue capability
- D. Minimal equipment

17. A pharmaceutical company is building a clinical trial facility with remote video consultation capability. FDA oversight requires documented session recording. The compliance architecture must include:

- A. Consumer video platform
- B. Standard office conferencing
- C. Cloud-only recording
- D. HIPAA-compliant codec with tamper-evident recording, archival storage, and FDA audit trail

18. A convention center exhibition hall (80,000 sq ft) must support 200 vendor booths with AV capability. Events change weekly. The infrastructure design approach is:

- A. Per-booth custom installation
- B. Pre-wired grid infrastructure with distributed power, data, and audio supporting flexible booth AV
- C. Consumer equipment per booth
- D. No AV infrastructure

19. A private equity firm is building a boardroom where acquisition discussions must remain absolutely confidential. The room is adjacent to a public corridor. The comprehensive security specification includes:

- A. Encrypted transport, isolated network, STC 45+ walls, physical camera/mic disconnect, and sound masking
- B. Standard office security
- C. Door lock only
- D. Consumer encryption

20. A retirement community is building a 200-seat multipurpose room for residents aged 65-90. Events include lectures, religious services, bingo, and movie nights. The accessibility-first design includes:

- A. Standard commercial design
- B. Premium audio only
- C. Hearing loop, large-format displays, high-contrast simplified control, and moderate-volume high-intelligibility audio
- D. Consumer equipment

21. A broadcast control room must support directors, technical directors, audio operators, and graphics operators simultaneously. The facility produces live news 18 hours per day. The ergonomic production design priority is:

- A. Standard office furniture
- B. Consumer computer desks
- C. Open floor plan
- D. Custom production consoles with role-specific monitor arrays, switcher/mixer integration, and broadcast-grade reference monitoring

22. A corporate campus amphitheater hosts outdoor summer events for 500 employees. The venue experiences afternoon thunderstorms June through September. The seasonal design consideration is:

- A. Permanent indoor-rated installation
- B. Weather-resistant IP65+ equipment with seasonal deployment, covered equipment storage, and lightning protection
- C. Consumer portable speakers
- D. No weather consideration needed

23. A courtroom complex with 6 courtrooms requires AV evidence presentation, witness recording, and public gallery viewing. Each courtroom must meet ADA accessibility requirements. The first compliance coordination is:

- A. ADA-compliant evidence display positioning, assistive listening, closed captioning, and recording with legal chain-of-custody
- B. Display size selection
- C. Audio brand preference
- D. Cable routing

24. A casino resort is building a 12,000 sq ft sportsbook with 120 displays showing live sporting events, odds data, and promotional content. The venue operates 24/7/365. The distribution architecture must support:

- A. Consumer cable boxes per display
- B. Individual media players
- C. IPTV with centralized tuner management, odds data integration, CMS for promotions, and 24/7 commercial reliability
- D. Single matrix switcher

25. A technology company is building an executive briefing center to impress visiting clients. The room transitions from formal presentation to informal collaboration to social entertaining. The experience design includes:

- A. Fixed presentation room
- B. Entertainment-only design
- C. Standard conference room
- D. Multi-mode design with seamless scene transitions, premium materials, and client-impressing automated operation

26. An airport terminal gate area requires passenger information displays, gate announcements, and emergency communication. Displays must be readable in daylight. Emergency messaging must override all content. The specification must include:

- A. High-brightness 700+ nit displays with FIDS integration, emergency override, and centralized CMS
- B. Consumer televisions
- C. Standard brightness displays
- D. Manual announcement system

27. A university science building has 6 lecture halls, 12 laboratories, and 20 offices. The lecture halls require recording and streaming for remote students. Labs require specialized data visualization. The system architecture priority is:

- A. Individual room designs
- B. Consumer equipment
- C. Unified infrastructure with room-type standardization, LMS integration, and centralized management
- D. Faculty personal equipment

28. A children's hospital is designing patient rooms with family-friendly AV. Content must be age-appropriate. System must integrate with nurse call. The design must not interfere with medical equipment. The design priority is:

- A. Consumer entertainment system
- B. Standard hospital TV
- C. Gaming console installation
- D. Medical-grade displays, interference-free design, nurse-call integration, and age-appropriate content management

29. A multinational corporation has offices in 15 countries requiring standardized video conferencing. Time zones span 16 hours. Each office has different IT infrastructure. The global design challenge is:

- A. Per-office custom systems
- B. Codec standardization with interoperability testing, bandwidth assessment per site, and unified management
- C. Consumer platforms
- D. Audio-only conferencing

30. A 40-story office tower lobby requires a 3-story atrium video wall as the architectural centerpiece. The display is visible from street level through floor-to-ceiling glass. The multidisciplinary coordination includes:

- A. Structural engineering for wall load, high-brightness panels for daylight, CMS integration, and architectural finish coordination
- B. Display selection only
- C. Content design only
- D. Electrical coordination only

31. A performing arts center is adding a cinema screening capability to its existing theater. DCI compliance is required for first-run film exhibition. The existing audio system serves live performance. The cinema integration must include:

- A. Consumer projector and soundbar
- B. Standard commercial projection
- C. DCI-compliant projection, P3 calibration, multichannel cinema audio, and integration with existing performance systems
- D. Streaming service only

32. A military base is constructing a joint operations center for multi-agency coordination. The facility must display real-time tactical data from multiple classified sources. The security and reliability requirements include:

- A. Standard commercial equipment
- B. Consumer monitors
- C. Cloud-based system
- D. Classified-rated systems, redundant power, mission-critical failover, and multi-source display with secure data integration

33. A teaching hospital is renovating its grand rounds auditorium. The 350-seat space hosts weekly medical education presentations with remote physician participation. Presentations include patient imaging requiring HIPAA protection. The design must address:

- A. Standard lecture hall design
- B. HIPAA-compliant streaming, clinical display standards, hybrid participation, and medical imaging privacy controls
- C. Consumer video conferencing
- D. Audio-only remote participation

34. A Fortune 500 company is building its annual shareholder meeting facility. The 2,000-seat venue must support live IMAG, webcast to 50,000 viewers, simultaneous interpretation in 4 languages, and ADA accessibility. The production specification includes:

- A. Multi-camera IMAG, professional streaming infrastructure, interpretation booths, assistive listening, and closed captioning
- B. Single camera and laptop stream
- C. Audio-only webcast
- D. Consumer livestream platform

35. A recording studio complex includes tracking room, control room, isolation booth, and mastering suite. Acoustic isolation between spaces is critical. The acoustic specification requires:

- A. Standard commercial treatment
- B. Consumer acoustic panels
- C. Carpet and curtains
- D. Precision acoustic treatment with measured STC between rooms, calibrated monitoring, and bass-trap design

36. A regional hospital network with 8 facilities is deploying standardized telemedicine across all locations. Clinical specialties include dermatology, psychiatry, and cardiology — each requiring different camera and lighting specifications. The network-wide design must include:

- A. Consumer webcams at each site
- B. Identical equipment at every location
- C. Specialty-specific camera/lighting configurations with HIPAA compliance and centralized management across all facilities
- D. Per-site custom design

37. A professional sports team's training facility needs video analysis rooms, coaches' offices with replay capability, and a media room for press conferences. Analytics platforms require multi-angle synchronized capture during practice. The integrated design includes:

- A. Consumer recording
- B. Multi-angle synchronized capture, coaching-analytics integration, video analysis rooms, and broadcast-grade media room
- C. Single camera recording
- D. Athlete personal devices

38. A historic theater built in 1920 is being renovated with modern AV while preserving architectural heritage. The local historic preservation board must approve all visible modifications. The design constraint is:

- A. Concealed equipment with architecture-sympathetic integration preserving original aesthetic while adding modern AV capability
- B. Standard commercial installation
- C. Consumer equipment
- D. No AV installation permitted

39. A pharmaceutical manufacturing facility needs clean room AV for production monitoring and communication. ISO Class 7 clean room standards restrict equipment materials and particulate generation. The specification must address:

- A. Standard commercial equipment
- B. Consumer displays
- C. Industrial monitors only
- D. Clean-room-compatible equipment with sealed enclosures, low-particulate materials, and communication integration

40. A 200-room hotel is deploying in-room entertainment, guest-facing digital signage, and back-of-house communication. The systems must integrate with the property management system for personalized guest experience. The infrastructure priority is:

- A. Consumer televisions per room
- B. Individual standalone systems
- C. IPTV platform with PMS integration, centralized management, guest personalization, and digital signage CMS
- D. Analog cable television

41. A new embassy building requires both classified and unclassified conference facilities, a public affairs briefing room, and diplomatic reception spaces. Security requirements vary by room classification. The security architecture must include:

- A. Single system for all spaces
- B. Tiered security with TEMPEST-rated classified spaces, standard-secure diplomatic areas, and public-facing briefing room
- C. Consumer equipment throughout
- D. Standard commercial security

42. A 60,000-seat stadium is upgrading its distributed PA system. The existing system shows 15 dB SPL variation across seating. Current STI averages 0.45 in upper deck. Emergency evacuation messaging must reach all seats within 3 seconds. The design priorities include:

- A. Zoned coverage redesign with delay-fill timing, ACU verification, STI 0.60+ target, and fire alarm integration
- B. Amplifier power increase only
- C. Speaker replacement only
- D. Volume increase

43. A research university is building a specialized visualization laboratory for large-scale data display. Researchers need 100-megapixel display capability across a 20-foot curved wall. Multiple researchers must collaborate simultaneously on shared datasets. The display technology must include:

- A. Consumer 4K television
- B. Standard projector
- C. Single LED wall
- D. Tiled high-resolution display wall with collaborative input management and multi-user interaction capability

44. A luxury automotive dealership is building a customer experience center. Prospective buyers configure vehicles on large interactive displays. The brand experience must convey premium quality. The design approach is:

- A. Standard retail signage
- B. Premium interactive displays with accurate color reproduction, tactile interface, and brand-appropriate aesthetic integration
- C. Consumer touchscreens
- D. Paper catalogs

45. A national laboratory handling classified nuclear research needs a multi-purpose briefing facility. Some briefings are classified TOP SECRET/SCI. Others are unclassified public outreach. The facility must serve both without cross-contamination. The design requires:

- A. Single room with software switching
- B. Shared AV infrastructure
- C. Physically separate classified and unclassified AV systems with independently verified isolation
- D. Standard commercial equipment

46. A community college with 3 campuses is standardizing classroom technology for 150 rooms. Faculty technical skill varies widely. The enrollment management system requires attendance tracking integration. The deployment strategy is:

- A. Standardized room types with occupancy sensing, simplified one-touch operation, LMS integration, and centralized management
- B. Unique design per classroom
- C. Faculty personal equipment
- D. Consumer tablets

47. A professional symphony orchestra is building a new rehearsal hall. The conductor requires precise monitoring of individual sections. Recording is needed for performance review. Acoustic environment must approximate the performance hall. The design includes:

- A. Consumer recording
- B. Background music system
- C. Standard commercial audio
- D. Multi-channel recording, conductor monitoring, section-specific capture, and acoustic treatment matching performance hall RT60

48. A metropolitan transit authority needs AV for a new rail operations control center. Dispatchers must monitor train positions, station cameras, and passenger information simultaneously. The facility operates 24/7 with shift changes every 8 hours. The design requires:

- A. Consumer monitors
- B. Multi-display operator workstations with centralized video wall, transit system integration, UPS/generator backup, and shift-transition capability
- C. Standard office setup
- D. Single large display

49. A law school is building a mock trial courtroom for student practice. The room must replicate real courtroom AV functionality including evidence display, recording, and remote witness testimony. Students operate all systems. The design priority is:

- A. Full courtroom AV functionality with student-accessible operation and self-service recording capability
- B. Standard classroom
- C. Consumer video setup
- D. Audio-only recording

50. A pharmaceutical company's corporate headquarters needs a 400-seat auditorium for shareholder meetings, product launches, and all-hands events. The CEO wants theatrical production quality for product launches but simple operation for routine meetings. The design approach is:

- A. Fixed theatrical configuration
- B. Meeting-room-only design
- C. Dual-mode design with production-grade capability and simplified meeting-mode operation through preset scenes
- D. Outsourced production only

51. A children's museum is designing 20 interactive learning stations. Exhibits must be child-proof, cleanable, and engaging for ages 3-12. Content rotates quarterly. The durability specification must include:

- A. Consumer tablets
- B. Standard commercial touchscreens
- C. Paper-based exhibits
- D. Vandal-resistant interactive displays with sealed construction, antimicrobial surfaces, and CMS for content rotation

52. A multinational bank is building a global trading floor in a new headquarters. 400 trader positions each require 6 displays. The facility connects to exchanges in New York, London, Tokyo, and Hong Kong. The infrastructure priority is:

- A. Consumer monitors per position
- B. Redundant systems with 24/7 reliability, global market connectivity, UPS/generator, and mission-critical failover across all positions
- C. Standard commercial displays
- D. Cloud-based virtual desktops

53. A state emergency management agency is building a joint emergency operations center. During disasters, the facility coordinates response across police, fire, EMS, public health, and National Guard. Multi-agency radio interoperability is required. The design must include:

- A. Multi-agency communication integration, multi-source video wall, incident command displays, and redundant mission-critical infrastructure
- B. Standard conference room
- C. Consumer equipment
- D. Audio-only coordination

54. A 200-bed skilled nursing facility is designing common areas and therapy rooms. Residents have age-related hearing and vision limitations. Therapy rooms require recording for clinical documentation. The accessibility-first design includes:

- A. Standard commercial equipment
- B. Consumer televisions
- C. Hearing loop, high-contrast large-text displays, simplified operation, and HIPAA-compliant therapy recording
- D. Premium home theater

55. A professional esports arena is being built for competitive gaming events broadcast to millions of viewers online. Players need zero-latency monitoring. Spectators need IMAG. Production requires broadcast-grade multi-camera coverage. The facility specification must address:

- A. Consumer gaming monitors
- B. Standard sports venue PA
- C. Streaming-only design
- D. Sub-millisecond player monitoring, broadcast production infrastructure, IMAG displays, and professional streaming encoding

56. A historic church built in 1850 is adding modern AV while preserving its National Register listing. The preservation board prohibits visible modern equipment. The congregation needs speech reinforcement and hearing assistance. The concealment strategy includes:

- A. Standard visible speaker installation
- B. Architecture-matched concealed speakers, invisible hearing loop, and preservation-compliant equipment integration
- C. No AV permitted
- D. Consumer portable speakers

57. A biopharmaceutical research facility needs AV in BSL-3 (Biosafety Level 3) laboratories. Equipment must be decontaminable. No equipment may compromise containment integrity. Communication with personnel outside containment is critical. The specification requires:

- A. Sealed decontaminable AV equipment maintaining containment integrity with intercom to external areas
- B. Standard commercial equipment
- C. Consumer devices
- D. No AV in BSL-3 spaces

58. A theme park is designing an immersive attraction using synchronized audio, video, projection mapping, and motion platforms. Show timing must maintain frame-accurate synchronization across all media. The show control architecture requires:

- A. Consumer media players
- B. Manual operator cues
- C. Standard AV control system
- D. Show control system with frame-accurate synchronization, redundant playback, and multi-media timing coordination

59. A metropolitan library system is deploying meeting room technology across 30 branches. Staff at each branch handles setup. Technology budgets vary by branch size. The system design approach is:

- A. Unique design per branch
- B. Premium equipment everywhere
- C. Tiered room-type standards with simplified self-service operation and remote monitoring across all branches
- D. Consumer equipment

60. A sports medicine clinic needs video gait analysis in examination rooms. Physicians compare patient movement against baseline recordings over time. HIPAA applies to all patient video. The clinical AV specification includes:

- A. HIPAA-compliant video capture, baseline comparison playback, archival storage, and clinical system integration
- B. Consumer video camera
- C. Smartphone recording
- D. Standard security camera

61. A new federal courthouse requires AV in 12 courtrooms, 4 hearing rooms, and a judicial conference center. Evidence display must maintain legal chain of custody. Remote witness testimony must be admissible. The judicial AV specification includes:

- A. Consumer video conferencing
- B. Evidence display with chain-of-custody recording, remote testimony capability, ADA accessibility, and jurisdictional compliance
- C. Audio-only recording
- D. Standard conference room design

62. A luxury hotel spa is adding AV to treatment rooms, relaxation areas, and a meditation room. Audio must be calming and non-intrusive. Equipment must be invisible. Humidity in wet areas exceeds 80%. The environmental design includes:

- A. Standard commercial equipment
- B. Consumer Bluetooth speakers
- C. No AV in wet areas
- D. Humidity-rated concealed equipment with calming content management and architectural integration

63. A television broadcast truck is being built for mobile production of live sporting events. The truck must set up at different venues weekly. All equipment must survive road vibration. The mobile production specification includes:

- A. Standard rack equipment
- B. Consumer production gear
- C. Broadcast-grade equipment with vibration-resistant mounting, redundant power, and rapid deployment capability
- D. Fixed installation design

64. A county 911 dispatch center is upgrading its AV for next-generation communications. Dispatchers handle emergency calls with simultaneous CAD display, mapping, and radio communication. The facility operates 24/7 with no downtime tolerance. The specification requires:

- A. Mission-critical displays, redundant control, UPS/generator, ergonomic dispatch positions, and NG911 system integration
- B. Standard office monitors
- C. Consumer equipment
- D. Single large display

65. A private school gymnasium serves basketball games, school assemblies, and graduation ceremonies. Ceiling height is 28 feet. Reverberation is significant due to hard surfaces. The multi-use audio design must address:

- A. Single speaker system
- B. Zoned audio with gymnasium-appropriate speakers, acoustic treatment, and scene presets for sports/assembly/ceremony
- C. Consumer portable PA
- D. Background music only

66. A corporate wellness center includes a yoga studio, cycling room, and meditation space. Each room has dramatically different audio requirements. The yoga studio needs ambient calm; the cycling room needs high-energy music. The audio architecture includes:

- A. Single system for all rooms
- B. Standard background music
- C. Consumer Bluetooth speakers
- D. Zone-isolated audio with room-specific DSP processing, independent volume control, and activity-appropriate content

67. A satellite operations center monitors 40 communications satellites in geostationary orbit. Each satellite requires dedicated telemetry monitoring. Anomaly detection must trigger immediate visual alerting. The operations center AV requires:

- A. Standard office setup
- B. Multi-satellite telemetry display wall with anomaly alerting, redundant monitoring, and 24/7 continuous-duty reliability
- C. Consumer monitors
- D. Single summary display

68. A vineyard tasting room is building an immersive experience combining video, spatial audio, and scent delivery synchronized to a virtual tour of the vineyard. The synchronized media design requires:

- A. Consumer television
- B. Standard presentation system
- C. Audio-only tour
- D. Multi-sensory show control with synchronized video, spatial audio, and environmental triggers

69. A state legislature's chamber requires AV for debate, voting display, public gallery viewing, press coverage, and live statewide broadcast. Accessibility requirements include hearing assistance and closed captioning. The legislative AV specification includes:

- A. Debate audio, voting display, broadcast production, press feeds, ADA accessibility, and public streaming capability
- B. Standard meeting room
- C. Audio-only recording
- D. Consumer livestream

70. A data analytics company's visualization lab requires researchers to interact with 3D data projections. Multiple users must manipulate shared holographic datasets. The room requires precise tracking of user positions. The next-generation display specification includes:

- A. Standard 4K display
- B. Consumer VR headsets
- C. Interactive 3D display technology with multi-user tracking, gesture recognition, and collaborative data manipulation
- D. Projection screen

71. A 500-room hotel chain is standardizing AV across 25 properties worldwide. Each property has different construction standards. Brand consistency is mandatory. The global standard must include:

- A. Per-property custom design
- B. Consumer equipment
- C. Different standards per region
- D. Global AV standard defining brand experience with property-specific adaptation for local construction

72. A medical examiner's office needs AV for autopsy documentation, forensic consultation, and courtroom evidence preparation. Chain of custody applies to all recordings. The forensic AV specification includes:

- A. Consumer recording
- B. Forensic-grade recording with chain-of-custody documentation, calibrated imaging, and courtroom-admissible archival
- C. Standard commercial camera
- D. Smartphone documentation

73. A space agency's launch control center requires real-time telemetry display, multi-agency communication, and mission-critical reliability during launch windows. Countdown clocks must synchronize across all displays. The mission-critical specification includes:

- A. Mission-critical displays with PTP-synchronized timing, redundant systems, multi-agency communication, and zero-tolerance failover
- B. Standard commercial setup
- C. Consumer monitors
- D. Cloud-based monitoring

74. A professional orchestra's concert hall has 2,500 seats with a 1.8-second RT60. The orchestra performs without amplification for classical repertoire but uses reinforcement for pops concerts and special events. The flexible audio design must include:

- A. Fixed reinforcement system
- B. Amplified-only design
- C. No audio system
- D. Concealed reinforcement with retractable line arrays, delay fills for balcony, and variable acoustics for multi-genre flexibility

75. A national weather service forecast office needs AV for its operations area. Forecasters monitor multiple satellite feeds, radar displays, and model outputs simultaneously. Warning coordination requires multi-agency communication. The operational AV includes:

- A. Standard office setup
- B. Consumer monitors
- C. Multi-source display walls with weather data integration, warning communication, and 24/7 continuous-duty reliability
- D. Single large display

76. A dental school clinic has 60 operatory positions for student dentists. Faculty must observe student procedures from a central monitoring area. Patient education displays are needed at each position. HIPAA applies to patient imaging. The educational AV includes:

- A. Centralized faculty monitoring, operatory cameras with HIPAA compliance, patient education displays, and clinical system integration
- B. Consumer webcams
- C. Standard commercial TV per chair
- D. No AV needed

77. A nuclear power plant control room is upgrading AV for its main control board area. NRC regulations govern control room modifications. Seismic qualification is required for safety-related equipment. The regulatory design constraint is:

- A. Standard commercial upgrade
- B. Consumer-grade monitors
- C. No upgrade permitted
- D. NRC-approved modification with seismically qualified displays and integration preserving control room human factors

78. A professional theater company's costume and set shop needs AV for design review video conferencing with directors at remote locations. The shop environment is dusty with woodworking equipment generating noise. The design consideration is:

- A. Standard consumer camera
- B. Dust-resistant camera enclosure with noise-isolating microphone and directional pickup for communication despite shop environment
- C. No AV in shop area
- D. Audio-only communication

79. A 200-seat cinema is converting from 35mm film to digital projection. DCI compliance is required for studio content. The existing 5.1 surround system must upgrade to immersive audio. The conversion specification includes:

- A. Consumer home theater projector
- B. Standard commercial projector
- C. DCI-compliant 4K projection, P3 calibration, immersive audio upgrade, and integration with studio distribution
- D. Streaming platform

80. A theme park hotel lobby uses AV as an extension of the park experience. Large-scale video content transitions through day and night themes. Audio zones create different atmospheres in reception, lounge, and restaurant areas. The immersive design includes:

- A. Themed video walls, zoned atmospheric audio, automated day/night content scheduling, and architectural AV integration
- B. Standard lobby signage
- C. Consumer televisions
- D. Background music only

81. A veterinary teaching hospital has surgical suites, examination rooms, and a 100-seat lecture hall. Surgical procedures must be captured for teaching. Students in the lecture hall watch live surgery. The educational AV specification includes:

- A. Consumer recording
- B. Standard commercial camera
- C. Audio-only lecture
- D. Multi-camera surgical capture, live streaming to lecture hall, recording for archive, and clinical-grade display at surgical positions

82. A private aviation FBO (fixed-base operator) lounge serves high-net-worth clients awaiting private flights. The brand experience must convey luxury. Flight information must integrate with aviation systems. The premium design includes:

- A. Standard digital signage
- B. Premium displays with flight data integration, luxury-appropriate content, discreet equipment, and architectural design coordination
- C. Consumer television
- D. Information printed on paper

83. A research vessel's marine science laboratory needs AV for live video feeds from underwater ROVs, data visualization from sonar systems, and communication with shore-based researchers. Ship motion and salt environment are constant. The marine AV specification includes:

- A. Standard commercial equipment
- B. Consumer displays
- C. Marine-rated displays, vibration-resistant mounting, ROV video integration, and ship-to-shore communication capability
- D. Laptop-based visualization

84. A psychiatric hospital's patient common areas and therapy rooms need AV that promotes calming environment. No equipment can be used for self-harm. All mounting must be anti-ligature. The behavioral health specification includes:

- A. Anti-ligature mounting, tamper-resistant equipment, calming content, and behavioral health-safe design throughout
- B. Standard commercial mounting
- C. Consumer equipment
- D. No AV in patient areas

85. A Formula 1 racing team's engineering room requires real-time telemetry from the car during races. Data refresh rates must support split-second decision making. Communication between trackside and factory engineers must be instantaneous. The race engineering AV includes:

- A. Consumer monitors
- B. Standard commercial displays
- C. Consumer video conferencing
- D. Low-latency telemetry display, real-time communication, multi-source data visualization, and mission-critical reliability

86. A residential high-rise building's amenity floor includes a theater room, fitness center, co-working space, and rooftop terrace. The HOA requires simplified operation by residents. The residential amenity design includes:

- A. Commercial-grade operation
- B. Resident-friendly operation with preset scenes, reservation system integration, and simplified self-service control
- C. Staff-operated-only facilities
- D. Consumer equipment

87. A fire department's training facility needs classroom instruction, live-fire exercise recording, and after-action review capability. Recordings must capture both video and radio communications. The training AV specification includes:

- A. Multi-source recording with radio integration, classroom playback, after-action review, and durable field-rated capture equipment
- B. Consumer camera
- C. Audio-only recording
- D. Standard classroom design

88. A television network's election night set requires a massive interactive touchscreen for anchors, multiple data visualization displays, and real-time results integration from state reporting systems. The broadcast set design includes:

- A. Standard news desk
- B. Consumer touchscreen
- C. Interactive anchor touchscreen, real-time data integration, multi-display visualization, and broadcast-grade production infrastructure
- D. Pre-recorded graphics only

89. A museum of natural history is building a planetarium with a 60-foot dome. The fulldome projection system must display both pre-rendered shows and live astronomical data. The immersive projection specification includes:

- A. Standard flat-screen projection
- B. Consumer projector
- C. Single projector
- D. Multi-projector fulldome system with edge blending, real-time astronomical data rendering, and show control automation

90. A federal prison needs AV for visitation rooms, educational classrooms, and a courtroom for remote hearings. All systems must prevent unauthorized recording. Equipment must resist tampering. The correctional AV specification includes:

- A. Tamper-resistant equipment, recording-prevention measures, secure remote hearing capability, and correctional-facility-appropriate design
- B. Standard commercial equipment
- C. Consumer video conferencing
- D. No AV permitted

91. A convention center is adding simultaneous interpretation capability for international events. Up to 6 languages may be needed simultaneously. Delegates use wireless receivers. The interpretation infrastructure includes:

- A. Consumer translation apps
- B. Machine translation only
- C. Multi-channel interpretation with soundproof booths, wireless receiver distribution, and language selection at each seat
- D. Sequential interpretation only

92. A medical device company needs a demo lab where surgeons evaluate equipment. Procedures are performed on simulation models. Multiple camera angles capture technique. Remote observers participate via secure video link. The demo lab design includes:

- A. Consumer webcam recording
- B. Multi-angle capture, secure remote observation, simulation integration, and HIPAA-compliant archival for medical device evaluation
- C. Audio-only observation
- D. Standard conference room

93. A national park visitor center is building an immersive theater introducing the park's natural features. The presentation combines 180-degree panoramic video with spatial audio and environmental effects. Shows run every 30 minutes for 8 hours daily. The immersive theater specification includes:

- A. Standard flat-screen display
- B. Consumer home theater
- C. Single projector
- D. Multi-projector panoramic display, spatial audio, environmental effects, automated show control, and continuous-duty reliability

94. A professional sports league headquarters has a media production studio, executive boardroom, and a league operations center monitoring games in progress. The operations center displays all simultaneous games with official replay review capability. The facility design includes:

- A. Multi-game monitoring with replay review, broadcast studio, premium boardroom, and mission-critical reliability
- B. Standard office setup
- C. Consumer televisions
- D. Single large display

95. A metropolitan police department's new headquarters includes interrogation rooms, briefing room, operations center, and public affairs room. Recording requirements vary by room. Chain of custody applies to interrogation recordings. The law enforcement AV specification includes:

- A. Standard commercial equipment
- B. Consumer recording
- C. Tiered specification with chain-of-custody interrogation recording, operations center monitoring, and public-facing briefing capability
- D. Audio-only recording

96. A corporate innovation lab encourages creative collaboration through writable wall surfaces, mobile display carts, and reconfigurable furniture. The space transforms daily for different teams. The agile workspace design includes:

- A. Fixed installation only
- B. Mobile displays, writable surfaces, flexible infrastructure, wireless connectivity, and reconfigurable AV supporting daily transformation
- C. Standard conference room
- D. Consumer equipment

97. A hospital NICU (Neonatal ICU) needs bedside cameras for parent remote viewing of premature infants. HIPAA governs all video. Camera systems must not interfere with medical equipment. Low-light operation is required for infant sleep cycles. The NICU AV specification includes:

- A. Consumer baby camera
- B. Standard commercial camera
- C. Standard security camera
- D. Medical-grade low-light cameras with HIPAA compliance, EMI-free operation, and secure parent remote access

98. A professional concert venue with 5,000 capacity is upgrading from analog to Dante networked audio. 128 input channels are required for large-format touring productions. The network audio migration includes:

- A. Dante infrastructure with 128+ channel capacity, redundant primary/secondary networks, and stage box integration
- B. Consumer audio interface
- C. Analog expansion only
- D. Wireless-only audio

99. A historic mansion converted to a boutique hotel needs invisible AV throughout while preserving original millwork, plaster, and architectural details. Local landmark designation prohibits visible modifications. The preservation-compliant AV includes:

- A. Standard visible installation
- B. No AV possible
- C. Concealed speakers, hidden displays, architecture-sympathetic integration, and preservation-board-approved installation methods
- D. Consumer portable equipment

100. A rehabilitation hospital needs AV in physical therapy gyms, occupational therapy rooms, and speech therapy suites. Patient progress must be recorded for clinical documentation. Motivational content displays during therapy sessions. The clinical AV specification includes:

- A. Consumer television
- B. Clinical recording, progress-tracking playback, motivational displays, HIPAA compliance, and therapy-specific AV integration
- C. Audio-only recording
- D. Standard commercial displays

101. A submarine fleet headquarters needs a tactical operations center. Display systems must function in electromagnetic warfare conditions. Communication must be redundant across multiple classified networks. The naval specification requires:

- A. Consumer equipment
- B. Standard commercial displays
- C. Cloud-based system
- D. Military-specification hardened displays, EMP-resistant design, multi-network secure communication, and submarine fleet integration

102. A major concert touring company needs a portable PA system serving venues from 2,000 to 20,000 capacity. The system must scale for different venue sizes while maintaining consistent coverage quality. The scalable design includes:

- A. Modular line array system with scalable configuration, digital networking, and venue-adaptive processing
- B. Fixed installation at each venue
- C. Consumer PA system
- D. Single-size system

103. A children's cancer treatment center needs AV in treatment rooms where children receive chemotherapy over multi-hour sessions. Content must distract and comfort during treatment. Equipment must be cleanable and infection-control compliant. The pediatric AV specification includes:

- A. Standard commercial display
- B. Consumer tablet
- C. Infection-control-compliant displays, age-appropriate distraction content, CMS for content rotation, and easy-clean surfaces
- D. No AV during treatment

104. A sports broadcasting network's highlight production room needs to ingest live feeds from 30 simultaneous events, clip highlights in real-time, and distribute packages to broadcast and digital platforms. The production room specification includes:

- A. Consumer editing software
- B. Multi-source ingest, real-time clipping, broadcast-grade storage, and automated distribution to broadcast and digital platforms
- C. Single-source editing
- D. Cloud-only production

105. A luxury yacht's entertainment system spans 5 viewing areas across 3 decks. Marine environment applies to all equipment. Owner requires cinema-quality audio and video throughout. The marine luxury AV specification includes:

- A. Marine-rated equipment with cinema-quality audio/video, multi-zone distribution, and corrosion-resistant installation throughout
- B. Consumer home theater
- C. Standard commercial equipment
- D. Portable speakers

106. A national library's rare manuscripts reading room needs AV for document imaging and scholarly collaboration. Lighting must not damage manuscripts. Environmental controls maintain temperature and humidity. The preservation-compatible AV includes:

- A. Standard commercial lighting
- B. Consumer camera
- C. Flash photography station
- D. UV-free lighting, non-contact document imaging, scholarly collaboration displays, and preservation-compatible environmental integration

107. A professional ballet company's rehearsal studio needs full-wall mirrors, recording for choreographic review, and music playback for rehearsal. The choreographer needs multi-angle simultaneous playback for movement analysis. The dance studio AV includes:

- A. Consumer Bluetooth speaker
- B. Standard commercial audio
- C. Multi-angle recording, choreographic playback analysis, high-fidelity music reproduction, and mirror-compatible camera placement
- D. Audio-only playback

108. A downtown transit hub needs AV for passenger wayfinding, service alerts, emergency communication, and advertising across 4 platforms and 6 entrances. The system must operate in outdoor temperature extremes and high humidity. The transit AV specification includes:

- A. Weather-rated displays with wayfinding, service alerts, emergency override, advertising CMS, and environmental durability
- B. Standard commercial displays
- C. Consumer televisions
- D. Paper signage

109. A professional golf tournament needs portable AV for 18 holes with leaderboard displays, spectator video screens at key holes, and broadcast camera positions throughout the course. Setup and strike must complete within 48 hours. The tournament AV includes:

- A. Standard venue installation
- B. Portable leaderboard displays, spectator screens, broadcast infrastructure, power distribution, and rapid deployment capability
- C. Consumer displays
- D. Audio-only announcements

110. A university is constructing a new student union with 3 meeting rooms, 1 multipurpose event space, a food court, and an outdoor plaza. Students book rooms via app. The event space hosts 50-500 person events weekly. The comprehensive student union AV specification includes:

- A. Consumer equipment throughout
- B. Individual standalone systems
- C. Per-room custom design
- D. Integrated building AV with app-based booking, scalable event space, food court signage, outdoor coverage, and centralized management

# PRACTICE EXAM 19: ANSWER KEY AND EXPLANATIONS

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1. D — The 75-inch display produces only 37-inch image height against a 44-inch BDM minimum ( $22 \times 12 \div 6 = 44$ ), and south-facing glass destroys projection ISCR through uncontrolled daylight. Both the display sizing failure and ambient light problem must be addressed simultaneously. This scenario tests the designer's ability to identify multiple concurrent design failures.
2. B — Variable acoustic treatment must support symphony (long RT60), amplified shows (moderate RT60), and speech (short RT60) without blocking loudspeaker coverage patterns. The AV designer must verify that retractable banners, curtains, or panels don't obstruct speaker aim. Acoustic and AV coordination prevents treatment from solving one problem while creating another.
3. A — Dedicated AV network resolves the IT prohibition, and HIPAA encryption protects patient health information during telemedicine consultations. These two requirements are interdependent — the network architecture enables the security compliance. Consumer platforms and corporate network approaches both fail one or both requirements.
4. C — Five buildings with independent IT require unified fiber backbone before room-level equipment can communicate across the campus. VLAN architecture and centralized management enable enterprise-scale control. Room equipment selection and display standardization are secondary to the backbone that connects everything.
5. D — PTP grandmaster must be operational and the redundant network fabric proven before migrating any production signals from SDI to IP. A 24/7 broadcast facility cannot risk on-air interruption from untested timing infrastructure. Equipment replacement and retraining follow after the foundation is verified.
6. B — Six-month temporary exhibitions require equipment that can be installed, operated, and removed without permanent infrastructure modification. Portable modular systems with temporary-duty ratings match the exhibition lifecycle. Permanent installation and fixed architectural integration waste resources on temporary deployments.
7. A — Medical simulation requires integrated capture of simulator data, multi-angle video, audio, and vital-sign telemetry for meaningful debriefing and education review. Consumer cameras and single-angle capture miss the multi-modality integration that makes simulation training effective. Integration with debriefing playback systems completes the educational loop.
8. C — STI below 0.50 in both balcony zones indicates coverage delivery failure, not equipment failure. Coverage uniformity analysis identifies whether the problem is aim, timing, or missing

delay-fill coverage in those specific zones. Amplifier, microphone, and DSP replacement address components rather than the spatial coverage pattern.

9. D — Classified and unclassified systems on the same floor must be physically separate with no shared pathways, networks, or equipment per federal security requirements. Software separation and access controls cannot provide the verified isolation that classified facility standards mandate. Physical separation prevents any cross-contamination pathway.
10. B — Thirty-minute room turnover demands instant reconfiguration through preset scenes rather than manual AV setup. Standardized interfaces across 25+ rooms ensure staff familiarity regardless of which room they operate. Premium equipment and individual systems don't address the operational speed requirement.
11. A — 24/7 operations centers monitoring critical infrastructure require comprehensive redundancy because any single-point failure blinds operators during incidents. Redundant control, UPS/generator backup, continuous-duty displays, and automatic failover ensure uninterrupted situational awareness. Standard and consumer approaches lack the reliability architecture.
12. C — "Invisible technology" affects every trade — architectural concealment, MEP coordination for hidden equipment ventilation, structural support for concealed displays, and automated control eliminating user interaction. This mandate transforms the design approach across all disciplines simultaneously.
13. D — Three power outages in two years demonstrate real facility vulnerability requiring comprehensive power protection. Online double-conversion UPS provides zero-transition protection; generator backup extends runtime through extended outages. Redundant power distribution prevents single-circuit failures from affecting multiple trader positions.
14. B — An 18,000-seat arena requires zoned coverage because bowl, club, and suite areas have dramatically different acoustic characteristics and SPL requirements. Emergency evacuation messaging integrated with fire alarm must reach all zones simultaneously. Single-zone coverage and music-only design ignore the multi-use and life-safety requirements.
15. A — 200 classrooms across 12 buildings require room-type standardization for manageable deployment and maintenance at scale. Centralized management enables efficient monitoring and troubleshooting. LMS integration supports the hybrid learning mission. Unique per-classroom design is unsustainable at this scale.
16. C — Marine environmental conditions (salt, vibration, temperature) destroy standard land-based equipment. Marine-rated equipment with motion-resistant rigging and salt-spray tolerance addresses the environmental challenge while maintaining performance venue capability for 800-passenger productions.
17. D — FDA-overseen clinical trials require documented session recordings with tamper-evident integrity and audit trail capability. HIPAA compliance governs the patient health information

captured during consultations. Consumer platforms and standard office conferencing lack the regulatory compliance architecture.

18. B — Weekly-changing exhibitions across 200 booths require pre-installed grid infrastructure that vendors plug into rather than custom-installing each week. Distributed power, data, and audio infrastructure throughout the hall enables rapid booth AV deployment. Per-booth custom installation is impractical at this turnover frequency.
19. A — Comprehensive boardroom security requires multiple coordinated layers: encrypted signals prevent electronic eavesdropping, isolated networks prevent data exfiltration, STC 45+ walls prevent acoustic leakage to the corridor, physical disconnects provide verifiable privacy, and sound masking addresses flanking paths.
20. C — Residents aged 65-90 may have hearing loss, reduced vision, and limited technology familiarity requiring accessibility as the primary design driver. Hearing loops serve hearing-impaired residents, large formats address reduced vision, and simplified controls accommodate varied technology comfort levels.
21. D — Custom production consoles with role-specific layouts serve the simultaneous workflow of directors, TDs, audio, and graphics during 18-hour daily live production. Standard furniture and open floor plans cannot accommodate the specialized equipment integration and sight-line requirements of broadcast production.
22. B — Afternoon thunderstorms from June through September require weather-resistant equipment rated for outdoor exposure, seasonal deployment planning for equipment protection, and lightning protection for electrical safety. Permanent indoor-rated installation fails the first storm encounter.
23. A — ADA compliance in courtrooms requires accessible evidence display positioning for wheelchair users, assistive listening for hearing-impaired participants, and closed captioning for gallery viewing. Legal chain-of-custody recording must be addressed simultaneously because courtroom recordings serve as legal evidence.
24. C — A 24/7 sportsbook with 120 displays requires IPTV for scalable content distribution, centralized tuner management for efficient channel allocation, odds data integration for wagering information, and CMS for promotional content. Consumer cable boxes per display create unmanageable operational complexity.
25. D — Executive briefing centers must seamlessly transition between formal presentation, collaborative work, and social entertaining with automated scene control. Premium materials and client-impressing operation differentiate the space from standard conference rooms. Fixed single-purpose design fails the multi-mode requirement.
26. A — Airport gate displays require 700+ nit brightness for daylight readability, FIDS integration for accurate flight information, emergency override for safety messaging, and centralized CMS for

coordinated content across terminals. Consumer and standard-brightness displays wash out in airport ambient light.

27. C — Six lecture halls, 12 labs, and 20 offices across one building benefit from unified infrastructure with room-type standardization. LMS integration enables lecture recording and streaming. Centralized management provides efficient operations. Individual room designs create unsustainable maintenance complexity.
28. D — Children's hospital patient rooms require medical-grade displays that don't interfere with clinical equipment, nurse-call integration for patient safety coordination, and age-appropriate content management. Consumer entertainment systems and gaming consoles may cause electromagnetic interference with medical devices.
29. B — 15 countries with 16 hours of time zone spread require codec standardization ensuring interoperability across all sites. Bandwidth assessment per site addresses varying infrastructure quality. Unified management enables global monitoring and troubleshooting from a central team.
30. A — A 3-story atrium video wall visible from street level requires structural engineering for massive display weight, high-brightness panels overcoming daylight through glass, CMS for dynamic content, and architectural finish coordination with the building's design intent. No single discipline can address this alone.
31. C — DCI compliance for first-run film requires specific projection standards, P3 color calibration, and multichannel cinema audio that standard commercial projection cannot provide. Integration with the existing performance audio system enables dual-use of the venue without duplicate infrastructure.
32. D — Joint operations centers handling classified tactical data require classified-rated systems preventing information leakage, redundant power ensuring continuous operation during incidents, mission-critical failover eliminating single points of failure, and secure multi-source display supporting simultaneous data visualization.
33. B — Medical education with patient imaging creates HIPAA obligations for streaming and recording. Clinical display standards ensure accurate image rendering for diagnostic-quality content. Hybrid participation enables remote physicians to join grand rounds. Privacy controls prevent unauthorized access to patient data.
34. A — A 2,000-seat shareholder meeting with 50,000-viewer webcast, 4-language interpretation, and ADA accessibility requires professional production infrastructure at every level. Multi-camera IMAG, professional streaming, interpretation booths, assistive listening, and closed captioning each serve distinct audience segments.
35. D — Recording studio acoustic isolation requires measured STC verification between rooms, precision treatment with calibrated monitoring, and bass-trap design addressing low-frequency

energy accumulation. Standard commercial treatments and consumer panels cannot achieve the acoustic precision professional recording demands.

36. C — Different clinical specialties require different camera and lighting specifications — dermatology needs color-accurate skin imaging, psychiatry needs comfortable framing, cardiology needs clinical data integration. HIPAA applies network-wide. Centralized management enables consistent operations across 8 facilities.
37. B — Sports training combines multi-angle synchronized capture for coaching analytics, video analysis rooms for performance review, and broadcast-grade media room for press conferences. These three capabilities serve different stakeholders (coaches, athletes, media) with different technical requirements.
38. A — Historic preservation mandates concealed equipment that doesn't alter the 1920 architectural character. Architecture-sympathetic integration uses hidden speakers, invisible cable routing, and preservation-board-approved methods. Standard visible installation would be rejected by the preservation board.
39. D — BSL-3 containment integrity cannot be compromised by AV equipment penetrations. Sealed decontaminable enclosures prevent particulate contamination from equipment. Communication with personnel outside containment is critical for safety coordination during procedures.
40. C — 200 rooms across a hotel property require IPTV for scalable content delivery, PMS integration for personalized guest experience, centralized management for operational efficiency, and digital signage CMS for guest-facing information. Consumer televisions and analog cable cannot provide integration or personalization.
41. B — Embassy facilities require tiered security matching each space's classification level. TEMPEST-rated spaces serve classified diplomatic functions, standard-secure areas serve routine diplomatic operations, and the public-facing briefing room serves media engagement. Single-tier design either over-secures public spaces or under-secures classified ones.
42. A — 15 dB SPL variation and 0.45 STI indicate fundamental coverage design failure requiring comprehensive redesign. Zoned coverage with delay-fill timing addresses SPL uniformity. ACU verification confirms improvement. STI 0.60+ ensures intelligibility. Fire alarm integration satisfies life-safety code requirements for 60,000 seats.
43. D — 100-megapixel capability across a 20-foot curved wall requires tiled high-resolution display technology beyond any single panel's capability. Multi-user collaborative interaction requires input management supporting simultaneous researchers. Standard displays and single panels cannot achieve the pixel density or collaborative functionality required.
44. B — Luxury automotive brand experience requires displays with color accuracy matching vehicle paint and material rendering. Premium interactive interfaces with tactile response convey quality

matching the brand. Standard retail signage and consumer touchscreens undermine the premium brand positioning.

45. C — TOP SECRET/SCI and unclassified public outreach in the same facility require independently verified physical separation preventing any cross-contamination. Software switching and shared infrastructure cannot achieve the isolation verification that classified facility standards mandate.
46. A — 150 rooms across 3 campuses with varied faculty skill requires standardized room types for maintainable deployment. Occupancy sensing supports attendance tracking. Simplified one-touch operation accommodates all faculty skill levels. Centralized management enables efficient campus-wide support.
47. D — Orchestra rehearsal requires multi-channel recording capturing individual sections for detailed review. Conductor monitoring enables real-time balance assessment. Acoustic treatment approximating the performance hall ensures rehearsal conditions match concert conditions.
48. B — Transit operations dispatchers need multi-display workstations showing simultaneous train, camera, and data feeds. Centralized video wall provides supervisory overview. Transit system integration enables real-time operational awareness. UPS/generator ensures continuous operation through shift changes and power events.
49. A — Mock trial courtrooms must replicate full courtroom AV functionality for realistic student practice. Student-accessible operation ensures students learn to operate evidence display, recording, and remote testimony systems they will encounter in practice.
50. C — Dual-mode design provides theatrical production capability for product launches while simplifying to preset meeting operation for routine events. Scene-based control enables the same room to serve dramatically different production levels without technical staff for routine meetings.
51. D — Children ages 3-12 subject equipment to significant physical stress requiring vandal-resistant construction. Sealed displays prevent liquid and debris damage. Antimicrobial surfaces support health safety. CMS enables quarterly content rotation without physical exhibit modification.
52. B — 400 trader positions connecting to global exchanges represent enterprise-critical revenue infrastructure. UPS/generator ensures continuous operation during power events. Mission-critical failover prevents any single failure from affecting trading capability. 24/7 reliability supports global market hours.
53. A — Multi-agency emergency coordination requires interoperable communication between agencies with different radio systems. Multi-source video wall supports simultaneous display of feeds from multiple responding agencies. Incident command displays organize response coordination. Redundant infrastructure ensures operation during the disasters it's designed to manage.

54. C — Skilled nursing residents with hearing and vision limitations need hearing loops for hearing-impaired accessibility, high-contrast large-text displays for reduced vision, and simplified controls for varied technology comfort. HIPAA-compliant therapy recording supports clinical documentation requirements.
55. D — Esports combines competitive gaming requiring sub-millisecond monitoring latency with broadcast production serving millions of online viewers. Player monitoring, IMAG for live spectators, and professional streaming encoding each serve different audiences with different technical requirements.
56. B — National Register listing prohibits visible modern equipment while the congregation needs functional speech reinforcement and hearing assistance. Architecture-matched concealed speakers maintain visual historic character. Invisible hearing loop beneath flooring provides accessibility without visible modification.
57. A — BSL-3 containment must not be compromised by AV equipment. Sealed decontaminable enclosures withstand decontamination procedures. Low-particulate materials maintain clean room standards. Intercom communication with external personnel is essential for safety during containment operations.
58. D — Theme park attractions requiring frame-accurate synchronization across video, projection mapping, audio, and motion platforms need dedicated show control systems. Consumer media players and standard AV control lack the timing precision for multi-media synchronization. Redundant playback ensures show reliability.
59. C — 30 branches with varying budgets and staff-operated technology require tiered room-type standards matching branch size to budget. Simplified self-service operation enables non-technical branch staff to manage AV independently. Remote monitoring allows central IT to support all branches efficiently.
60. A — HIPAA governs all patient video in the sports medicine clinic. Baseline comparison requires archival storage maintaining recordings over the treatment period. Clinical system integration enables physicians to access video alongside medical records. Consumer and smartphone recording fail HIPAA compliance.
61. B — Federal courtroom evidence display must maintain legal chain of custody for admissibility. Remote witness testimony requires court-approved video conferencing meeting jurisdictional standards. ADA accessibility is federally mandated in all courtrooms. These requirements are simultaneously binding.
62. D — Spa treatment rooms with 80%+ humidity require moisture-rated equipment that standard commercial and consumer products cannot survive. Concealed installation maintains the calming spa aesthetic. Content management delivers calming audiovisual experiences appropriate to the therapeutic environment.

63. C — Broadcast trucks traveling between venues weekly subject all equipment to continuous road vibration. Broadcast-grade equipment with vibration-resistant rack mounting maintains reliability through transit. Redundant power provides protection at venues with varying electrical infrastructure quality.
64. A — 911 dispatch centers supporting next-generation communications require mission-critical reliability with zero downtime tolerance. Ergonomic dispatch positions support 8-hour shifts. NG911 integration ensures compatibility with evolving emergency communication standards. UPS/generator prevents any service interruption.
65. B — A 28-foot ceiling gymnasium with significant reverberation from hard surfaces requires acoustic treatment and gymnasium-appropriate speakers designed for highly reverberant environments. Scene presets enable the same room to serve sports events, school assemblies, and graduation ceremonies with different audio requirements.
66. D — Yoga, cycling, and meditation have dramatically different audio requirements that a single system cannot serve. Zone isolation prevents high-energy cycling music from bleeding into the meditation space. Room-specific DSP processing optimizes each zone's audio character for its activity.
67. B — 40-satellite monitoring with anomaly detection requires dedicated display positions for each satellite's telemetry with visual alerting capability. 24/7 continuous-duty reliability ensures uninterrupted monitoring. Redundant systems prevent single-point failures from creating monitoring gaps.
68. D — Synchronized video, spatial audio, and scent delivery require multi-sensory show control coordinating diverse media types with precise timing. Standard presentation systems and consumer equipment cannot synchronize environmental triggers with audiovisual content.
69. A — Legislative chambers serve multiple simultaneous functions: floor debate, electronic voting, public gallery viewing, press coverage, statewide broadcast, and citizen accessibility. Each function requires specific AV capability. Accessibility requirements including hearing assistance and captioning are mandated by law.
70. C — Interactive 3D visualization with multi-user tracking represents next-generation display technology beyond standard 2D screens. Gesture recognition and collaborative data manipulation enable researchers to interact naturally with holographic datasets. Consumer VR headsets isolate users rather than enabling collaboration.
71. D — 25 properties worldwide require a global standard defining the brand experience while allowing property-specific adaptation for local construction practices, codes, and infrastructure. Per-property custom design creates inconsistent brand experience, while identical specifications ignore local construction reality.

72. B — Medical examiner recordings serve as forensic evidence requiring chain-of-custody documentation throughout the recording lifecycle. Calibrated imaging ensures accurate forensic documentation. Courtroom-admissible archival maintains evidence integrity through legal proceedings.
73. A — Launch control centers represent the highest tier of mission-critical AV with zero tolerance for failure during launch windows. PTP-synchronized countdown clocks ensure all displays show identical timing. Multi-agency communication coordinates complex launch sequences. Redundant systems provide failsafe operation.
74. D — Concealed reinforcement preserves the concert hall's acoustic character for unamplified classical performance. Retractable line arrays deploy for amplified pops concerts. Delay fills serve balcony seating during amplified events. Variable acoustics enable RT60 adjustment for different performance genres.
75. C — Weather forecast offices require simultaneous display of satellite, radar, and model data from multiple sources. Warning coordination communication enables multi-agency severe weather response. 24/7 continuous-duty reliability ensures weather monitoring never lapses.
76. A — 60 operatory positions requiring faculty observation necessitate centralized monitoring with camera feeds from each position. HIPAA compliance governs patient imaging captured during student procedures. Patient education displays enhance the clinical experience at each operatory.
77. D — Nuclear plant control room modifications require NRC approval to ensure changes don't degrade safety system human factors. Seismically qualified displays maintain operability during seismic events. Integration must preserve existing control board functionality per regulatory requirements.
78. B — Dusty woodworking shop environments require sealed camera enclosures preventing particulate damage. Directional microphone pickup isolates the speaker's voice from machinery noise. These environmental adaptations enable functional video conferencing despite challenging shop conditions.
79. C — DCI compliance is mandatory for studio first-run content projection. P3 color calibration ensures accurate theatrical color reproduction. Immersive audio upgrade extends beyond the existing 5.1 system to match modern cinema standards. Studio distribution integration enables content delivery.
80. A — Theme park hotel lobbies extend the immersive park experience through themed video walls, atmospheric audio zones, and automated day/night content transitions. Architectural AV integration ensures the technology supports rather than detracts from the themed environment.
81. D — Multi-camera surgical capture enables teaching from multiple angles simultaneously. Live streaming to the lecture hall creates real-time educational experience. Recording creates an archive

for future teaching. Clinical-grade display at surgical positions maintains medical imaging standards.

82. B — High-net-worth FBO clients expect luxury-appropriate environments. Flight data integration with aviation systems provides functional value. Premium displays with discreet equipment and architectural coordination convey the premium service level these clients expect.
83. C — Marine science vessels subject equipment to continuous salt exposure and ship motion. Marine-rated displays with vibration-resistant mounting survive the environment. ROV video integration enables real-time underwater observation. Ship-to-shore communication supports remote collaboration with shore-based researchers.
84. A — Psychiatric patient safety requires anti-ligature mounting preventing self-harm. Tamper-resistant equipment prevents misuse. Calming content supports therapeutic environment. Every design decision must prioritize behavioral health safety throughout the facility.
85. D — Formula 1 telemetry requires low-latency display enabling split-second engineering decisions during races. Real-time communication between trackside and factory engineers is mission-critical. Multi-source data visualization enables simultaneous monitoring of all telemetry channels.
86. B — Residential amenity spaces operated by residents require preset scenes, reservation system integration, and simplified self-service control. Commercial-grade complexity and staff-only operation models don't suit the residential self-service environment.
87. A — Fire training requires multi-source recording capturing both video and radio communications during live-fire exercises. Classroom playback enables instruction using recorded scenarios. After-action review integrates all captured sources for comprehensive exercise debriefing.
88. C — Election night broadcast requires interactive anchor touchscreen for on-air data exploration, real-time results integration from state reporting systems, multi-display visualization for comprehensive election data presentation, and broadcast-grade production infrastructure supporting live network programming.
89. D — 60-foot fulldome projection requires multiple projectors with edge blending creating a seamless hemispheric image. Real-time astronomical data rendering enables live sky visualization alongside pre-rendered shows. Show control automation manages the complex multi-projector system.
90. A — Correctional facilities require tamper-resistant equipment preventing inmate modification or weaponization. Recording-prevention measures protect against unauthorized documentation of security procedures. Secure remote hearing capability enables judicial proceedings without prisoner transport.
91. C — Six-language simultaneous interpretation requires soundproof booths preventing crosstalk between interpreters, multi-channel wireless distribution to delegates, and language selection at

each seat. Consumer translation apps and machine translation cannot match professional simultaneous interpretation quality.

92. B — Medical device evaluation requires multi-angle capture documenting surgical technique from multiple perspectives. Secure remote observation enables off-site surgeon participation. HIPAA-compliant archival maintains regulatory compliance for medical device documentation.
93. D — 180-degree panoramic theater running shows every 30 minutes for 8 hours requires multi-projector panoramic display with edge blending, spatial audio creating immersive soundscape, environmental effects enhancing the experience, and automated show control managing the complex multi-media presentation reliably.
94. A — League headquarters combines multi-game monitoring with official replay review for game operations, broadcast studio for league media production, premium boardroom for executive functions, and mission-critical reliability ensuring uninterrupted game-day operations.
95. C — Police headquarters require tiered specification because interrogation recording needs chain-of-custody integrity, operations centers need 24/7 monitoring capability, and public affairs rooms need media-ready briefing capability. Each space has fundamentally different compliance and operational requirements.
96. B — Innovation labs requiring daily transformation need mobile displays, writable surfaces for ideation, flexible infrastructure accommodating reconfiguration, and wireless connectivity eliminating cable constraints. Fixed installation and standard conference room approaches prevent the agile workspace transformation.
97. D — NICU cameras must operate in low-light conditions protecting infant sleep cycles while providing parent remote viewing. Medical-grade construction ensures EMI-free operation near sensitive neonatal monitoring equipment. HIPAA compliance governs all parent-accessible video. Consumer cameras lack all three requirements.
98. A — 128-channel Dante infrastructure requires properly sized network with redundant primary/secondary paths. Stage box integration enables efficient multi-channel connectivity for touring productions. Redundant networks ensure audio reliability during live performance where dropouts are unacceptable.
99. C — Landmark designation prohibiting visible modifications requires concealed speakers within existing architectural elements, hidden displays integrated without altering original millwork, and preservation-board-approved installation methods that maintain the mansion's historic character.
100. B — Rehabilitation hospital AV serves clinical documentation through progress-recording, patient motivation through therapy-session displays, and regulatory compliance through HIPAA-protected video. Therapy-specific integration connects AV with rehabilitation equipment and clinical systems.

101. D — Submarine fleet operations in electromagnetic warfare conditions require military-specification hardened displays surviving EMP events. Multi-network secure communication supports simultaneous classified communications. Submarine fleet integration enables tactical coordination with deployed vessels.
102. A — Venues ranging from 2,000 to 20,000 seats require modular line array configurations that scale by adding or removing array elements. Digital networking enables flexible system architecture. Venue-adaptive processing optimizes coverage for each space's unique geometry.
103. C — Multi-hour chemotherapy sessions require engaging distraction content for children undergoing treatment. Infection-control-compliant displays with antimicrobial easy-clean surfaces meet clinical hygiene requirements. CMS enables content rotation keeping the experience fresh across treatment sessions.
104. B — 30 simultaneous live feeds require professional multi-source ingest infrastructure. Real-time clipping capability enables rapid highlight production. Broadcast-grade storage supports the throughput required for simultaneous capture. Automated distribution delivers packages to both broadcast and digital platforms efficiently.
105. A — Marine environment applies to all five viewing areas across three decks requiring marine-rated equipment throughout. Cinema-quality audio and video satisfy the owner's premium expectations. Multi-zone distribution enables independent content per viewing area. Corrosion-resistant installation ensures longevity at sea.
106. D — Rare manuscripts require UV-free lighting preventing photochemical damage to paper and inks. Non-contact document imaging captures manuscript detail without physical handling. Preservation-compatible environmental integration maintains the temperature and humidity controls essential for manuscript conservation.
107. C — Choreographic review requires multi-angle simultaneous playback enabling movement analysis from multiple perspectives. High-fidelity music reproduction serves rehearsal performance quality. Mirror-compatible camera placement avoids obstructing the full-wall mirrors essential to dance rehearsal.
108. A — Transit hub AV operating in outdoor temperature extremes and high humidity requires weather-rated equipment with environmental durability. Wayfinding, service alerts, and emergency override serve distinct passenger communication functions. Advertising CMS generates revenue supporting system operation.
109. B — Golf tournament AV across 18 holes requires portable infrastructure for 48-hour setup and strike. Leaderboard displays, spectator screens at key holes, and broadcast camera positions each serve different audiences. Power distribution across the course enables remote equipment operation.

110. D — Student union integrating meeting rooms, event space, food court, outdoor plaza, and app-based booking requires unified building AV with centralized management. Scalable event space supporting 50-500 persons, food court signage, outdoor weather-rated coverage, and app integration serve the diverse student union functions under coordinated control.