

CONTENT OF EXAMINATION

EXAMINATION FOR CERTIFIED BIOMEDICAL EQUIPMENT TECHNICIAN (CBET)

I. Anatomy and Physiology (Approximately 12%)

A. Systems

1. Respiratory
2. Gastrointestinal
3. Nervous
4. Circulatory
5. Musculoskeletal
6. Endocrine

B. Organs

1. Heart
2. Lungs
3. Liver
4. Kidneys
5. Brain
6. Gallbladder
7. Pancreas
8. Other

C. Blood

1. Components
2. Metabolism

D. Terminology

II. Public (employee, patient, visitor) Safety in The Healthcare Facility (Approximately 15%)

A. Electrical

1. Microshock/Electrical Safety Testing
2. Other

B. Chemical

1. Material Safety Data Sheet
2. Other

C. Radiation Hazards

1. Light Spectrum
2. Types of Rays

D. Biological

1. Standard Precautions
2. Other

E. Fire

1. Class
2. Fire Extinguishers

F. Codes and Standards

1. Credentialing and Certification
 - a. Joint Commission Comprehensive Accreditation Manual
 - b. AABB
 - c. American College of Radiology

2. NFPA 99
 - a. Gas and Vacuum Systems
 - b. Electrical Systems
3. FDA
 - a. SMDA
 - b. Other
4. OSHA
5. Other (NEC, ANSI, FCC, etc.)

III. Fundamentals of Electricity and Electronics (Approximately 15%)

- A. Transducers
- B. Calculations and Conversions
 1. Hex/Decimal/Binary
 2. Other
- C. Circuits and Components
 1. Active Devices
 - a. Solid-State Devices
 1. Analog
 2. Digital
 - b. Other (CRTs, X-Ray tubes, photomultipliers, etc.)
 2. Power Supplies
 3. Passive Devices
- D. Power Distribution and Storage Systems
 1. Transformers
 2. Distribution
 3. Batteries
 4. UPS/Line Conditioning
- E. Terminology

IV. Healthcare Technology Function and Operation (Approximately 24%)

- A. Monitoring Systems (ECG, EEG, Blood Pressure, Pulse Oximetry, Fetal Monitor)
- B. Portable Equipment (Infusion Devices, Syringe Pumps, PCA Pumps, Hypo Hyperthermia)
- C. Life Support Equipment (Defibrillators, Anesthesia Machines, Critical Care Ventilators, Balloon Pumps)
- D. Therapeutic Equipment (Infant Warmers, Ultrasound Therapy)
- E. Laboratory Equipment (Centrifuges, Water Baths, Analyzers)
- F. Diagnostic Imaging (Ultrasound, Radiographic/Fluoroscopy)
- G. Operating Room (Electro Surgical Generators, Video Carts, Lasers, Tourniquets, Sterilizers, Warmers)
- H. Test Equipment (Electrical Safety, Defibrillator, Electro Surgical, Physiologic Simulators, Oscilloscopes, Meters)
- I. Diagnostic Equipment
- J. Terminology

V. Healthcare Technology Problem Solving (Approximately 24%)

- A. Electronic Component Level, Block Level
- B. Monitoring Systems (ECG, EEG, Blood Pressure, Pulse Oximetry, Fetal Monitor)
- C. Portable Equipment (Infusion Devices, Syringe Pumps, PCA Pumps, Hypo Hyperthermia)
- D. Life Support Equipment (Defibrillators, Hemodialysis, Anesthesia Machines, Critical Care Ventilators, Balloon Pumps)
- E. Therapeutic Equipment (Infant Warmers, Ultrasound Therapy)
- F. Laboratory Equipment (Centrifuges, Water Baths, Analyzers)
- G. Diagnostic Imaging (Ultrasound, Radiographic/Fluoroscopy)
- H. Operating Room (Electro Surgical Generators, Video Carts, Lasers, Tourniquets, Sterilizers, Warmers)
- I. Diagnostic Equipment
- J. Situational (User Error, User Training, Applications)

VI. Healthcare Information Technology (Approximately 10%)

- A. Regulatory and Safety
 1. Medical Device Data Systems (MDDS)

2. IEC 80001 – Application of Risk Management for IT Networks
3. Health Insurance Portability and Accountability Act (HIPAA)
4. Digital Millennium Copyright Act (DMCA)

B. Foundations

1. Hardware
 - a. Topology
 - b. PCs/Laptops/Servers
 - c. Wiring/Structured Cabling/Connectors
 - d. Switches/Hubs/Routers
 - e. Wireless Communications
 - f. Other
2. Software/Middleware/Applications
 - a. EMR/EHR
 - b. Healthcare Information Systems (PACs, LIS, RIS)
 - c. Network Protocols (IP, CCP, UDP)
 - d. Operating Systems

C. Function and Operation

1. Hardware
 - a. PCs, Switches, Patch Panels
 - b. Networks, Topology
 - c. Peripherals
 - d. Other
2. Integration
 - a. Bedside Medical Device Integration (BMDI)
 - b. Medical Device Integration (MDI) (Labs, Printers, etc.)
 - c. Mobile Devices (Handhelds, Smart Phones, Tablets, etc.)
3. Test Equipment
 - a. Cable Test Devices (Copper, Fiber)
 - b. Network Test Devices
4. Security

D. Problem Solving

1. Computer Networks
2. Integration
3. PCs, Switches, Hubs

E. Terminology

EXAMINATION FOR CERTIFIED RADIOLOGY EQUIPMENT SPECIALIST (CRES)

I. Anatomy and Physiology (Approximately 12%)

A. Systems

1. Respiratory
2. Gastrointestinal
3. Nervous
4. Circulatory
5. Musculoskeletal
6. Endocrine

B. Organs

1. Heart
2. Lungs
3. Liver
4. Kidneys
5. Brain
6. Gallbladder
7. Pancreas
8. Other

C. Blood

1. Components
2. Metabolism

D. Terminology

II. Public (employee, patient, visitor) Safety in The Healthcare Facility (Approximately 15%)

A. Electrical

1. Microshock/Electrical Safety Testing
2. Other

B. Chemical

1. Material Safety Data Sheet
2. Other

C. Radiation Hazards

1. Light Spectrum
2. Types of Rays

D. Biological

1. Standard Precautions
2. Other

E. Fire

1. Class
2. Fire Extinguishers

F. Codes and Standards

1. Credentialing and Certification
 - a. Joint Commission Comprehensive Accreditation Manual
 - b. American College of Radiology
2. NFPA 99
 - a. Gas and Vacuum Systems
 - b. Electrical Systems
3. FDA
 - a. MQSA
 - b. CFR Title 21
 - c. SMDA
4. OSHA
5. Other (NEC, ANSI, FCC, etc.)

III. Fundamentals of Electricity and Electronics (Approximately 15%)

- A. Transducers**
- B. Calculations and Conversions**
 - 1. Hex/Decimal/Binary
 - 2. Other
- C. Circuits and Components**
 - 1. Active Devices
 - a. Solid-State Devices
 - 1. Analog
 - 2. Digital
 - b. Other (CRTs, X-Ray tubes, photomultipliers, etc.)
 - 2. Power Supplies
 - 3. Passive Devices
- D. Power Distribution and Storage Systems**
 - 1. Transformers
 - 2. Distribution
 - 3. Batteries
 - 4. UPS/Line Conditioning
- E. Terminology**

IV. Healthcare Technology Function and Operation (Approximately 24%)

- A. Equipment Types**
 - 1. Test Equipment
 - 2. Film Processors
 - 3. X-Ray Tubes
 - 4. TV Camera
 - 5. Intensifying Screens
 - 6. Image Intensifier
 - 7. Other
- B. Systems**
 - 1. X-Ray Machines
 - 2. Nuclear Medicine
 - 3. Magnetic Resonance Imaging
 - 4. Linear Tomography Systems
 - 5. Ultrasound – Diagnostics
 - 6. Mammography
 - 7. Digital Imaging
 - 8. CT
 - 9. Health Care Information Systems (PACS, LIS, RIS)
 - 10. Other (Support Equipment, EKG, Defibrillator)
- C. Quality Control**
- D. Terminology**

V. Healthcare Technology Problem Solving (Approximately 24%)

- A. Component Level (Electronic Circuit)**
- B. Equipment Types**
 - 1. Film Processors
 - 2. X-Ray Tubes
 - 3. TV Cameras/Displays
 - 4. Intensifying Screens
 - 5. Image Intensifier
 - 6. Digital Imaging
 - 7. CT
 - 8. Other (Support Equipment, EKG, Defibrillator)
- C. Systems**
 - 1. X-Ray Machines

2. Nuclear Medicine
3. Magnetic Resonance Imaging
4. Linear Tomography Systems
5. Ultrasound – Diagnostic
6. Mammography
7. Other

D. Situational

1. Prioritizing Work
2. Operator vs. Equipment
3. Applications
4. Other

VI. Healthcare Information Technology (Approximately 10%)

A. Regulatory and Safety

1. Medical Device Data Systems (MDDS)
2. IEC 80001 – Application of Risk Management for IT Networks
3. Health Insurance Portability and Accountability Act (HIPAA)
4. Digital Millennium Copyright Act (DMCA)

B. Foundations

1. Hardware
 - a. Topology
 - b. PCs/Laptops/Servers
 - c. Wiring/Structured Cabling/Connectors
 - d. Switches/Hubs/Routers
 - e. Wireless Communications
 - f. Other
2. Software/Middleware/Applications
 - a. EMR/EHR
 - b. Healthcare Information Systems (PACs, LIS, RIS)
 - c. Network Protocols (IP, CCP, UDP)
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 - e. Other

C. Function and Operation

1. Hardware
 - a. PCs, Switches, Patch Panels
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D. Problem Solving

1. Computer Networks
2. Integration
3. PCs, Switches, Hubs

E. Terminology

EXAMINATION FOR CERTIFIED LABORATORY EQUIPMENT SPECIALIST (CLES)

I. Anatomy and Physiology (Approximately 12%)

A. Systems

1. Respiratory
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6. Endocrine

B. Organs

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1. Standard Precautions
2. Other

E. Fire

1. Class
2. Fire Extinguishers

F. Codes and Standards

1. Credentialing and Certification
 - a. Joint Commission Comprehensive Accreditation Manual
 - b. College of American Pathologists
 - c. Clinical Laboratory Improvement Amendments
 - d. COLA (formerly known as Commission on Laboratory Accreditation)
 - e. AABB (formerly known as American Association of Blood Banks)
2. NFPA 99
 - a. Gas and Vacuum Systems
 - b. Electrical Systems
3. FDA
 - a. SMDA
 - b. Other

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IV. Healthcare Technology Function and Operation (Approximately 24%)

- A. Equipment Types**
 1. Test Equipment
 2. Common Lab Equipment
 - a. Centrifuges
 - b. Microscopes
 - c. Blood Gas Analyzers
 - d. Refrigerators
 3. Chemistry Equipment
 4. Hematology Equipment
 5. Microbiology Equipment
 6. Blood Bank Equipment
 7. Urinalysis Equipment
 8. Histology Equipment
 9. Other
- B. Systems**
 1. Lab Information
 2. Other
- C. Quality Control**
- D. Terminology**

V. Healthcare Technology Problem Solving (Approximately 24%)

- A. Component Level (Electronic Circuit)**
- B. Equipment Types**
 1. Common Lab Equipment
 - a. Centrifuges
 - b. Microscopes
 - c. Blood Gas Analyzers
 - d. Refrigerators
 2. Chemistry Equipment
 3. Hematology Equipment

- 4. Microbiology Equipment
 - 5. Blood Bank Equipment
 - 6. Urinalysis Equipment
 - 7. Histology Equipment
 - 8. Other
- C. Systems**
- 1. Lab Information
 - 2. Other
- D. Situational**
- 1. Prioritizing Work
 - 2. Operator vs. Equipment
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