

National Marine Manufacturers Association
Product Compliance Specialist Examination
A.C. Electrical (12/08)

1. Which of the following would be a non-current carrying conductor in an AC electrical system?
 - a. The White wire
 - b. The Green wire
 - c. The Red wire
 - d. The Black wire

2. A current carrying conductor that is connected to the side of the power source which is intentionally maintained at ground potential is a:
 - a. Grounding conductor
 - b. Ground
 - c. Neutral conductor
 - d. Galvanic isolator

3. An isolation transformer will:
 - a. Remove the need for a galvanic isolator and a reverse polarity indicator.
 - b. Be considered a source of power for AC.
 - c. Be rated to be equal to the shore power supply.
 - d. All the above are true.

4. An ungrounded conductor of a branch circuit is to be provided with overcurrent protection at the point of connection to the main switchboard. The circuit breaker or fuse that is used for this purpose is rated:
 - a. Not to exceed the maximum current carrying capacity of the conductor between the fuse or circuit breaker and the load
 - b. At least for the nominal voltage of the supply circuit
 - c. To 150% of the conductor ampacity if no standard circuit breaker is available for 100%
 - d. All the above

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5. According to ABYC Standards, the AC grounding conductor shall:
 - a. be connected to AC neutral at the source
 - b. be connected to the AC grounded conductor at the inverter output in the invert mode, generator output, and at the secondary of an isolation or polarization transformer
 - c. be connected to the engine negative terminal or its bus
 - d. all the above

6. The shore power cable must be:
 - a. Provided by the boat manufacturer
 - b. A twist lock flexible cord
 - c. Installed with a Galvanic Isolator
 - d. Equipped with a male end connector at the boat

7. The reason for posting a shore-power inlet warning sign is:
 - a. To turn-off the shore power connection correctly
 - b. To establish reverse polarity
 - c. As a reminder to disconnect the cable prior to getting underway
 - d. To minimize fire and shock hazards

8. Electrical conductors are marked with:
 - a. Type of conductor, voltage, gauge and temperature rating
 - b. The electrical rating in volts, amperes or watts
 - c. Ignition protection if applicable
 - d. The size of overcurrent protection that is to be installed

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9. More than one conductor can be crimped into a terminal provided that:
- a. the combined circular millimeters of the conductors does not exceed the circular millimeter capacity of the terminal.
 - b. the current flow is 20 amps or less and the voltage drop at the terminal is 50 millivolts or less.
 - c. the connection is tested in accordance with E – 11.14.6.9.1.2 pulling on the smallest conductor according to its rating in Table XV.
 - d. Both a and c are correct.
10. When more than one shore power inlet is installed, ABYC recommends that the neutrals are
- a. not connected together
 - b. connected together
 - c. connected to the AC grounding bus
 - d. connected to the engine negative terminal
11. Additional fuses or circuit breakers must be installed within _____ of the shore power inlet if the power feed conductor from the shore power inlet to the main circuit breaker exceeds:
- a. Ten feet measured along the conductor
 - b. 72" measured along the conductor
 - c. 40" measured along the conductor
 - d. Ten feet measured in a straight line
12. While installing a clothes dryer and connecting to the boat's AC electrical grounding system, it is noted that a neutral-to-ground strap is provided by the appliance manufacturer. The neutral-to-ground strap:
- a. Must be removed
 - b. Is connected to the neutral conductor
 - c. Is redundant
 - d. Is never removed

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13. E – 11 requires the installation of a Residual Current Device, with a recommended compliance date of July 31, 2010, in the shore power circuit:
- a. called an Equipment Leakage Circuit Interrupter which blocks galvanic current above 30 ma.
 - b. called an Equipment Leakage Circuit Interrupter which detects equipment ground fault leakage current and disconnects all ungrounded (110v and 240v) and grounded (110v neutral) current carrying conductors from the supply source at a preset level.
 - c. called an Equipment Leakage Circuit Interrupter which detects the reversal of the grounded and ungrounded conductors.
 - d. called an Equipment Leakage Circuit Interrupter which replaces the GFCI breakers in the head, galley, and other wet areas.
14. An Equipment Leakage Circuit Interrupter shall be installed:
- a. in addition to or with the main shore power disconnect breakers or at the breakers within 10' of the shore connection, whichever is closer to the shore power connection.
 - b. in a readily accessible location.
 - c. which has a trip point of 30ma and a trip time of 100ms.
 - d. all of the above
15. The minimum rating for a flexible cord used in an AC electrical system should be at least:
- a. 600 volts
 - b. 120 volts
 - c. 240 volts
 - d. 300 volts

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16. The transfer of AC power to a circuit from one source to another shall be made:
- a. by a make before break switch.
 - b. by a switch that connects to the new source before opening the original source.
 - c. by a means that opens all current carrying conductors, including neutrals, before closing the alternate source circuit, to maintain isolation of power sources.
 - d. by a means to prevent arc-over between sources.
17. A branch circuit that supplies a combination of receptacle loads and permanently connected loads, shall not supply fixed loads in excess of:
- a. 600 watts for a 20 amp circuit
 - b. 600 watts for a 15 amp circuit
 - c. 1000 watts for a 15 amp circuit
 - d. 2000 watts for a 20 amp circuit
18. A battery charger installed in a gasoline engine compartment without output overcurrent protection shall be:
- a. Labeled Self Limiting and Ignition Protected.
 - b. Labeled Explosion Proof.
 - c. Labeled with manufacturer's identification.
 - d. Both a and c are correct.
19. Reverse polarity is defined as the reversed connection of which circuits?
- a. neutral and ground
 - b. Line 1 and Line 2
 - c. Hot and neutral
 - d. Hot and ground

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20. Downrating of the ampacity of AC conductors to avoid excessive heat build up is done because of
- a. Voltage drop
 - b. Thin insulation
 - c. Bundling of more than 2 current carrying conductors
 - d. Too few wire strands
21. Reverse polarity indicators are installed
- a. Between the green and white conductors
 - b. Between the white and black conductors
 - c. In the green wire
 - d. Between the black and green conductors
22. Which of the following is the function of the galvanic isolator?
- a. Block AC fault current and pass low voltage galvanic current
 - b. Block all AC current
 - c. Block low voltage DC current and pass AC current associated with the grounding conductor
 - d. Reduce stray current corrosion
23. The recommended circuit location to install a galvanic isolator is:
- a. in series with the shore power grounding conductor
 - b. between the AC grounding bus and DC negative bus
 - c. between shore power neutral and AC grounding bus
 - d. Both a and c are correct

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24. Four 10 gauge current carrying conductors rated at 105 degrees C that are bundled inside the engine compartment for a distance of 3', must have their ampacity down rated:
- a. to 36 amps
 - b. to 30.6 amps
 - c. to 42 amps
 - d. to 35.7 amps
25. AC circuit breakers must have an Ampere Interrupting Capacity:
- a. labeled on the breaker.
 - b. which is based on the installed shore power.
 - c. which can be dependent on fuses installed in series with the breaker.
 - d. Both b and c are correct.