

2009 UMR/MISSOURI REGIONAL MINE RESCUE CONTEST
ROLLA, MISSOURI
iTX MULTI-GAS INSTRUMENT TEST
ANSWER SHEET (25 QUESTIONS)
MSHA 3027 (Formerly IG 6) Revised 2008

FROM TRAINING MODULE IG6 REVISED 2008: MINE GASES

True and False Questions (1-10)

1. An increase in temperature causes a gas to contract
 - a. True
 - b. **False (Page 2-5)**
2. The specific gravity of sulfur dioxide is 2.2683.
 - a. True
 - b. **False (Page 2-6 s.g. is 2.2638)**
3. The explosive range for hydrogen is 4.0 to 72.4 percent.
 - a. True
 - b. **False (Page 2-7)**
4. The Threshold Limit Value (TLV) for carbon dioxide (CO₂) is 0.5 percent.
 - a. **True (Page 2-9)**
 - b. False
5. Oxygen is not an explosive gas and it doesn't support combustion.
 - a. True
 - b. **False (Page 2-13)**
6. The specific gravity of carbon dioxide (CO₂) is 1.5219.
 - a. True
 - b. **False (Page 2-15)**
7. The specific gravity of carbon monoxide (CO) is 0.9627
 - a. True
 - b. **False (Page 2-16)**

8. Carbon monoxide (CO) is explosive and non flammable.
- a. True
 - b. **False (Page 2-16)**
9. The specific gravity of nitrogen dioxide (NO₂) is 1.5894.
- a. **True (Page 2-17)**
 - b. False
10. Hydrogen sulfide (H₂S) is flammable and explosive in concentrations from 3.4 to 46.5 percent in normal air.
- a. True
 - b. **False (Page 2-19)**

FROM TRAINING MODULE MSHA 3027 REVISED 2008:
MINE VENTILATION Multiple Choice Questions (11-18)

11. A medium-velocity or “regular” anemometer is used for measuring velocities from _____.
- a. 100 to 2000 feet per minute
 - b. 200 to 2200 feet per minute
 - c. **120 to 2000 feet per minute (Page 3-16)**
 - d. 100 to 2200 feet per minute
12. A high-velocity anemometer is used for measuring velocities from _____.
- a. 1,500 to 8,000 feet per minute
 - b. 2,000 to 12,000 feet per minute
 - c. 1,500 to 10,000 feet per minute
 - d. **2,000 to 10,000 feet per minute (Page 3-16)**
13. The anemometer actually measures linear feet of travel and requires timing- usually one minute- to determine _____ in feet per minute.
- a. quantity
 - b. quality
 - c. area
 - d. **velocity (Page 3-16)**

14. Two instruments commonly used to measure air movement are the anemometer and the _____.
a. pilot tube
b. magic wand
c. pyrometer
d. **smoke tube** (Page 3-16)
15. To obtain the quantity of the air current in cubic feet per minute, the area is then multiplied by the _____.
a. width
b. length
c. volume
d. **velocity** (Page 3-16)
16. If your team finds a fallen check curtain while exploring a mine you should _____.
a. immediately re-hang it and make it air-tight
b. build an air lock in front of it
c. **leave it as it is for the time being and report the condition to the command center** (Page 3-10 first paragraph).
d. neatly fold it and lay it against a rib out of the way
17. The following smoke tube reading of 10 foot measured distance and an average of 15 seconds with an area of 200 ft² the quantity of airflow is _____.
a. 8,400 ft/min
b. 8,800 ft/min
c. 8,000 ft/min
d. **none of the above** (Page 3-20, 8,000 ft³/min)
18. A commonly used method of measuring the velocity in an airway is to traverse the airway to get the _____ velocity in the airway.
a. lowest
b. highest
c. median
d. **average** (Page 3-17, 3rd paragraph)

From Multi Gas Monitor iTX Instruction Manual (19-25)

19. In the gas reading mode of the iTX, as the instrument battery life is reduced, the shaded area of the battery indicator will turn clear until the instrument reaches the low battery condition. With _____ minutes of battery life left, a low battery condition occurs.
- 5
 - 10
 - 20
 - None of the above (Page 6, 15 minutes)**
20. iTX units equipped with bias sensors will self discharge a fully charged battery in approximately in four days. Because of this, bias sensor equipped units are shipped without the battery installed. Upon receipt, install the battery and allow the bias sensors to stabilize for _____ hours.
- 12-24
 - 16-32
 - 24-52 (Page 4, under Warning)**
 - None of the above
21. If the PPM Explosive gas feature is enabled, this screen will display the current concentration of gas in parts per million (ppm) in _____.
- 1 ppm intervals up to 999 ppm
 - 2 ppm intervals up to 999 ppm
 - 5 ppm intervals up to 1,000 ppm
 - 50 ppm intervals up to 10,000 ppm (Page 7)**
22. The dimensions on the iTX are _____.
- 4.5" L, 3.0"W, 2.0" H
 - 4.75" L, 3.19"W, 1.68" H (Page 27)**
 - 4.5" L, 2.5"W, 1.75" H
 - none of the above
23. Remove the battery pack and replace with _____ fresh alkaline batterie(s). A replacement cell alkaline battery pack is available for use with the iTX.
- 1 AAA
 - 2 AAA
 - 3 AAA
 - None of the above (Page 25, 1st paragraph)**

24. When a new NO bias sensor is installed, you must turn on the instrument so the iTX identifies that this bias sensor is installed and recognizes the need to supply a bias voltage. Then turn off the unit and put it on charge for _____ hours to allow the sensor to stabilize before calibration.
- a. 6 to 12
 - b. 12 to 24
 - c. **24 to 48 (Answer on page 26)**
 - d. None of the above
25. The operating temperature range for typical toxic/oxygen (not LEL) sensors of the iTX is _____.
- a. -40 degrees F to 100 degrees F
 - b. -20 degrees F to 100 degrees F
 - c. **-4 degrees F to 122 degrees F (Answer on page 28)**
 - d. None of the above