

# ***2018 National Metal and Nonmetal Mine Rescue Contest***

## **Technician Team Competition Written Test (BioPak 240R)**

### **Directions:**

- 1. Find the correct answer to each of the questions.**
- 2. Select only one answer per question.**
- 3. Then, fill in the corresponding circle on the answer sheet for each numbered question.**

**Good Luck!**



***July 23, 2018***

# 2018 Metal/Nonmetal National Mine Rescue Contest

## Technician Team Competition – BioPak 240R – Written Test

### 10 Questions for BioPak 240R:

1. As stated in the BioPak 240 R Cautions and Limitations, which of the following is TRUE:
  - A. Never substitute, modify, and, or omit parts
  - B. All users of the SCBA must be trained by Biomarine qualified instructors
  - C. All repairs beyond the scope of this manual must be performed by Biomarine or qualified Biomarine representative
  
2. Relating to the use of high pressure Oxygen, which of the following is TRUE:
  - A. Do not open the cylinder valve in the presence of Nitrogen
  - B. The oxygen cylinder shall meet DOT specifications and shall be marked BREATHING GAS
  - C. Oxygen will not cause materials to ignite without the presence of an ignition source
  
3. Regarding the proper donning of the facemask, which of the following is TRUE:
  - A. Tighten the facepiece as tight as you can
  - B. Adjust the facemask top strap so that the mask is at the correct level with the face and the head-harness pad is in the center of the back of the head
  - C. Emphysema is a potential disqualifying factor for wearing a BioPak 240 R
  
4. The SCBA (BioPak 240 R) is approved only when:
  - A. Filled to 3000 psi with breathing gas
  - B. Fully charged with compressed medical or aviation grade oxygen
  - C. Fully charged with compressed medical or aviation grade breathing air
  
5. Which of the following is TRUE as it relates to the Oxygen Cylinder?
  - A. The Oxygen cylinder is polypropylene-wrapped aluminum
  - B. The Oxygen cylinder has a volume of 3000 psig
  - C. The Oxygen cylinder has a volume of 440 liters
  
6. Which of the following will NOT assist the USER in cooling the breathing gas or clearing the mask of fog?
  - A. Breathe normally through the nose and use the Magnetic wiper
  - B. Ensure Ice has been installed
  - C. Depress the Emergency By-Pass for up to 2-seconds
  
7. Should the LED flash RED and/or the horn sounds, the USER shall:
  - A. Retire to a safe location as quickly as possible
  - B. Exit and change your battery
  - C. Exit and reboot your RMS


8. The use of Orbsorb carbon dioxide chemical scrubbers must always include:
  - A. Shake test and O-ring lubrication
  - B. Two scrubber cartridges and three wet sponges
  - C. Two scrubber cartridges and the Moisture Pad provided with the scrubber
  
9. As prescribed in the BENCHMAN manual which is the most correct regarding Long Term Maintenance:
  - A. Perform Turn-Around Maintenance and Maintenance Tag Validation
  - B. Visually inspect the O-rings and perform a Low-Pressure Leak Test
  - C. Visually inspect. Perform the Demand Valve, Constant flow, Vent Valve, Low pressure, high pressure, emergency bypass and alarm tests as well as Maintenance Tag Validation
  
10. If after 5-10 minutes under oxygen your LED changes from a flashing GREEN to a FLASHING BLUE. You should:
  - A. Immediately leave the area and replace your battery
  - B. Immediately leave the area and check for low-pressure leaks
  - C. Check that the coolant canisters have been installed

#### **10 Questions for MX6 iBrid:**

1. The battery icon at >100% charge remaining is the color blue.
  - A. True
  - B. False
  
2. The operating temperature range for the instrument is -25° Celsius to 55° Celsius.
  - A. True
  - B. False
  
3. There are three levels of audio gas alarms based on the frequency of beeps and the length of delay between beeps.
  - A. True
  - B. False
  
4. The bump test process does not allow qualified personnel to review and adjust a unit's settings
  - A. True
  - B. False
  
5. The configuration mode display screens time out after 90 seconds. When activated, the main configuration screen remains on for 10 minutes.
  - A. True
  - B. False

6. An optical media interface is located on the bottom of the instrument and is used for infrared data transmissions at speeds of \_\_\_\_\_ bytes/second.
- A. 100,000
  - B. 105,000
  - C. 115,000
  - D. None of the above
7. The alkaline battery pack is only approved for use with \_\_\_\_\_ or \_\_\_\_\_ batteries in the instrument.
- A. Duracell MM 2500, Rayovac LR10
  - B. Duracell MM 1500, Rayovac LR6
  - C. Duracell MM 2000, Rayovac LR8
  - D. None of the above
8. The measurement range for Hydrogen Sulfide (H<sub>2</sub>S) electrochemical sensor is zero to \_\_\_\_ ppm.
- A. 50
  - B. 100
  - C. 500
  - D. None of the above
9. The LCD backlight flashes as part of all alarm sequences, except for the battery low condition. The visual alarm is also used as the confidence indicator which, when enabled, blinks the LEDs once every \_\_\_\_ seconds.
- A. 5
  - B. 10
  - C. 30
  - D. None of the above
10. For a Carbon Dioxide (CO<sub>2</sub>) infrared sensor range of 0% to 5% volume, the measurement resolution is \_\_\_\_\_% volume.
- A. 0.01
  - B. 0.02
  - C. 0.05
  - D. None of the above

**10 Questions from MSHA Publication 3027 (Module 2 and Module 3):**

21. The map symbol  indicates:
- A. An undercast.
  - B. An overcast
  - C. An axillary fan.
  - D. The main fan.

22. Mine Rescue teams should not alter ventilation without authorization from the command center because:
- A. Altering the ventilation could force explosive gases into areas where survivors might be located.
  - B. It could force deadly gases over fire areas or hot spots and cause an explosion.
  - C. It could supply additional oxygen to a fire area and “feed” the fire.
  - D. It could also result in ventilation changes that would alter the air at the command center.
23. Which of the following gases have the largest explosive range?
- A. Carbon Monoxide
  - B. Hydrogen
  - C. Butane
  - D. Acetylene
24. The specific gravity for Propane is \_\_\_\_\_.
- A. 1.5291
  - B. 1.5625
  - C. 1.5894
  - D. 2.0100
25. MSHA requires mine rescue stations serving underground M/NM mines to have \_\_\_\_\_ gas detectors appropriate for each gas which may be encountered at the mines served.
- A. Three
  - B. Four
  - C. Five
  - D. Enough
26. Chemical analysis is generally a more time-consuming process than testing with a portable device, but its advantage is timeliness. It tells exactly what gases the sample contains, and in precisely what amounts. A complete chemical analysis can also reveal the presence of gases that portable detectors are not designed to detect.
- A. True
  - B. False
27. The range of concentrations within which a gas will explode is known as its “explosive range.” Figures representing the higher and lower limits of the explosive range are expressed in percentages.
- A. True
  - B. False

28. With mechanical ventilation, mine fans are used to create the pressure differential by changing the air pressure at specified points in the mine. And the less pressure difference the fan creates, the faster the flow of air.
- A. True
  - B. False
29. In many mines during a rescue and recovery operation, air locks are put up to establish a fresh air base and enable teams to move forward into questionable air without contaminating the air at the fresh air base.
- A. True
  - B. False
30. **Anemometer** – Instrument used for measuring medium-velocity (120-2,000 cfm) and high-velocity (2,000-10,000 cfm) air currents in the mine.
- A. True
  - B. False

# 2018 Metal/Nonmetal National Mine Rescue Contest

## Technician Team Competition – Written Test (BioPak 240R)

### ANSWER KEY

	Answer	Page	Publication
1	A	6	User Manual Revision K
2	C	6	User Manual Revision K
3	B	17	User Manual Revision K
4	B	7	User Manual Revision K
5	C	12	User Manual Revision K
6	C	19	User Manual Revision K
7	A	19	User Manual Revision K
8	C	9	Benchman Manual Revision M
9	C	15-16	Benchman Manual Revision M
10	C	18	User Manual Revision K
11	A	33	MX 6 Manual Revision 9
12	B	3	MX 6 Manual Revision 9
13	B	6	MX 6 Manual Revision 9
14	A	11	MX 6 Manual Revision 9
15	B	32	MX 6 Manual Revision 9
16	D	7	MX 6 Manual Revision 9
17	D	3	MX 6 Manual Revision 9
18	C	39	MX 6 Manual Revision 9
19	C	7	MX 6 Manual Revision 9
20	A	6	MX 6 Manual Revision 9
21	D	7	MSHA 3027 Module 3
22	C	21	MSHA 3027 Module 3
23	D	47	MSHA 3027 Module 2
24	B	47	MSHA 3027 Module 2
25	B	3	MSHA 3027 Module 2
26	B	4	MSHA 3027 Module 2
27	A	7	MSHA 3027 Module 2
28	B	5	MSHA 3027 Module 3
29	A	23	MSHA 3027 Module 3
30	B	53	MSHA 3027 Module 3