

**Western Mine Rescue Association
Nevada Underground Mine Rescue Contest
March 11-14, 2024**



Directions:

- 1. Find the correct answer to each of the questions.**
- 2. Select only one answer per question.**
- 3. Then, fill in the corresponding circle on the answer sheet for each numbered question**

Western Mine Rescue Association

Team Technician – Written Test

- Oxygen-enriched atmospheres may cause combustible gas readings to be ____ actual concentrations.
 - Higher than
 - Lower than
 - The same as
- The IR (infrared) methane sensor reading is not to be used for methane concentrations below ____ in air.
 - 10%
 - 3%
 - 5%
- The High Level audio gas alarm consists of _____.
 - Low frequency beeps with a long delay
 - High frequency with short delay
 - Low frequency with short delay
- The confidence indicator blinks the LEDs once every ____ seconds.
 - 30
 - 45
 - 60
- How many error events for the instrument are recorded into a FIFO queue in nonvolatile memory and are time stamped?
 - 20
 - 15
 - 10
- When the low battery display (shown below) appears, the battery life remaining is _____.
 - Less than 30 minutes
 - Less than one hour
 - Less than 15 minutes

O2 20.9 %vol	PID 0.0 ppm	SO2 0.0 ppm
H2S 0.0 ppm	CO 0 ppm	LEL 0 %LEL
Low Battery		16:54

- If there is a CO2 sensor present in the instrument, it is zeroed _____.
 - First
 - In the middle of calibration
 - Last

8. During calibration, gas should be applied at a flow rate of _____ lpm.
- 0.25
 - 0.5
 - 1.0
9. What is the acceptable temperature range for normal operating conditions?
- 4 °F to +131 °F
 - 0 °F to +120 °F
 - 40 °F to +131 °F
10. Industrial Scientific recommends that infrequently used lithium-ion batteries be fully charged every _____ months.
- 12
 - 6
 - 4
11. Air samples taken from behind sealed areas of the mine are analyzed to determine when it's safe to begin _____ work.
- Exploration
 - Rescue
 - Recovery
12. When barometric pressure falls, the pressure on the gas is _____.
- Reduced
 - Increased
 - Unchanged
13. Clean, dry air at sea level is made up of _____ percent nitrogen and _____ percent oxygen.
- 80, 20
 - 78, 21
 - 75, 24
14. Breathing air containing 5 percent carbon dioxide increases respiration _____ percent, causing difficult breathing.
- 300
 - 250
 - 200

15. Hydrogen Sulfide is most explosive at _____ percent.
- 12.4
 - 45.5
 - 14.2
16. _____ is a very toxic, irritating gas that is dangerous even in small concentrations, as little as 0.04 to 0.05 percent (400 to 500 ppm) is dangerous to life.
- Carbon Monoxide
 - Sulfur Dioxide
 - Hydrogen Sulfide
17. The explosive range of Acetylene in normal air is _____ percent.
- 2.5-80
 - 5-15
 - 2.2-9.35
18. _____ has a “sweetish” taste
- Sulfur Dioxide
 - Radon
 - Hydrogen Sulfide
19. This is a mixture of carbon monoxide, carbon dioxide, methane, oxygen, nitrogen, and hydrogen.
- Whitedamp
 - Afterdamp
 - Blackdamp
20. _____ is a mixture of carbon dioxide, nitrogen, and air.
- Firedamp
 - Stinkdamp
 - Blackdamp
21. _____ ventilation is rarely used in mines because the pressure differential is usually not great enough to create a sufficient and steady flow of air through the mine.
- Upcast
 - Mechanical
 - Natural

22. A “parachute stopping” is considered to be a _____?
- Temporary bulkhead
 - Check curtain
 - Permanent bulkhead
23. _____ are usually built with concrete block walls sealed against the sides and floor, and with some type of airtight roof made of pre-stressed concrete, railroad ties, or steel beams.
- Undercasts
 - Overcasts
 - Mine doors
24. For measurements of high velocities encountered in flowing ducts or tubing, a _____ can be inserted through a small hole in the duct or tubing.
- Smoke tube
 - Anemometer
 - Pitot tube
25. A medium-velocity (or “regular”) anemometer is for measuring velocities from _____ feet per minute.
- 120-2,000
 - 1500-5,000
 - 2,000-10,000
26. The anemometer should be raised and lowered as you walk to the opposite side so that the _____ velocity of the air is measured.
- Total
 - Average
 - Corrected
27. Velocity is always measured in _____.
- feet per minute
 - cubic feet per minute
 - feet per second
28. When installing a temporary bulkhead in a passageway, particularly in a crosscut of a room-and-pillar, single-level mine, the bulkhead should be erected a sufficient distance into the passageway (at least _____) to permit enough room for a permanent bulkhead to be built later.
- 2 to 3 feet
 - 3 to 5 feet
 - 4 to 6 feet

29. In many mines during a rescue and recovery operation, _____ are put up to establish a fresh air base and enable teams to move forward into questionable air without contaminating the air at the fresh air base.

- a. Permanent bulkheads
- b. Air locks
- c. Line brattice

30. Spring-loaded expandable metal rods that can be used instead of posts to erect temporary bulkheads are called _____.

- a. Pogo sticks
- b. Timbers
- c. Posts