**2013 Northern Mine Rescue Contest**

**Written Exam**

**(Technician Team Competition)**



**2010**

**2013**

**July 16, 2013**

**Rochester, New York**

**2013 Northern Mine Rescue Contest**

**Rochester, NY**

**Written Test – Technician Team**

**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.**

**Draeger BG-4 Questions:**

1. When checking the relief valve, opening pressure gauge should be between 2 and 5 Lpm.  
     
   a. True

b. False

1. Repair and general overhaul of the apparatus can only be performed by Draeger personnel.  
      
   a. True

b. False

1. The constant dosage metering quantity should lie between 1.5 and 1.9 Lpm.

a. True

b. False

1. If drainage valve opens too early or too late, this can be caused by incorrect spring pressure.

a. True

b. False

1. When checking the inhalation valve while testing, set the tester to negative pressure.

a. True

b. False

1. When checking the Inhalation Valve – if the system does not reach 10 mbar:

a. Replace the exhalation hose.

b. Check the test apparatus for leaks.

c. Replace the inhalation hose.

d. Replace the inhalation valve or valve disc.

e. None of the above.

1. When checking the Pressure Relief Valve:

a. Sentinel low pressure warning indicates valve failure.

b. Opening pressure should lie between 3 and 6 mbar.

c. Replace the pressure relief valve if opening pressure lies between 2 and 5 mbar.

d. Set the test unit to “negative pressure pumping.”

e. None of the above

1. Using Sentinel which of the following would not produce a successful high pressure leak test?

a. Open Cylinder Valve is displayed.

b. Oxygen cylinder pressure below 2,600 psi

c. “X” is displayed with 4 bleeps and red LEDs flashing.

d. Both b. and c.

e. None of the above

1. Welding grade oxygen can be used to fill the BG-4 oxygen cylinders.
2. True

b. False

1. During the shelf-life of the apparatus with the CO2 cartridge installed the operating test can be run:

a. Total of 4 times with each test lasting no more than 10 minutes.

b. Total of 8 times with each test lasting no more than 5 minutes.

c. Total of 6 times with each test lasting no more than 15 minutes.

d. Total of 10 times with each test lasting no more than 20 minutes.

e. None of the above

1. When checking the response threshold of the Low Pressure Warning the alarm should activate below \_\_\_\_\_\_\_\_\_\_\_.

a. 1.4 mbar

b. 2.8 mbar

c. 2.2 mbar

d. 1.8 mbar

e. None of the above

1. Oxygen cylinder safety precautions include: \_\_\_\_\_\_\_\_\_\_\_\_.
2. Check charging pressure before use.
3. Do not allow oils or grease to contact the cylinder valve.
4. Handle oxygen cylinders with care to prevent damage/rupture.
5. All of the above
6. None of the above

**Multi-gas Instrument (iTX or MX6) Questions:**

1. Oxygen deficient atmospheres may cause readings of combustible (methane) gas to be lower than actual concentrations.  
   1. True
   2. False
2. Silica can affect the combustible gas sensor and may cause readings to be lower than actual gas concentrations.  
   1. True
   2. False
3. Sudden changes in atmospheric pressure will not cause temporary fluctuations in the oxygen reading.  
   1. True
   2. False
4. The manufacturer recommends that a functional (bump) test be performed on the gas instrument after each day's use.  
   1. True
   2. False
5. The iTX and the MX6 ibrid use a hydrogrn 2-ion battery.  
   1. True
   2. False
6. When the battery life is nearing its end, the following occurs.

(Answer the question for your gas instrument below)

|  |  |
| --- | --- |
| For the iTX, with a minimum of 30 minutes of battery life, the unit will emit a periodic tone. | For the MX6 iBrid, if the remaining runtime is less than 30 minutes, “Low Battery” is displayed. |

* 1. True
  2. False

1. While in the normal operational mode the screen on your instrument shows the battery at the \_\_\_\_\_\_\_\_ of the screen.  
   1. top middle
   2. top right
   3. bottom middle
   4. bottom right
   5. None of the above
2. Industrial Scientific recommends that a full instrument calibration be performed \_\_\_\_\_\_.  
   1. Daily
   2. Weekly
   3. Monthly
   4. None of the above
3. If there is an oxygen sensor installed in the iTX or MX6, it is calibrated during the zeroing operation.  
   1. True
   2. False
4. During calibration of the iTX or MX6, what is the recommended flow rate?
   1. 0.5 Lpm
   2. 1.5 Lpm
   3. 2.0 Lpm
   4. 2.5 Lpm

**MSHA Publication 3027 (Module 2 – Mine Gases and Module 3 – Ventilation) Questions:**

1. It is much easier for concentrations of explosive gases to build up when the barometric pressure is high.  
   1. True
   2. False
2. Air containing 4.0 % to 74.2 % hydrogen will explode even when there is as little as 5.0 % oxygen present.  
   1. True
   2. False
3. Porous stoppings such as concrete block stoppings are usually plastered \_\_\_\_\_\_\_\_\_ to reduce air leakage.  
   1. on the low-pressure side
   2. on the high-pressure side
   3. on both sides
   4. None of the above
4. Firefighting with water or foam cannot produce hydrogen.  
   1. True
   2. False
5. Which of the following is not a property of Carbon Dioxide?  
   1. Carbon Dioxide will neither burn nor explode
   2. Carbon Dioxide has a specific gravity of 1.5 (rounded to the nearest tenth)
   3. Carbon Dioxide is colorless and odorless
   4. In normal air, Carbon Dioxide is about 0.3 percent
6. Smoke is not normally considered to be an asphyxiant.  
   1. True
   2. False
7. A disrupted ventilation system could result in an oxygen-rich atmosphere.  
   1. True
   2. False
8. If the oxygen content of the air drops as low as 14 percent, a person may lose consciousness.  
   1. True
   2. False