

# ***2014 National Metal and Nonmetal Mine Rescue Contest***

## **Mine Rescue Field Competition Written Test**

### **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.**

**Good Luck!**



***August 4, 2014***

Please do not write on this test. Use the answer sheet provided.

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1. All decisions concerning the mine rescue teams (scheduling, assignments, tracking, rotations, and methods of exploration or firefighting) are made by the mine superintendent.
  - A. True
  - B. False
2. Each mine must have an Emergency Notification Plan for notifying necessary personnel when there is an emergency at the mine. This plan lists the various supervisors, administrators, and government officials who must be notified in case of an emergency.
  - A. True
  - B. False
3. Sulfur dioxide, hydrogen sulfide, and radon are examples of water-insoluble gases.
  - A. True
  - B. False
4. MSHA requires mine rescue stations serving underground M/NM mines to have \_\_\_\_\_ gas detectors appropriate for each gas which may be encountered at the mines served. The detectors must measure concentrations of methane from 0.0 percent to 100 percent of volume, oxygen from 0.0 percent to at least 20 percent of volume, and carbon monoxide from 0.0 parts per million to at least 9,999 parts per million [**30 CFR 49.6(a)(6)**].
  - A. two
  - B. three
  - C. four
  - D. None of the above
5. A gas is a substance with neither a definite shape nor volume. It expands or contracts to fill the area in which it's contained.
  - A. True
  - B. False
6. A drop in barometric reading indicates an increase in pressure.
  - A. True
  - B. False

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7. Clean, dry air at sea level contains about \_\_\_\_\_ percent of nitrogen (N<sub>2</sub>).
  - A. 61
  - B. 71
  - C. 78
  - D. 68
  
8. There are four main causes of oxygen deficiency in the mine:
  - A. Insufficient or improper ventilation which fails to bring enough oxygen to the work area.
  - B. Displacement of the air's oxygen by other gases.
  - C. A fire or explosion that consumes oxygen.
  - D. All of the above
  
9. The explosive range of methane (CH<sub>4</sub>) is 5 to 15 percent when there is at least \_\_\_\_\_ percent oxygen.
  - A. 20.9
  - B. 19.5
  - C. 12.1
  - D. None of the above
  
10. Hydrogen is a highly explosive gas. Air containing \_\_\_\_\_ percent hydrogen will explode even when there is as little as 5 percent oxygen present.
  - A. 0.4 to 74.2
  - B. 4.0 to 74.2
  - C. 40.0 to 74.2
  - D. None of the above
  
11. The degree to which a toxic gas will affect you depends on:
  - A. How concentrated the gas is.
  - B. How toxic the gas is.
  - C. How long you're exposed to the gas.
  - D. All of the above.
  
12. The presence of acetylene could indicate that an explosion has taken place in an area with low oxygen content, such as in a sealed area.
  - A. True
  - B. False
  
13. As little as 500 ppm (0.05 percent) carbon monoxide can kill you in three hours.
  - A. True
  - B. False

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14. High CO<sub>2</sub> readings could indicate a mine fire or a sulfide ore dust explosion.
  - A. True
  - B. False
  
15. A self-contained breathing apparatus (SCBA) will protect you from all toxic gases, as long as your face-to-face piece seal is tight and the unit is working properly.
  - A. True
  - B. False
  
16. Specific gravity is the only factor that determines how quickly a gas will diffuse or disperse.
  - A. True
  - B. False
  
17. Since your self-contained breathing apparatus supplies you with oxygen, it will protect you against asphyxiating gases.
  - A. True
  - B. False
  
18. There are very few circumstances when your team can alter ventilation without orders to do so from the command center.
  - A. True
  - B. False
  
19. The basic principle underlying mine ventilation is that \_\_\_\_\_.
  - A. Fans create pressure differentials in the mine.
  - B. Air naturally flows from outside to inside.
  - C. Air always moves from high pressure regions to low pressure regions.
  - D. None of the above
  
20. In mine rescue work, permanent bulkheads are used to advance ventilation as the exploration or mine recovery work progresses.
  - A. True
  - B. False
  
21. Barefaced exploration should stop at any point
  - A. When gas tests indicate the presence of any carbon monoxide or other noxious gases.
  - B. When gas tests indicate an oxygen deficiency.
  - C. Where disruptions in ventilation are found.
  - D. All of the above

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22. Which of the following is not one of the main responsibilities of the “fresh air base coordinator”?
- A. Following the team’s progress on the mine map and marking findings on the map as the team reports them.
  - B. Coordinating and overseeing the activities of all personnel who are at the fresh air base.
  - C. Establishing a mine rescue team rotation schedule.
  - D. Maintaining communications with the working rescue team and the command center.
23. It’s recommended that you don’t eat within one hour of the time you’ll be wearing your apparatus, and you shouldn’t drink alcoholic beverages for at least \_\_\_\_\_ hours before you get under oxygen.
- A. 8 to 12
  - B. 12 to 18
  - C. 6 to 10
  - D. None of the above
24. Which of the following is not a reason for a “team check”?
- A. To make sure each team member’s apparatus is functioning properly.
  - B. To give the team a chance to rest.
  - C. To report the team’s location to the fresh air base coordinator.
  - D. To make sure each team member is fit and ready to continue.
25. It is generally recommended that mine rescue teams use multi-purpose dry chemical extinguishers, which contain monoammonium phosphate, because they are effective on \_\_\_\_\_.
- A. Class A fires.
  - B. Class B fires.
  - C. Class C fires.
  - D. All of the above
26. High expansion foam is used mainly to contain and control fire by removing two legs of the fire triangle \_\_\_\_\_.
- A. Oxygen and heat.
  - B. Fuel and oxygen.
  - C. Fuel and heat.
  - D. None of the above
27. Methods of “direct firefighting” include sealing the fire and filling the fire area with foam, sand fill or water.
- A. True
  - B. False

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28. When several survivors suffering from physical and/or psychological trauma have been located, the accurate sorting of priority victims may mean the difference between life and death. This sorting of victims is commonly referred to as a \_\_\_\_\_ system.
- A. Classification
  - B. Priority
  - C. Triage
  - D. Selective
29. Reestablishing ventilation and bringing fresh air to an area damaged by fire or explosion is the main task of mine rescue teams in a rescue operation.
- A. True
  - B. False
30. Which of the following is not one of the main factors governing the time for unsealing a fire area?
- A. Extent and intensity of the fire at the time of sealing.
  - B. Location of the fire area with respect to ventilation.
  - C. How long the area has been sealed.
  - D. Gas conditions as indicated by analysis of air samples taken from behind the seals (Usually, the gases analyzed are oxygen, carbon dioxide, carbon monoxide, methane, hydrogen, and nitrogen.)