

2013 Central Mine Rescue Contest
Kellogg, Idaho
Written Test-Field Competition

Name_____ Company_____

Team Name_____ Contest Position_____

Team Member No._____

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

1. It is much easier for concentrations of explosive gases to build up when the barometric pressure is low.
 - a. True
 - b. False (*page 2-6, it is much easier for concentrations of gases to build up when the barometric pressure is high.*)

2. Heavier gases such as carbon dioxide and sulfur dioxide do not diffuse rapidly, so they're more difficult to disperse.
 - a. True *page 2-7, Heavier gases such as sulfur dioxide and carbon dioxide do not diffuse rapidly so they're more difficult to disperse)*
 - b. False

3. The explosive range of Ethane in normal air is:
 - a. 2.12% - 9.35%
 - b. 3.0% - 12.5% (*page 2-23, Ethane- from 3 to 12.5 percent in normal air.*)
 - c. 2.5% - 9.35%
 - d. 1.86% - 8.41%

4. Two soluble gases to be concerned with before disturbing water or starting pumping operations are:
 - a. Hydrogen and Nitric oxide
 - b. Acetylene and Carbon monoxide
 - c. Hydrogen Sulfide and Sulfur dioxide (*page 2-7, Sulfur dioxide and hydrogen sulfide, for example, are water-soluble gases.*)
 - d. Nitrogen dioxide and Methane

5. Which component of air accounts for 21%:
- Nitrogen
 - Argon
 - Oxygen (*page 2-12, Normal air is made up of 21% Oxygen*)
 - Carbon Dioxide
6. The degree to which a toxic gas will affect you depends on three factors: 1) how concentrated the gas is, 2) how explosive the gas is, and 3) how long you're exposed to the gas.
- True
 - False (*page 2-9, how concentrated, how toxic the gas is, how long your exposed to the gas*)
7. Color, odor, and taste are sensory properties that can help you identify a gas.
- True
 - False (*page 2-8, Color, odor, and taste are physical properties that can help you identify a gas.*)
8. One of the most poisonousness gasses is Hydrogen Sulfide; concentrations of _____ to _____ percent can cause rapid unconsciousness, cessation of respiration, and death.
- 0.07 - 0.10 % (*page 2-20, Higher concentrations of .07 to .10 (700 to 1000 ppm) can cause rapid unconsciousness, cessation of respiration, and death.*)
 - 0.02 - 0.07 %
 - 0.10 - 0.20 %
 - 0.04 - 0.05 %
9. _____ is formed when methane is burned or heated in air having low oxygen content.
- Butane
 - Argon
 - Ethane
 - Acetylene (*page 2-24, where found: acetylene is found after methane explosions in air having a low oxygen content.*)
10. The most practical instrument to use when measuring high velocities flowing in ducts or tubing is:
- Anemometer
 - Smoke tube
 - Pitot tube (*3-16, sometimes the high velocities encountered are those flowing inside ducts or tubing where measurements by anemometer are difficult, for such measurements the most practical instrument is the pitot tube...*)
 - All of the above

11. When smoke gets dense it can disorient reference points causing you to fall down, this is called _____.
- Spatial distortion
 - Spatial distention
 - Spatial disorientation (page 4-25, smoke so dense that it conceals the back and sides and other reference points you normally use to guide you from place to place can cause you to experience what's known as spatial disorientation.)*
 - Spatial difficulty
12. The team captain might order the team to fresh air when there is:
- Fire that cannot be extinguished
 - Ground conditions that cannot be secured
 - Malfunctioning apparatus
 - All of the above (Q. #1 Answer--Malfunctioning apparatus, hazardous ground that cannot be secured, presence of gases that produce an imminent explosion hazard, fire that cannot be extinguished.)*
13. Drowning from water in the lungs can occur by the body trying to counteract corrosive effects from severe exposure of acids formed by _____.
- Hydrogen Sulfide
 - Oxides of Nitrogen (page 2-18, If exposure has been severe, the victim may die , literally drowned by water that has entered the lungs from the body in attempt to counteract the corrosive effects of the acids formed by the oxides of nitrogen.)*
 - Carbon Monoxide
 - Sulfur Dioxide
14. Sandfill or flooding is generally used as a last resort to seal an out of control mine fire.
- True (page 5-18 & 5-19, both are used as a last resort)*
 - False
15. The discharge of an extinguisher varies between:
- 8-20 seconds
 - 5-60 seconds
 - 18-25 seconds
 - 8-60 seconds (page 5-7, the discharge time of a hand held extinguisher varies from 8-60 seconds.)*

16. The three elements to create a fire triangle are:
- Fuel, Oxygen, Hydrogen
 - Oxygen, Fuel, Flammability
 - Heat, Fuel, Oxygen (page 5-4, In each case three elements are needed at the same time for the fire to occur: fuel, oxygen, and heat)*
 - Heat, Oxygen, Combustion
17. In a multi-level mine, a tunnel driven perpendicular to the main vein system of the mine is considered a:
- Drift
 - Crosscut (Glossary 3-53, Crosscut-For multi-level mines: A tunnel driven perpendicular to the main vein system of the mine.)*
 - Stope
 - Passage way driven at right angles
18. The law requires that gas detectors be able to measure concentrations of methane from 0.0 to 90% of volume, oxygen from 0.0 to 20% volume, and carbon monoxide from 0.0 to 9,999 ppm.
- True
 - False (page 4-13, (6) Gas detectors must measure concentrations of methane from 0.0% to 100% of volume, O₂ form at least 0.0 to 20%, and CO₂ from 0.0 ppm to at least 9,999 ppm)*
19. Air locking operations should never be undertaken until the oxygen content of the air behind the seals has been reduced to at least _____%.
- 1%
 - .05%
 - 2.0% (page 7-7, Air locking operations should never be undertaken until the O₂ content of the air behind the seals has been reduced to at least 2%)*
 - 5.0%
20. Urethane foam should never be applied greater than ____ inch thick because of spontaneous combustion.
- ½ inch
 - 2 inches
 - 1 ½ inches
 - 1 inch (page 5-23, Urethane foam should never be applied more than one inch thick because of the potential for spontaneous combustion with greater thicknesses.)*

21. Which of these conditions is not a first priority during triage?
- Deep Shock
 - Second degree burns covering 10% of the body (page 6-5, Second degree burns covering more than 30% of the body)**
 - Severe bleeding
 - Inhalation of poisonous gases
22. The three preconditions for opening a sealed fire area are: 1) O₂ content is low enough to prevent explosion, 2) there is no CO, and 3) the sealed area has cooled so the fire will not rekindle when re-ventilated.
- True (page 7-11, the oxygen content of the atmosphere in the sealed area should be low enough so that an explosion is impossible. There should be no carbon monoxide, indicating that the fire is out. The sealed area should have cooled enough so that the fire is not rekindled when the area is re-ventilated.)**
 - False
23. Direct ventilation must be used if an entire level is sealed.
- True (page 7-11, Q.1-Direct ventilation is quick, but should only be used if there is conclusive evidence that the fire is out. Direct ventilation must be used if an entire level was sealed.)**
 - False
24. The ideal time to take an air sample is when the sealed area is under positive pressure.
- True (page 5-23, the ideal time to collect an air sample is when the sealed area is under positive pressure or "breathing out".)**
 - False
25. The rule of thumb when altering ventilation is not to change the ventilation into an unexplored area.
- True (page 3-15, the rule of thumb when altering ventilation is not to change the ventilation into an unexplored area.)**
 - False
26. Hydrogen is produced by the complete combustion of carbon materials during fires and explosions.
- True
 - False (page 2-19, produced by the incomplete combustion of carbon materials during fire and explosions.)**

27. The smoke tube is used to determine the direction and velocity of air moving above 120 feet per minute.
- True
 - False (page 3-21, Q-2. The smoke tube is used to determine the direction and velocity of slow moving air, below 120 feet per minute)*
28. During the debriefing session the _____ will provide the information found during exploration.
- Captain
 - Co-Captain
 - Team (page 4-32, When you arrive on the surface your team will attend a briefing session,This time, your team provides the information)*
 - Fresh Air Base
29. The advantage of progressive ventilation is it is a fast process.
- True
 - False (page 7-7, the disadvantage of progressive ventilation is it is a slow process.)*
30. If you throw up in your mask while in unsafe air you must hold your breath to remove your mask and clean out.
- True
 - False (page 6-11, If you throw up you cannot remove your mask)*