Electrical Grounding Systems and Testing
Test on Section 10 of Surface Mine Supervisor MSHA-Compliance Manual

1. The ground wire carries current under normal conditions. T__, F__.
2. The neutral wire carries current under normal conditions. T__, F__.
3. A ground fault is a condition where: a) hot and neutral wires come into contact, b) a hot wire contacts the earth, c) a break in the ground wire occurs, d) the hot wire contacts the frame.
4. A ground fault can be detected by: a) looking at the end of a cord to see if the third prong is snipped off, b) testing the cord to make sure the ground circuit is continuous, c) measuring the voltage between the equipment frame and the ground bus at the service entrance, d) a shock felt by quickly touching the tip of your finger on metal parts of the equipment frame.
5. A break in the ground wire: a) causes a ground fault, b) results in ground fault protection becoming nonfunctional, c) stops current flow.
6. The ground and neutral conductors are connected at the equipment frame. T__, F__.
7. The ground and neutral conductors are connected at the service entrance. T__, F__.
8. Making sure fuses and/or circuit breakers are of the correct size and type: a) protects the wire from current overloads and overheating, b) is necessary for ground fault protection to function correctly.
9. The ampere rating of a fuse is: a) the time it will take for a fuse to open the circuit, b) the current flow above which the fuse will open the circuit, c) the time the current will be interrupted when the fuse detects an overload, d) the maximum current at which the fuse will continue to function correctly.
10. The current-interrupting rating of a fuse is: a) the time it will take for a fuse to open the circuit, b) the current flow needed for the fuse to open the circuit, c) the time the current will be interrupted when the fuse detects an overload, d) the maximum current at which the fuse will continue to function correctly.
11. A ground-fault circuit interrupter (GFCI) is a device which opens the circuit when: a) a person’s body conducts current between the hot and neutral wires, b) a short circuit occurs, c) a ground fault condition occurs, d) a person’s body conducts current between the hot wire in the circuit and ground, e) the ground circuit is not continuous.
12. A double-insulated tool: a) provides the user a measure of protection against ground faults, b) is any tool with a plastic handle, c) has the third prong on the plug, d) is safe to use when standing in water, e) has a nonconductive handle and is designed to prohibit contact between the user and conductive parts which would become energized in the event of a ground fault, f) is safer when used with GFCI protection, g) may no longer provide protection if impacted by dropping or in other ways.
13. Only low voltage battery-powered hand tools should be used when standing in water. T__, F__.
14. Rubber boots and dry gloves provide a measure of protection against electrocution when working with tools on low-voltage circuits. T__, F__.
15. A circuit which has a continuous ground and is properly fused will be much safer if GFCI protection is provided. T__, F__.
16. It is important to have a continuous connection between equipment frames and ground because this should cause a fuse or circuit breaker of the correct size and type to open the circuit a) in the event of a ground fault condition, b) when a person’s body contacts an energized frame.
17. The ground conductor between an equipment frame and the ground bus (and neutral bus) in the service entrance should have a resistance less than: a) 25 ohms, b) 10 ohms, c) 1 ohm.
18. A grounding electrode system a) is considered in the National Electric Code to have too high a resistance if the resistance exceeds 25 ohms, b) needs a resistance less than 5 ohms to provide ground fault protection, c) is connected to the neutral bus in the service entrance, and the neutral conductor often carries most of the fault current in the event of a ground fault.
19. Resistance between equipment frames and the ground bus at the service entrance must be tested and recorded: a) immediately after installation, b) immediately after repair, c) at least annually.
20. Ground bed resistance must be tested and recorded: a) immediately after installation, b) immediately after repair, c) at least annually.

21. Electric cords that supply power tools and portable or mobile equipment must be tested and recorded: a) immediately after installation, b) immediately after repair, c) at least annually.

22. Any good quality ohm meter can be used to test the ground bed resistance. T__, F__

23. The technique which must be used to measure ground bed resistance correctly is called the a) “fall-of-potential” method, b) 3-Point method, c) 62% method.

24. It is dangerous to measure the ground bed resistance without the power disconnected and locked out. T__, F__

25. The current test electrode is driven in the ground at a distance greater than a) 2 times, b) 5 times, c) 10 times the maximum bed dimension.

26. The voltage test electrode is driven in at a number of locations in line between the ground bed and the current electrode. T__, F__

27. At positions close to either the grounding electrode system or the current test electrode, resistances change rapidly with distance from the electrode. T__, F__

28. The measured ground-bed system resistance is the resistance a) which is calculated when little change in potential occurs while moving the potential test electrode along the line between the ground bed and the current electrode, b) usually occurs at about 50 % of the distance between the ground bed and the current electrode, c) usually occurs at about 62 % of the distance between the ground bed and the current electrode.

29. Factors affecting ground bed resistance include: a) Number of rods or mesh, b) Length of rods or mesh, c) Depth of rods or mesh, d) Ground moisture content, e) dissolved minerals, f) Temperature, g) Soil type, h) Soil particle size range and packing, i) Distance between ground conductors or electrodes.

Answers: 1) F, 2) T, 3) d, 4) c, 5) b, 6) F, 7) T, 8) ab, 9) b, 10) d, 11) d, 12) aefg, 13) T, 14) T, 15) T, 16) a, 17) c, 18) abc, 19) abc, 20) abc, 21) abc, 22) F, 23) abc, 24) T, 25) b, 26) T, 27) T, 28) ac, 29) abcdefghi