

**2014 TN Mine Rescue Contest
Dalton, GA
Written Test Answers – Mine Rescue 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. Knowing what gases are present and in what concentrations provides you with important clues as to what has happened in the mine. For your own safety, you'll want to know which of the following:
 - A. what harmful gases are present,
 - B. how much oxygen is in the atmosphere,
 - C. whether or not gas levels are within the explosive range.
 - D. All of the above** [MSHA 3027 (IG6) 2008, pg.2-3]

2. MSHA requires mine rescue stations serving underground M/NM mines to have two gas detectors appropriate for each gas which may be encountered at the mines served.
 - A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.2-3]

3. Gas detectors must measure concentrations of carbon monoxide from 0.0 parts per million to at least 999 parts per million.
 - A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.2-3]

4. Knowing the effects of air current, temperature, and pressure on a gas will help you determine its
 - A. identity
 - B. flammability.
 - C. rate of diffusion.** [MSHA 3027 (IG6) 2008, pg.2-3]
 - D. none of the above

5. Carbon Dioxide is a heavier gas and will diffuse rapidly.
 - A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.2-7]

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6. Any flammable gas can explode under certain conditions. In order for a flammable gas to explode, there must be enough of the gas in the air, enough oxygen, and a source of _____.
- A. Carbon Monoxide
 - B. Water
 - C. Ignition** [MSHA 3027 (IG6) 2008, pg.2-7]
 - D. Methane
7. Clean, dry air at sea level is made up of 78 percent oxygen and 21 percent nitrogen.
- A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.2-12]
8. TLV, or threshold limit value is used to denote the _____ concentrations of gases to which workers can (under Federal regulations) be exposed over an 8-hour daily period.
- A. Highest
 - B. Lowest
 - C. Average** [MSHA 3027 (IG6) 2008, pg.2-74]
 - D. Maximum
9. A self-contained breathing apparatus (SCBA) will protect you from all gases.
- A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.2-10]
- ~~10. At high concentrations, _____ can replace oxygen in the air and act as an asphyxiant, and is also highly explosive.~~
- _____
- ~~A. Carbon Monoxide~~
 - ~~B. Sulfur Dioxide~~
 - ~~C. Hydrogen Sulfide~~
 - D. Hydrogen** [MSHA 3027 (IG6) 2008, pg.2-59]

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11. Which of the following gases would be considered highly water-soluble?
- A. Carbon Monoxide
 - B. Carbon Dioxide
 - C. Sulfur Dioxide [MSHA 3027 (IG6) 2008, pg.2-47]**
 - D. Hydrogen
12. The effects of a toxic gas depend on concentration, toxicity, and length of exposure.
- A. **True [MSHA 3027 (IG6) 2008, pg.2-43]**
 - B. False
13. The sorting of victims is commonly referred to as a “triage” system. A fractured arm, hand, or foot takes priority over a miner suffering from moderate heat exhaustion.
- A. True
 - B. False [MSHA 3027 (IG6) 2008, pg.6-6]**
14. Any combustible gases in the main exhaust should, if feasible, be kept below the LEL. LEL means:
- A. Limit ending level
 - B. Lowest exposure limit
 - C. Lowest explosive limit [MSHA 3027 (IG6) 2008, pg.7-9]**
 - D. Lightest exposure level
15. High expansion foam is used mainly to contain and control fire by removing two legs of the fire triangle—oxygen and fuel.
- A. True
 - B. False [MSHA 3027 (IG6) 2008, pg.5-10]**
16. Urethane foam is an effective sealant when used around the perimeter of a seal. Urethane foam should never be applied more than _____ thick because of the potential for spontaneous combustion with greater thicknesses.
- A. two inches
 - B. ½ inch
 - C. three inches
 - D. one inch [MSHA 3027 (IG6) 2008, pg.5-23]**
17. One source for a Class B Fire is titanium.
- A. True
 - B. False [MSHA 3027 (IG6) 2008, pg.5-31]**

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18. Please choose the class for an electrical fire from the choices below:
- A. "A"
 - B. "B"
 - C. **"C"** [MSHA 3027 (IG6) 2008, pg.5-31]
 - D. "D"
19. Methane is not an explosive gas, but it does support combustion.
- A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.2-13]
20. Carbon monoxide gas will not explode.
- A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.2-17]
21. For Carbon Dioxide testing in an underground mine, should you hold your portable detector high, or low?
- A. Low** [MSHA 3027 (IG6) 2008, pg.2-15C]
 - B. High
22. The first symptom of carbon monoxide poisoning is:
- A. Nausea
 - B. Slight tightening across the forehead with a possible headache.** [MSHA 3027 (IG6) 2008, pg.2-16]
 - C. Dizziness
 - D. Blurred vision
23. One cause of carbon monoxide is
- A. Bottled breathing air
 - B. Oxygen
 - C. Fire** [MSHA 3027 (IG6) 2008, pg.2-16]
 - D. SCBA
23. Air locks are not required prior to opening a refuge chamber, barricade, or door in irrespirable atmospheres behind which survivors may be located.
- A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.3-23]

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24. Before going underground, the team should make sure that the **main fan is running**, that a **guard is monitoring the operation of the fan**, and _____ . [MSHA 3027 (IG6) 2008, pg.5-12]
- A. that any indication of fire has been determined.
 - B. The Team Captain has tested all respiratory devices.
 - C. Families of the miners involved are being counseled.
 - D. tests are being made at the main exhausts for any gases that may be present in the mine.**
25. Elevated readings of _____ could indicate that there is inadequate ventilation around battery charging stations.
- A. Carbon Monoxide
 - B. Hydrogen** [MSHA 3027 (IG6) 2008, pg.2-19]
 - C. Nitrogen Dioxide
 - D. Carbon Dioxide
26. You may recognize _____ by its distinctive “rotten egg” odor.
- A. Hydrogen
 - B. Carbon Dioxide
 - C. Carbon Monoxide
 - D. Hydrogen Sulfide** [MSHA 3027 (IG6) 2008, pg.2-20]
- ~~27. In direct firefighting, the brattice should cover about one-half to two-thirds of the area from the floor to the back.~~
- ~~**A. True**~~ [MSHA 3027 (IG6) 2008, pg.5-14] ~~B. False~~
28. The extremely toxic gas, Nitrogen Dioxide, is produced by all fires because of the incomplete combustion of carbon materials during the burning process.
- A. True
 - B. False** [MSHA 3027 (IG6) 2008, pg.5-15]

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29. _____ is a toxic gas and exposure to .01 to .015 percent (100 to 150 ppm) can be dangerous for even short exposures.
- A. Hydrogen
 - B. Carbon Dioxide
 - C. Methane
 - D. Nitrogen Dioxide** [MSHA 3027 (IG6) 2008, pg.2-17]
30. The explosive range for _____ is 4.0 to 74.2 percent when there is at least 5 percent oxygen present.
- A. Hydrogen Sulfide
 - B. Carbon Dioxide
 - C. Carbon Monoxide
 - D. Hydrogen** [MSHA 3027 (IG6) 2008, pg.5-16]