Audio Visual Systems Study Guide

Basic Electricity
  Ohm’s Law
  Watt’s Law

Audio Cabling and Connectors
  Balanced vs. Unbalanced systems
  Shielding
  Ground loops
  Types of cable
  Types of Connectors, RCA, XLR, Phone Plugs
  Baluns

Audio Equipment
  Amplifiers
  Preamplifiers
  Crossovers
  Equalizers
  Compressors
  Limiters
  Echo and reverb
  Filters
  Noise gates
  Audio Analyzers

Audio Microphones and Loudspeakers
  Frequency Response
  Sensitivity
  dBs
  Types of Microphones
    Condenser
    Dynamic
    Lavalier
  Power ratings
  Types of distortion
  Microphone polar patterns
  Resonant Frequency vs. size of speaker
  Phantom power
Audio Theory
- Frequency
- Bandwidth
- Harmonics
- Octaves
- dBs
- Dynamic range
- Headroom
- Inverse Square law
- Attenuation
- Reverberation
- Echo
- Phon
- Absorption
- Diffraction
- Reflection
- Refraction
- Phase
- Pitch
- Wavelength

Paging
- 70 V vs. 24 V systems
- Wiring installation requirements
- Speaker Phase
- Class 2 and Class 3 Audio circuit requirements
- Audio circuits near bodies of water or swimming pools
- Noise masking
- White noise
- Pink noise
- Amplifiers
- Preamplifiers

Residential
- HDTV standards
- LCD vs. Plasma
- Viewing distance
- Surround sound systems
- Recommended wattage ratings for speakers
- Recommended speaker locations
- Wire resistance vs. system impedance
- Video connectors
- Sources of noise and interference
- Zoned systems
- Speaker sensitivity
Filters
Video signal standards
Video voltage levels
Volume controls
Aspect ratio for HDTV and standard TV
HD Transmission frequencies
Ground loops
A-Bus
Video Bandwidth
DBS satellite installation
Recommended signal strength for television broadcast in dBs
TIA/EIA 570-B standard
Maximum length for residential data links
CAT 5 and CAT 6 installation
Coaxial cable installation
Types of coaxial cable
Full-duplex vs. half-duplex transmission

Power Line Carrier
X-10
Modulation
Microphone level, vs. line level vs. speaker level
Dolby systems
Test equipment
Tip and Ring color codes for residential telephone cable
Compression Lock connectors
BNC
Service loops
Recommended clearance around a structured cabling media center
Video cable media
Audio cable media
Fire Alarm Systems Study Guide

Basic Electricity
   Ohm’s Law
   Watt’s Law

Fire Alarm Basics
   Fire Alarm Control Panels
   Notification Appliances
   Initiating Devices
   Smoke Detector Theory
   Heat Detector Theory
   Detector installation requirements
   Notification Appliance Sound Pressure Levels
   Smoke alarms in single family dwellings
   Normal vs. trouble vs. supervisory signals
   Fire alarm panels and ground faults, and wiring integrity
   Coded Fire Alarm Signals
   Fire suppression systems
   Signaling Line circuits
   Mounting requirements for visible notification appliances
   Waterflow switches, testing and inspection
   Class A and Class B circuits
   UL conformity for fire panels, detectors and notification appliances
   Single-station smoke alarms
   Single action vs. double action
   Addressable circuits
   Power supply requirements

Fire Alarm Miscellaneous
   ADA requirements
   Fire Command Centers
   Elevator shunt
   Smoke detectors used in HVAC systems
   Magnetic door holders
   DACT, DACR circuits
   Placards

Fire Alarm Types
   Central Station
   Proprietary
   Remote Station
   Emergency voice/alarm communications
   Combination Systems
   Single and multi-station smoke alarms
Firestop
  Purpose of Firestop
  Testing Firestop
  UL Firestop ratings
  Structural Integrity of Penetrations
  Concrete penetrations
  Firestoping definitions, ie. Intumescent, Ablative, Endothermic, etc.

NEC 760
  Power-limited Fire Alarm

NEC 725
  Class 2 and Class 3 circuits
  Installation requirements

NEC Intro
  Purpose of the code
  Understanding how to use the codebook
  Structure of the codebook
  Workspace requirements
  Basic definitions
  Size of conductors
  Types of conductors
  Listing and labeling
  Dissimilar metals
  Conductor installation in damp, wet, or dry environments
  Understanding different types of conduits and type of cable
  Installation of Boxes, and raceways
Security Alarm & Camera Systems Study Guide

Basic Electricity
  Ohm’s Law
  Watt’s Law

CCTV Systems
  Wiring the basic system
  Video scanning
  Video frames and fields
  Video standards
  Camera installation
  Video motion detection

CCTV Cabling
  Coaxial cable installation
  Ground loops
  Baluns

CCTV Cameras
  Types of cameras
  Camera Formats
  Pan/tilt camera mounts
  Power supplies
  Outdoor cameras

CCTV Lenses
  Types of Lenses
  Focal lengths
  What type of lenses are used in specific situations

CCTV Digital and IP
  Digital video
  Digital video motion detection
  IP compliant Network cameras
  Digital compression standards
  Power over IP

CCTV Equipment and Recorders
  DVRs
  Monitors
  Switchers
  Quad processors
  Multiplexers
  Video monitor vs. Computer terminal
Video Resolution
Types of batteries
Video waveform monitor
Video sync

CCTV Lighting
Lighting variety
Measurement

Card Access
Purpose of Card Access
Types of credentials
Types of electronic access control
Types of locks
Fail-safe vs. fail-secure
ADA requirements
Active vs. passive sensors
Detector technology
Sensor technology
Communication link
Types of card readers
Types of cards
Supervised inputs

Security Systems
Purpose of the CP-01 standard
Motion sensors
Glass Break sensors
Shock sensors
Magnetic sensors
Infrared detectors
Precision line microwave detectors
Installation practice for sensors and detectors
RJ-31X
Central Station
Magnetic switches, installation and mounting
Types of glass
Normally closed vs. normally open
PIR

NEC Article 725
NEC Article 250 Grounding and Bonding
Voice, Data, Fiber, Cabling Study Guide

Basic Electricity
   Ohm’s Law
   Watt’s Law

Fiber Optic Cables
   Types and use of Fiber Optic cable
   Fiber Optic Theory
   Fiber Optic Cable Construction
   Single mode vs. Multimode
   Refractive Index
   Numerical aperture
   Fiber Optic Cable losses
   The standard core sizes of fiber optic cable
   TIA/EIA 568 B.3 fiber standard
   Fiber optic connectors
   Splicing Fiber optic cables
   Fiber optic bend radius
   Service loops
   Fiber Color Codes
   Return Loss
   Pull strength
   Budget Loss
   Pull boxes
   Acceptable Splice Losses
   Transmission distances
   Transmission wavelengths
   Fiber Tests
   Test Methods A, B, or C
   Using an OTDR

Grounding and Bonding
   Purpose of grounding
   Ground faults
   Grounding conductors
   Grounded conductors
   The Grounding System
   Types of electrodes
   Bonding jumpers
   Ground resistance requirements
   TIA/EIA 607 standards
   TGB/TMGB/TBB/CBC
   Ground block thickness, and insulated support requirements
   Color codes
NEC Article 800

Networking Cable Pinout
   Cable pinout
   Types of network cable
   Network Cable standards

Network Definitions and Protocols

Network DSL and Communications
   Types of DSL
   Transmission Distances
   Baud rate
   Frequency
   Packets
   Modems
   Communication bus

Networking Hardware
   NIC
   Hubs
   Switch
   Routers
   Gateway
   Communication analyzers
   TDR

Networking OSI and Addressing
   7 layers of the OSI
   Binary math
   Address resolution
   Subnetting
   Class A, B, C addressing
   DSN
   Ports

Networking Topology Types
   Ring
   Star
   Bus
   Tree
   TIA/EIA 802 Standards
Structured Wiring Connectors and Cabling
- Installation requirements of structured cabling
- Requirements of pathways and conduits
- 110 Blocks
- 66 Blocks
- Types of Cable
- Screened Twisted Pair vs. UTP vs. Shielded Twisted Pair
- Riser vs. Plenum
- IDC
- Horizontal Cabling
- Vertical Cabling
- Maximum cable lengths (permanent link)
- Ladder Racks
- Permanent Link Tests
- Channel Tests

Structured Wiring Specifications
- Next
- FLEXE
- Attenuation
- Power Sum
- Characteristic Impedance
- ACR
- Cable Testers
- Wire Mapping
- Return Loss
- Cable performance
- Propagation Delay
- Delay Skew
- Cable CAT Ratings

Structured Wiring Standards
- Grade 1 and Grade 2 Residential Cabling standards
- TIA/EIA Residential 570 A
- TIA/EIA label color codes
- TIA/EIA Administrative standard 606
- TIA/EIA 569A
- TIA/EIA 568B
- Conduit Fill

Telecom EKS and PBX system basics
Telecom Hardware
   RJ-45 connectors
   Styles of type 89 Frames
     66 blocks
     110 blocks
   Protectors
   NIU
   Butt set

Telephone Theory
   Types of Loop Circuits
   RJ-11 and RJ-14 connectors
   Nominal voltages for voice and ringer circuits
   Telephone number resolution
   “on-hook” vs. “off-hook”
   Telephone topology
   Home-runs and cabling requirements
   ISDN
   Multiplexing
   Asynchronous vs. Synchronous
   Switch tails
   Terms and Definitions, i.e. POTS