National Marine Manufacturers Association

Product Compliance Specialist Examination
A.C. Electrical (2013 MY)
ABYC E-11 (08 – Amended 2009)

1. Which of the following AC conductors would be connected to the DC negative bus bar or the battery negative terminal in the DC electrical system?

   a. The White wire
   b. The Green wire
   c. The Red wire
   d. The Black wire

2. An AC conductor that is connected to the Galvanic Isolator is the:

   a. White wire
   b. Ungrounded conductor or Hot wire
   c. Grounding conductor
   d. Neutral conductor

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. The ungrounded conductor of a non-motor branch circuit is to be provided with overcurrent protection at the point of connection to the main switchboard. The circuit breaker that is used for this purpose is rated:

   a. Not to exceed the maximum current requirements of the load
   b. For at least 150% of the nominal voltage of the supply circuit
   c. For no more than 150% of the conductor ampacity if no standard circuit breaker is available for 100% of the conductor ampacity
   d. All the above

5. According to ABYC Standards, the AC grounded conductor shall:

   a. be connected to AC grounding at the source
   b. be connected to the AC grounding conductor at the inverter output in the invert mode, generator output, and at the secondary of an isolation or polarization transformer
   c. not 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. Permanently attached to the boat

7. A shore-power inlet Warning Label is required to be installed:

   a. In accordance with the T-5 ABYC Standard
   b. At the shore power inlet
   c. To protect against fire and shock hazards
   d. All of the above

8. AC electrical conductors are required to be:

   a. Marked with type of conductor, voltage, gauge and temperature rating
   b. Tinned, stranded copper
   c. Rated for 300 volts
   d. Installed as a part of a bundle of AC conductors

9. AC wiring requirements include which of the following:

   a. Conductors shall be bundled, sheathed or kept separate form DC conductors
   b. All current carrying and the grounding conductor shall be contained in the same sheath, bundle or raceway.
   c. Conductors shall be identified by color to indicate proper polarity
   d. All of the above are correct.

10. When more than one shore power inlet is installed, ABYC recommends that the neutrals:

   a. not be connected together
   b. be connected together
   c. be connected to the AC grounding bus on the boat
   d. be connected to the engine negative terminal

11. AC circuit breakers must be installed that have the following ratings:

   a. Ampere interrupting capacity based on the installed shore power and Table IV B.
   b. Trip free and manual reset and based on the nominal voltage of the circuit.
   c. Not exceeding the ampacity of the conductor being protected unless the 150% exception applies.
   d. All of the above ratings are necessary for AC circuit breakers.

12. While installing a clothes dryer and connecting to the boat's AC electrical 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. Must be connected to the neutral buss at the panel
   c. Must be connected to the boat bonding system
   d. Must never be connected to battery negative

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 incorporated with the main shore power disconnect breakers or 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 grounding conductor in an AC circuit is permitted to be:

    a. Made from a material other than stranded copper.
    b. Routed and secured separate and apart form the current carrying conductors if the circuit is rated less than 30 amps.
    c. One size smaller than the current carrying conductors if the circuit is rated less than 30 amps.
    d. One size smaller than the current carrying conductors if the circuit is rated greater than 30 amps.

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. AC receptacles shall be:

    a. Installed in a UL 514 receptacle box.
    b. Limited to a circuit of 600 watts installed load for a 15 amp circuit.
    c. Protected by a 5 milli-amp GFCI if installed in a potentially wet area.
    d. a, b, and c are all requirements.

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. Two marine electrical technicians are having a discussion. Tech A says that reverse polarity is defined as the reversed connection of the hot and neutral? Tech B says that the reverse polarity indicator is installed between the neutral and ground. Which Tech is correct?

    a. Tech A
    b. Tech B
    c. Both techs
    d. Neither tech

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 current carrying conductors for a distance of 24”
    d. Too few wire strands

21. Reverse polarity indicators:

    a. Are installed in 120 volt shore power systems.
    b. Are not required with twin 30 amp shore cords.
    c. Are required in shore power systems with isolation transformers.
    d. Are required equipment for all shore power systems.

22. Which of the following is the function of the galvanic isolator?

    a. Block AC fault current below 1 amp and pass low voltage galvanic current
    b. Eliminate galvanic corrosion
    c. Block low voltage DC current at 1.1 volts and pass AC current associated with the grounding conductor
    d. Reduce stray current corrosion

23. Two marine electrical technicians are discussing the recommended circuit location to install a galvanic isolator. Tech A says it should be installed in series with the shore power grounding conductor. Tech B says it should be installed between the shore neutral and the grounding bus. Which Tech is correct

    a. Tech A
    b. Tech B
    c. Both are correct
    d. Neither are correct

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. What size circuit breaker should be used to protect an AC circuit that has 25 current carrying 12 gauge, 105 degree C, conductors bundled together for a distance of 20' inside the engine compartment of a gasoline powered boat?

    a. 20 amp
    b. 15 amp
    c. 150 % of 15.4 amps
    d. 25 amps