CONSTRUCTION
BASIC
VETERANS

CONSTRUCTION ELECTRICIAN

Qualification Standards

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DEPARTMENT OF THE NAVY
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QSB Electronically: **http://www.seabee.navy.mil/cbvet/QSB.htm**

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Section 200

200 Mathematics

References:

~~a. Mathematics, Vol I, NAVPERS 10069-C~~ [1]

~~b. General Mathematics for Construction Ratings, NAVPERS 94415~~[2]

a. Mathematics, Basic Math and Algebra, NAVEDTRA, Course No: 14139

200.1 With the use of a calculator, convert whole numbers, fractions, decimals, and percents.

_____

(Signature) (Date)

.2 With the use of a calculator, **CALCULATE** the areas of circles, triangles, squares, and rectangles.

_____

(Signature) (Date)

[1] Obsolete. Replaced with NAVEDTRA 14139. See NAVEDTRA Number Conversion Table, Updated 27 September 2002.

Note: NAVEDTRA 10069-C was more recently published as *Mathematics, volume 1*, NAVEDTRA 10069-D1 (also obsolete). Volume 1 provides a review of basic arithmetic and elementary algebra; it includes fractions, decimals, percentages, exponents, radicals, and logarithms. It also contains exercises in factoring polynomials, linear equations, ratio, proportions, variation, complex numbers and quadratic equations. It presents brief introduction to plane figures, geometric construction, and trigonometry. Reduction, and General Maintenance books.) Reference: *Electronics Technician Supervisor (ET1)* NAVEDTRA: 14085, page 1-6.
Retrieved January 3, 2003 from https://www.advancement.cnet.navy.mil/products/web-pdf/tramans/bookchunks/14085_ch1.pdf

[2] Obsolete.

.3 With the use of a calculator, **CALCULATE** the square root of numbers.

_____

(Signature) (Date)

.4 With the use of a calculator, **SOLVE** mathematical and algebraic problems common to the Construction Electrician rating.

_____

(Signature) (Date)

CONSTRUCTION ELECTRICIAN

Qualification Standards

Section 201

201 Pole Climbing

References:

a. SG J3ABR3E031 002/003/004-I-2 thru 12, Personal Equipment, Tools, Climbing, Safety, Environmental Concerns, Knot Tying, Mathematics, Electrical/Electronic Terms and Symbols, Traversing Obstacles, Pole Top Rescue, CPR[3]

b. Lineman's and Cableman's Handbook[4]

c. Construction Electrician Basic, NAVEDTRA 14026

201.1 **DESCRIBE** the following personal climbing equipment and their uses: Climbers with gaffs, body belt, safety strap, gloves, hard hat with chin strap, and safety toed shoes.

_____

(Signature) (Date)

.2 **EXPLAIN** the procedures for inspecting, maintaining, and storing climbing equipment.

_____

(Signature) (Date)

[3] USAF Student Instructional Materials

[4] USAF Student Instructional Materials

.3 **NAME** the types and uses of electrician hand tools.
EXPLAIN the safety precautions with each.

_____
(Signature) (Date)

.4 **DEMONSTRATE** the stretching exercises required before pole climbing each day.

_____
(Signature) (Date)

.5 **DEMONSTRATE** the proper procedures for inspecting a pole before climbing.

_____
(Signature) (Date)

.6 **DEMONSTRATE** proper techniques to ascend and descend a pole using climbers.

_____
(Signature) (Date)

.7 **DEMONSTRATE** the correct procedures for belting in, unbelting, hitchhiking up and down a pole.

_____
(Signature) (Date)

.8 **PERFORM** the procedures for circling a pole while belted in, both to right and to the left (2 feet from top of pole)

_____
(Signature) (Date)

.9 **DESCRIBE** the correct procedure for changing out a cross-arm using a two-man team (one lineman and one ground man).

_____
(Signature) (Date)

.10 **PERFORM** the correct procedure for changing out a cross-arm using a two-man team (one lineman and one ground man).

_____
(Signature) (Date)

.**11** **EXPLAIN** the importance of safety as it relates to Hand lines, Tool Buckets, Housekeeping, Material handling, and Protective Clothing.

_____
(Signature) (Date)

.12 **TIE** three knots; overhand, square, half hitch, timber hitch, lineman's hitch, and a bowline.

_____
(Signature) (Date)

.13 **IDENTIFY** the use and care of manila and nylon rope.

_____
(Signature) (Date)

Section 201, cont'd

.14 **IDENTIFY** electrical terms and symbols.

_____
(Signature) (Date)

.15 **EXPLAIN** how they apply in the electrical field.

_____
(Signature) (Date)

.**16** **INTERPRET** wiring diagrams, schematics, specifications, MTO sheet, one-line diagrams, and describe their meanings.

_____
(Signature) (Date

.17 **DEMONSTRATE** climbing over a cross-arm without using the cross-arm for a handhold and **SIMULATE** climbing through faulty double cross-arms.

_____
(Signature) (Date)

.18 **DEMONSTRATE** the proper procedure to perform a pole top rescue (180 lbs dummy within 5 minutes on a 35 ft pole)

_____
(Signature) (Date)

.19 **COMPLETE** certification in Adult CPR in accordance with American Red Cross standards.

_____
(Signature) (Date)

CONSTRUCTION ELECTRICIAN

Qualification Standards

Section 202

202 Electrical Principles

References:

a. SG J3ABR3E031 002/003/004-II-1 thru 5, Electrical Principles, Series Circuits, Parallel Circuits, Series-Parallel Circuits, Electronic Principles[5]
b. WB J3ABR3E031 002/003/004-II-I thru 5, Electrical Principles Series Circuits, Parallel Circuits, Series-Parallel Circuits, Electronic Principles[6]
c. HO J3ABR3E031 002/003/004-II-I, Electrical Principles Problems[7]
d. Construction Electrician Basic, NAVEDTRA 14026

202.1 **DEFINE** the following electrical terms:

1. Theory of Electricity
2. Theory of Magnetism
3. Types of magnets
4. Electromagnetism
5. Electrical generation

_____

(Signature) (Date)

.2 **DRAW** a series circuit, show the computations (amps, volts, watts, resistance.

_____

(Signature) (Date)

[5] USAF Student Instructional Materials
[6] USAF Student Instructional Materials
[7] USAF Student Instructional Materials

Section 202, cont'd

.3 **DEMONSTRATE** the use of a Multimeter and the safety concerns associated with metering the circuit.

_____

(Signature) (Date)

.4 **DRAW** a Parallel circuit. **SHOW** computations (amps, volts, watts, resistance)

_____

(Signature) (Date)

.5 **DRAW** a Series-Parallel circuit. **SHOW** computations (amps, volts, watts, resistance)

_____

(Signature) (Date)

.6 **STATE** the function of the following electronic components: Rectifiers, Transistors, Resistors, Capacitors, and Inductors

_____

(Signature) (Date)

.7 **IDENTIFY** electronic components in a parallel circuit.

_____

(Signature) (Date)

CONSTRUCTION ELECTRICIAN

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Section 203

203 Introduction To Distribution Systems

References:

a. SG J3ABR3E031 002/003/004-III-1 thru 9, Line Truck, Primary Distribution Systems, Substation Equipment, Primary Dist. Sys. Grounds, Direct Burial Cable, Manhole, Underground Duct Systems, Underground Cable, Splicing[8]

b. Construction Electrician Basic, NAVEDTRA 14026

203.1 **PERFORM** operator's maintenance on a line maintenance truck.

_____

(Signature) (Date)

.2 **DEMONSTRATE** proper operation of a line maintenance truck.

_____

(Signature) (Date)

.3 **EXPLAIN** the purpose of hand signals to direct the operation of the line maintenance truck.

_____

(Signature) (Date)

[8] USAF Student Instructional Materials

.4 **DEMONSTRATE** the proper hand signals to direct the operation of the line maintenance truck.

_____

(Signature) (Date)

.5 **STATE** the purpose for primary distribution systems. **EXPLAIN**

- the purpose for the electrical configuration,
- the purpose for the construction configuration, and
- what the voltage levels are at generation, transmission, sub-transmission, and distribution.[9]

_____

(Signature) (Date)

.6 **STATE** the purpose of the transmission line.

_____

(Signature) (Date)

.7 **IDENTIFY and DISCUSS** the safety considerations for installing substation equipment. Include types of equipment and installation requirements for that equipment.

_____

(Signature) (Date)

.8 **EXPLAIN** the principles and types of distribution system grounds.

_____

(Signature) (Date)

[9] Change submitted by NCTC Port Hueneme on 23Jan2003. Original text read as follows: "**STATE** the purpose of primary distribution systems: Include the purpose, the electrical configuration, the construction configuration, voltage levels at generation, transmission, sub-transmission, and distribution."

.9 **DESCRIBE** the procedures for installing a primary distribution system ground.

_____

(Signature) (Date)

.10 **EXPLAIN** the purpose and the use of a BIDDLE vibroground.

_____

(Signature) (Date)

.11 **IDENTIFY** the steps to install direct burial cable.

_____

(Signature) (Date)

.12 **PERFORM** a manhole rescue

_____

(Signature) (Date)

.13 **EXPLAIN** how to fabricate an underground duct system.

_____

(Signature) (Date)

.14 **EXPLAIN** and **DEMONSTRATE** the proper procedures for installing underground cable in a duct.

_____

(Signature) (Date)

.15 **EXPLAIN** the purpose of a high voltage splice (parts of a cable, materials used, the necessary tools/equipment, and the reason that specifications are provided with each kit).

_____

(Signature) (Date)

.16 **DEMONSTRATE** how to splice a high voltage cable (specify voltage)

_____

(Signature) (Date)

.17 **EXPLAIN** the purpose of a high voltage termination.

_____

(Signature) (Date)

.18 **CONSTRUCT** a high voltage termination.

_____

(Signature) (Date)

.19 **DESCRIBE** the procedures to install a load break elbow. **EXPLAIN** why a load break elbow is used.

_____

(Signature) (Date)

CONSTRUCTION ELECTRICIAN

Qualification Standards

Section 204

204 Overhead Distribution Systems

References:

a. SG J3ABR3E031 002/003/004-IV-1 thru 13, High Reach Truck, Anchors, Aerial Lift Rescue, High Voltage Switches, Install Poles, Install Guys, Conductor Support Devices, Conductors, Transformer Theory, Protective Devices, Install Transformers, Hazardous Materials, Recovery[10]

b. Construction Electrician Basic, NAVEDTRA 14026

204.1 **PERFORM** operator's maintenance and operate a high reach truck with an insulated bucket.

_____

(Signature) (Date)

.2 **EXPLAIN** the purpose of a dielectric test on the high reach boom.

_____

(Signature) (Date)

.3 **EXPLAIN** the reasons for anchoring.

_____

(Signature) (Date)

[10] USAF Student Instructional Materials

.4 **EXPLAIN** the purpose and the equipment to perform aerial lift rescue.

_____
(Signature) (Date)

.5 **PERFORM** an aerial lift rescue[11].

_____
(Signature) (Date)

.6 **IDENTIFY** the procedures to install high voltage switches and automatic re-closers as per manufacturers specifications.

_____
(Signature) (Date)

.7 **EXPLAIN** the necessary procedures for safe pole transportation and the equipment required.

_____
(Signature) (Date)

.8 **DESCRIBE** the purpose of pole framing.
IDENTIFY the tools and equipment required.
DEMONSTRATE correct procedures for framing a pole.

_____
(Signature) (Date)

[11] Training not provided by NCTC as of 09 Jan 2003.

.9 **DISCUSS** the purpose of guy wires.
DESCRIBE type of guy wire installations.

_____
(Signature) (Date)

.10 **EXPLAIN** the purpose of guy wires and attachment devices.

_____
(Signature) (Date)

.11 **INSTALL** a guy wire.

_____
(Signature) (Date)

.12 **DISCUSS** the purposes and types of conductor support devices.

_____
(Signature) (Date)

.13 **EXPLAIN** the installation procedures, including steps to prepare pole equipment for installation.
DEMONSTRATE installation procedures, including steps to rig pole equipment for installation.

_____
(Signature) (Date)

.14 **LIST** the types of conductors and the advantages/disadvantages of each.

_____
(Signature) (Date)

.15 **EXPLAIN** the procedures to reel out conductors and install them on poles. Include the sagging requirements and various methods of attaining it.

_____
(Signature) (Date)

.16 **DISCUSS** the types of ties used on pin insulators.
DISCUSS the use and purpose of armor rod.

_____
(Signature) (Date)

.17 **IDENTIFY** the following principles of transformer theory:

1. Operation
2. Transformer construction
3. Types
   (a) Step-up
   (b) Step-down
   (c) Completely self protected (CSP)
   (d) Self protected (SP)
4. Transformer losses
5. Ratings
6. Polarity

_____
(Signature) (Date)

.18 **NAME** the types of protective devices, their purpose, and their application with transformers.

_____
(Signature) (Date)

Section 204, cont'd

.19 **DISCUSS** various methods for indoor and outdoor transformer installations. **EXPLAIN** the procedures for each.

_____

(Signature) (Date)

.20 **EXPLAIN** identifications of terminals and bushings.

_____

(Signature) (Date)

.21 **DESCRIBE** types of service drops to transformers and the conductors used for the drop.

_____

(Signature) (Date)

.22 **IDENTIFY** facts about hazardous materials (PCB's), hazardous waste, and environmental concerns.

_____

(Signature) (Date)

.23 **DRAW** a connection diagram for a Wye and Delta configuration.

_____

(Signature) (Date)

CONSTRUCTION ELECTRICIAN

Qualification Standards

Section 205

205 Maintenance Of Distribution Systems

References:

a. SG J3ABR3E031 002/003/004-V-1 THRU 11, Maintenance of Hotline Tools, Substation Equip Maintenance, Isolating System Faults, Tracing Underground Cables, Inspect Splice/Terminations, Inspect Equipment, Replacement of Cross-arms and Conductors, Transfer Conductors, Lighting Systems, Service Meter, Lighting Systems[12]

b. AFR 91-12, Electrical Safe Practices[13]

c. Construction Electrician Basic, NAVEDTRA 14026

205.1 **DESCRIBE** the process of maintaining hotline tools and rubber protective equipment.
DEMONSTRATE steps to test hotline tools by using the hot stick tester (Moisture Tester).

_____

(Signature) (Date)

.2 **DESCRIBE** procedures necessary to perform recurring maintenance and to troubleshoot substation equipment.

_____

(Signature) (Date)

[12] USAF Student Instructional Materials
[13] USAF Student Instructional Materials

.3 **DESCRIBE** the purpose of the following procedures for isolating a system fault:

1. Obtaining safe clearance forms
2. Installing a grounding set
3. Lock-out and tag-out
4. Use of a High voltage-phasing tester

_____
(Signature) (Date)

.4 **DISCUSS** characteristics of underground cable faults.
DEMONSTRATE procedures to connect test equipment.
PERFORM troubleshooting steps in sequence.

_____
(Signature) (Date)

.5 **NAME** the various components of the LV Cable Locator/Fault test set.

_____
(Signature) (Date)

.6 **TROUBLESHOOT** an underground system cable for faults using a Cable Test Set.

_____
(Signature) (Date)

.7 **DESCRIBE** procedures for inspecting a termination and an underground splice.

_____
(Signature) (Date)

.8 **DESCRIBE** maintenance procedures and inspection frequency on an overhead distribution system.

_____
(Signature) (Date)

.9 **IDENTIFY** the different types of splices.
DISCUSS the different types of splices.

_____
(Signature) (Date)

.10 **SPLICE** a defective section of de-energized overhead conductors.

_____
(Signature) (Date)

.11 **EXPLAIN** the process of transferring de-energized conductors from an old pole to a new pole.

_____
(Signature) (Date)

.12 **IDENTIFY** the equipment and procedures needed to perform a dielectric test of a transformer.

_____
(Signature) (Date)

.13 **DISCUSS** the purposes and types of lighting systems.
DESCRIBE the installation procedures.

_____
(Signature) (Date)

.14 **DEMONSTRATE** the installation of fixtures and control components.

_____
(Signature) (Date)

.15 **EXPLAIN** the purpose of meters.
DESCRIBE the types of meters.
DESCRIBE the process of reading a meter.

_____
(Signature) (Date)

.16 **DISCUSS** adjustment procedures of lighting controls.

_____
(Signature) (Date)

CONSTRUCTION ELECTRICIAN
Qualification Standards
Section 206

206 - Removed -

- This section removed from curriculum -

Airfield Lighting was removed from the Navy "A" School curriculum as of April 1997.[14]

206 AIRFIELD LIGHTING

References:
a. SG J3ABR3E031 002/003/004-VI-1 thru 12, Airfield Lighting Configuration, System Components, Lighting Vaults, Constant Current Reg, Fixtures, Lamps, Control Ckts, Lighting Circuits, Airport Beacon, Lightning Protection System, Maint, Condenser Discharge Light[15]
b. WB J3ABR3E031 002/003/004-VI-1 thru 12, Airfield Lighting Configuration, System Components, Lighting Vaults, Constant Ckt Regulator, Fixtures, Lamps, Control Ckts, Lighting Ckts, Airport Beacon, Lightning Protection System, Maint, Condenser Discharge Light[16]
c. Construction Electrician Basic, NAVEDTRA 14026

206.1 **EXPLAIN,** in detail, an airfield lighting system layout.

_____
(Signature) (Date)

.2 **NAME** the types of components used in airfield lighting systems. **DISCUSS** installation procedures.

_____
(Signature) (Date)

.3 **IDENTIFY** what is needed to maintain airfield lighting vaults.

_____
(Signature) (Date)

.4 **DETERMINE** the step-by-step procedures to connect an airfield lighting constant-current-regulator for emergency operation.

_____
(Signature) (Date)

[14] NCTC Port Hueneme reconfirmed on 17JAN2003.
[15] USAF Student Instructional Materials
[16] USAF Student Instructional Materials

.5 **DESCRIBE** the procedures needed to maintain an airfield lighting fixture.

_____
(Signature) (Date)

.6 **REPLACE** an isolating transformer.

_____
(Signature) (Date)

.7 **EXPLAIN** how to approach troubleshooting an airfield lighting control circuit.

_____
(Signature) (Date)

.8 **DEMONSTRATE** the proper procedures to maintain control components.

_____
(Signature) (Date)

.9 **DISCUSS** equipment required, isolating procedures, and troubleshooting steps, to check circuit values and circuits.

_____
(Signature) (Date)

.10 **IDENTIFY** what steps are taken in installing rotating beacon components.

_____
(Signature) (Date)

.11 **EXPLAIN** why removal and installation is part of the requirement when performing a maintenance check on lights and beacons.

_____
(Signature) (Date)

.12 **DESCRIBE** the procedures for installing the lightning protection system.

_____
(Signature) (Date)

.13 **DEMONSTRATE** how to maintain airfield lighting counterpoise components and a constant current regulator.

_____
(Signature) (Date)

.15 **DESCRIBE** procedures for maintaining a condenser discharge light unit.

_____
(Signature) (Date)

CONSTRUCTION ELECTRICIAN

Qualification Standards

Section 207

207 Interior Distribution Systems

References:

a. SG J3ABR3E031 002/003/004-VII-1 thru 13, Wiring Diagrams, National Electrical Code, Electrical Shock Rescue, Conduit, Electrical Appliances, Services, Installing Interior Dist. Sys., Compiling a Material Takeoff (MTO) list, Branch Circuits, Circuit Extensions, Hazardous Location Installation, Maintenance and Troubleshooting[17]

b. Construction Electrician Basic, NAVEDTRA 14026

207.1 **EXPLAIN** the purpose of wiring diagrams, the types of diagrams, and the symbols used on electrical diagrams.

_____

(Signature) (Date)

.2 Using Electrical Blueprints, **EXPLAIN** how they are read and how the legend aids the electrician in reading and interpreting the diagram.

_____

(Signature) (Date)

.3 **DESCRIBE** the purpose, scope, arrangement, table of contents and index of the National Electrical Code (NEC) handbook

_____

(Signature) (Date)

[17] USAF Student Instructional Materials

Section 207, cont'd

.4 **DEMONSTRATE** how to locate information in the National Electrical Code (NEC) handbook

_____

(Signature) (Date)

.5 **DEMONSTRATE** the proper procedures to perform Electrical Shock Rescue.

_____

(Signature) (Date)

.6 **BEND** a 12"-90 degree stub, with 1/2" rigid conduit utilizing a manual hickey bender.
BEND the same with 1/2" EMT conduit using a manual EMT bender.

_____

(Signature) (Date)

.7 **BEND** a 12"- 90-degree stub with 1/2" rigid conduit using a hydraulic conduit bender.

_____

(Signature) (Date)

.8 **DEMONSTRATE** the use of a hydraulic knockout punch.

_____

(Signature) (Date)

.9 **REAM** and **THREAD** rigid conduit using a power conduit threader.

_____
(Signature) (Date)

.10 **DISCUSS** installation requirements for conduit using the National Electrical Code (NEC) handbook.

_____
(Signature) (Date)

.11 **INSTALL** a run of 1/2" rigid conduit between (2) junction boxes. The minimum distance of the run is 12-feet, and must include (2) 90 degree bends. Offsets at the entrance of junction boxes are also required.

_____
(Signature) (Date)

.12 **DISCUSS** the use and safety precautions pertaining to power conduit benders and threaders.
IDENTIFY hazardous waste concerns that might be applicable to this part of the electrical field.

_____
(Signature) (Date)

.13 **IDENTIFY** installation and maintenance procedures for commercial and domestic electrical appliances.
IDENTIFY troubleshooting procedures for commercial and domestic electrical appliances.

_____
(Signature) (Date)

Section 207, cont'd

.14 Using the National Electrical Code (NEC) handbook, **DESCRIBE** installation procedures for service entrances, service equipment, and feeders.

_____
(Signature) (Date)

.15 **INSTALL** service entrance equipment in accordance with National Electrical Code (NEC) specifications.

_____
(Signature) (Date)

.16 With the National Electrical Code (NEC) handbook, **DESCRIBE** the purpose of panel boards. With NEC handbook, **DESCRIBE** the types of panel boards.

_____
(Signature) (Date)

.17 **DISCUSS** the types of protective devices.
DISCUSS the purposes of protective devices.
DISCUSS the sizes of protective devices.

_____
(Signature) (Date)

.18 **DEMONSTRATE** the use of a Circuit Breaker Tester.

_____
(Signature) (Date)

.19 **INSTALL** a single phase 120/240 volt distribution panel and protective devices according to the National Electrical Code (NEC) handbook specifications.

_____
(Signature) (Date)

.20 **EXPLAIN** the importance of correct grounding installations and the potential for severe injury or death and damage to equipment. Using the National Electrical Code (NEC) handbook, **IDENTIFY** installation procedures for system and equipment grounding.

_____
(Signature) (Date)

.21 **PERFORM** the installation of system and equipment grounds according to National Electrical Code (NEC) handbook guidelines.

_____
(Signature) (Date)

.22 Provided with electrical diagrams, **COMPILE** a Material Takeoff (MTO), listing the minimum amount of material necessary to complete the project in accordance with the National Electrical Code (NEC).

_____
(Signature) (Date)

Section 207, cont'd

.23 Referring to Branch circuits in the National Electrical Code (NEC) handbook**, EXPLAIN** the purpose/types of splices.
FABRICATE the splices; taping as required, show terminal loops, and stress safety concerns.

_____
(Signature) (Date)

.24 **INSTALL** a branch circuit in Rigid Non-Metallic conduit that contains a 30A/220-volt receptacle and is controlled by a circuit breaker in a panel board, using the National Electrical Code (NEC) as a guideline.

_____
(Signature) (Date)

.25 **DESCRIBE** a power conditioner.
EXPLAIN the purpose of a power conditioner.
EXPLAIN the steps for installation.

_____
(Signature) (Date)

.26 **DESCRIBE** a 50/60 hertz frequency converter.
EXPLAIN the purpose of a 50/60 hertz frequency converter.

_____
(Signature) (Date)

Section 207, cont'd

.27 **INSTALL** a branch circuit, which contains a switch, a lighting fixture and receptacle with a protective device according to NEC specs.
INSTALL (2) three-way switches in the circuit.
INTRODUCE a four-way switch for a third control in the circuit.

_____
(Signature) (Date)

.28 Using the National Electrical Code (NEC) handbook, **IDENTIFY** the procedures pertaining to the installation of surface metal raceway.
INSTALL an extension circuit containing a duplex receptacle with the proper protective device.

_____
(Signature) (Date)

.29 Using the National Electrical Code (NEC) handbook, **IDENTIFY** the use, types, and sizes of non-metallic sheathed cable used to install circuit extensions.

_____
(Signature) (Date)

.30 **INSTALL** a circuit extension using non-metallic sheathed cable from an existing branch circuit, the circuit will contain a duplex receptacle controlled by a single-pole switch.

_____
(Signature) (Date)

Section 207, cont'd

.31 **REPLACE** a duplex receptacle with a Ground Fault Interrupter (GFI) type device. **TEST** the circuit for proper operation.

_____
(Signature) (Date)

.32 **DISCUSS** Hazardous Location installations and the Article pertaining to them in the National Electrical Code (NEC) handbook.

_____
(Signature) (Date)

.33 **DEFINE** the following Hazardous locations.

1. Class I locations
2. Class II locations
3. Class III locations

_____
(Signature) (Date)

.34 **INSTALL** a circuit containing an explosion-proof outlet in a hazardous location in accordance with National Electrical Code (NEC) handbook
specifications.

_____
(Signature) (Date)

.35 **IDENTIFY** areas in an electrical distribution system that might need particular attention and why diligent inspection of these system are required.

_____
(Signature) (Date)

.36 **TROUBLESHOOT** at least three faults in a distribution system.

_____
(Signature) (Date)

.37 **DISCUSS** different types of troubles and how they affect the various circuits.

_____
(Signature) (Date)

.38 **EXPLAIN** the process of troubleshooting. **EXPLAIN** the importance of establishing a pattern for quickly locating faults and correcting them.

_____
(Signature) (Date)

.39 **EXPLAIN** reasons why troubleshooting faults in hazardous locations will differ from areas outside hazardous locations.

_____
(Signature) (Date)

CONSTRUCTION ELECTRICIAN

Qualification Standards

Section 208

208 Motors And Motor Controllers

References:

a. SG J3ABR3E031 002/003/004-VIII-1 thru 4, Three Phase Motors and Controls, Single-Phase Motors and Controls, Reduced Voltage Starter, Reversing Starter (USAF Student Instructional Materials)
b. National Electric Code (NEC) handbook
c. Construction Electrician Basic, NAVEDTRA 14026

208.1 **INSTALL** a three-phase motor in accordance with National Electrical Code (NEC) handbook specifications. Include a magnetic starter and start/stop station to control the motor.

_____

(Signature) (Date)

.2 **REPLACE** the start/stop station with an automatic device such as a pressure or thermostat.

_____

(Signature) (Date)

.3 **DEMONSTRATE** proficiency in troubleshooting three-phase motors, motor controls, and motor control circuits.

_____

(Signature) (Date)

.4 **EXPLAIN** the theory of overload protection, both thermal and magnetic.

_____
(Signature) (Date)

.5 **DISCUSS** the use of test equipment such as a voltage tester and tachometer.

_____
(Signature) (Date)

.6 **EXPLAIN** the reasons why excess lubrication causes motor problems and why data plates should not be painted over.

_____
(Signature) (Date)

.7 **INSTALL** double start/start station.
DEMOSTRATE circuit functions.
REPLACE start/stop station with auto control.
DRAW a drum switch installation.

_____
(Signature) (Date)

.8 **IDENTIFY** a motor control circuit with (2) start/stop stations controlling the motor in accordance with National Electrical Code (NEC) installation guidelines.

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(Signature) (Date)

.9 **IDENTIFY** maintenance requirements for single-phase motors and motor control circuit.

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(Signature) (Date)

.10 **DEMONSTRATE** the ability to troubleshoot a single-phase motor control system, motors, and across-the-line motor starters.

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(Signature) (Date)

.11 Using a megometer, **TEST** insulation resistance on a single-phase motor in accordance with manufacturer's specifications.

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(Signature) (Date)

.12 **DISCUSS** the theory of split-phase motors, compare the different types and characteristics of each. Point out how induction and capacitance interact in split-phase motors.

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(Signature) (Date)

.13 **DRAW** a diagram of motor windings, **IDENTIFY** the leads, and **SHOW** how to make the high and low voltage connections for single-phase and three-phase motors (one Wye and one Delta).

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(Signature) (Date)

Section 208, cont'd

.14 **DESCRIBE** reduced voltage starters and **EXPLAIN** the purpose, types, troubleshooting, and corrective action for this type of starter.

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(Signature) (Date)

.15 **DESCRIBE** reversing starters and **EXPLAIN** applications where they're used, troubleshooting , and corrective action.

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(Signature) (Date)

CONSTRUCTION ELECTRICIAN

Qualification Standards

Section 209

209 MEP-Generators

References:

a. NAVEDTRA 14027 (Current Edition), Construction Electrician Intermediate
b. NEETS, Module 02--Introduction To Alternating Current And Transformers[18], NAVEDTRA Course No: 14174
c. NEETS, MOD 05--Intro To Generators And Motors, NAVEDTRA 14177
d. NAVFAC P-8-628-12, Generator Set, Diesel Engine Driven, Tactical 100KW
e. American Electrician's Handbook, McGraw-Hill Book Company, New York, 1981
f. Hayden Book, Mileaf, Harry, Electricity One and Seven
g. Construction Electrician Basic, NAVEDTRA 14026

209.1 **DISTINGUISH** the differences between 60 HZ usage (US) and 50 HZ usage **(**European**)**

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(Signature) (Date)

[18] Construction Electrician QSB (1997) erroneously published, "NAVEDTRA 172-02-00-79, Basic Electricity and Electronics Training Series (NEETS) Module 5". Other references show this as module 2. See the following:

- "NAVEDTRA 172-02-00-79 (Module 2) Introduction To Alternating Current And Transformers; Issued 1979; approx. 120 pages". Retrieved 02 Jan 2003 from http://www.warbirdrelics.com/manuals_2.htm
- *"Navy Electricity and Electronics Training Series* (NEETS), modules 1 and 2, NAVEDTRA 172-01-00-79 and NAVEDTRA 172-02-00-79". Retrieved 02 Jan 2003 from https://www.advancement.cnet.navy.mil/products/web-pdf/tramans/bookchunks/14104_ch12.pdf

.2 **EXPLAIN** the definition of a prime mover and be able present examples.

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(Signature) (Date)

.3 **DESCRIBE** generator types, the effect of a changing load on them, and two areas where they would normally be used.

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(Signature) (Date)

.4 **EXPLAIN** the procedures of a pre-start check and it's relative importance.

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(Signature) (Date)

.5 **PERFORM** a pre-start check on a Mobile Electrical Power (MEP) generator or in accordance with NAVFAC P-8-628-12.

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(Signature) (Date)

.6 **DEMOSTRATE** the steps to follow and check when grounding a Mobile Electrical Power (MEP) generator.
DESCRIBE what can happen if it is not done properly.

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(Signature) (Date)

.7 **IDENTIFY** the precautions that should be taken when re-fuelinga Mobile Electrical Power (MEP) generator.

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(Signature) (Date)

.8 **STATE** how often fuel filters should be drained, fuel strainers cleaned, and oil filters changed. What environmental concerns must be considered.

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(Signature) (Date)

.9 **DETERMINE** the effects of oil pressure being too low or too high.

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(Signature) (Date)

.10 **DESCRIBE** safety precautions to be aware of when handling batteries .

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(Signature) (Date)

.11 **EXPLAIN** what needs to be checked on generator V-belts and why.

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(Signature) (Date)

.12 **DETERMINE** when and why a day tank should be drained.

_____
(Signature) (Date)

.13 Given a picture of a Mobile Electrical Power (MEP) generator control panel, **DESCRIBE** the function of each control and instrument.

_____
(Signature) (Date)

.14 **OPERATE** a Mobile Electrical Power (MEP) generator, in single and parallel operation, in accordance with the manufacturer's manual.

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(Signature) (Date)

.15 **DEMONSTRATE** how to remove a generator from parallel operation and then the shut-down procedure.

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(Signature) (Date)