Qualified Electrical Equipment Maintenance Worker (QEMW)

Detailed Content Outline
I. Safety 27% of Overall Score

A. Risk Assessment
   1. Identify requirements to create a safe work environment for self and crew
   2. Determine the location and implications of shock protection approach and arc-flash boundaries
   3. Determine condition of maintenance based on visual inspection and test labels

B. Establish an electrically safe work condition (e.g., isolation/switching, LOTO, protective grounding)

C. Safety Tools and Personal Protective Equipment (PPE)
   1. Verify the correct use, storage, and routine inspection of PPE for self and crew
   2. Verify correct use, storage, and inspection of safety equipment

D. Incident Energy Analysis (Arc-Flash Hazard Analysis)
   1. Verify valid incident energy/shock hazard labels
   2. Interpret incident energy/shock hazard equipment labels
   3. Recognize how distance, current, and time effect arc-flash hazard

E. Codes and Standards
   1. Utilize industry standards and regulations (i.e., OSHA, OH&S, NFPA, CSA, NEMA)
   2. Recognize the scope of ANSI/NETA Standards (i.e., ATS, MTS, ETT, ECS)
   3. Comply with manufacturer’s published data

II. Electrical Maintenance Fundamentals 27% of Overall Score

A. Recognize requirements for single-line diagrams and power system studies

B. Fundamental Tests
   1. Describe the concept of verifying bolted-connections using contact-resistance test or torque verification
   2. Describe the concept of verifying insulation resistance quality

C. Correctly apply electrical test equipment (i.e., current, resistance, and voltage measurement)

D. Verify system parameters prior to and after maintenance (e.g., voltage, current, temperature)

E. Verify calibration of test equipment

F. Identify alarms, annunciations, and indications (e.g., self-check light, trip-flags, horns, ground fault alarms, temperature gauges, level gauges)

G. Perform fundamental functional tests and self-test features

H. Demonstrate fundamental troubleshooting techniques
III. Electrical Equipment

A. Power and Distribution Transformers
   1. Perform visual inspections
   2. Employ cleaning methods in accordance with industry standards
   3. Perform mechanical servicing procedures
   4. Perform fundamental electrical tests (i.e., insulation resistance)
   5. Evaluate insulation resistance values

B. Switchgear, Switchboards, and Panelboards
   1. Perform visual inspections
   2. Employ cleaning methods in accordance with industry standards
   3. Perform mechanical servicing procedures
   4. Perform fundamental electrical tests (i.e., insulation and connection resistance)
   5. Evaluate insulation and connection resistance values

C. Cables and Busways
   1. Perform visual inspections
   2. Employ cleaning methods in accordance with industry standards
   3. Perform mechanical servicing procedures
   4. Perform fundamental electrical tests (i.e., insulation and connection resistance)
   5. Evaluate insulation and connection resistance values

D. Circuit Breakers
   1. Perform visual inspections
   2. Employ cleaning methods in accordance with industry standards
   3. Perform mechanical servicing procedures

E. Switches
   1. Perform visual inspections
   2. Employ cleaning methods in accordance with industry standards
   3. Perform mechanical servicing procedures

F. Grounding Systems
   1. Perform visual inspections
   2. Perform mechanical servicing procedures
   3. Perform fundamental electrical tests (i.e., connection resistance)
   4. Evaluate connection resistance values
G. Ground-Fault Protection
   1. Perform visual inspections
   2. Perform mechanical servicing procedures

H. Rotating Equipment
   1. Perform visual inspections
   2. Perform mechanical servicing procedures
   3. Perform fundamental electrical tests (i.e., insulation resistance)
   4. Evaluate insulation resistance values

I. Motor Control Equipment
   1. Perform visual inspections
   2. Employ cleaning methods in accordance with industry standards
   3. Perform mechanical servicing procedures
   4. Perform fundamental electrical tests (i.e., insulation and connection resistance)
   5. Evaluate insulation and connection resistance values

J. Batteries and Chargers
   1. Perform visual inspections
   2. Employ cleaning methods in accordance with industry standards
   3. Perform mechanical servicing procedures
   4. Perform battery measurements (e.g., cell voltage, electrolyte level, specific gravity, temperature)
   5. Evaluate measurement values