

Southwest Wyoming Mutual Aid Mine Rescue Contest
Rock Springs WY
June 10-12, 2014

MX6 iBrid Team Technician Test Answers

1. *b)* MSHA requires mine rescue stations serving underground M/NM mines to have **four** gas detectors appropriate for each gas which may be encountered at the mines served. *MSHA Publication 3027, Page 2-3*

2. *a)* In addition, gas detectors must measure concentrations of methane from 0.0 percent to 100 percent of volume, oxygen from 0.0 percent to at least 20 percent of volume, and carbon monoxide from 0.0 parts per million to at least 9,999 parts per million. *MSHA Publication 3027, Page 2-3*

3. *b)* The volume of a gas changes in response to any change in atmospheric pressure or temperature. For example: An increase in temperature causes a gas to **expand**. *MSHA Publication 3027, Page 2-5*

4. *c)* The specific gravity of normal air is **1.0**
MSHA Publication 3027, Page 2-6

5. *b)* Sulfur dioxide, for example, has a specific gravity of **2.2638**. *MSHA Publication 3027, Page 2-6*

6. *d)* The explosive range of hydrogen, for example, is **4.0 to 74.2** percent in the presence of normal air. *MSHA Publication 3027, Page 2-7*

7. *b)* In order to get the air to flow from the intake to the exhaust, the exhaust air must be at a **lower** pressure than the intake. *MSHA Publication 3027, Page 3-5*

8. *a)* Bulkheads are used to direct air to where it is needed and to keep intake air from short circuiting to the exhaust before it reaches the working area. *MSHA Publication 3027, Page 3-8*

9. *a)* Check curtains are used to deflect the **intake** air current into a working area. *MSHA Publication 3027, Page 3-9*

10. *b)* Any teams working beyond the established time period will be notified by the #1 Judge that they must leave the field. 2014 Metal/Non Metal Mine Rescue Rules *Page 7*

11. a) Silicone compound vapors or other known contaminants may affect the combustible gas sensor and cause readings of combustible gas to be lower than actual gas concentrations. MX6 iBrid Operational Guide page 3

12. b) Oxygen deficient atmospheres may cause combustible gas readings to be **lower** than actual concentrations. MX6 iBrid Operational Guide page 3

13. b) Obstruction of the sensor openings or contamination of the water barriers may cause readings to be lower than actual gas concentrations. MX6 iBrid Operational Guide page 4

14. a) Industrial Scientific recommends the “2 & 2 Sampling Rule” when sampling with a motorized pump and tubing, allow for 2 minutes plus 2 seconds per foot of tubing used, prior to noting the monitor readings. MX6 iBrid Operational Guide page 4

15. b) The lithium-ion cells are **not user-replaceable**. MX6 iBrid Operational Guide page 5

16. c) When calibrated using methane concentrations less than **5%** of volume, reading accuracy of the infrared methane sensor may not be guaranteed to be better than +/-20%. MX6 iBrid Operational Guide page 5

17. b) There are two levels of audio gas alarms based on the frequency of the beeps and the length of delay between beeps. Low-level (level-1): Low frequency beeps with a **long** delay. MX6 iBrid Operational Guide page 5

18. b) The instrument has alarm LEDs located beneath the **opaque** sensor array at the top of the unit. MX6 iBrid Operational Guide page 6

19. c) **Three** different cradles are available for use with the MX6 multigas monitor. MX6 iBrid Operational Guide page 6

20. b) The menu system consists of **two** different root menus. MX6 iBrid Operational Guide page 7

21. b) **Fifteen** alarm events for the instrument are recorded into a FIFO queue in nonvolatile memory and are time stamped. MX6 iBrid Operational Guide page 7

22. b) Data logging is a feature that allows a variety of system parameters to be recorded at regular intervals (and saved internally) for retrieval (and viewing) at a later date. Data **are saved** in case of power loss. MX6 iBrid Operational Guide page 7,8

23. c) Bump testing checks for sensor and **alarm** functionality. . MX6 iBrid Operational Guide page 7,8
24. c) Zeroing sets each installed sensor to recognize the **ambient** air as clean Air. MX6 iBrid Operational Guide page 12
25. a) The MX6 multigas monitor (instrument) is powered by an alkaline or rechargeable Lithium-ion (Li-ion) battery. MX6 iBrid Operational Guide page 12
26. b) . ISC recommends that the monitor be fully charged using an ISC compatible charger or docking station; this may require up to **eight** hours. MX6 iBrid Operational Guide page 13,14
27. b) The MX6 multigas monitor is a handheld, “dockable” instrument for personal protection with a **five**-way navigation button. MX6 iBrid Operational Guide page 16
28. a) The sensor *readings* are displayed as solid black numerals during normal operation, and solid red numerals during alarm conditions. MX6 iBrid Operational Guide page 17
29. d) . The *operation-mode root menu* is the entry point to any feature. It is activated from the gas-monitoring display screen and has **three** menu *tabs*. MX6 iBrid Operational Guide page 20
30. b) Passwords are a minimum of three characters and a maximum of **10**. MX6 iBrid Operational Guide page 26