

Team Technician (Bio) Written Test  
2012 Nevada Regional Contest  
March 14-15, 2012  
Winnemucca, NV

Name: \_\_\_\_\_ Company: \_\_\_\_\_

Team Name: \_\_\_\_\_ Contest Position #: \_\_\_\_\_

Team Member #: \_\_\_\_\_

**Please circle your answer. If you make a mistake make sure that you fully erase any marks.**

1. If a slight leak occurs in the breathing loop/circuit or facemask seal, the user generally will:
  - A. Hit the demand valve more often
  - B. Reduce duration
  - C. Increase oxygen consumption
  - D. All of the Above
  - E. None of the Above
  
2. The Check valves in mask/hose adapter perform a critical function. Which of the following is **not** true:
  - A. They control the directional flow of inhalation and exhalation gasses
  - B. They control the amount of oxygen being metered out from the oxygen cylinder
  - C. The inhalation valve is closed during exhalation
  - D. The exhalation valve is closed during inhalation
  
3. My Mine Rescue Closed Circuit Breathing Apparatus does **not** use AIR in the cylinder because:
  - A. Air does not have any oxygen
  - B. Air has too much CO<sub>2</sub>
  - C. The manufacturer specifies Oxygen
  - D. Air has 21% oxygen by volume, & for Closed-Circuit apparatus that is not enough
  - E. Both C & D
  
4. When refilling your oxygen cylinder it is NOT acceptable to:
  - A. Fill the cylinder to 4000 psig so I can get more than 4-hours
  - B. Use lubricants such as Vaseline or petroleum jelly on the cylinder components
  - C. Use welders grade Oxygen
  - D. Use a booster pump in an area filled with hydrocarbons and open ignition sources
  - E. All the above
  
5. Typically a Closed Circuit Breathing Apparatus has:
  - A. Cylinder or High pressure, regulated or reduced pressure, and breathing circuit or breathing loop pressure
  - B. Only oxygen pressure
  - C. Only Oxygen and CO<sub>2</sub> pressure
  - D. Only Mask pressure

6. Which of the following is a correct statement:
- A. It is acceptable to reuse CO2 absorbent
  - B. It is acceptable to use unapproved CO2 absorbent material in my apparatus
  - C. CO2 absorbent material left exposed to ambient air for 48 hours is approved for use
  - D. It is acceptable to store CO2 absorbent at temperatures below freezing
  - E. None of the Above
7. Prior to donning the apparatus you notice that the harness has been modified by a previous user. The user cut extra holes in the straps to hold some of his gear and now the harness appears compromised. What best describes your actions:
- A. Do nothing, everyone does it and it's not going to hurt anything, it's just the harness
  - B. Scream obscenities at the guy who last used it telling him he just ruined a perfectly good harness.
  - C. Replace or repair the harness per the manufacturer's recommendations.
  - D. None of the above
8. It is an acceptable practice to store your apparatus for long term in the manufacturer's hard storage case when it is:
- A. Clean but wet
  - B. Right after it has been used and is still wet
  - C. Washed/disinfected, dried and properly assembled for storage and properly benched
  - D. Just throw it in the case and let someone else worry about it later.
9. During startup or donning you get a failure or you do not hear the alarm test. What best describes your actions:
- A. Place the apparatus into service
  - B. Bench the apparatus and repair per manufacturer's recommendations
  - C. Replace the battery or check your whistle
  - D. Tell your team member not to worry because you are only going underground for 1-hour
10. When handling compressed oxygen connections caution is used to ensure:
- A. No special requirements are necessary
  - B. Connections, fittings and components must be clean and oil and grease free
  - C. It is handled just like my grill propane tank
  - D. B & C

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

**Industrial Scientific Corporation Gas Instruments:**

11. According to the gas instrument manual, a functional (bump) test is defined as a brief exposure of the monitor to a known concentration of gas(es) for the purpose of verifying sensor and alarm operation and is not intended to be a measure of the accuracy of the instrument.
- A. True
  - B. False

12. In non-latching mode for the gas instrument, all high alarm conditions (and not in Over Range condition) will clear or turn off automatically when the gas concentration has decreased to a level below the high alarm setpoint.

- A. True
- B. False

13. The iTX and MX6 gas instruments can not accept zinc-carbon battery types.

- A. True
- B. False

14. According to the gas manufacturer's recommendation, a full instrument calibration should be performed bi-monthly to ensure maximum accuracy

- A. True
- B. False

15. When the gas instrument is in non-latching mode, alarms set according to the Technician Team Competition in Contest Rule Book and exposed to 19.9% Oxygen, 0.2% Methane, 40 ppm Carbon Monoxide and 4 ppm Nitrogen Dioxide, it will \_\_\_\_.

- A. be in high alarm condition
- B. display "40" for the Carbon Monoxide reading
- C. display "4" for the Nitrogen Dioxide reading
- D. all of the above
- E. none of the above

16. When the gas instrument is exposed to 99 PPM nitrogen dioxide, it will \_\_\_\_\_

- A. remove power from the nitrogen dioxide sensor.
- B. display "+OR" or "OR" for the nitrogen dioxide reading.
- C. display "99.0" on the nitrogen dioxide reading.
- D. both A and B
- E. None of the above

17. The maximum display range for the (catalytic) combustible\methane\LEL sensor is \_\_\_\_\_

- A. 10% Methane
- B. 100% Methane
- C. 50% LEL
- D. None of the above

18. If the sensor's full span value or span reserve is less than \_\_\_\_\_ of the applied (calibration) gas value\ concentration, the gas sensor will fail calibration.
- A. 30%
  - B. 50%**
  - C. 70%
  - D. 90%
  - E. 100%
19. What is the recommended flow rate during calibration of the gas instrument?
- A. 2.0 liter per minute (LPM)
  - B. 2.5 liter per minute (LPM)
  - C. 3.0 liter per minute (LPM)
  - D. 4.0 liter per minute (LPM)
  - E. none of the above**
20. According to the gas instrument manual, silicone compound vapors may cause readings of combustible (methane) gas to be \_\_\_\_\_ than gas concentrations.
- A. higher
  - B. the same
  - C. lower**
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21. Oxygen is an explosive gas and supports combustion.
- A. True
  - B. False**
22. Specific gravity (or relative weight) of a gas is its weight in relation to an equal amount of normal air under the same temperature and pressure.
- A. True**
  - B. False
23. The basic principle underlying mine ventilation is that air always moves from high pressure regions to low pressure regions.
- A. True**
  - B. False
24. The traverse method is used when \_\_\_\_\_
- A. taking a reading with a smoke tube.
  - B. taking a reading with an anemometer.**
  - C. taking a reading with a psychrometer.
  - D. erecting bulkheads to form an air lock
  - E. none of the above.

25. High NO<sub>2</sub> readings could indicate that
- A. Explosives are burning
  - B. Malfunctioning electrical equipment is arcing
  - C. Inadequate ventilation with diesel equipment operating
  - D. All of the above
26. The rule-of-thumb when altering ventilation is to direct only fresh air into an unexplored area.
- A. True
  - B. False
27. Exposure to an atmosphere containing 6% of oxygen or less will almost always result in death
- A. True
  - B. False
28. Temporary bulkheads can be constructed by fitting brattice around a piece of equipment.
- A. True
  - B. False
29. A medium- velocity (or “regular”) anemometer is used to measure air velocities from 100 to 2,000 feet per minute?
- A. True
  - B. False
30. Which of the following gases is not toxic?
- A. Oxides of Nitrogen
  - B. Ethane
  - C. Acetylene
  - D. All of the Above