**Mine Gases**

Questions and Answers taken from PowerPoint Presentations at

<http://miningquiz.com/powerpoints/mine_gases.htm>

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**Carbon Dioxide**

1. What is carbon dioxide (CO2)?

1. It is a colorless gas with a foul odor which is combustible.
2. It is a gas formed by the chemical combination of sulfur and oxygen.
3. Carbon dioxide is a colorless, odorless, combustible gas.
4. Carbon dioxide is a colorless and odorless gas formed by the chemical combination of carbon and oxygen.\*

2. How is carbon dioxide formed in a mine?

1. By combustion, by breathing of miners and animals.
2. By the decay of vegetable matter.
3. By the oxidation of coal by chemical action of acid water on carbonates.
4. All the above.\*

3. What is a product of complete combustion?

1. Carbon Monoxide.
2. Hydrogen.
3. Nitrogen.
4. Carbon dioxide.\*

4. What is the specific gravity of carbon dioxide?

1. Five hundred fifty-five one-thousands (0.555).
2. One (1.000)
3. Nine hundred sixty-five one-thousands (0.967).
4. One and five hundred twenty-nine one-thousands (1.529).\*

5. What is the weight of one (1) cubic foot of carbon dioxide at 60 degrees Fahrenheit and 30.00 inches mercury pressure?

1. Seven hundred sixty-five ten thousandths (0.765) pounds.
2. Eleven hundred seventy ten thousandths (0.1170) pounds.\*
3. Eight hundred forty-six ten thousandths (0.846) pounds.
4. Four hundred twenty-four ten thousandths (0.0424) pounds.

6. Is carbon dioxide combustible?

1. Yes, it can explode at any temperature.
2. Yes, it can explode only at high temperatures.
3. No.\*
4. Yes, but only at low temperatures.

7. Where might concentrated accumulations of carbon dioxide ordinarily be found?

1. Near the roof.
2. Near the floor, in inadequately ventilated places.\*
3. Along the belt lines.
4. In well ventilated places.

8. What effect does carbon dioxide have upon life?

1. Lung ventilation is decreased.
2. It has no effect.
3. Lung ventilation is increased as carbon dioxide increases. When five percent (5%) of carbon dioxide is present lung ventilation has increased three hundred percent (300%) and breathing is laborious and continued exposure is injurious.\*
4. It is extremely poisonous.

9. How is carbon dioxide detected?

1. By the galvanometer.
2. By the iodine peroxide detector.
3. By the photonic method.
4. Usually by a chemical analysis.\*

10. What percent of carbon dioxide is given off by the body during exhalation?

1. Approximately 2.6 to 6.6 percent.\*
2. Approximately 26 to 66 percent.
3. Approximately 16 to 20 percent.
4. Approximately 1.6 to 2.0 percent.

**Carbon Monoxide**

11. What is carbon monoxide (CO)?

1. It is a colorless, odorless, tasteless, inert gas.
2. It is a colorless, odorless, tasteless, combustible and poisonous gas.\*
3. It is a colorless, combustible gas with a disagreeable odor.
4. It is a colorless, odorless, tasteless gas supporting combustion.

12. How can carbon monoxide be detected?

1. With a flame lamp and CO2 tubes.
2. With a flame lamp and SO2 detectors.
3. By carbon monoxide detectors and by chemical analysis.\*
4. With a CO2 tester or small bird.

13. What is the source of carbon monoxide?

1. It is the result of inadequate ventilation.
2. It is produced as a result of the use of explosives.
3. It is the product of incomplete combustion (combustion with insufficient oxygen).\*
4. It is produced when batteries are charged.

14. When is carbon monoxide most likely to be found in mines?

1. When the barometric pressure falls.
2. When there is a mine fire or after an explosion.\*
3. When the barometric pressure rises.
4. When ventilation is less than required by law.

15. What is afterdamp?

1. The atmosphere deficient in oxygen.
2. The atmosphere containing carbon monoxide and oxygen.
3. The atmosphere following an explosion containing carbon dioxide, carbon monoxide, decreased oxygen, nitrogen, hydrogen and smoke.\*
4. The atmosphere containing sulfur dioxide.

16. What kind of engines produce carbon monoxide?

1. Steam engines.
2. Electric engines.
3. Diesel engines.
4. Internal combustion engines.\*

17. What is the principal poisonous gas produced by explosives?

1. Ammonia nitrate.
2. Carbon monoxide.\*
3. Nitrogen peroxide.
4. Carbon dioxide.

18. What effect does carbon monoxide have on life?

1. It is extremely poisonous.\*
2. It supports life and combustion.
3. It has no effect.
4. It increased lung ventilation.

19. How does carbon monoxide cause injury to life?

1. By preventing breathing.
2. By corroding the lung.
3. By combining with the hemoglobin of the blood and excluding oxygen.\*
4. By clotting the blood.

20. What percentage of carbon monoxide will produce symptoms in several hours?

1. Four hundredths of one percent (0.04%).
2. Eight hundredths to twelve hundredths of one percent (0.08% to 0.12%).
3. Two tenths to three tenths of one percent (.2% to 0.3%).
4. Two hundredths of one percent (.02%).\*

21. What percentage of carbon monoxide will produce discomfort in two or three hours?

1. Two hundredths of one percent (0.02%).
2. Four hundredths of one percent (0.04%)\*
3. Eight hundredths to twelve hundredths of one percent (0.08% to 0.12%).
4. Two tenths to three tenths of one percent (0.2% to 0.3%).

22. What percentage of carbon monoxide will produce a tendency to stagger in one and one-half (1½) hours?

1. Two hundredths of one percent (0.02%).
2. Two tenths to three tenths of one percent (0.2% to 0.3%).
3. Eight tenths to twenty hundredths of one percent (0.8% to 0.020%).
4. Eight to twelve hundredths of one percent (.08% - 0.12%) or 800 to 1,200 ppm.\*

23. What percentage of carbon monoxide will produce symptoms of unconsciousness in thirty (30) minutes?

1. Twenty to thirty hundredths of percent (0.20% - 0.30%).\*
2. One percent (1.00%).
3. Thirty hundredths to fifty hundredths percent (0.30% to 0.50%).
4. Five hundredths of one percent (0.05%).

24. How much greater affinity does hemoglobin have for carbon monoxide than for oxygen?

1. About five hundred (500) times.
2. About three hundred (300) times.\*
3. About two hundred (200) times.
4. About one thousand (1,000) times.

25. Why are small quantities of carbon monoxide injurious?

1. Because it is not easily thrown off and accumulates in the blood.\*
2. It immediately coagulates the blood.
3. Because it accumulates in the lungs.
4. It partially paralyzes the action of breathing.

26. What is the specific gravity of carbon monoxide?

1. Nine hundred sixty-seven thousandths (0.967).\*
2. One and five hundred twenty-nine thousandths (1.529).
3. Five hundred fifty-five thousandths (0.555).
4. One (1.00).

27. What is the weight of one (1) cubit foot of carbon monoxide at 60 degrees Fahrenheit and 30.00 inches of mercury pressure?

1. Seven hundred sixty-five ten thousandths of one pound (0.0765).
2. Seven hundred forty ten thousandths of one pound (0.0740).\*
3. Four hundred twenty-four ten thousandths of one pound (0.0424).
4. Eleven hundred seventy ten thousandths of one pound (0.1170).

**Methane**

28. What is methane (CH4)?

1. A colorless, odorless and tasteless combustible gas.\*
2. A colorless, odorless and tasteless poisonous gas.
3. A colorless, odorless and tasteless gas which supports combustion.
4. A colorless, odorless and tasteless inert gas.

29. What is the source of methane in coal mines?

1. It is liberated from coal and adjoining strata.\*
2. It is the chemical combination of water and carbon.
3. It is the chemical combination of air and carbon.
4. It is the chemical combination of oxygen and hydrogen.

30. Where is methane found?

1. In almost all coal mines.\*
2. In some coal mines.
3. On the bottom in some coal mines.
4. In the pores of coal.

31. What is the composition of methane?

1. Carbon and hydrogen (CH3).
2. Carbon and hydrogen (CH4).\*
3. Carbon and hydrogen (CH5).
4. Carbon and hydrogen (CH2).

32. What is the specific gravity of methane?

1. One and five hundred twenty-nine thousandths (1.529).
2. One and nine hundred sixty-seven thousandths (1.967).
3. Five hundred fifty-five thousandths (0.555).\*
4. One (1.000).

33. What is the weight of one cubic foot of methane at 60 degrees Fahrenheit and 30.00 inches of mercury pressure?

1. Seven hundred sixty-five ten thousandths of one pound (1.529).
2. Eight hundred forty-six ten thousandths of one pound (0.0846).
3. Seven hundred forth ten thousandths of one pound (0.740).
4. Four hundred twenty-four ten thousandths of one pound (0.0424).\*

34. Where is methane usually found in mines?

1. In all panel workings and along the floor.
2. Along all longwall faces.
3. Along the roof, to the rises, in the vicinity of working faces, in dead ends and above falls.\*
4. In all dip workings.

35. Why is methane not explosive by itself?

1. Oxygen is required to support combustion.\*
2. Nitrogen is required to support combustion.
3. Carbon dioxide is required to support combustion.
4. None of the above.

36. What is firedamp?

1. An explosive mixture of hydrogen and air.
2. An explosive mixture of methane and air.\*
3. An explosive mixture of carbon dioxide and air.
4. An explosive mixture of carbon monoxide and air.

37. What is the range of explosibility for methane?

1. Between one and five tenths and five tenths percent (1.5% and 0.5%).
2. Between two and twelve and five tenths percent (2% and 12.5%).
3. Between five percent and fifteen percent (5% and 15%).\*
4. Between fifteen and twenty percent (15% and 20%).

38. Why can there be no explosion when the percentage of methane is greater the fifteen percent (15%)?

1. Because the heat liberated by combustion, is dissipated into the air.
2. Because the higher the methane content the higher the explosive limit.
3. It can explode regardless of the methane content.
4. Because the amount of oxygen present is insufficient for rapid combustion to occur.\*

39. What is the percentage of methane required for maximum explosive violence?

1. Five percent (5%).
2. Ten percent (10%).\*
3. Fifteen percent (15%).
4. Twenty percent (20%).

40. What is the percentage of oxygen below which no explosion of a methane air mixture can occur?

1. Twelve percent (12%).\*
2. Ten percent (10%).
3. Fifteen percent (15%).
4. Twenty percent (20%).

41. What effect does an atmosphere with a reduced oxygen content have upon the explosibility of methane?

1. A small percentage of the methane is necessary to cause an explosion.
2. Methane’s explosive limit does not change.
3. A greater percentage of methane is necessary to start an explosion in an atmosphere which contains less than the normal percentage of oxygen.\*
4. Methane’s ignition temperature increases.

42. What effect does the presence of methane have upon the explosibility of coal dust?

1. The coal dust is ignited less easily.
2. The coal dust is more easily ignited and the force of the explosion is greater.\*
3. Methane does not affect the explosibility of coal dust.
4. None of the above.

43. What effect does coal dust in the air have upon the explosibility of methane?

1. The lower explosive limit is increased.
2. The upper explosive limit is increased.
3. The upper explosive limit is increased.
4. The lower explosive limit is decreased.\*

44. How can methane be detected?

 (Although included here, flame safety lamps are no longer in use in coal mines.)

1. By the flame safety lamp, canaries or the iodine peroxide detector.
2. By the flame safety lamp or by the odor.
3. By a flame safety lamp, by the use of methane detectors and testers and by chemical analysis.\*
4. By the flame safety lamp or by the photonic acid detector.

45. What dangerous gas is most likely to be encountered above a pillar fall?

1. Methane.\*
2. Carbon monoxide.
3. Carbon dioxide.
4. Hydrogen sulfide

46. If a split of air of twenty thousand (20,000) cubic feet per minute contains three percent (3%) methane how many cubic feet per minute would be required to reduce the methane content to one percent (1%)?

1. Six thousand six hundred sixty-six (6,666) cubic feet.
2. Six hundred thousand (600,000) cubic feet.
3. Eighty thousand (80,000) cubic feet.
4. Sixty thousand (60,000) cubic feet.\*

47. What is the instrument most often used in detecting methane?

1. The carbide lamp.
2. An approved methane detector.\*
3. CSE-AU-9A1.
4. None of the above.

48. What is the least percentage of methane that can be detected with a flame safety lamp?

 (Although included here, flame safety lamps are no longer in use in coal mines.)

1. Three tenths percent (0.3%).
2. About seventy-five hundredths percent (0.75%).
3. About one percent (1%).\*
4. Five tenths percent (0.5%).

49. What is meant by the diffusion of gases?

1. Their tendency to volatilize.
2. Their tendency to escape confinement.
3. Their capacity to absorb water.
4. Their mixing with each other when they contact.\*

50. How does the diffusion rate of gases vary?

1. Their rates of diffusion vary in inverse proportion to the square roots of their densities. (Light gases diffuse more rapidly than heavy gases).\*
2. Light gases diffuse easier then heavy gases.
3. Heavy gases diffuse more rapidly than light gases.
4. None of the above.

51. Will diffused gases separate from a mixture because of their differences in weight?

1. They will separate only after they are mixed.
2. No, they will not separate or stratify once they have been diffused or mixed.\*
3. Yes, they will separate even after they have been mixed.
4. They will stratify only when they have been subjected to heat.

52. Which is easier to remove, a body of methane or carbon dioxide?

1. Methane would be the easiest to remove because it is lighter than carbon dioxide and diffuses more readily.\*
2. Carbon dioxide, as it is heavier than methane and diffuses slowly.
3. When the temperature is light, carbon dioxide is the easier to move.
4. Methane is easier to remove only when velocity is high.

53. What gas is odorless, tasteless, non-toxic, colorless and explosive in the concentration of 5% - 15%?

1. Carbon monoxide.
2. Oxygen.
3. Nitrogen.
4. Methane.\*

54. Where is methane normally found?

1. Since the specific gravity of methane is .555 which indicates that it is lighter than air, it is normally found in high places.\*
2. Since methane’s specific gravity is 0.555, it is normally found in low places.
3. Methane is normally found at the working areas of the mine.
4. Methane is normally found in abandoned or worked out areas of the mine.

**Oxygen**

55. What element in air is essential for life?

1. Hydrogen.
2. Oxygen.\*
3. Nitrogen.
4. Moisture.

56. What is oxygen?

1. It is a tasteless, odorless, colorless gas which supports life and combustion.\*
2. An explosive gas that gives off a foul odor.
3. It is a tasteless, colorless, odorless gas that does not support life.
4. It is a colorless, tasteless gas that gives off a foul odor.

57. How does the body receive oxygen?

1. Through the windpipe.
2. Through the skin, oxygen is absorbed by osmosis.
3. Through breathing air, the oxygen is taken up by the hemoglobin of the blood and carried to all parts of the body.\*
4. By breaking down the composition of the air.

58. What chemical changes does oxygen undergo in the support of life?

1. The oxygen combines with carbon to form carbon monoxide.
2. The oxygen combines with the carbon contained by waste products in the body and forms carbon dioxide (CO2).\*
3. The oxygen combines with the hemoglobin to support life.
4. All of the above.

59. What is the specific gravity of oxygen?

1. One and one hundred and five thousandths (1.105).\*
2. One thousand seven (1,007).
3. Ninety-seven (97).
4. One hundred (100).

60. What supports the chemical reaction that produces fires and explosions?

1. Nitrogen.
2. Oxygen.\*
3. Carbon dioxide.
4. Carbon monoxide.

61. What percent oxygen can a person most easily work in?

1. Twenty-one percent (21%).\*
2. Seventeen percent (17%).
3. Ten percent (10%).
4. Fifty percent (50%).

62. What percent oxygen will a person breathe faster and deeper?

1. Twenty-five percent (25%).
2. Twenty-one percent (21%).
3. Seventeen percent (17%).\*
4. Thirty percent (30%).

63. The earth's atmosphere consists of what percent oxygen?

1. Approximately three fourths or seventy-five percent (75%).
2. Approximately one half or fifty percent (50%).
3. Approximately one fifth or twenty percent (20%).\*
4. Approximately on fourth or twenty-five percent (25%).

**Nitrogen**

64. What is nitrogen?

1. It is a tasteless, odorless and colorless gas which neither supports life nor combustion.\*
2. It is an explosive gas that gives off a foul odor.
3. It is a colorless, tasteless gas that supports life.
4. A colorless, tasteless, odorless gas that supports combustion.

65. Is nitrogen combustible?

1. Yes.
2. Only under very high temperature.
3. No.\*
4. Yes, but only under high pressure.

66. What effect does nitrogen have towards propagating an explosion?

1. Ignition temperatures of gases are lowered.
2. None.\*
3. The intensity of an explosion is increased.
4. Ignition temperatures of gases are raised.

67. What is the specific gravity of nitrogen?

1. Five hundred fifty-five thousandths (0.555).
2. One and five hundred twenty-nine thousandths (1.529).
3. Nine hundred sixty-seven thousandths (0.967).\*
4. One (1.000).

68. What is the weight of one (1) cubic foot of nitrogen at 60 degrees Fahrenheit and 30.00 of mercury pressure?

1. Seven hundred sixty-five thousandths of one pound (0.0765).
2. Seven hundred fifty ten thousandths of one pound (0.0750).\*
3. Seven hundred forty-six ten thousandths of one pound (0.0746).
4. Eight hundred forty-six ten thousandths of one pound (0.0846).

69. What effect does nitrogen have upon life?

1. It has no effect, except when it depletes oxygen to the extent that there is a deficiency of oxygen.\*
2. Small amounts can be fatal.
3. It makes breathing easier.
4. It irritates the eyes and nostrils.

70. Does nitrogen have an ignition temperature?

1. No, nitrogen will not explode.\*
2. Yes, two hundred twelve (212) degrees Fahrenheit.
3. Yes, if the nitrogen content is at least fourteen percent (14%0 of the atmosphere.
4. Yes, when mixed with at least twenty percent (20%) of oxygen.

71. The earth's atmosphere consists of what percent nitrogen?

1. Approximately four fifths or eighty percent (80%).\*
2. Approximately one fifth or twenty percent (20%).
3. Approximately one half or fifty percent (50%).
4. Approximately one fourth of twenty-five (25%).

**Nitrogen Peroxide**

72. What is nitrogen peroxide (NO2)?

1. It is non-poisonous, incombustible gas.
2. It is an extremely poisonous gas frequently formed by the burning of high explosives.\*
3. It is a combustible, non-poisonous gas, yellow in color.
4. It is a poisonous gas with a foul odor.

73. What is the specific gravity of nitrogen peroxide?

1. One and five hundred eighty-nine one-thousandths (1.589).\*
2. Nine hundred sixty-seven one thousandths (0.967).
3. One and one hundred ninety-one one-thousandths (1.191).
4. One and five hundred twenty-nine one thousandths (1.529).

74. What is the weight of a cubic foot of nitrogen peroxide at 60 degrees Fahrenheit and 30.00 inches of mercury pressure?

1. Seventeen hundred thirty-three ten-thousandths (0.1733) of one pound.
2. Nine hundred eleven ten-thousandths (0.0911) of one pound.
3. Twelve hundred seventeen ten-thousandths (0.1217) of one pound.\*
4. Seven hundred sixty-five ten-thousandths (0.0765) of one pound.

75. Is nitrogen peroxide combustible?

1. Yes, always.
2. No, it is incombustible.\*
3. Yes, but only in areas with a high oxygen content.
4. Yes, but only in areas with a low oxygen content.

76. What percentage of nitrogen peroxide will be fatal?

1. A concentration of one percent(1%).
2. An extremely low concentration of one thousandths of one percent (0.001%).
3. A concentration on one tenth of one percent (0.1%).
4. Extremely low concentrations, probably about one hundredth of one percent (0.01%).\*

77. How may traces of nitrogen peroxide be detected?

1. A paper soaked in a solution of starch and potassium iodine will turn blue when exposed to nitrogen peroxide.
2. A paper soaked in a solution of acetate of lead.
3. By a flame safety lamp.
4. By chemical analysis.\*

78. What are the first effects of nitrogen peroxide on a person?

1. It blurs the vision.
2. It gives off a foul odor.
3. It creates a feeling of dizziness.
4. It is extremely irritating to the nostrils and the eyes.\*

79. What is the particular danger of nitrogen peroxide?

1. It is extremely explosive.
2. Relatively small quantities may cause death even after apparent recovery.\*
3. Poisonous but only in large quantities.
4. There is no danger.

**Hydrogen**

80. What is hydrogen (H2)?

1. It is a colorless, explosive gas with a foul odor.
2. It is a colorless, odorless and tasteless, explosive gas.\*
3. It is a colorless, odorless, tasteless, non-explosive gas.
4. It is a colorless, odorless, tasteless, poisonous gas.

81. How is hydrogen formed in a mine?

1. It is formed by decomposing sulfur compounds.
2. It is formed by electrical arcing.
3. It is formed by mine fires, explosions and by charging batteries.\*
4. It is formed by decomposing timbers.

82. Is hydrogen explosive?

1. Yes, it is explosive over a small range.
2. No.
3. Yes, it is explosive, but only at high temperatures.
4. Yes, it is explosive over a wide range.\*

83. What is the specific gravity of hydrogen?

1. It is the heaviest of all gases. Specific gravity one and five hundred twenty-nine thousandths. (1.529).
2. The specific gravity is five hundred fifty-five thousandths (0.555).
3. It is the lightest of all gases. Specific gravity seven hundredths (0.07).\*
4. The specific gravity is nine hundred sixty-seven thousandths (0967).

84. What is the weight of one cubic foot of hydrogen at 60 degrees Fahrenheit and 30.00 inches of mercury pressure?

1. Five hundred fifty-five ten thousandths (0.0555) of one pound.
2. Fifty-three ten thousandths (0.0053) of one pound.\*
3. Seventy-six thousandths (0.076) of one pound.
4. Fifty-five thousandths (0.055) of one pound.

85. What is the explosive range of hydrogen?

1. From four and one tenth percent (4.1%) to seven and four tenths percent (7.4%).
2. From forty-one percent (41% to seventy-four percent (74%).
3. From four and one-tenth percent (4.1%) to seventy-four percent (74%).\*
4. Seven and four tenths percent (7.4%) to forty-one percent (41%).

86. What is the ignition temperature of hydrogen?

1. Six hundred fifty-five (655) degrees Fahrenheit.
2. Twelve hundred (1,200) degrees Fahrenheit.935 degrees Fahrenheit.
3. Eleven hundred ninety (1,190) degrees Fahrenheit.
4. Nine hundred thirty-five (935 degrees Fahrenheit.\*

87. How is hydrogen detected?

1. By the use of litmus paper.
2. By the Riken gas detector.
3. By the Bacharach Electronic Canary.
4. By chemical analysis.\*

**Hydrogen Sulfide**

88. What is hydrogen sulfide?

1. A colorless, odorless, incombustible gas.
2. A poisonous gas, yellow in color which is combustible.
3. It is a poisonous, combustible, colorless gas having a taste and odor like rotten eggs.\*
4. A non-poisonous, combustible gas with an odor like rotten eggs.

89. What mine gas can be detected by its odor?

1. Hydrogen sulfide.\*
2. Carbon monoxide.
3. Methane.
4. Carbon dioxide.

90. What is the origin of hydrogen sulfide?

1. It is liberated by old timbers.
2. It is liberated by burning explosives containing sulfur such as black powder or dynamite.\*
3. It is liberated from pools of stagnant water in the mine.
4. It is liberated when the methane content of air reaches five (5%0 percent or above.

91. How can hydrogen sulfide be detected other than by sense of smell?

1. By the Bacharach Electronic Canary.
2. By the color.
3. By the flame safety lamp.
4. By the hydrogen sulfide detector, by paper dipped in acetate of lead, which will turn black immediately on exposure to hydrogen sulfide, or by chemical analysis.\*

92. What is the specific gravity of hydrogen sulfide?

1. Five hundred fifty-five one thousandths (0.555).
2. One and one hundred ninety-one one thousandths (1.191).\*
3. One and five hundred twenty-nine one thousandths (1.529).
4. Nine hundred sixty-seven one thousandths (0.967).

93. What is the weight of one (1) cubic foot of hydrogen sulfide at 60 degrees Fahrenheit and 30.0 0 inches of mercury pressure?

1. Nine hundred eleven ten-thousandths (0.0911) pound.\*
2. Seven hundred forty ten-thousandths (0.0740) pound.
3. Eleven hundred seventy ten-thousandths (0.1170) pound.
4. Four hundred twenty-four ten-thousandths (0.0424) pound.

94. What is the range of explosibility of hydrogen sulfide?

1. Four and six tenths percent (4.6%) to forty-three percent (43%).
2. Forty-three percent (43%) to forty-six percent (46%).
3. Four and three-tenths (4.3%) to forty-six percent (46%).\*
4. Four and three-tenths percent (4.3%) to four and six tenths percent(4.6%).

95. Is hydrogen sulfide poisonous?

1. Only in confined areas.
2. No, it is not poisonous.
3. Yes, but only in large amounts.
4. Yes, it is extremely poisonous even in small amounts.\*

96. What is the most violent explosive point of hydrogen sulfide?

1. Forty-six percent (46%).
2. Fifteen percent (15%).
3. Fourteen percent (14%).\*
4. Ten percent (10%).

97. What is the temperature of ignition of hydrogen sulfide?

1. Six hundred fifty-five (655) degrees Fahrenheit.\*
2. Thirteen hundred (1,300) degrees Fahrenheit.
3. Nine hundred sixty (960) degrees Fahrenheit.
4. Twelve hundred (1,200) degrees Fahrenheit.

98. What percent of hydrogen sulfide will become dangerous after a 1/2 hour?

1. Five one-thousandths (0.005) to seven one-hundredths (0.07).\*
2. Five tenths (0.5) to eight tenths (0.8).
3. Ten one-hundredths (0.10).
4. Twenty-five one hundredths (0.25) to thirty one-hundredths (0.30).

99. What is the immediate effect of hydrogen sulfide on a person?

1. It causes disorientation.
2. It is extremely nauseating.
3. It has no effect.
4. It is extremely irritating to the eyes.\*

**Sulfur Dioxide**

100. What is sulfur dioxide (SO2)?

1. A colorless, suffocating, irritating, poisonous gas.\*
2. A colorless, odorless, combustible gas.
3. A noncombustible, poisonous gas.
4. A combustible, nonpoisonous gas.

101. How is sulfur dioxide formed in a mine?

1. By burning coal containing pyrites or by the firing of black powder.\*
2. By decomposing hydrogen compounds.
3. By burning coal not containing pyrites or by the firing of nitrates.
4. By decomposing nitrogen compounds.

102. What is the specific gravity of sulfur dioxide?

1. One and five hundred twenty-nine one-thousandths (1.529).
2. Two and two hundred sixty-three one-thousandths (2.263).\*
3. Five hundred fifty-five one-thousandths (0.555).
4. Nine hundred sixty-seven one-thousandths (0.967).

103. What is the weight of a cubic foot of sulfur dioxide at 60 degree Fahrenheit and 30.00 inches of mercury pressure?

1. Seven hundred sixty-five ten thousandths (0.0765) pounds.
2. Eleven hundred seventy ten thousandths (0.1170) pounds.
3. Twelve hundred seventeen ten thousandths (0.1217) pounds.
4. Seventeen hundred thirty-three ten thousandths (0.1733) pound.\*

104. What is the particular danger of sulfur dioxide?

1. It is extremely combustible.
2. It caused oxygen deficiency.
3. It is extremely poisonous even in small amounts.\*
4. It may cause coal dust explosions.

105. How is sulfur dioxide detected?

1. By chemical analysis.\*
2. By the sense of smell and its effect on the air passages.
3. By the use of litmus paper.
4. By its pale yellow color.

106. What is the first effect on a person exposed to sulfur dioxide?

1. It is extremely irritating and suffocating and is intolerable to breathe.\*
2. Lung ventilation is increased.
3. It has the odor of rotten eggs.
4. The eyes water.

107. Is sulfur dioxide combustible?

1. Yes, extremely combustible.
2. Only when present with carbon dioxide.
3. No, it is incombustible.\*
4. Only when present with methane.