

**2019 Missouri Regional Mine Rescue Contest
Rolla, MO
Written Test – Team Tech Competition (Bio 240S)**

Name _____ Company _____

Team Name _____ Contest Position No. _____

Team Member No. _____

Directions: Use answer sheet & fill in completely.

Q#1) The gases present in a mine following a disaster will vary according to:

- A) The type of equipment;
- B) The disaster situation;
- C) The type of mine;
- D) All of the above.

Q#2) For the Bio 240 S proper facepiece fit is critical in maintaining the _____ pressure seal.

- A) High;
- B) Low;
- C) Positive;
- D) Negative.

Q#3) A medium-velocity anemometer for measuring velocities from 120 to 2,000 feet per minute is also referred to as a:

- A) Common anemometer;
- B) Standard anemometer;
- C) Regular anemometer;
- D) None of the above.

Q#4) To avoid carbon dioxide poisoning, it is suggested that the user exits the contaminated area after an elapsed time of 4 hours since the Bio 240 S DOES NOT give any indication of:

- A) Remaining oxygen levels;
- B) Remaining carbon dioxide absorbent;
- C) Neither of the above;
- D) Both of the above.

Q#5) On the Bio 240 S the oxygen cylinder sealing washer serves the same purpose as an o-ring seal and should:

- A) Be lubricated with Cristo-Lube;
- B) Be lubricated with Dow-111 Silicone lubricant;
- C) Never be lubricated;
- D) Be lubricated with an oil-based lubricant.

- Q#6) The Operation-mode root menu for the MX6 has the following menu tabs, EXCEPT:
- A) Sensor;
 - B) View;
 - C) Bump test;
 - D) Data.
- Q#7) During the Bio 240 S flow test, when the oxygen valve is opened the flow reading should be at least ____ lpm with the oxygen cylinder at 3000 psig.
- A) 1.0
 - B) 1.3
 - C) 1.6
 - D) 1.5
- Q#8) After all the sensors installed in the MX6 have been bump tested the user must acknowledge this screen to continue, by selecting the ____ button.
- A) "Cancel"
 - B) "OK"
 - C) "Abort"
 - D) Any
- Q#9) A device used to control and adjust the quantity of airflow in a mine is called a:
- A) Bulkhead;
 - B) Line Brattice;
 - C) Regulator;
 - D) Auxiliary fan.
- Q#10) Before removing the oxygen cylinder:
- A) Depress the bypass valve to relieve any internal pressure;
 - B) Verify the cylinder valve is closed;
 - C) Verify the chest mounted pressure gauge reads 0 psi;
 - D) All of the above.
- Q#11) In order for a flammable gas to explode, there must be:
- A) A source of ignition;
 - B) Enough oxygen;
 - C) Enough of the gas in the air;
 - D) All of the above.
- Q#12) A mechanical ventilator installed at the surface which operates by either exhausting or pushing to induce airflow through the mine is considered to be a:
- A) Booster fan;
 - B) Auxiliary fan;
 - C) Radiator fan;
 - D) Main fan.

- Q#13) The _____ pressure will insure that the entire breathing loop of the respirator is greater than the external ambient pressure.
- A) Positive;
 - B) Negative;
 - C) High;
 - D) Low.
- Q#14) On the MX6 the High-level visual alarm is:
- A) No change in LEDs;
 - B) LEDs are pulsed with a long delay;
 - C) LEDs are pulsed with a short delay;
 - D) None of the above.
- Q#15) Each toxic gas has a TLV, which stands for:
- A) The Level Varies;
 - B) Threshold Limit Value;
 - C) Toxic Limit Value;
 - D) Threshold Line Varies.
- Q#16) It is normal for the pressure gauge of the harness to:
- A) Immediately read full pressure;
 - B) Take up to 30 seconds to read full pressure;
 - C) Take up to 90 seconds to read full pressure;
 - D) Take up to 1 minute to read full pressure.
- Q#17) During the MX6 zeroing operation the following sensor is calibrated:
- A) Oxygen;
 - B) Nitrates of Oxygen;
 - C) Carbon Monoxide;
 - D) Carbon Dioxide.
- Q#18) To perform a positive pressure check on the Bio 240 S facepiece the _____port/s should be blocked.
- A) Red;
 - B) Green;
 - C) Both;
 - D) Neither.
- Q#19) MSHA's approval/certification for the use of the MX6 is under CFR30, _____.
- A) Part 62;
 - B) Part 58;
 - C) Part 46;
 - D) Part 22.

Q#20) Temporary bulkheads built in a passageway should be placed at least 4 to 6 feet into the passageway in order that:

- A) It will be protected from further explosions;
- B) It will provide a rest area for the team;
- C) It will not be affected by a fire;
- D) Sufficient space is available to construct a permanent bulkhead.

Q#21) The Biopak 240 S closed circuit system differs from an open circuit system because of:

- A) All breathing air is vented to atmosphere;
- B) All breathing air is recycled and confined within the device;
- C) All breathing air is recycled then vented to the atmosphere;
- D) None of the above.

Q#22) When bump testing the MX6, once a sensor has passed the test, the word "Pass is displayed for:

- A) 3 seconds;
- B) 5 seconds;
- C) 8 seconds;
- D) 10 seconds.

Q#23) If the barometric pressure falls, a gas will:

- A) Expand;
- B) Concentrate;
- C) Doesn't matter;
- D) Not change.

Q#24) The MX6 Low-level audio gas alarm is a:

- A) High frequency with short delays;
- B) Continuous claxon;
- C) Low frequency beeps with a long delay;
- D) Vibration only.

Q#25) Collapsible tubing for auxiliary fans should be used for:

- A) Forcing systems;
- B) Exhausting systems;
- C) Neither of the above;
- D) Both of the above.

Q#26) The calibration complete screen could show what results for each sensor once the calibration is finished?

- A) Failed;
- B) Marginal;
- C) Passed;
- D) Any of the above.

Q#27) Maintenance to the breathing chamber assembly may involve:

- A) Replacement of the flow restrictor;
- B) Replacement of the demand valve;
- C) Replacement of the diaphragm;
- D) Any of the above.

Q#28) Prior to each day's use the MX6 should:

- A) Have a bump test performed;
- B) Be calibrated;
- C) Be serviced;
- D) Have sensor's replaced.

Q#29) Light gases such as Hydrogen will:

- A) Not diffuse rapidly;
- B) Be fairly easy to disperse;
- C) Not disperse easily;
- D) Be hard to remove.

Q#30) On the MX6 gas-monitoring display screen in numeric format, each sensor will display its reading in the following order:

- A) Gas concentration; Unit of measure; Sensor type.
- B) Sensor Type; Gas concentration; Unit of measure.
- C) Sensor type; Unit of measure; Gas concentration.
- D) Depends on the type of sensor.

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Written Test Answers – Team Tech (Bio 240S) Competition**

- A#1) D) Module 2; Page 12; Paragraph 7.
- A#2) C) Bio 240S Benchman Instruction Manual Rev L; Pg. 9 Facepiece Section.
- A#3) C) Module 3; Page 16; Paragraph 7.
- A#4) B) Bio 240S User Instruction Manual Rev F; Pg. 11 Item #10 & Warning
- A#5) C) Bio 240S Benchman Instruction Manual Rev L; Pg. 23 2nd Warning.
- A#6) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.21; Paragraph #2
- A#7) C) Bio 240S Benchman Instruction Manual Rev L; Pg. 16 Section G-3.
- A#8) B) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.38; Paragraph #5.
- A#9) C) Module 3; Page 14; Paragraph 7.
- A#10) D) Bio 240S Benchman Instruction Manual Rev L; Pg. 13 1st Warning
- A#11) D) Module 2; Page 7; Paragraph 5.
- A#12) D) Module 3; Page 54; Paragraph 4.
- A#13) A) Bio 240S Benchman Instruction Manual Rev L; Pg. 7 5th paragraph
- A#14) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.6; Visual Alarm.
- A#15) B) Module 2; Page 9; Paragraph 4
- A#16) C) Bio 240S User Instruction Manual Rev F; Pg. 8 Item #14.
- A#17) A) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.36; 6th Paragraph
- A#18) A) Bio 240S User Instruction Manual Rev F; Pg. 7 Item 11.
- A#19) D) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.2; MSHA.
- A#20) D) Module 3; Page 22; Paragraph 1.
- A#21) B) Bio 240S Benchman Instruction Manual Rev L; Pg. 7 1st paragraph.
- A#22) A) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.38; Paragraph #4.
- A#23) A) Module 2; Page 6; Paragraph 2.
- A#24) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.6; Audio Indicator.
- A#25) A) Module 3; Page 10; Paragraph 8
- A#26) D) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.37; Paragraph #4.
- A#27) D) Bio 240S Benchman Instruction Manual Rev L; Pg. 28 Breathing Chamber Assembly.
- A#28) A) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.3; last Warning.
- A#29) B) Module 2; Page 7; Paragraph 2.
- A#30) B) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.17 Reading the gas-monitoring display screen.