

Welcome Contestants  
Central Mine Rescue Contest  
May 12 through May 14, 2016  
Kellogg, Idaho

Technician Team Written Examination KEY

Choose the most appropriate answer or answers for the questions that follow. Use the supplied score card to record your answers. Please ensure the marks you make are **dark** and **completely fill the box**. If you make a mistake you must completely erase the mark you've made. Improperly marked sheets can result in an incorrect answer.

Using TABLE 1 match the attributes with the gas. The correct answer must contain all of the attributes shown in TABLE 1 for that gas.

(Example: Hydrogen shown below)

Hydrogen

- A. 1, 4, 5, 8
- B. 2, 3, 6, 7
- C. 2, 3, 5
- D. 1, 8

1	Component of Afterdamp
2	Slightly Soluble in water
3	Toxic
4	Asphyxiant
5	Lighter than air
6	Heavier than air
7	Component of rock strata gas
8	Not soluble in water

1. Methane (CH<sub>4</sub>)
  - a. 1, 3, 7
  - b. 1, 3, 6, 7, 8
  - c. 1, 2, 4, 5 (Afterdamp (pg. 2-27)), Slightly Soluble, Asphyxiant & lighter than air (pg. 2-22))
  - d. 2, 3, 5, 8
  
2. Sulfur Dioxide (SO<sub>2</sub>)
  - a. 1, 4, 7, 8
  - b. 3, 5, 7
  - c. 3, 6 (Toxic & heavier than air (pg. 2-21))
  - d. None of the above
  
3. Carbon Dioxide (CO<sub>2</sub>)
  - a. 4 only
  - b. 1, 4, 5, 8
  - c. 1, 3, 6, 7 (Afterdamp (pg. 2-27), Rock Strata gas (pg. 2-26), toxic & heavier (pg. 2-15))
  - d. 2, 4
  - e. None of the above
  
4. Nitrogen (N<sub>2</sub>)
  - a. 1, 2, 3, 6

- b. 1, 4, 5, 7 (Afterdamp (pg. 2-27), rock strata (pg. 2-26), asphyxiant & lighter (pg. 2-14))
  - c. 2, 3
  - d. None of the above
5. Carbon Monoxide (CO)
- a. 1, 2, 3, 5 (Afterdamp (pg. 2-27), slight, toxic & lighter (pg. 2-16))
  - b. 1, 4, 6, 8
  - c. 4, 6, 8
  - d. None of the above
6. \_\_\_\_\_ has a specific gravity of 1.5493.
- a. Carbon Dioxide
  - b. Nitrogen Dioxide
  - c. Propane
  - d. Ethane
  - e. None of the above (Chart on pg. 2-47)
7. Regulators are used to control the direction of airflow in a mine.
- a. True
  - b. False (3027, page 3-12, quantity)
8. When using a vane anemometer to determine air velocity, the measurement shown on the dial is always the final number that you provide to the command center.
- a. True
  - b. False (3027, page 3-17, the readings must be corrected using the table of corrections)
9. If a team loses the ability to communicate with the fresh air base, the team captain is authorized to change ventilation.
- a. True
  - b. False (3027, page 3-15)
10. A smoke tube is commonly used to test the moisture content of air in the mine.
- a. True
  - b. False (3027, page 3-16, direction and velocities below 120 fpm)
11. Sensor types are displayed as solid black text during normal operation, and blinking red text during alarm conditions.
- a. True
  - b. False Pg. 17 (Blinking black text)
12. Oxygen deficient atmospheres may cause combustible gas readings to be higher than actual concentrations.
- a. True
  - b. False Pg. 4 (Lower)

13. The MX6 is intrinsically safe for Zone 1 Classified Areas within an ambient temperature range of -20°C to 40°C with the alkaline battery pack and -20°C to 55°C with the li-ion battery pack.
- True Pg. 3
  - False
14. If the instrument is still reading gas while in configuration mode, and there is an alarm, the instrument returns to the gas-monitoring display screen.
- True Pg. 32
  - False
15. Passwords are a minimum of five characters and a maximum of ten characters in the MX6 iBrid.
- True
  - False Pg. 26 (three and ten characters)
16. ~~For compliance determinations required by 30 CFR 75, Subpart D, what must the monitor display during the monitor's start-up sequence?~~
- ~~"CH4" and "O2"~~
  - ~~"CH4" and "%VOL" Pg. 5~~
  - ~~"CAL DUE" and "CH4"~~
  - ~~"O2" and "%VOL"~~
17. If the user doesn't remember the password, entering \_\_\_\_\_ and pressing \_\_\_\_\_ simultaneously resets the password to nothing.
- 123, ◀ and ▶
  - 412, ◀ and ▶ Pg. 26
  - 123, ▲ and ▼
  - 412, ▲ and ▼
18. During the calibration process of the MX6 iBrid, the user has \_\_\_\_\_ seconds to apply gas before the calibration times out.
- 100
  - 250
  - 300 Pg. 35 (5 minutes or 300 seconds)
  - 500
19. The typical run time for a fully charged battery operating at room temperature for a MX6 iBrid with pump and having an extended range Li-ion battery pack is \_\_\_\_\_ hours.
- 10
  - 12
  - 16
  - 20 Pg. 37

20. In order to pass the bump test a sensor must reach a gas reading of \_\_\_\_\_ or greater (user selectable in configuration menu) of the applied calibration gas concentration within \_\_\_\_\_ seconds (user selectable in configuration menu).
- 25%, 30
  - 50%, 30
  - 25%, 60
  - 50%, 60 Pg. 36
21. The breathing air is enriched with Oxygen from the Oxygen cylinder – via the minimum valve in the case of low breathing rates?
- True
  - False (Pg. 3)
22. The Sentinel electronic monitoring system comprises of a sensor, basic unit and display?
- True
  - False (Pg. 3)
23. A leaking minimum valve can cause low dosage?
- True
  - False (Pg. 12)
24. A leak in dosage lines can cause high dosage?
- True (Pg. 12)
  - False
25. Maximum drying temperature for the BG4 is 120 degrees F?
- True
  - False (Pg. 16)
26. Permissible impurities in depressurized gas: max air vapor concentration: 50 mg/m<sup>3</sup>?
- True
  - False (Pg. 17)
27. The low pressure warning should be activated when the pressure is greater than 1.4 mbar?
- True
  - False (Pg. 24)
28. The minimum valve should open at between \_\_\_\_ to \_\_\_\_ mbar .
- 1.0-1.5
  - 1.5-2.0
  - 0.1-2.5 (Pg. 29)
  - 1-2
29. Inhalation and Exhalation valve discs are to be replaced every \_\_\_\_ years.
- 2
  - 3 (Pg. 38)

- c. 4
- d. 5

30. Maximum temperature range limits for use of the Bg4 are \_\_\_ degrees F in a 4hr. period.

- a. 98
- b. 100
- c. 104 (Pg. 42)
- d. 106