

2013 Nevada Mine Rescue Contest
Winnemucca, Nevada
March 12, 2013
Team Technician Written Test – Draeger BG4

Name: _____

Company: _____

Team: _____

Arm Band # or Position: _____

Chose the correct answer by circling the letter next to it using a pencil. If you make a mistake, please erase your marks completely.

MSHA Publication 3027, Modules 2 and 3 (revised 2008)

1. The formula used to find the quantity of air moving through a drift is:
 - a. Quantity (ft³) = Area (ft²) x Velocity (ft/min.) (#5, page 3-19, MSHA 3027)
 - b. Quantity (ft³) = Area (ft²) x Velocity (ft/sec.²)
 - c. Quantity (ft²) = Area (ft²) x Velocity (ft/min.)
2. It's okay to alter ventilation without command center approval if:
 - a. All team members agree it needs to be done.
 - b. All fires have been extinguished.
 - c. Gas readings at your present location are normal.
 - d. None of the above (Page 3-3, MSHA 3027)
3. High levels (1000 ppm) of sulfur dioxide (SO₂) will explode violently when combined with 21% oxygen.
 - a. True
 - b. False (Page 2-63, MSHA 3027)
4. Hydrogen sulfide (H₂S) is only considered a toxic gas.
 - a. True
 - b. False (Page 2-61, MSHA 3027)
5. After Damp is:
 - a. Toxic and explosive
 - b. A mixture of four mine gasses
 - c. Is always present after a mine fire or explosion
 - d. A and C (Pages 2-27 & 2-28, MSHA 3027)
 - e. None of the above
6. Gas diffuses slowly in higher temperatures.
 - a. True
 - b. False (Page 2-39, MSHA 3027)
7. A "line brattice" is used to
 - a. Connect two points on a mine map.
 - b. Direct air to flush out noxious or explosive gasses. (Page 3-24, MSHA 3027)
 - c. Divert water.

8. Overcasts are normally used to
 - a. Allow two air currents to cross at intersections without mixing. (Page 3-11, MSHA 3027)
 - b. Allow drainage
 - c. Neither of the above
9. Bulkhead and stopping mean the same thing when it comes to ventilation.
 - a. True (Page 3-8, MSHA 3027)
 - b. False
10. Hydrogen Sulfide has an explosive range of _____ in normal air
 - a. 3.4 to 54.5%
 - b. 4.3 to 45.5 ppm
 - c. 5 to 15%
 - d. 4.3 to 45.5% (Page 2-61, MSHA 3027)

Draeger BG4 Questions

11. Repair and general overhaul of the apparatus may only be carried out by Draeger personnel.
 - a. True
 - b. False (Page 2)
12. The breathing air is enriched with oxygen from the O₂ cylinder via the constant metering valve in the case of high breathing rates and via the minimum valve or manually operated bypass valve in the case of low breathing rates.
 - a. True
 - b. False (page 3)
13. Before the breathing air is inhaled again, it flows through the regenerative canister. When it is filled with ice the temperature of the exhaled air is lowered, thus reducing the physical strain on the user.
 - a. True
 - b. False (Page 3)
14. Only use the corresponding respirator mask Panorama Nova-EPDN/Silicone.
 - a. True (Page 3)
 - b. False
15. The Monitron meets the explosion-proof standards to EEx ia 11c and EEx ia 1 and is approved for use in gaseous mines by MSHA (appr. No. 2G-3985-0)
 - a. True (page 3)
 - b. False
16. The factory packed CO₂ absorber must be checked before being fitted and may only be used if Ports 1-3 are tightly sealed with plugs and used by date on the label has not yet expired.
 - a. True (page 4)
 - b. False
17. Operation without the ice pack is permitted below 32 degrees Fahrenheit.
 - a. True (page 7)
 - b. False

18. Fill the ice receptacle with water up to 50mm (2 inches) from the rim. Leave to freeze completely at approximately -15 degrees Celsius for at least 16 hours in a deep freezer.
 - a. True (page 7)
 - b. False
19. If a fault is found during the high pressure leak test: Alarm sounds 3 times, red indicator flashes 30 seconds, Err is displayed for 30 seconds.
 - a. True (page 9)
 - b. False
20. Always set out in groups with at least 2 people wearing apparatus.
 - a. True (page 12)
 - b. False

Industrial Scientific Gas Detector Questions

21. Oxygen deficient atmospheres may cause readings of combustible (methane) gas to be higher than actual concentrations.
 - a. True
 - b. False (page 3 of iTX (rev 6)-1st item, MX6 (rev3)-6th item)
22. Oxygen enriched atmospheres may cause readings of combustible (methane) gas to be lower than actual concentrations.
 - a. True
 - b. False (page 3 iTX (rev 6)-2nd item, MX6 (rev 3) 7th item)
23. Silica can affect the combustible gas sensor and may cause readings to be lower than actual gas concentrations.
 - a. True
 - b. False (page 3 iTX (rev 6) 4th item, MX6 (rev 3) (9th item – states “silicon compounds” not silica which is sand.)
24. Sudden changes in atmospheric pressure will not cause temporary fluctuations in the oxygen reading.
 - a. True
 - b. False (operation guide on iTX page 3, MX6 page 3)
25. The manufacturer recommends that a functional (bump) test be performed on the gas instrument after each day’s use.
 - a. True
 - b. False (ISC recommends the bump test prior to use (page 23 iTX (rev 6), page 17 MX6 (rev 3))
26. When the battery life is nearing its end, the following occurs (answer the question for your gas instrument)

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.
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- a. True
- b. False (iTX ((rev 6) page 27 of manual (15 minutes)) MX6 (rev 3) page 11 (10 minutes))

27. Marginal calibration occurs if the span reserve is between _____ of the applied (calibration) gas value/concentration.
- 20% - 60%
 - 40% - 60%
 - 60% - 80%
 - 80% - 100%
 - None of the above (iTX (page 25, rev 6, slide 30), MX6 (slide 14 of on-line Calibration Training Tutorial Video))
28. While in the normal operational mode the screen on your instrument shows the battery at the _____ of the screen.
- Top middle
 - Top right
 - Bottom middle
 - Bottom right
 - None of the above ((iTX page 8, gas reading mode)(MX6 manual, page 11))
29. When the gas instrument is in non-latching mode, alarms set according to the Technician Team Competition is the MNM National Mine Rescue Contest Rule Book and exposed to 20.4% Oxygen, 1.2% Methane, 40.0 ppm Carbon Monoxide, and 2.0 ppm Nitrogen Dioxide, it will _____.
- Be in high alarm condition
 - Display “40” for the Carbon Monoxide reading
 - Display “2.0” for the Nitrogen Dioxide reading
 - All of the above
 - Only B and C (2010 MNM Contest Rule book; page 30 iTX (rev 6) manual & slide 19 of on-line Features Training Tutorial Video, 2010 MNM Contest Rule book; page 30 iTX (rev 6) manual & slide 19 of on-line Features Training Tutorial Video)
30. Both the iTX and the MX6 use a hydrogen-ion battery
- True
 - False (page 23 iTX (rev 6) manual, page 10 MX6 manual (rev 3))