**2015 Northern Mine Rescue Contest**

**Written Exam**

**Technician Team Competition**

**Dräger BG-4**

**2010**

**2015**

**July 28, 2015**

**Clymer, New York**

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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.**

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. .1 and 2
	3. .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
11. To power up the MX6 instrument, locate, press and hold the center [ENTER] navigation button for at least 5 seconds.
12. True
13. False
14. 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.
15. True
16. False
17. Four different cradles are available for use with the MX6 multi-gas monitor.
18. True
19. False
20. The MX6 has a four-way Navigation button.
21. True
22. False
23. The sensor readings are displayed as solid \_\_\_\_\_\_\_\_ numerals during normal operation, and solid \_\_\_\_\_\_\_\_\_ numerals during alarm conditions.
24. Black, Black
25. Black, Red
26. Red, Red
27. Black, Yellow
28. Up to \_\_\_\_\_\_\_\_\_\_ sensors may be displayed on the instrument screen.

	1. Three
	2. Four
	3. Five
	4. None of the Above
29. Alkaline battery packs are only approved for use with \_\_\_\_\_\_ or \_\_\_\_\_\_ batteries in the instrument.
30. Duracell MN 1500, Rayovac LR6
31. Duracell MN 2000, Rayovac LR8
32. Duracell MN 2500, Rayovac LR10
33. None of the above
34. 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 \_\_\_\_\_\_\_\_?
35. +/- 15%
36. +/- 20%
37. +/- 25%
38. None of the above
39. The Normal Operations Menu has a \_\_\_\_\_\_\_\_\_ background and the Configuration Menu has a \_\_\_\_\_\_\_\_\_\_ background on LCD.
40. White, Blue
41. White, Red
42. White, Yellow
43. White, Black
44. The measurement resolution for a Methane sensor with 0% to 5% volume is \_\_\_\_\_\_\_\_% volume.
45. 1.0
46. 0.1
47. 0.01
48. 0.001
49. Nitric Oxide will burn and can explode.
50. True
51. False
52. The formula for Acetylene is C2H6.
53. True
54. False
55. The Explosive Range of Propane is from \_\_\_\_ to \_\_\_\_\_ % in normal air.
56. 1.12, 7.35
57. 1.52, 7.85
58. 1.92, 9.15
59. 2.12, 9.35
60. Solubility is the ability of a gas to be dissolved in air.
61. True
62. False
63. The Specific Gravity of Carbon Dioxide (CO2) is 1.5921.

	1. True
	2. False
64. Quantity (feet3/ minute) = Area (feet2) X Velocity (feet/minute). If the Quantity of airflow is 13,140 (feet3/minute)and the area of the entry is 200 feet2 then the velocity is \_\_\_\_\_\_\_.

	1. 65.7
	2. 6.57
	3. 657
	4. None of the Above
65. High –velocity anemometer is used to determine air velocities from \_\_\_\_\_\_ to \_\_\_\_\_\_\_ feet/minute.

	1. 120 to 2,000
	2. 2,000 to 8,000
	3. 2,000 to 10,000
	4. None of the Above
66. During rescue team explorations, the MAIN FAN:

	1. Should be continually monitored
	2. Should be operated continuously
	3. Both A. and B
	4. None of the above
67. The main purpose of a regulator is:

	1. A line brattice cloth/plastic that is hung to channel intake air into a working area.
	2. To direct air to where it is needed and to keep intake air from short-circuiting to the exhaust fan before it reaches the working area.
	3. A wall or partition constructed of incombustible material across a passageway to direct the ventilating air in its proper course.
	4. Adjustable door/opening in a bulkhead, or a partially open mine door, used to control and adjust the quantity of airflow in the mine in order to ensure proper distribution.
68. Two Instruments used to measure velocity of airflow in a mine are:

	1. Flame safety lamp and smoke tube.
	2. Anemometer and smoke tube.
	3. Methane detector and anemometer.
	4. Multi-gas detector and smoke tubes.

**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. .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. False, page 15 (at least 3 seconds)
12. A. True, page 4 (lower than)
13. B. False, page 7 (Three different)
14. B. False, page 15 (five-way)
15. B. Page 17 (Black, Red)
16. D. None of the Above, page 16 (up to six)
17. A. Page 3 (Duracell MN 1500, Rayovac LR6)
18. B. Page 6 (+/- 20%)
19. C. Page 7 (White, Yellow)
20. C. Page 38 (0.01)
21. B. False, page 2-17
22. B. False, page 2-24 (C2H2)
23. D. Page 2-23 (2.12, 9.35)
24. B. False, page 2-7 (in water)
25. B. False, page 2-15 (1.5291)
26. D. None of the Above, page 3-20 (65.7 fpm)
27. C. Page 3-21 (2,000 to 10,000)
28. C. Both A. and B., page 3-4
29. D. Page 3-54
30. B. Anemometer and smoke tube, pages 3-16 & 3-18