BIO 240 TECHNICIAN TEAM WRITTEN TEST
Southwestern Regional Mine Rescue Contest
Industrial Scientific Corporation Gas Instruments: iTX and MX6
Ruidoso, New Mexico - 2011

1. 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

2. When completing washing/disinfection during turn-around maintenance users may use any antibacterial cleaner they choose because
   A. Bleach works on any germ so I can use it
   B. Alcohol is used in hospitals so it works on my apparatus
   C. Any liquid detergent is OK since it won't hurt my skin
   D. None of the above

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 CO2
   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. What will 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 rescue station
   C. Do not use the gel tube/ice canister at all.
   D. Use only partially frozen gel tube/ice canister

5. 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

6. Under extremely heavy work conditions, if the user inhales and collapses the diaphragm as far as it can travel, it activates the
   A. By-Pass Valve
   B. Demand Valve
   C. Relief Valve
   D. Check Valve

7. If the constant add or the demand valve fails in your apparatus, the user can still manually fill the breathing chamber by activating the
   A. Emergency By-Pass Valve
   B. Demand Valve
   C. Relief Valve
   D. Check Valve

8. If the user exhales and the breathing diaphragm/breathing chamber fills to a specified capacity, the breathing chamber will cause the activation of the
   A. By-Pass Valve
   B. Demand Valve
   C. Relief/vent Valve
   D. Check Valve

9. What specifically controls the directional flow of the breathing gasses:
   A. The hoses
   B. The mask
   C. The breathing bag or chamber
   D. The CO2 scrubber/absorber
   E. The check valves

10. 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 CO2 pressure
    D. Only Mask pressure

11. What can be determined by the specific gravity of a gas?

    A. Where the gas will stratify in still air.
    B. Determines the explosive range of the gas.
    C. How easily the gas will diffuse.
    D. A and C
    E. All of the above

12. What does the presence of sulfur dioxide indicate?

    A. Inadequate ventilation around battery charging station
    B. Burning of diesel fuel
    C. A sulfide ore dust explosion has occurred
    D. B and C
    E. All of the above

13. Atmospheric pressure does not affect the diffusion rate of a gas.

A. True
B. False

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

A. True
B. False

15. Smoke is not normally considered to be an asphyxiate.

A. True
B. False

16. Before changes are made to the ventilation system, the Command Center should consider _____.

A. Stopping the main fan before making changes
B. How alterations will affect ventilation in the unexplored area
C. Wrong alterations could cause changes in the air at the fresh air base
D. B and C
E. All of the above

17. Using smoke cloud method, what is the air velocity when the smoke cloud travels a measured distance of 30 feet in 15 seconds?

A. 120 ft./min
B. 125 ft./min.
C. 130 ft./min.
D. 135 ft./min

18. Porous stopping's such as concrete block stoppings are usually plastered on the low-pressure side.

A. True
B. False

19. During exploration of the mine, [a mine rescue team's] initial responsibility will be to repair any damaged or destroyed ventilation controls.

A. True
B. False

20. To obtain the "flow" of air through a mine there must be a difference in air velocity between the intakes and exhaust airways.

A. True
B. False

21. For the purposes of contest work, no barricade will be entered without ventilating in front of the barricade if _____

A. Hydrogen Sulfide (H_2S) exceeds 0.01%
B. Nitrogen Dioxide NO_2) exceeds 0.002%
C. Carbon Monoxide (CO) exceeds 0.12%
D. A and C
E. All of the above

22. Before making changes to ventilation, the team must _____.

A. exit the affected area
B. conduct an apparatus check
C. inform the official in charge
D. none of the above

23. Which of the statements are correct regarding the acceptable limits for the gas box test?

A. Oxygen within plus 1.0% by volume
B. Carbon Monoxide within plus or minus 20% of actual reading
C. Nitrogen Dioxide within plus or minus 5% of actual reading
D. All of the above

24. 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. True
B. False

25. The Peak Reading screen will display the highest toxic, explosive and oxygen gas concentrations since the peak reading was last cleared.

A. True
B. False

26. Catalytic diffusion sensors are used for detecting combustible gases.

A. True
B. False

27. Explosive gas reading can be configured to read in _____.

A. Percent by volume
B. Parts per million (PPM)
C. Percent of lower explosive limit (LEL)
D. A and C
E. All of the above

28. The real time operation screen can be made to display _____.

A. Gas concentrations for sensors installed
B. Data logging configuration
C. Battery status
D. A and C
E. All of the above

29. Electrochemical sensors are used for detecting

A. Combustible gases
B. Toxic Gases
C. Oxygen
D. B and C
E. All of the above

30. It takes _____ to get 90% sensor response time for an electrochemical sensor on the typical response curve.

A. 5 seconds
B. 15 seconds
C. 30 seconds
D. 60 seconds