

# 2014 Northern Mine Rescue Contest

## Written Exam (Field Competition)



June 17, 2014

Findley Lake, New York

**2014 Northern Mine Rescue Contest  
Findley Lake, NY  
Written Test - Field Competition**

Name \_\_\_\_\_ Company \_\_\_\_\_

Team Name \_\_\_\_\_ Contest Position No. \_\_\_\_\_

Team Member No. \_\_\_\_\_

**Directions: Circle the letter preceding the correct answer to each of the following questions. Circle only one answer per question.**

1. Federal regulations require mines to have and post a Mine Rescue Notification Plan for notifying all the mine rescue team members that will be needed to assist in the rescue and recovery operation (**30 CFR Section 49.9**).
  - A. True
  - B. False
  
2. All decisions concerning the mine rescue teams (scheduling, assignments, tracking, rotations, and methods of exploration or firefighting) are made by the Mine Superintendent or a designated responsible person.
  - A. True
  - B. False
  
3. Sulfur dioxide has a specific gravity of 2.2638. Knowing this, you can predict that sulfur dioxide will collect in greater concentrations \_\_\_\_\_.
  - A. About waist high.
  - B. Near the top in high areas of the mine.
  - C. Near the bottom in low areas of the mine.
  - D. About chest high.
  
4. The degree to which a toxic gas will affect you depends on how concentrated the gas is, how toxic the gas is, and how hard you are working in the contaminated atmosphere.
  - A. True
  - B. False
  
5. Asphyxiating gases cause suffocation. If worn, your breathing apparatus will protect you from these gases by providing oxygen.
  - A. True
  - B. False

6. A gas that will burn is said to be “flammable.” Any flammable gas can explode under certain conditions.
- A. True
  - B. False
7. Carbon monoxide is explosive and flammable. Its explosive range in normal air is \_\_\_\_\_ percent.
- A. 4 to 74.2
  - B. 4.3 to 45.5
  - C. 5 to 15
  - D. 12.5 to 74.2
8. Nitrogen Dioxide is flammable and explosive. Its explosive range in normal air is 4.3 to 45.5 percent.
- A. True
  - B. False
9. Acetylene is combustible but it will not support combustion. Its explosive range in normal air is \_\_\_\_\_ percent.
- A. 4 to 74.2
  - B. 2.5 to 80
  - C. 5 to 15
  - D. 12.5 to 74.2
10. Besides the dangers involved in inhaling smoke and its potential for explosion, the presence of smoke limits your visibility.
- A. True
  - B. False
11. **Firedamp.** This is a mixture of carbon monoxide, carbon dioxide, methane, oxygen, nitrogen, and hydrogen. It is called “firedamp” because it’s usually found after a mine fire or explosion.
- A. True
  - B. False
12. Ethane (C<sub>2</sub>H<sub>6</sub>), Propane (C<sub>3</sub>H<sub>8</sub>), and Butane (C<sub>4</sub>H<sub>10</sub>) are all lighter than normal air and can displace enough oxygen to cause death by asphyxiation.
- A. True
  - B. False

13. A \_\_\_\_\_ is used to show the direction and velocity of slow-moving air (below 120 feet per minute).
- A. Pitot tube
  - B. Low speed anemometer
  - C. Smoke tube
  - D. All of the above
14. The anemometer actually measures linear feet of travel and requires timing – usually one minute – to determine \_\_\_\_\_.
- A. Area in square feet.
  - B. Quantity in cubic feet per minute.
  - C. Velocity in feet per minute.
  - D. None of the above
15. To calculate the quantity (Q) of air flowing in a mine entry, you can use the formula:  $Q \text{ (ft.}^3 \text{ / min.)} = A \text{ (ft.}^2\text{)} \times V \text{ (ft./min.)}$ .
- A. True
  - B. False
16. 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. Check Curtains
  - B. Temporary Bulkheads
  - C. Inflatable Seals
  - D. Air locks
17. \_\_\_\_\_ is the term used to describe the process of assessing conditions underground and locating miners during a rescue or recovery operation.
- A. Evaluation
  - B. Exploration
  - C. Search
  - D. Mission
18. The purpose of \_\_\_\_\_ exploration is to quickly establish the extent of damage and to progress to the point where apparatus teams can continue the exploration.
- A. Systematic
  - B. Focused
  - C. Barefaced
  - D. Shotgun

19. Whether you put it underground or on the surface, the fresh air base should be located as close as possible to the affected area of the mine, but situated where it's assured a supply of good air.
- A. True
  - B. False
20. The command center is the base of operations and starting point for rescue and recovery work into irrespirable atmospheres.
- A. True
  - B. False
21. During exploration, the team's first priority is team safety. The second priority is to \_\_\_\_\_.
- A. Recover the mine.
  - B. Re-establish ventilation.
  - C. Extinguish or seal any fires.
  - D. Rescue survivors.
22. During the debriefing, the information that your team captain should transfer to the backup team includes such things as \_\_\_\_\_.
- A. The traveling conditions your team encountered.
  - B. How far your team traveled.
  - C. What gases your team encountered.
  - D. The ground conditions that your team encountered
  - E. All of the above
23. Before you open and travel through any bulkheads or doors beyond which conditions are not definitely known, you should \_\_\_\_\_.
- A. Ask the fresh air base to send in the backup team.
  - B. Erect an air lock to prevent the mixing of atmospheres.
  - C. Open the door or bulkhead and wait at least 10 minutes so that any harmful gases are diffused.
  - D. Never enter such areas.
24. Fires in underground mines are particularly hazardous not only because they produce toxic gases and heat, but also because they \_\_\_\_\_.
- A. Produce smoke.
  - B. Pose an explosion hazard.
  - C. Create oxygen-deficient atmospheres.
  - D. All of the above

25. The “fire triangle” can be used to illustrate the three elements necessary for fire (i.e., fuel, oxygen, or heat). Fighting a fire with water removes the \_\_\_\_\_.
- A. Oxygen
  - B. Fuel
  - C. Heat
  - D. All of the above
26. The National Fire Protection Association classifies fires into four classes: Class A, Class B, Class C, and Class D. Electrical fires are classified as \_\_\_\_\_ fires.
- A. Class D
  - B. Class C
  - C. Class B
  - D. Class A
27. After survivors have been found in the mine, the next step is to get them to safety and fresh air as quickly as possible.
- A. True
  - B. False
28. The best way to relieve psychological stress in survivors is to try to \_\_\_\_\_.
- A. Get them out as quickly as possible.
  - B. Give them food and water.
  - C. Restrain them with elastic bandages.
  - D. Communicate with them as soon as possible.
29. Experience indicates that no attempt should be made to unseal a fire area until \_\_\_\_\_.
- A. The oxygen content of air behind the seal is low enough to make an explosion impossible.
  - B. Carbon monoxide has disappeared or nearly disappeared from the air behind the seal.
  - C. The area behind the seals has been given enough time to cool so that air introduced during the unsealing operation will not rekindle the fire.
  - D. All of the above
30. Opening a sealed fire area requires certain preparations. One of these is to withdraw all unnecessary persons from the mine.
- A. True
  - B. False

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**ANSWER KEY**

<b>Q</b>	<b>Answer</b>	<b>Source</b>	
1.	<b>A.</b>	Module 1, Page 1-3	<b>MSHA Publication 3027 (Questions 1 to 30)</b>
2.	<b>B.</b>	Module 1, Page 1-3	
3.	<b>C.</b>	Module 2, Page 2-6	
4.	<b>B.</b>	Module 2, Page 2-9	
5.	<b>A.</b>	Module 2, Page 2-10	
6.	<b>A.</b>	Module 2, Page 2-7	
7.	<b>D.</b>	Module 2, Page 2-16	
8.	<b>B.</b>	Module 2, Page 2-17	
9.	<b>B.</b>	Module 2, Page 2-24	
10.	<b>A.</b>	Module 2, Page 2-26	
11.	<b>B.</b>	Module 2, Page 2-27	
12.	<b>B.</b>	Module 2, Page 2-23	
13.	<b>C.</b>	Module 3, Page 3-18	
14.	<b>C.</b>	Module 3, Page 3-16	
15.	<b>A.</b>	Module 3, Page 3-20	
16.	<b>D.</b>	Module 3, Page 3-23	
17.	<b>B.</b>	Module 4, Page 4-5	
18.	<b>C.</b>	Module 4, Page 4-6	
19.	<b>A.</b>	Module 4, Page 4-7	
20.	<b>B.</b>	Module 4, Page 4-6	
21.	<b>D.</b>	Module 4, Page 4-12	
22.	<b>E.</b>	Module 4, Page 4-32	
23.	<b>B.</b>	Module 4, Page 4-26	
24.	<b>D.</b>	Module 5, Page 5-4	
25.	<b>C.</b>	Module 5, Page 5-4	
26.	<b>B.</b>	Module 5, Page 5-5	
27.	<b>A.</b>	Module 6, Page 6-5	
28.	<b>D.</b>	Module 6, Page 6-7	
29.	<b>D.</b>	Module 7, Page 7-6	
30.	<b>A.</b>	Module 7, Page 7-6	