

2016 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!



July 25, 2016

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

2016 Metal/Nonmetal National Mine Rescue Contest

Mine Rescue Field Competition – Written Test

1. Direct ventilation is the common method of recovery in multi-level mines. However, before using direct ventilation, there should be _____.
 - A. A means to assure that gases can be carefully controlled.
 - B. Sufficient time allotted to complete the process.
 - C. Conclusive evidence that the fire has been extinguished.
 - D. None of the above
2. In a single-level, room-and-pillar mine, progressive ventilation is the usual method of recovery when _____.
 - A. The sealed area is large.
 - B. The fire is extensive.
 - C. Bodies must be recovered.
 - D. All of the above
3. During progressive ventilation, air locking should never be undertaken until the oxygen content of the air behind the seals has been reduced to at least two percent.
 - A. True
 - B. False
4. In accordance with 30 CFR 49.6(a)(3), each mine rescue station must have _____, fully-charged oxygen bottles for every six self-contained breathing.
 - A. One spare
 - B. Two spare
 - C. Three spare
 - D. None of the above
5. Before your team proceeds to the fresh air base, the team trainer is responsible for ensuring that the team, its equipment, and its apparatuses are ready to go.
 - A. True
 - B. False
6. Dry chemical fire extinguishers put out fires by stopping the chemical reaction between the fuel and oxygen (which produces the fire).
 - A. True
 - B. False

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

7. Barefaced exploration should only be conducted when _____.
- A. The ventilation system is operating properly.
 - B. When gas tests indicate there is sufficient oxygen and no buildup of carbon monoxide or other dangerous gases.
 - C. When a backup crew with apparatuses is stationed outside the area and is ready to rescue the others if needed
 - D. All of the above
8. Electrical fires are classified as Class C fires. However, if the power has been cut off to the burning equipment, then the fire can be treated as a _____.
- A. Class A fire.
 - B. Class B fire.
 - C. Class D fire.
 - D. Both A and B
9. Foam generators are used to extinguish a fire by simultaneously smothering and cooling it. Before traveling through a foam-filled area, you should knock down the foam _____ to clear a path for you to safely walk along.
- A. With a walking stick
 - B. With compressed air
 - C. With water
 - D. None of the above
10. If a survivor is found with heavy debris on his/her abdomen, extreme caution must be taken when removing the debris. The rescuers must realize that the victim's _____ to the critical area has been maintained by the pressure of the debris.
- A. Blood temperature
 - B. Blood pressure
 - C. Blood circulation
 - D. None of the above
11. When survivors are found, their behavior may range from apprehension to uncontrollable hysteria. The best way to relieve psychological stress in survivors is to _____.
- A. Communicate with them as soon as possible.
 - B. Restrain them to keep them from hurting themselves or "bolting" to fresh air.
 - C. Provide food and water.
 - D. All of the above.
12. Back injuries with or without spinal injuries are first priority conditions.
- A. True
 - B. False

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

13. A team rotation schedule should be designed so there is a clear working order and backup teams are always available. Time should be allotted so that the teams can ____.
- A. Rest
 - B. Clean, test and prepare apparatuses
 - C. Prepare other equipment
 - D. All of the above
14. A great number of people will be doing many different jobs during a rescue and recovery operation. Therefore, it is important to establish a _____ so that rescue and recovery work can be well coordinated.
- A. Command Center
 - B. Waiting Area for Teams
 - C. Clear chain-of-command
 - D. None of the above
15. An information center is established at the mine to release information related to the emergency to the families and the public. However, it is crucial that the information released is ____.
- A. Approved by MSHA.
 - B. Controlled, communicated, and disseminated properly.
 - C. Provided on a scheduled basis by the command group.
 - D. Only A and C
16. When a body is found underground, do not examine the victim's clothing for personal possessions without the approval of _____.
- A. The command center
 - B. The fresh air base coordinator
 - C. The next of kin
 - D. None of the above
17. Several different kinds of water nozzles are available for hoses. To fight a fire at shorter distances, a _____ should be used.
- A. Solid stream
 - B. Pistol nozzle
 - C. Fog spray
 - D. High impact nozzle
18. The degree to which a toxic gas will affect you depends exclusively on the concentration of the gas.
- A. True
 - B. False

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

19. Which of the following gases is not produced as a result of the detonation of explosives?
- A. CO
 - B. CO₂
 - C. N₂
 - D. None of the above
20. When mixed with moisture in your lungs, ____ forms acids that corrode your respiratory passages and cause them to swell.
- A. Sulfur Dioxide
 - B. Nitrogen Dioxide
 - C. Hydrogen Sulfide
 - D. None of the above
21. _____ is formed when methane is burned or heated in air having a low oxygen content.
- A. Propane
 - B. Butane
 - C. Ethane
 - D. Acetylene
22. The explosive range of methane is 5 to 15 percent when there is at least 12.1 percent oxygen. However, methane is most explosive in the ____ percent range.
- A. 7.5 to 8
 - B. 8.5 to 9
 - C. 9.5 to 10
 - D. 10.5 to 11
23. This colorless, odorless, tasteless gas is highly explosive. It is an asphyxiant and lighter than air. It is produced by incomplete combustion of carbon materials during fires and explosions. It is not soluble in water. What gas is it?
- A. Carbon monoxide
 - B. Hydrogen
 - C. Methane
 - D. All of the above
24. This colorless gas is nonexplosive and nonflammable. It is heavier than air and soluble in water? What gas is it?
- A. Carbon dioxide
 - B. Sulfur dioxide
 - C. Radon
 - D. All of the above

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

25. This is an important factor when determining where to establish a fresh air base.
- A. The location is assured positive ventilation and fresh air
 - B. The location is situated close to the affected area
 - C. The location is assured a fresh air travel way to the surface.
 - D. All of the above
26. In natural ventilation, warm air displaces cold air in the mine due to differences in _____ of the workings.
- A. The physical dimensions
 - B. The material being mined and the friction factor
 - C. Elevation and Temperature
 - D. All of the above
27. A check curtain is used to temporarily advance and direct the flow of air until a permanent stopping (which is much stronger and more airtight) can be built.
- A. True
 - B. False
28. This can be used to control and adjust the quantity of airflow in a mine in order to ensure proper distribution.
- A. A partially opened mine door
 - B. A permanent bulkhead
 - C. An adjustable regulator
 - D. Both A and C
29. Under no circumstances can your team alter ventilation without orders to do so from the command center.
- A. True
 - B. False
30. _____ are used to permit two air currents to cross without the intake air short-circuiting into the exhaust.
- A. Air locks
 - B. Permanent bulkheads
 - C. Overcasts
 - D. Line Brattices

2016 Metal/Nonmetal National Mine Rescue Contest

Mine Rescue Field Competition – Written Test

ANSWER KEY - Reference MSHA Publication 3027

1. **A** pg. 7-7
2. **D** pg. 7-7
3. **A** pg. 7-7
4. **B** pg. 4-13
5. **B** pg. 4-17
6. **A** pg. 5-6
7. **D** pg. 4-6
8. **A** pg. 5-5
9. **C** pgs. 5-9 and 5-10
10. **B** pg. 6-6
11. **A** pg. 6-7
12. **B** pg. 6-6
13. **D** pg. 1-4
14. **C** pg. 1-6
15. **B** pg. 1-5
16. **D** pg. 6-11
17. **C** pg. 5-8
18. **B** pg. 2-9
19. **D** pgs. 2-14 (N₂), 2-15 (CO₂), and 2-16 (CO)
20. **B** pgs. 2-17 (NO₂), 2-19 (H₂S) and 2-21 (SO₂)
21. **D** pg. 2-24
22. **C** pg. 2-22
23. **B** pgs. 2-15 (CO), 2-18 (H₂), and 2-22 (CH₄)
24. **D** pgs. 2-15 (CO₂), 2-21 (SO₂), and 2-25 (Rn)
25. **D** pg. 4-7
26. **C** pg. 3-5
27. **B** pg. 3-9
28. **D** pg. 3-12
29. **A** pg. 3-3
30. **C** pg. 3-11