Southwest Regional Mine Rescue Contest 2012
Carlsbad, NM
BG4-Technician Team Written Test

Contestants Name_____ **Company**_____

Team Name_____ **Draw Number**_____

Circle the correct answer
Answers test 1

1. A
2. B
3. A
4. B
5. A
6. B
7. D
8. A
9. A
10. A

From MSHA Publication 3027 Module 2 Mine Gases

1. A gas is a substance with neither a definite shape nor volume.
   A. True pg 2-5
   B. False

2. An increase in pressure causes a gas to contract.
   A. True pg 2-5
   B. False

3. An increase in temperature causes a gas to expand.
   A. True pg 2-5
   B. False

4. Pressure exerted on a gas is _____ atmospheric pressure.
   A. never

B. always
C. usually pg 2-5

5. The rate of diffusion is greatly decreased by higher velocities of air currents
   A. True
   B. False pg 2-5

From MSHA Publication 3027 Module 3 Ventilation

6. Blower fans are used mostly in mines having:
   A. excessive overburden
   B. no overburden
   C. little overburden pg 3-4

7. Urethane foam is _____ used by rescue teams for sealing the edges of a temporary bulkhead to make it more airtight.
   A. always
   B. sometimes pg 3-9
   C. never

8. Mine doors should _____ be closed after you pass through them.
   A. never
   B. occasionally
   C. always pg 3-11

9. A regulator can be made by knocking blocks out of a permanent bulkhead.
   A. True pg 3-12
   B. False

10. Mine rescue teams have the latitude to alter ventilation without direct orders from the command center
    A. True
    B. False pg 3-15

From MX6 iBrid Manual Rev 3 and iTX Manual Rev 6

11. Oxygen deficient atmospheres may cause readings of combustible (methane) gas to be _____ than actual concentrations.

A. higher

B. the same
C. lower **(answer on page 3 of manuals for TMX412 (rev 10)-1st item; iTX (rev 6)-1st item; MX6 (rev 3)-6th item)**

12. Silicone compound vapors may cause readings of combustible (methane) gas to be _____ than actual gas concentrations.

A. higher
B. the same
C. lower **(answer on page 3 of manual, TMX (rev 10)-4th item; iTX (rev 6)-4th item; and MX6 (rev 3)-9th item)**

13. Obstruction of the gas sensor aperture areas and/or contamination of the water barriers may cause readings to be _____ than actual gas concentrations.

A. higher
B. the same
C. lower **(answer on page 3 of manual, TMX412 (rev 10)-5th item, iTX (rev 6)-5th item and MX6 (rev 3)-10th item)**

14. Sudden changes in atmospheric pressure may cause temporary fluctuations in the _____ reading.

A. carbon monoxide
B. methane
C. nitrogen dioxide
D. oxygen **(answer on page 3 of manual: TMX412 (rev 10), 6th item; iTX (rev 6)-6th item; MX6 (rev3)-11th item)**
E. all of the above

15. 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 to measure the accuracy of the instrument.

A. True
B. False **(answer on page 12 of manual" TMX412 (rev 10), last paragraph; page 23 of iTX manual (rev 6), 2nd paragraph; page 17 of MX6 iBrid manual (rev 3), under Calibration Policy**

16. The calibration of the combustible gas sensor should be verified after any incident where the combustible gas content has caused the instrument to display an over range condition.

A. True **(answer in manual on page 3: TMX 412 (rev 10)-3rd item; iTX manual (rev 6)-3rd item; page 3 MX6 (rev 3)- 8th item)**
B. False

17. If an instrument fails to operate properly following any functional bump test:

A. the batteries should immediately be replaced
B. the instrument should immediately sent back to the manufacturer for repair
C. all sensors should be replaced
D. a full instrument calibration should be performed prior to use (answer on page 23 of iTX manual rev 6 and page 17 of MX6 manual rev 3)

18. According to the manufacturer's recommendation, how often should a functional "bump" test be performed on a gas instrument?

A. Before each day's use **(answer in the manual on page 12 TMX412 (rev 10), last sentence states "Industrial Scientific recommends that a functional ("bump") test be performed on every instrument prior to each days use." And on page 23 iTX (rev 6) manual. And on page 17 of the MX6 iBrid manual (rev 3)**
B. When the gas instrument shows a noticeable loss of sensor sensitivity
C. Once a week
D. Once a month

19. According to the gas instrument's manual, the recommended flow rate for calibration is 1.5 liter per minute (LPM).

A. True
B. False **(answer in manuals on page 13 TMX412 (rev10), first NOTE states "Calibration gas flow rate should be between 0.5 and 1.0 liters per minute), on page 24 iTX (rev 6), 2nd paragraph states ".5 LPM and on page 19 of the MX6 iBrid (rev 3) manual)**

20. Substitution of iTX or MX6 iBrid components may impair the intrinsic safety of these instruments and may cause an unsafe condition.

A. True (answer on page 5 of iTX rev 6 manual and page 3 of MX6 Rev3 manual)
B. False