

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

1. Electrical conductors shall be supported throughout their length or at least every
  - a. 18"
  - b. 7"
  - c. 40"
  - d. 72"
  
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
  - d. All of the above
  
3. The minimum size electrical conductor that is permitted to be used in a non sheathed application is
  - a. 8 gauge
  - b. 16 gauge
  - c. 4 gauge
  - d. 14 gauge
  
4. The proper color for a DC negative conductor according to ABYC Standards is
  - a. yellow
  - b. black
  - c. green
  - d. either a or b

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5. Fuses or circuit breakers are required for all circuits except:
- a. Submersible bilge pump float switches
  - b. Pigtails less than 7 inches in length
  - c. Non self-limiting alternators
  - d. Navigation lights
6. The DC Grounding conductor is used 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
  - 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
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

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9. A ring terminal installed on a 10 gauge conductor shall be capable of withstanding a pull off force (tensile test value) of
- a. 30 pounds
  - b. 6 pounds
  - c. 40 pounds
  - d. 20 pounds
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. All of the above
11. Friction connectors may be used:
- a. If the current flow is not more than 20 amps
  - b. If the voltage drop at 20 amps does not exceed 50 millivolts
  - c. If the connection will withstand a 6 pound pull force
  - d. All the above
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. Two or more batteries are connected in series
  - d. Trolling motor batteries are installed

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13. Devices that are considered ignition protected:
- a. If the source of ignition is hermetically sealed
  - b. Must meet all requirements for "explosion proof"
  - c. Are always considered intrinsically safe
  - d. Can only be certified only by the UL
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 blower or a navigation light is sized for a voltage drop not to exceed:
- a. 10%
  - b. 5%
  - c. 3%
  - 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

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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
  - c. Wire nuts may be used anywhere in DC electrical systems for circuits of less than 1 amp and less than 7" long
  - d. Wire nuts may be used anywhere in DC electrical systems provided that the wires are soldered together
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.
  - d. Both a and c are correct.
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
  - b. Not exceed 125% of the current carrying capacity of its supply conductor
  - c. Be internal to the motor
  - d. Greater than the current carrying capacity of its switch or controls

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20. If DC and AC conductors are run together outside of an engine compartment or other machinery space:
- a. The AC conductors are bundled with the DC conductors.
  - b. The AC conductor is sheathed, bundled or otherwise kept together with the DC conductors.
  - c. The AC conductor is sheathed, bundled or otherwise kept separate from the DC conductors.
  - d. The DC conductor is sheathed, bundled or otherwise kept separate from the other DC conductors.
21. Electrical equipment is marked to indicate:
- a. Ignition protection, if applicable
  - 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 is
- a. 1"
  - 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 panelboard 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

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24. Circuit breakers installed in a boat's main electrical distribution panel shall be capable of a minimum ampere interrupting capacity so as to remain operable after a fault. They shall also:
- a. Be of the non trip-less type
  - b. Have a DC voltage rating of not less than the nominal system voltage
  - c. Be tested at twice their current rating
  - d. Be of the thermal reset type
25. Overcurrent protection is required within 7" of both ends of a non-sheathed conductor that is connected:
- a. Between the output of a non self-limiting battery charger and the battery
  - b. Between any source and the load
  - c. Between the output of a self-limiting battery charger and the battery switch
  - d. This is never required