**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. The Command Center is the hub of rescue and recovery operations and is typically staffed and controlled by a mine emergency “command group.” This group is generally comprised of:

A. Mine management personnel

B. Federal and state officials

1. Union representatives
2. All of the above (p.1-3)

p. 1-3… mine emergency “command group.” This group is generally

comprised of mine management personnel, federal and state officials, and union representatives

1. Federal regulations require mines to have and post a Mine Rescue Notification Plan for notifying all the mine rescue team members that will be needed to assist in the rescue and recovery operation. This regulation is:

1. 30 CFR Section 49.9 (p.1-3)
2. 30 CFR Section 50.2
3. Section 7(3) of the MINER Act of 2006
4. 30 CFR Section 46.6(a)
5. Incoming traffic on the roads leading to the mine property should also be regulated by authorized personnel to keep unnecessary vehicles off the roads so that they can remain open for needed personnel, supplies, and emergency vehicles.

 A. True p. 1-4 B. False

4. A notification plan is a schedule that establishes a clear order of team usage

 during a rescue and recovery operation.

 A. True B. False (p.1-14)

**Notification plan** – Plan for notifying necessary personnel when there is an

 emergency at the mine.

1. MSHA requires mine rescue stations serving underground M/NM mines to have five gas detectors appropriate for each gas which may be encountered at the mines served.
2. True B. False (p.2-3)

MSHA requires mine rescue stations serving underground M/NM mines to have **four** gas detectors appropriate for each gas which may be encountered at the mines served.

6 . An increase in pressure causes a gas to expand.

1. True B. False (p.2-6)

For example, if the barometer rises, indicating increased pressure, gas responds by contracting.

7. The rate of \_\_\_\_\_\_\_\_\_is how quickly the gas will mix or

blend with one or more other gases and how quickly it can be dispersed.

 A. temperature rise

 B. current

 C. pressure increase

 D. diffusion (p. 2-5)

The rate of diffusion is how quickly the gas will mix or blend with one or more other gases and how quickly it can be dispersed.

8. The explosive range of hydrogen is 3.0 to 64.3 percent in the presence of normal air.

1. True B. False (p.2-7)

The explosive range of hydrogen, for example, is 4.0 to 74.2 percent in the presence of normal air.

9. Specific gravity indicates how quickly a gas will diffuse and how easily it can be dispersed by ventilation.

1. True (p.2-7) B. False

Specific gravity is not the only factor that determines how quickly a gas will diffuse or disperse.

10. Hydrogen is such a heavy gas; making it difficult to disperse because it does not diffuse rapidly.

1. True B. False (p.2-7)

Light gases, such as hydrogen, diffuse rapidly and are fairly easy to disperse. Heavier gases such as sulfur dioxide and carbon dioxide do not diffuse rapidly, so they’re more difficult to disperse

11. The TLV for carbon monoxide is 50 ppm. This is equivalent to

\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A. 50%

B. 0.05%

C. 5.0%

D. 0.005% (p.2-9)

For example, the TLV for carbon monoxide (CO) is relatively low—50 PPM (or .005 percent).

12. For a flammable gas that is present in mining - if there is no oxygen present there cannot be an explosion.

A. True (p.2-10) B. False

The explosive range of a gas is the concentrations within which a flammable gas can explode when there is a specific amount of oxygen present.

13. What is the specific gravity of oxygen?

A. 1.0000

B. 1.2010

C. 1.1054 (p. 2-13)

D. 1.1030

14. Although an asphyxiant, nitrogen is considered nontoxic.

A. True (p.2-14) B. False

15. What is the second largest component of air?

A. Nitrogen

B. Oxygen (p. 2-14)

C. Argon

D. Helium

16. An elevated nitrogen content indicates an oxygen-rich

atmosphere.

A. True B. False( p.2-15)

An elevated nitrogen content indicates an oxygen-deficient

atmosphere.

17. Although carbon dioxide is both colorless and odorless at high concentrations it may produce an acid taste.

 A. True (p.2-15) B. False

 Carbon dioxide is colorless and odorless. High concentrations may

produce an acid taste.

18. The presence of NO2 above normal ambient levels for a

continued period of time definitely indicates there is a fire somewhere in the mine.

 A. True B. False (p.2-17)

 The presence of **CO** above normal ambient levels for a

continued period of time definitely indicates there is a fire somewhere in the mine.

19. The toxicity of hydrogen is its most hazardous aspect.

 A. True B. False (p.2-19)

The most hazardous aspect of hydrogen, however, is the fact that it

is highly explosive.

20. What gas is often liberated when acid mine water corrodes metallic sulfides.

1. carbon monoxide
2. nitrogen
3. arsine
4. hydrogen sulfide (p.2-20)

Hydrogen sulfide is often liberated when acid mine water corrodes metallic sulfides.

21. Sulfur dioxide has a low specific gravity.

 A. True B. False (p.2-21)

Because of its high specific gravity, sulfur dioxide is hard to disperse

by ventilation.

22. Traffic cones are used to direct air to where it is needed and to keep intake air from short circuiting to the exhaust before it reaches the working area.

A. True B. False (p.3-8)

Bulkheads are used to direct air to where it is needed and to keep intake air from shortcircuiting to the exhaust before it reaches the working area.

23. A bulkhead is basically a brattice cloth, canvas, or plastic

curtain that is hung across a passageway and opens to allow miners and equipment to pass through.

A. True B. False (p.3-9)

A check curtain (or run-through check) is basically a brattice cloth, canvas, or plastic curtain that is hung across a passageway and opens to allow miners and equipment to pass through.

24. There are three reasons for the team check: 1. To make sure each team member is fit and ready to continue.; 2. To give the team a chance to rest. What is the 3rd reason?

1. To allow the captain time to review the mine map;
2. To make sure each team member’s apparatus is functioning properly; (p.4-20)
3. To meet the Mine Manager prior to entry;
4. None of the above.

25. When using a horn as the team signaling device, what does two horn signals mean?

1. Advance – move toward captain (p.4-21)
2. Stop
3. Retreat
4. Distress or emergency

26. During mine rescue if explosive concentrations of gas are detected in the exhaust air of the fire, what is the first step?

1. Immediately verify the concentrations with a second digital instrument
2. Quickly reverse the fans
3. Teams and any other underground personnel should leave the mine immediately**. (p.5-22)**
4. None of the above.

**If any explosive concentrations of gas are detected in the exhaust air of the fire, all teams and any other underground personnel should leave the mine immediately.**

27. When sealing a mine fire, the only way to keep the air flowing over the fire area is to leave one intake airway and one exhaust airway unsealed while other airways are being sealed.

A. True (p.5-22) B. False

When sealing a mine fire, the only way to keep the air flowing over the fire area is to leave one intake airway and one exhaust airway unsealed while other airways are being sealed.

28. A Class D fire involves non-combustible metals.

A. True B. False (p. 5-50)

**Class D fires** – Fires that involve **combustible** metals

29. When \_\_\_\_\_\_\_\_\_\_\_\_\_ is the ventilation method of recovery being used, be sure that all unnecessary personnel are out of the mine before air is actually directed into the sealed area.

A. direct ventilation (p.7-9)

 B. progressive ventilation

**When this method of recovery is being used, be sure that all unnecessary personnel are out of the mine before air is actually directed into the sealed area.**

30. Gas detectors must measure concentrations of methane from 0.0 percent to

50 percent of volume, oxygen from 0.0 percent to at least 20 percent of volume, and carbon monoxide from 0.0 parts per million to at least 9,999 parts per million.

A. True B. False (p.2-3)

…methane from 0.0 percent to **100** percent of volume, oxygen from 0.0 percent to at least 20 percent of volume, and carbon monoxide from 0.0 parts per million to at least 9,999 parts per million.