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:

1. what harmful gases are present,
2. how much oxygen is in the atmosphere,
3. whether or not gas levels are within the explosive range.
4. All of the above

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.

1. True B. False

3. Gas detectors must measure concentrations of carbon monoxide from 0.0 parts per million to at least 999 parts per million.

1. True B. False

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.

 D. none of the above

5. Carbon Dioxide is a heavier gas and will diffuse rapidly.

1. True B. False

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

1. Carbon Monoxide
2. Water
3. Ignition
4. Methane

7. Clean, dry air at sea level is made up of 78 percent oxygen and 21 percent nitrogen.

1. True B. False

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.

1. Highest
2. Lowest
3. Average
4. Maximum

9. A self-contained breathing apparatus (SCBA) will protect you from all gases.

1. True B. False

~~10. At high concentrations, \_\_\_\_\_\_\_\_ can replace oxygen in the air and act as an asphyxiant, and is also highly explosive.~~  **(REMOVED)**

1. ~~Carbon Monoxide~~
2. ~~Sulfur Dioxide~~
3. ~~Hydrogen Sulfide~~
4. ~~Hydrogen~~

11. Which of the following gases would be considered highly water-soluble?

1. Carbon Monoxide
2. Carbon Dioxide
3. Sulfur Dioxide
4. Hydrogen

12. The effects of a toxic gas depend on concentration, toxicity, and length of exposure.

 A. True 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

14. Any combustible gases in the main exhaust should, if feasible, be

 kept below the LEL. LEL means:

1. Limit ending level
2. Lowest exposure limit
3. Lowest explosive limit
4. 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

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

17. One source for a Class B Fire is titanium.

 A. True B. False

18. Please choose the class for an electrical fire from the choices below:

 A. “A”

 B. “B”

 C. “C”

 D. “D”

19. Methane is not an explosive gas, but it does support combustion.

1. True B. False

20. Carbon monoxide gas will not explode.

 A. True B. False

21. For Carbon Dioxide testing in an underground mine, should you hold your portable detector high, or low?

1. Low B. High

22. The first symptom of carbon monoxide poisoning is:

A. Nausea

B. Slight tightening across the forehead with a possible headache.

C. Dizziness

D. Blurred vision

23. One cause of carbon monoxide is

 A. Bottled breathing air

 B. Oxygen

 C. Fire

 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

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

1. that any indication of fire has been determined.
2. The Team Captain has tested all respiratory devices.
3. Families of the miners involved are being counseled.
4. 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.

1. Carbon Monoxide
2. Hydrogen
3. Nitrogen Dioxide
4. Carbon Dioxide

26. You may recognize \_\_\_\_\_\_\_\_by its distinctive “rotten egg” odor.

 A. Hydrogen

 B. Carbon Dioxide

 C. Carbon Monoxide

 D. Hydrogen Sulfide

~~27. In direct firefighting, the brattice should cover about one-half~~

~~to two-thirds of the area from the floor to the back.~~ **(REMOVED)**

~~A. True 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

29. \_\_\_\_\_\_\_\_\_\_\_\_ is a toxic gas and exposure to .01 to .015 percent (100 to 150 ppm) can be dangerous for even short exposures.

1. Hydrogen
2. Carbon Dioxide
3. Methane
4. Nitrogen Dioxide

30. The explosive range for \_\_\_\_\_\_\_\_\_\_\_\_is 4.0 to

74.2 percent when there is at least 5 percent oxygen present.

1. Hydrogen Sulfide
2. Carbon Dioxide
3. Carbon Monoxide
4. Hydrogen