National Marine Manufacturers Association

Product Compliance Specialist Examination
D.C. Electrical (2013 MY)
ABYC E-11 (08 – Amended 09)

1. Two marine electrical technicians are discussing conductor support. Tech A says that all conductors shall be supported throughout their length or at least every 18". Tech B says that there is an exception for battery cables. Who is right?

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

2. Ungrounded battery cables without overcurrent protection, e.g. engine cranking circuit cables, shall be installed

   a. to avoid contact with metallic fuel system components
   b. to avoid contact with any part of the engine or drive train
   c. above normal bilge water levels throughout their length
   d. All of the above

3. The minimum size and Type electrical conductor that is permitted to be used as a single wire which is not a part of a harness or on instrumentation wiring is

   a. 18 gauge tinned, stranded copper
   b. 16 gauge stranded copper, Type II or Type III
   c. 12 gauge copper clad aluminum
   d. 14 gauge type III wire

4. The proper color for a DC negative conductor according to ABYC Standards is

   a. Dependant on the presence of an AC system on the boat.
   b. Only black
   c. Green or green with a yellow stripe
   d. Yellow or black

5. Two marine electrical technicians are discussing sending units. Tech A says that grounded liquid level sending units must be connected directly to the engine negative with a conductor that serves no other function. Tech B says that sending units with two wires coming out of the center of the unit do not have to be connected that way. Who is right?

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

6. The DC Grounding conductor is installed to:

   a. connect metallic non-current carrying parts of some devices to the engine negative terminal or its bus
   b. minimize stray current corrosion
   c. provide a path for fault current in the event of a short circuit to protect form shock hazard
   d. all of the above are correct

7. In a 12 volt system, the power source for a bilge pump that draws 5 amps is located 48 feet from the pump. Allowing for the maximum allowed drop in voltage, what is the correct wire gauge (size) to use in this installation?

   a. 16 gauge
   b. 6 gauge
   c. 12 gauge
   d. 8 gauge

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8. A 12 volt main panel board feeder conductor from the battery to the panel with a calculated load of 50 amps and a total circuit length of 60' would require which size conductor in order to not exceed the allowable voltage drop?

   a. 1/0 gauge
   b. 2 gauge
   c. 4 gauge
   d. 10 gauge

9. A ring terminal crimped on a 10 gauge conductor and the terminal stud shall be capable of withstanding a pull off force (tensile test value) of

   a. 40 pounds for 30 seconds
   b. 6 pounds
   c. 40 pounds for one minute
   d. 20 pounds for one minute

10. Potential sources of ignition are most likely found in:

    a. Diesel machinery spaces
    b. Gasoline fuel tank and engine spaces
    c. Isolated compartments
    d. Outboard powered boats

11. Two marine electrical technicians are discussing friction connectors. Tech A says that they may be used if the current in the circuit does not exceed 20 amps. Tech B says that they must present no more than a 50 milli-volt drop at the maximum current and pass a 6 pound pull test. Who is right?

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

12. A battery switch is required in the positive conductor(s) from each battery or battery bank if:

    a. The Cold Cranking Amps of the battery or battery bank is over 800 amps
    b. Two or more batteries are connected in parallel
    c. The boat has loads installed in excess of 30 amps that includes a motor
    d. Trolling motor batteries are installed with a breaker at the battery and a manual disconnect at the motor is present

13. Two marine electrical technicians are discussing ignition protected electrical devices. Tech A says that devices are considered to be ignition protected if they are labeled with UL 1500 or SAE J 1171. Tech B says that they must be labeled "ignition protected". Who is right?

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

14. An ignition source would be considered isolated from a potential source of fuel vapors under which of the following:

    a. The source of fuel vapor is higher than the source of ignition
    b. They are both located in an open compartment, and at least 2 ft. apart
    c. The source of ignition is higher than the source of fuel vapor
    d. They both are separated by a distance of at least 12 inches

15. A conductor used in the installation of a bilge pump is sized for a voltage drop not to exceed:
    a. 10% without exception
    b. 3% without exception
    c. 10% to 3%, depending on the pumping requirements and the available wiring
    d. 15%

16. Ungrounded conductors other than cranking motor conductors shall be provided overcurrent protection. Which of the following is NOT an acceptable rule or exception?

    a. Within a distance of 72 inches of the point at which the sheathed conductor is connected to the battery terminal measured along the conductor
    b. Within a distance of 40 inches of the point at which the sheathed conductor is connected to the source of power measured along the conductor
    c. Within a distance of 7 inches of the point at which the conductor is connected to the source of power measured along the conductor
    d. Within a distance of 18 inches of the point at which the conductor is connected to the source of power measured along the conductor

17. Which of the following is a true statement?

    a. Wire nuts may not be used anywhere in DC electrical systems even if the wires are soldered
    b. Wire nuts are used in DC electrical systems to install cabin lights or courtesy lighting if provided by the light manufacturer
    c. Flat spade connectors may be used anywhere in DC electrical systems for circuits of less than 1 amp and less than 7" long
    d. Solder may be the only means of connection for two conductors anywhere in DC electrical systems provided that the wires hold together under a 6 pound pull.

18. When a twin engine boat has a parallel start switch or crossover starting systems, the following is required:

    a. All battery negatives must be connected together.
    b. A battery switch
    c. The engines must be connected together with an additional cable that is large enough to carry cranking motor current and connected at different points on the engines than the conductors mentioned in answer a above.
    d. Both a and c are correct.

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19. The rating of overcurrent protection devices used to protect a DC motor shall:

    a. Not exceed the value of overcurrent protection required to provide thermal or locked rotor protection for a period of 7 hours.
    b. Not exceed the current carrying capacity of its supply conductor without exception.
    c. Be internal to the motor
    d. Be installed within 7" of the motor to be protected.

20. Terminal strips or studs or nuts or washers shall:

    a. Be made from aluminum.
    b. Be made form a metal that is corrosion resistant and galvanically compatible with the terminal lug and conductor.
    c. Never be a set screw pressure type conductor connector.
    d. Any material as long as the conductor strands are not damaged.

21. DC electrical equipment must be marked to indicate:

    a. DC rated amperage or wattage
    b. DC electrical rating in volts
    c. All of these
    d. The terminal polarities, if necessary to operation

22. According to ABYC Standards, the minimum clearance between wet exhaust components and electrical conductors or components is:

    a. 1" air gap or the equivalent thermal barrier
    b. 1.25"
    c. just so it is not touching
    d. 2"

23. If an engine compartment exhaust blower draws 5 amps at 12 volts, and is located 20 feet from the circuit panel board using wire with 80 degrees C. insulation, what is the correct wire size for this installation.

    a. #8 AWG
    b. #10 AWG
    c. #12 AWG
    D. #14 AWG

24. DC panel boards may be combined with AC panel boards or DC and AC may be on separate panel boards. Which of the following are true statements?

    a. The controls must be "readily accessible" in either configuration.
    b. Access to the electrical connections must require the use of tools in either configuration.
    c. Access to the AC section must require the further use of tools if the DC section is open.
    d. a, b, and c are all correct

25. Two marine electrical technicians are discussing overcurrent protection for non-sheathed conductors. Tech A says that overcurrent protection is required within 7" of the output of a non self-limiting battery charger. Tech B says that the conductor from the battery charger must have overcurrent protection with 7" of the point at which it is connected to the DC system. Which Tech is correct?

    a. Both are right.
    b. Both are wrong.
    c. Tech A
    d. Tech B