

**2014 North Central Mine Rescue Contest  
Wilmington, Illinois  
Written Test – Field Competition**

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

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

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

1. A rise in the barometric reading will cause a gas to?

- A. Expand in volume
- B. Contract in volume
- C. Diffuse more quickly
- D. Diffuse more slowly
- E. Both b and d
- F. Both a and c

2. What is this map symbol?



- A. undercast
- B. regulator
- C. overcast
- D. mainfan

3. If the team loses voice contact with the fresh air base, it will be the attendant's job to receive and send signals to and from the team by a system of pulls or tugs on the communication line. Three pulls on the line would signal?

- A. Advance
- B. Retreat
- C. Stop
- D. Emergency or distress

4. It is generally recommended that mine rescue teams use which one of the following types of fire extinguisher?
- A. dry chemical extinguishers which contains potassium bicarbonate
  - B. carbon dioxide
  - C. dry chemical extinguishers which contain monoammonium phosphate
  - D. dry chemical extinguishers which contains sodium bicarbonate
5. High expansion foam is used in fighting which classes of fire?
- A. Class A and B
  - B. Class B and C
  - C. Class C and D
  - D. Class A and C
6. 30 CFR § 49.6(a) requires one oxygen pump and a cascading system compatible with the supplied breathing apparatus.
- A. True
  - B. False
7. Class B fires are fires that involve electricity. They are best extinguished by non-conducting agents such as carbon dioxide and certain dry chemicals.
- A. True
  - B. False
8. Under the triage system which one in not a third priority condition?
- A. Mild hysteria
  - B. Moderate heat exhaustion
  - C. Fractured arm, hand or foot.
  - D. Second degree burns involving less than 15 percent of the body

9. An overcast is an enclosed airway built at an intersection of mine passages that permits one air current to pass under another air current without mixing.
- A. True
  - B. False
10. A high-velocity anemometer is used to measure velocities from 2,000 to 10,000 feet per minute.
- A. True
  - B. False
11. Prior to a mine rescue team passing through a door or bulkhead behind which conditions are not definitely known, they 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.
12. A gas that is heavier than air will have specific gravity less than 1.0.
- A. True
  - B. False
13. What is the Threshold Limit Value (TLV) of carbon monoxide?
- A. 50 PPM
  - B. 0.005%
  - C. 1/200 of one percent
  - D. none of the above
  - E. all of the above
14. Carbon monoxide is a product of complete combustion of any carbon material.
- A. True
  - B. False

15. Which of the following statements about Acetylene ( $C_2H_2$ ) is false?
- A. Acetylene is combustible but it will not support combustion.
  - B. Acetylene is slightly toxic.
  - C. Acetylene is non-soluble in water.
  - D. 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.
16. Because of sulfur dioxide's ( $SO_2$ ) high specific gravity it is hard to disperse by ventilation.
- A. True
  - B. False
17. Which one of the following gases is not a trace gas found in normal air?
- A. Helium
  - B. Carbon Monoxide.
  - C. Krypton
  - D. Neon
  - E. Methane
18. Which formula is used to calculate the quantity of airflow?
- A. Quantity ( $ft.^3$ ) = Area ( $ft^2$ ) x Velocity ( $ft./min.$ )
  - B. Quantity ( $ft.^2$ ) = Area ( $ft$ ) x Velocity ( $ft./min.$ )
  - C. Quantity ( $m^3$ ) = Area ( $m^2$ ) x Velocity ( $m/min.$ )
  - D. None of the above
19. Which of the following is the explosive range of Nitrogen Dioxide ( $NO_2$ )?
- A. In normal air 12.5 to 74.2 percent.
  - B. Air containing 4 to 74.2 percent Nitrogen Dioxide will explode even when there is as little as 5 percent oxygen present.
  - C. Nitrogen Dioxide is flammable and explosive in concentrations from 4.3 to 45.5 percent in normal air. It is most explosive at 14.2 percent.
  - D. None of the above

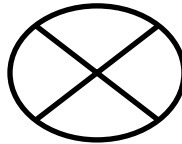
20. A non-toxic gas can still be dangerous because it can?

- A. Displace oxygen
- B. Burn
- C. explode
- D. All of the above
- E. None of the above

21. What is the specific gravity of Hydrogen Sulfide ( $H_2S$ )?

- A. 1.1906
- B. 0.0695
- C. 2.2638
- D. None of the above

22. This is a map symbol for?



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23. Which gases are not odorless and colorless?

- A. Carbon Dioxide
- B. Carbon Monoxide
- C. Methane
- D. Oxides of Nitrogen
- E. Hydrogen
- F. Oxygen

24. Hydrogen may be detected during firefighting when either water or foam extinguishing methods are used.

- A. True
- B. False

25. When a refuge chamber is found with survivors located inside, who determines whether fresh air will be advanced to the chamber or if an airlock will be constructed to enter the chamber?
- A. Team Captain
  - B. Fresh Air Base
  - C. Mine Superintendent
  - D. Command Center
26. \_\_\_\_\_ ventilation is the most common method of unsealing a fire area in single level mines, particularly room-and-pillar mines.
- A. Passive
  - B. Direct
  - C. Progressive
  - D. Indirect
27. \_\_\_\_\_ ventilation is the common method of recovery in multi-level mines.
- A. Passive
  - B. Direct
  - C. Progressive
  - D. Indirect
28. \_\_\_\_\_ fires are those that involve combustible metals such as magnesium, titanium, zirconium, sodium, and potassium.
- A. Class A
  - B. Class B
  - C. Class C
  - D. Class D
29. Which instrument would be the most practical to use to measure airflow inside an air duct?
- A. high-velocity anemometer
  - B. pitot tube
  - C. medium-velocity anemometer
  - D. smoke tube

30. The wrong ventilation alterations could cause changes in the air at the fresh airbase, push deadly gases or smoke into areas where survivors are located, force explosive gases back over fire areas or hot spots and cause an explosion, or redirect and feed air to a fire.

A. True

B. False