

2015 Northern Mine Rescue Contest

Written Exam

Field Competition



July 28, 2015

Clymer, New York

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Directions: Fill in the corresponding bubble on your Scantron sheet to indicate the letter preceding the correct answer to each of the following questions. Select only one answer per question.

1. A ____ fire can best be extinguished by excluding air or by special chemicals that affect the burning reactions.
 - A. Class A
 - B. Class B
 - C. Class C
 - D. None of the Above

2. Before entering a mine to search for missing miners, there are several questions to which you should have answers. These include:
 - A. Where do the miners typically congregate for lunch?
 - B. Are the miners trained to follow the established escape routes?
 - C. How many miners are missing?
 - D. All of the Above

3. Atmospheric pressure is measured on a barometer. A drop in the barometric reading indicates an increase in atmospheric pressure.
 - A. True
 - B. False

4. The volume of a gas changes in response to any change in atmospheric pressure or temperature. An increase in temperature causes a gas to expand.
 - A. True
 - B. False

5. Solubility is the ability of a gas to be dissolved in water. Sulfur dioxide and hydrogen sulfide, for example, are water-soluble gases.
 - A. True
 - B. False

6. Carbon monoxide (CO) is explosive and flammable. Its explosive range in normal air is ____.
 - A. 4 to 74.2 percent
 - B. 2.5 to 80 percent
 - C. 12.5 to 74.2 percent
 - D. 4.3 to 45.5 percent

7. Some toxic gases are harmful to inhale. A self-contained breathing apparatus (SCBA) will protect you from these gases, as long as the face-to-face piece seal is tight and the unit is working properly.
- A. True
 - B. False
8. Ethane (C_2H_6), Propane (C_3H_8), and Butane (C_4H_{10}) are known as “heavy hydrocarbons.” For these gases, which of the following statement is true:
- A. Each gas has an explosive range in normal air
 - B. Each gas is slightly soluble in water
 - C. Each gas can collect in low areas of the mine
 - D. All of the Above
9. Sulfur Dioxide (SO_2) is flammable and explosive. Its explosive range in normal air is 4.3 to 45.5 percent.
- A. True
 - B. False
10. Methane (CH_4) is flammable. Its explosive range is 5 to 15 percent when there is at least 12.1 percent oxygen. Methane is most explosive, however, in the ____ to ____ percent range.
- A. 14.5 to 15
 - B. 10.5 to 11
 - C. 9.5 to 10
 - D. 11.5 to 12
11. Hydrogen (H_2) is a highly explosive gas. Air containing 4 to 74.2 percent hydrogen will explode even when there is as little as ____ percent oxygen present.
- A. 7
 - B. 3
 - C. 5
 - D. 12.1
12. Oxides of Nitrogen, including nitrogen dioxide (NO_2), are highly toxic. Breathing even small amounts can irritate your throat. Often, symptoms don’t show up until several hours after you have been exposed to the gas.
- A. True
 - B. False
13. To help ensure your team’s safety while working underground, the main fan(s) should be monitored or guarded by an authorized individual to make sure that it operates continuously. If the fan goes down while you’re underground, your team should immediately return to the surface.
- A. True
 - B. False

14. The basic principle underlying mine ventilation is that air always moves from high pressure regions to low pressure regions.
- A. True
 - B. False
15. It is important to establish a clear chain-of-command so that rescue and recovery work can be well coordinated. Thus, the team is under the direct supervision of the _____.
- A. Command Center
 - B. Fresh Air Base Coordinator
 - C. Team Captain
 - D. None of the above
16. Blackdamp gets its name from the fact that this mixture caused miners' lights to go out. This mixture is oxygen-deficient so it makes breathing difficult and can cause suffocation.
- A. True
 - B. False
17. A standby team is stationed at the fresh air base as a "back up" for the working team beyond the fresh air base.
- A. True
 - B. False
18. The fresh air base coordinator is responsible for which of the following tasks?
- A. Handling communications with the exploring team and the command center
 - B. Setting up a team rotation schedule
 - C. Mapping the team's progress and findings
 - D. Both A and C
19. In accordance with 30 CFR 49.6(a)(3), each mine rescue station shall be provided with:
- A. One extra, fully charged oxygen bottle for every self-contained breathing apparatus
 - B. One extra, fully charged oxygen bottle for every six self-contained breathing apparatuses
 - C. Two extra, fully charged oxygen bottles for every six self-contained breathing apparatuses
 - D. Two extra, fully charged oxygen bottles for every twelve self-contained breathing apparatuses
20. At the briefing, your team should _____.
- A. Be told as much as possible about what has happened in the mine and what conditions currently exist.
 - B. Receive a specific assignment from the briefing officer.
 - C. Be given a time limit for completing your assigned task and returning to the fresh air base.
 - D. All of the Above.

21. Barefaced exploration should only stop when disruptions in ventilation are found or an oxygen deficient atmosphere exists.
- A. True
 - B. False
22. Three elements must be present for an explosion to occur: fuel (explosive mixture of gases), sufficient oxygen, and heat (ignition).
- A. True
 - B. False
23. The chief concerns of a mine rescue team when exploring a mine after an explosion include:
- A. The possibility of further explosions
 - B. The possibility of fires
 - C. Disrupted ventilation
 - D. All of the Above
24. As part of the “triage” system, survivors can be categorized into three priority groups according to their condition or injury. A survivor with third degree burns covering 10 percent of his/her body or involving hands, feet, or face would be a _____ condition.
- A. Low, or third priority
 - B. Second priority
 - C. First priority
 - D. Described condition not included in any of the above priority categories.
25. An electrical fire is classified as a Class C fire. However, if the power has been cut off to the burning equipment, the fire can be treated as a Class ____ or ____ fire.
- A. A or D
 - B. B or D
 - C. D or E
 - D. None of the Above
26. The safest procedure for getting survivors out of a refuge chamber or out from behind a barricade is to construct an airlock outside of either structure before it is entered.
- A. True
 - B. False
27. Reestablishing ventilation and bringing fresh air to an area damaged by fire or explosion is the main task of mine rescue teams during _____.
- A. Systematic exploration
 - B. Barefaced exploration
 - C. A rescue mission
 - D. A recovery operation

28. When re-ventilating the mine after an explosion had occurred, progressive ventilation should only be used if there is conclusive evidence that the fire is out.
- A. True
 - B. False
29. When unsealing a fire area, air locking operations should never be undertaken until the oxygen content behind the seals has been reduced to at least ____ percent.
- A. 1.0
 - B. 2.0
 - C. 3.0
 - D. 4.0
30. At the fresh air base, an incoming coordinator who is replacing another coordinator should get all necessary information from the _____ to ensure that the changeover goes smoothly.
- A. Command center
 - B. Briefing officer
 - C. Backup team
 - D. Outgoing coordinator

ANSWER KEY

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All questions taken from MSHA Publication 3027

<u>Question</u>	<u>Answer</u>	<u>Source</u>
1.	B.	Module 5, pg. 5-5
2.	C.	Module 6, pg. 6-3
3.	B.	Module 2, pg. 2-5
4.	A.	Module 2, pg. 2-5
5.	A.	Module 2, pg. 2-7
6.	C.	Module 2, pg. 2-16
7.	A.	Module 2, pg. 2-10
8.	D.	Module 2, pg. 2-23
9.	B.	Module 2, pg. 2-21
10.	C.	Module 2, pg. 2-22
11.	C.	Module 2, pg. 2-18
12.	A.	Module 2, pg. 2-17
13.	B.	Module 3, pg. 3-4
14.	A.	Module 3, pg. 3-5
15.	C.	Module 1, pg. 1-6
16.	A.	Module 2, pg. 2-27
17.	B.	Module 1, pg. 1-14
18.	D.	Module 4, pg. 4-8
19.	C.	Module 4, pg. 4-13
20.	D.	Module 4, pg. 4-15
21.	B.	Module 4, pg. 4-6
22.	A.	Module 5, pg. 5-25
23.	D.	Module 5, pg. 5-27
24.	C.	Module 6, pg. 6-5
25.	D.	Module 5, pg. 5-5
26.	B.	Module 6, pg. 6-4
27.	D.	Module 7, pg. 7-4
28.	B.	Module 7, pg. 7-11
29.	B.	Module 7, pg. 7-7
30.	D.	Module 4, pg. 4-9