**2016 Northern Mine Rescue Contest**

**Written Exam**

**Technician Team Competition**

**Dräger BG-4**



**2010**

**2016**

**June 14, 2016**

**Clymer, New York**

**2016 Northern Mine Rescue Contest**

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**Dräger BG-4**

**Directions: Fill in the corresponding bubble on your Scantron sheet to indicate the letter preceding the correct answer to each of the following questions. Select only one answer per question.**

**10 Questions for Dräger BG-4:**

1. A carbon cylinder has a \_\_\_\_\_ year lifespan.
   1. 5
   2. 10
   3. 12
   4. 15
2. BG-4 minimum valve activates between ­­­\_\_\_\_\_ and \_\_\_\_\_ mbar.
   1. 1 and 2
   2. 0.1 and 2
   3. 0.1 and 2.5
   4. 1 and 2.5
3. A BG-4 breathing bag has a \_\_\_\_\_ Liter volume.
   1. 0.5
   2. 1.5
   3. 5.0
   4. 5.5
4. The panorama nova mask has \_\_\_\_\_ % of peripheral vision.
   1. 50
   2. 75
   3. 90
   4. 100
5. The color of the medium pressure hose is blue.
   1. True
   2. False
6. The high pressure transducer does what?
   1. Converts pressure into digital signal
   2. Converts pressure into breathable air
   3. Converts pressure into energy
   4. Converts pressure into hot air
7. When checking the exhalation valve you set the RZ tester to \_\_\_\_\_.
   1. Negative pressure pumping
   2. Positive pressure pumping
   3. Leak test
   4. Dosage 0.5 - 2 L/min
8. When checking the Inhalation hose, part of the procedure is to pinch the \_\_\_\_\_ tightly with your hand.
   1. Inhalation hose
   2. Exhalation Hose
   3. High Pressure Hose
   4. None of the Above
9. The Sentinel switch box monitors what?
   1. Low oxygen
   2. Low pressure
   3. Low voltage
   4. Low carbon monoxide
10. What does the yellow button on the Sentinel do?
    1. Activates the backlight
    2. Activates the automatic distress signal-unit (ADSU)
    3. Panic button - Activates the manual distress signal-unit (DSU)
    4. Shows the oxygen bottle pressure in psi/bar

**10 Questions for MX6 iBrid:**

1. If more than one sensor fails the bump test, the sensors are calibrated in order\_\_\_\_\_\_\_.
2. Top row right to left, bottom row right to left
3. Top row left to right, bottom row left to right
4. Bottom row right to left, bottom row right to left
5. Bottom row left to right, bottom row left to right
6. The “Bump Test” item is activated from the operation mode root menu.
7. True
8. False
9. The data log feature saves all of the following except\_\_\_\_\_\_\_.
10. Gas Type
11. Time of Day
12. Temperature
13. Barometric pressure
14. Alarm event information stored in the FIFO queue includes\_\_\_\_\_\_\_.
15. Gas type
16. Fault error code
17. Peak exposure level
18. A and C
19. Powering the instrument off or charging its battery does not affect the peak readings.
20. True
21. False
22. When accessing DATA from the drop down menu and selecting View Data, you may view details for any of the 10 most recent alarm events.
23. True
24. False
25. During calibration, the user has \_\_\_\_\_\_\_\_\_\_\_\_ minutes to apply gas before the calibration times out.
26. 2 minutes
27. 3 minutes
28. 4 minutes
29. 5 minutes
30. A bump test measures the accuracy of the sensor.
31. True
32. False
33. Verify the calibration of the combustible gas sensor after any incident where the combustible gas content has caused the instrument to display an over-range condition.
34. True
35. False
36. If a CO2 sensor is present in the instrument it will be zeroed last in fresh air.
37. True
38. False

**10 Questions for Module 2 and Module 3 of MSHA Publication 3027:**

1. The rate of diffusion of a gas is effected by:
2. Pressure
3. Air Current
4. Temperature
5. All of the above
6. Low NO2 readings could indicate there has been a fire or that explosives are burning.
7. True
8. False
9. In emergency situations, it is permitted to alter ventilation without orders to do so from the command center.
10. True
11. False
12. When installing a temporary bulkhead in a passageway, particularly in a crosscut of a room and pillar, single-level mine, the bulkhead should be erected a sufficient distance into the passageway (at least \_\_\_\_ to \_\_\_\_ feet) to permit enough room for a permanent bulkhead to be built later.
13. 3 to 5
14. 5 to 8
15. 4 to 6
16. 6 to 9
17. Why would an airlock need to be built?  
    1. When opening a door or breaking through a bulkhead when conditions on the other side are not known.
    2. When opening a refuge chamber or barricade in irrespirable atmospheres.
    3. In single level mines, to establish a fresh air base and when advancing the fresh air base.
    4. All of the above
18. Smoke tubes are used to determine the direction and velocity of slow moving air when \_\_\_\_  
    1. The velocity is below 250 feet per minute
    2. The velocity is below 500 feet per minute
    3. The velocity is below 120 feet per minute
    4. None of the Above
19. The more accurate method of determining air velocity using a smoke tube is to take readings only at the center of the airway.  
    1. True
    2. False
20. Natural ventilation is typically used in mines because the pressure differential is usually great enough to create a sufficient and steady flow of air through the mine.  
    1. True
    2. False
21. Hydrogen sulfide gas is \_\_\_\_\_ in water.  
    1. Slightly soluble
    2. Moderately soluble
    3. Soluble
    4. Insoluble
22. Because rock gas is largely \_\_\_\_\_ and \_\_\_\_\_, the effect of rock gas is to produce an oxygen-deficient atmosphere.  
    1. Hydrogen sulfide, nitrogen
    2. Carbon monoxide, carbon dioxide
    3. Carbon dioxide, methane
    4. Nitrogen, carbon dioxide

**ANSWER KEY**

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**BioPak 240R**

Questions 1 – 10 : PSS BG-4 Service Manual - Rev O  
Questions 11 – 20 : MX6 iBrid Operation Guide – Rev 9  
Questions 21 – 30 : MSHA 3027 (2008) - Module 2 (Mine Gases) & Module 3 (Ventilation)

Question Answer Source

1. D. 15 years, page 45
2. C. 0.1 and 2.5, page 46
3. D. 5.5 Liter, page 51
4. C. 90 %, page 53
5. B. False (yellow), page 19
6. A. Converts pressure into digital signal, page 54
7. A. Negative pressure pumping, page 25
8. B. Exhalation hose, page 25
9. B. Low pressure, page 54
10. C. Panic button - Activates the manual distress signal-unit, page 55
11. B. Page 36 (Top row left to right, bottom row left to right)
12. A. True, Page 35
13. D. Page 8 (Barometric pressure)
14. D. Page 7 (Gas type and Peak exposure level)
15. A. True, Page 12
16. B. False, Page 23 (15 most recent alarm events)
17. D. Page 35
18. B. False, Page 11 (Does not measure accuracy)
19. A. True, Page 4
20. B. False, Page 11
21. D. A, B, C, page 2-5 (Pressure, Air Current, Temperature)
22. B. False, page 2-18 (High readings)
23. B. False, page 3.3 (Never permitted)
24. C. Page 3-22 (4,6)
25. D. Page 3-24 (All of the above)
26. C. Page 3-21 (Velocity below 120 fpm)
27. B. False, Page 3-18 (At quarter points within the airway)
28. B. False, page 3-5 (Rarely used)
29. C. Page 2-47 (Soluble)
30. D. Page 2-26 (Nitrogen, carbon dioxide)