

Name: \_\_\_\_\_  
Street Address: \_\_\_\_\_  
Company: \_\_\_\_\_  
Phone: \_\_\_\_\_

Date: \_\_\_\_\_  
City/St: \_\_\_\_\_  
Title: \_\_\_\_\_  
E-Mail: \_\_\_\_\_

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***Please use the following questions to challenge your knowledge of grounding and bonding.***

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**1) “Backfill” is \_\_\_\_\_**

- a) Used to enhance the electrical conductivity between a grounding electrode and the earth.
- b) The filler material around a buried ground electrode and/or conductor.
- c) a & b
- d) None of the above.

**2) Why are ground loops undesirable?**

- a) Ground loops re-circulate unwanted noise back into the electrical system.
- b) Electrical equipment is more susceptible to lightning induced damage.
- c) Ground loops can make it very difficult to test a ground system using a clamp on meter.
- d) All of the above.

**3) The size of grounding system to achieve 5 ohms resistance to ground depends on the soil characteristics.**

- a) True
- b) False

**4) When testing a true single point grounding configuration the clamp-on test always references the ground system under test to utility neutral.**

- a) True
- b) False

**5) G.P.R. (Ground Potential Rise) is \_\_\_\_\_**

- a) The maximum current flow that a grounding grid may attain relative to a distant ground point assumed to be at earth potential.
- b) The potential voltage rise across a 50' x 50' area that may occur during a direct lightning strike.
- c) The voltage that a grounding grid may attain relative to a distant ground point assumed to be at earth potential.
- d) None of the above.

**6) A halo is \_\_\_\_\_**

- a) A copper conductor encircling the top of a room that is used to tie all of the equipment grounds together.
- b) A copper conductor encircling the top of a room that bonds all non-energized metallic objects to the master ground bar.
- c) A copper conductor encircling the floor of a room that is used to absorb secondary lightning strikes.
- d) b & c

**7) A single point grounding system has \_\_\_\_\_**

- a) All of the individual equipment ground conductors connected directly to the ground ring of a grounding system.
- b) A halo connected directly to the ground ring.
- c) a & b
- d) A single conductor connecting the ground ring to the Main Ground Bar (MGB).

**8) The minimum bend radius for lightning protection conductors is 8 inches.**

- a) Yes
- b) No

**9) The purpose of a counterpoise is \_\_\_\_\_**

- a) To electrically connect all of the ground electrodes together.
- b) To prevent ground transformer induced voltages from corrupting data transmission lines.
- c) a & b
- d) None of the above.

**10) Exothermic bonding is \_\_\_\_\_**

- a) The joining of two pieces of material by high compression crimping.
- b) A permanent bonding of two materials created by using high heat and powdered metal.
- c) The joining together of two materials using arc welding.
- d) None of the above.

**11) Which one of the following tests is used to measure soil resistivity?**

- a) Fall of Potential test
- b) Four Point Method
- c) Ohmmeter test
- d) None of the above.

**12) Because telco lines share the same AC service neutral, in order to avoid ground loops, telco lines should never be grounded.**

- a) True
- b) False

**13) In a -48vDC battery backup system, the positive conductor of the batteries along with the battery chassis ground are connected to the master ground bar or similar ground bar.**

- a) True
- b) False

**14) For the most part, the frost line is irrelevant to the grounding system.**

- a) True
- b) False

**15) A cell site has a guy wire type tower, cell site building, metallic fence with gate and backup generator. Which of the following would be the best grounding scenario for this site?**

- a) Bond the guy wires to separate electrodes located at the guy wire anchor points, bond the fence to the ground ring, bond the gate to the fence, bond the generator to the ground ring and bond the coax cable shields from the tower to the ground ring, bond the master/exterior ground bar to the ground ring.
- b) Bond the guy wires directly to the ground ring using a #2 conductor, bond the fence to the ground ring, bond the gate to the fence, bond the generator to the ground ring, and bond the coax cable shields from the tower to the ground ring.
- c) Bond the guy wires to separate electrodes located at the guy wire anchor points, bond the fence to the ground ring, bond the gate to the fence, bring the bond from the generator and the cable shield grounds to the master ground bar located inside the building.
- d) None of the above.

**16) A cell site has a halo installed, a battery backup system, telco equipment, and coax line entering the building. What would be the best grounding scenario for this site?**

- a) Ground the halo directly to the ground ring, Attach the battery backup, telco, equipment grounds and coax cable shields to the main ground bar.
- b) Attach the halo, telco, equipment grounds, battery backup, and coax cable center pin protection to the master ground bar.
- c) Attach the telco and coax cable shield grounds to the halo. Attach the halo, equipment grounds and battery backup grounds to the master ground bar.
- d) Attach the equipment grounds, telco, battery backup and coax cable shield grounds to the halo. Attach the halo to the main ground bar.

**17) Ufer grounds are impossible to test and maintain.**

- a) True
- b) False

**18) A “Miller Box” test is used to measure \_\_\_\_\_**

- a) Soil resistivity
- b) Soil moisture content
- c) Soil acidity
- d) None of the above.

**19) A M.O.V. is \_\_\_\_\_**

- a) A type of surge protection device.
- b) A metal oxide varistor.
- c) A transient voltage surge suppression device.
- d) All of the above.

**20) A “sphere of influence” is \_\_\_\_\_**

- a) A term used to describe the effective volume of earth that a ground rod influences.
- b) A term used to describe the volume of earth that is influenced by electromagnetic forces induced by pad mounted transformers.
- c) a & b
- d) None of the above.

**21) A high compression lug is \_\_\_\_\_**

- a) A type of electrical connector used to join two or more pieces of material together to form an electrical connection.
- b) A high strength bolt used in high voltage electrical systems
- c) a & b
- d) None of the above.

**22) The purpose of grounding gravel is to create an electrical insulating barrier between the operator and ground.**

- a) True
- b) False

**23) An Integrated Ground Plane incorporates multiple bonding references for the purpose of reducing voltage drops between conductive structures during AC/DC faults and lightning strikes.**

- a) True                      b) False

**24) With regards to lightning protection, down conductors along with all other ground conductors should always terminate at the main ground bar to form a single point ground system.**

- a) True                      b) False

**25) In multistory shared buildings, it is an acceptable practice to have totally isolated ground systems for cell site equipment.**

- a) True                      b) False