

**Missouri Mine Rescue Contest**  
**Rolla, MO**  
**September 23-25, 2014**  
**Multi-Gas Written Test – Field Competition**

1. To power up the MX6 instrument, locate, press and hold the center [ENTER] navigation button for at least 5 seconds.
  - A. True
  - B. False
  
2. Silicone compound vapors or other known contaminants may affect the combustible gas sensor and cause readings of combustible gas to be lower than actual gas concentrations
  - A. True
  - B. False
  
3. Four different cradles are available for use with the MX6 multi-gas monitor
  - A. True
  - B. False
  
4. The MX6 has a four-way Navigation button
  - A. True
  - B. False
  
5. Industrial Scientific recommends the “3 & 3 Sampling Rule” when sampling with a motorized pump and tubing, allow for 3 minutes plus 3 seconds per foot of tubing used, prior to noting the monitor readings.
  - A. True
  - B. False
  
6. Passwords are a minimum of \_\_\_\_\_ characters and a maximum of \_\_\_\_\_ characters.
  - A. Two, five
  - B. Two, nine
  - C. Three, five
  - D. Three, ten
  
7. To power on the MX6 instrument, press and hold the center of the Navigation button for \_\_\_\_ second(s)
  - A. 1
  - B. 2
  - C. 3
  - D. 4

8. Rechargeable lithium-ion battery pack part number 1713-1038-4, or -5. Containing two or three 3.6V, \_\_\_\_ amp-hour Lithium batteries.
- A. 1.2
  - B. 1.4
  - C. 1.6
9. When calibrated using methane concentrations less than 5% of volume, reading accuracy of the infrared methane sensor may not be guaranteed to be better than +/- \_\_\_\_ %.
- A. 10
  - B. 15
  - C. 20
  - D. 25
10. \_\_\_\_ error events are recorded into a FIFO queue in nonvolatile memory and are time stamped.
- A. 10
  - B. 15
  - C. 20
  - D. 25
11. An optical media interface is located on the bottom of the instrument and is used for infrared data transmissions at speeds of \_\_\_\_ bytes/second.
- A. 106000
  - B. 116000
  - C. 105200
  - D. 115200
12. Sensor *types* are displayed as solid \_\_\_\_ text during normal operation, and blinking \_\_\_\_ text during alarm conditions.
- A. Green, green
  - B. Green, Red
  - C. Black, red
  - D. Black, black
13. The Oxygen sensor has a measurement range from \_\_\_\_ to \_\_\_\_ % volume.
- A. 0, 25
  - B. 0, 30
  - C. 0, 100
  - D. 5, 100

14. The Carbon Dioxide sensor has a measurement range from \_\_\_\_ to \_\_\_\_ % volume.

- A. 0, 5
- B. 0, 50
- C. 0, 75
- D. 5, 100

15. The Hydrogen sensor has a measurement range from \_\_\_\_ to \_\_\_\_ ppm.

- A. 0, 500
- B. 0, 1,000
- C. 0, 2,000
- D. 0, 10,000

16. The Nitric Oxide sensor has a measurement range from \_\_\_\_ to \_\_\_\_ ppm.

- A. 0, 500
- B. 0, 1,000
- C. 0, 2,000
- D. 0, 10,000

17. If the battery life remaining is less than one hour, the battery icon flashes on the display and has an audible battery low alarm. If the run time is less than \_\_\_\_ minutes, the instrument alerts the user of impending shutdown by showing "low Battery" on the lower central part of the display.

- A. 30
- B. 20
- C. 10
- D. 5

18. For over-range conditions, a blinking "OR" is displayed in \_\_\_\_ as the sensor value.

- A. Green
- B. Red
- C. Yellow
- D. Black

19. The Alkaline battery pack is only approved for use with \_\_\_\_ or \_\_\_\_ batteries.

- A. Duracell MN 1500, Rayovac LR6
- B. Duracell MN 2500, Rayovac LR8
- C. Duracell MN 1500, Rayovac LR8
- D. Duracell MN 2500, Rayovac LR6

20. Oxygen enriched atmospheres may cause combustible gas readings to be \_\_\_\_\_ than actual concentrations.
- A. No change
  - B. Higher
  - C. Lower
  - D. None of the above
21. The smoke tube is used mainly to determine what direction very slow-moving oxygen is moving, and at what velocity.
- A. True
  - B. False
22. \_\_\_\_\_ are devices used to control and adjust the quantity of airflow in the mine.
- A. Anemometers
  - B. Auxiliary Fans
  - C. Regulators
  - D. None of the above
23. To obtain the “flow” of air through the mine there must be a difference in air quality between the intake and exhaust airways.
- A. True
  - B. False
24. If placards have not been changed after \_\_\_\_\_ seconds, teams must assume that their actions were not successful.
- A. 10
  - B. 20
  - C. 15
  - D. 30
25. No team member may advance more than (3) feet beyond the second (2<sup>nd</sup>) intersection before tying across and/or behind into all unexplored areas that intersect.
- A. True
  - B. False
26. The captain must verbally indicate to the judges each time initials and dates are simulated.
- A. True
  - B. False

27. Whether to use regulators to control the fire or to entirely seal the fire must be decided by the \_\_\_\_\_.
- A. Fresh Air Base Attendant
  - B. Mine Manager
  - C. Team
  - D. Command Center
28. The most dangerous aspect of methane is the fact that it is toxic.
- A. True
  - B. False
29. Knowing the effects of air current, temperature, and pressure on a gas will help you determine its rate of diffusion.
- A. True
  - B. False
30. Your team will make frequent tests for gases as it advances beyond the portal.
- A. True
  - B. False