

**2010 Metal/Nonmetal Mine Rescue Contest**  
**TECHNICIAN TEAM WRITTEN TEST-BIO 240 S/R**

1. Oxygen deficient atmospheres may cause readings of combustible (methane) gas to be \_\_\_\_\_ than actual concentrations.

- A. higher
- B. the same
- C. lower

2. Which of the following may cause the combustible gas sensor to read lower than actual gas concentrations?

- A. Silicone compound vapors
- B. Oxygen enriched atmospheres
- C. Sudden changes in atmospheric pressure
- D. all of the above
- E. only A and C

3. Sudden changes in atmospheric pressure may cause temporary fluctuations in the \_\_\_\_\_ reading.

- A. Carbon monoxide
- B. Methane
- C. nitrogen dioxide
- D. oxygen
- E. all of the above

4. When the gas instrument is in the normal operating\gas viewing mode, each segment (TMX412) or shaded area (ITX) of the battery status indicator represents approximately \_\_\_\_\_ of operating time.

For TMX412:

- A. 15 minutes
- B. 30 minutes
- C. 1 hour
- D. 10%

For ITX

- A. 5%
- B. 10%
- C. 25%
- D. 30 minutes

5. With the exception of \_\_\_\_\_ gas over-range, all over-range conditions will clear automatically when the gas concentration has decreased to a level within the display range of the gas instrument in non-latching mode.

- A. carbon monoxide
- B. nitrogen dioxide
- C. combustible
- D. oxygen
- E. None of the above

6. In latching mode for the gas instrument, all high alarm conditions (and not in Over Range condition) will clear automatically when the gas concentration has decreased to a level below the high alarm set point.

- A. True
- B. False

7. The oxygen sensor will calibrate to room (clean) air at \_\_\_\_\_

- A. 20.0%
- B. 20.5%
- C. 20.9%
- D. 23.0%

8. According to the manufacturer's recommendation, how often should the gas instrument be calibrated?

- A. Before each day's use
- B. When gas instrument shows a noticeable loss of sensor sensitivity
- C. Once a week
- D. Once a month

9. If the sensor's full span value or span reserve is less than \_\_\_\_\_ of the applied (calibration) gas value\concentration, the sensor will fail calibration.

- A. 30%
- B. 50%
- C. 70%
- D. 90%
- E. 100%

10. The gas instrument measures nitrogen dioxide in \_\_\_\_\_ increments.

- A. 0.01 PPM
- B. 0.1 PPM
- C. 1 PPM
- D. 0.1 PPB

**From MSHA Publication 3027 Modules 2 and 3: (Revised 2008)**

11. It is important to “control” and “course” air underground so that it reaches only the area miners are working.

- A. True
- B. False

12. A person can tolerate concentrations of  $\frac{1}{2}$  of 1 percent CO<sub>2</sub> over an 8-hour daily period without harmful effects.

- A. True
- B. False

13. Its much easier for concentrations of explosive gases to build up when the barometric pressure is high.

- A. True
- B. False

14. Air containing 4 to 74.2 percent hydrogen will explode even when there is as little as 5 percent oxygen present.

- A. True
- B. False

15. Porous stopping's such as concrete block stoppings are usually plastered \_\_\_\_\_ to reduce air leakage.

- A. low-pressure side
- B. high-pressure side
- C. both sides
- D. none of the above

16. Mine doors are \_\_\_\_\_
- A. used to keep air flowing in the travel way.
  - B. used to vacillate separate splits of air.
  - C. always hung so that the ventilation pressure will push them open.
  - D. all of the above
  - E. **none of the above**
17. Firefighting with water or foam can not produce hydrogen.
- A. True
  - B. **False**
18. Which of the following is not a property of carbon dioxide?
- A. Will neither burn or explode
  - B. Has a specific gravity of 1.5 (rounded to the nearest tenth)
  - C. Is colorless and odorless
  - D. **Normal air contains about 0.3 percent of carbon dioxide**
19. Ethane is often detected along with methane in mines that have methane and like methane is much lighter than air.
- A. True
  - B. **False**
20. Smoke is not normally considered to be an asphyxiate.
- A. **True**
  - B. False

## **BIO 240 Questions**

21. MSHA requires that Periodic Maintenance be performed at least \_\_\_\_\_ on Mine Rescue Breathing Apparatus.
- A. Daily
  - B. Weekly
  - C. Every 30 days
  - D. Quarterly
22. Carbon Fiber wrapped Oxygen cylinders must be hydrostatically tested every \_\_\_\_\_.
- A. One year
  - B. Three years
  - C. Five years
  - D. Fifteen years

23. In a properly working positive pressure NIOSH/MSHA approved closed circuit breathing apparatus the pressure inside the breathing loop/circuits is:

- A. Lower than ambient
- B. The same as ambient
- C. The same as cylinder pressure
- D. Slightly higher than ambient

24. 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. None of the above

25. Turn-around maintenance should be performed \_\_\_\_\_.

- A. As soon as possible after every use
- B. On monthly basis
- C. During periodic maintenance
- D. During long term maintenance

26. There are various methods to eliminate or reduce mask fogging. Which one is the least likely to work:

- A. Depress the emergency By-pass valve
- B. Use an approved wiper
- C. Use an approved anti-fog spray or solution
- D. B&C

27. When completing washing/disinfection during turn-around maintenance users may use any antibacterial cleaner they chose because \_\_\_\_\_;

- A. Bleach works on any germ so I can use it
- B. Alcohol is used in hospitals so it works on any apparatus
- C. Any liquid detergent is OK since it won't hurt the users skin
- D. None of the above

28. What will BEST result in the best cooling of breathing gasses:

- A. Install the gel tube/ice canister just prior to donning
- B. Install the gel tube/ice canister during benching back at the bench station
- C. Do not use the gel tube/ice canister at all
- D. Use only partially frozen gel/ice canister

29. During rescue operations in oxygen deficient and high CO atmosphere a team member's apparatus goes into low oxygen alarm. Which best describes your actions:

- A. Do nothing, press on with the rescue
- B. Tell the team member to breath slower
- C. Tell the team member to go back to the fresh air base alone
- D. Each team member checks their oxygen supply and the team retreats to correct the problem
- E. Have him change out the oxygen cylinder.

30. If the constant add or the demand valve fails in your apparatus, the user can still manually fill the breathing chamber by activating:

- A. Emergency By-pass valve
- B. Demand valve
- C. Relief valve
- D. Check Valve