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

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

2. The specific gravity of sulfur dioxide is 2.2683.
   a. True
   b. False

3. The explosive range for hydrogen is 4.0 to 72.4 percent.
   a. True
   b. False

4. The Threshold Limit Value (TLV) for carbon dioxide ($CO_{2)}$ is 0.5 percent.
   a. True
   b. False

5. Oxygen is not an explosive gas and it doesn't support combustion.
   a. True
   b. False

6. The specific gravity of carbon dioxide ($CO_{2)}$ is 1.5219.
   a. True
   b. False

7. The specific gravity of carbon monoxide (CO) is 0.9627
   a. True
   b. False

8. Carbon monoxide (CO) is explosive and non flammable.
   a. True
   b. False

9. The specific gravity of nitrogen dioxide (NO_2) is 1.5894.
   a. True
   b. False

10. Hydrogen sulfide (H_2S) is flammable and explosive in concentrations from 3.4 to 46.5 percent in normal air.
   a. True
   b. False

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
   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

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

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

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

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
    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 ft^2 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

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

From Multi Gas Monitor TMX 412 Instruction Manual (19-25)

19. When the instrument TMX 412 is in the normal viewing mode, an _____ segment battery status indicator continuously displays the battery condition.
    a. 6
    b. 7
    c. 8
    d. 10

20. To manually activate the backlight when needed, press and release the (E) key. The backlight will illuminate the display for approximately _____.
    a. 5 seconds
    b. 15 seconds
    c. 30 seconds
    d. 45 seconds

21. When a monitored gas concentration reaches the low level alarm setpoint, the instrument emits a short beep approximately every _____ seconds.
    a. 12
    b. 1.2
    c. 2.4
    d. None of the above

22. The dimensions on the TMX-412 are _____.
    a. 4.5″ L, 2.5″W, 2.5″ H
    b. 4.5″ L, 2.5″W, 2.0″ H
    c. 4.5″ L, 2.5″W, 1.75″ H
    d. none of the above

23. When you replace the lithium battery cells, replace with three _____ 3.0 volt lithium battery cells.
    a. Duracell DA 123A
    b. Panasonic CA 123A
    c. Sanyo CR 123A
    d. None of the above

24. When a new Oxygen sensor is installed, allow _____ for it to stabilize before attempting calibration.
    a. 5 minutes
    b. 15 minutes
    c. 30 minutes
    d. 45 minutes

25. The temperature range for continuous operation of the TMX 412 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
    d. None of the above