

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

Name _____ Company _____

Team Name _____ Contest Position No. _____

Team Member No. _____

Directions: Use answer sheet & fill in completely.

Q#1) The alarm battery should be replaced:

- A) After 6-months;
- B) After the low battery alarm Red/ Green/ Blue flashes with corresponding horn sounding;
- C) After 200-hours;
- D) Any of the above.

Q#2) 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#3) The wearer shall retire to a safe location as quickly as possible to doff the 240R if the LED flashes ____ and/or the horn sounds.

- A) Green;
- B) Red;
- C) Blue;
- D) All 3 colors.

Q#4) The Operation-mode root menu for the MX6 has the following menu tabs, EXCEPT:

- A) Sensor;
- B) View;
- C) Bump test;
- D) Data.

Q#5) 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#6) When handling the Bio 240R Oxygen cylinder do not allow _____ to come in contact with it to prevent a possible ignition.
- A) Grease;
 - B) Other foreign materials;
 - C) Oil;
 - D) All of the above.
- Q#7) 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#8) The 240R is approved only when the oxygen cylinder is fully charged with compressed medical grade oxygen or _____.
- A) Welding grade oxygen;
 - B) Aviation grade oxygen;
 - C) Both A & B;
 - D) None of the above.
- Q#9) 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#10) On the 240R to install the lid onto the top of the breathing chamber the ___ slide locks must be secured over the studs.
- A) 2
 - B) 4
 - C) 6
 - D) 8
- Q#11) 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#12) 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#13) Immediately after completion of the 240R use, disconnect the _____ to the center section to prevent migration of moisture into the manifold assembly.

- A) Demand and constant add lines;
- B) Input port of regulator;
- C) Oxygen cylinder;
- D) Breathing hoses.

Q#14) At ambient temperatures of 100 – 140 Degree F, the recommended safe duration of use of the 240 R is:

- A) 15-minutes;
- B) 30-minutes;
- C) 1-hour;
- D) 4-hours.

Q#15) The 240R can be used in temperatures as low as -5 Degrees F if:

- A) It does have the carbon dioxide scrubber pre-packed into the breathing chamber;
- B) The carbon dioxide scrubber is stored at temperature below 32 Degrees F;
- C) It does not have the carbon dioxide scrubber pre-packed into the breathing chamber;
- D) Both A & B.
- E) Both B & C.
- F) Both A & C.

Q#16) O-rings in the center section on the 240R should be inspected at least annually or after _____ use/s.

- A) Each;
- B) 10;
- C) 25;
- D) 50.

Q#17) 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#18) 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#19) 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#20) 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#21) If the barometric pressure falls, a gas will:

- A) Expand;
- B) Concentrate;
- C) Contract;
- D) Not change.

Q#22) During the MX6 zeroing operation the following sensor is calibrated:

- A) Oxygen;
- B) Nitrates of Oxygen;
- C) Carbon Monoxide;
- D) Carbon Dioxide.

Q#23) 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#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) 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#26) 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#27) 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#28) 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#29) When doing the constant flow test on the 240R if below 5280 feet of elevation and using a cylinder pressure of 2000-3000 psi the flow should read _____ lpm.

- A) 1.0 – 1.8;
- B) 1.9 – 2.5;
- C) 2.0 – 2.8;
- D) 1.5 – 1.9.

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.

**2019 Missouri Regional Mine Rescue Contest
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Written Test Answers – Team Tech (Bio 240R) Competition**

- A#1) D) BioPak 240R Benchman Manuel rev M; pg.18 – Section 3.4.
- A#2) D) Module 2; Page 12; Paragraph 7.
- A#3) B) BioPak 240R User Instructions rev K; pg.19 Section 5.3 3rd paragraph.
- A#4) C) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.21; Paragraph #2.
- A#5) D) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.2; MSHA.
- A#6) D) BioPak 240R Benchman Manuel rev M; pg.7- Compressed Oxygen Hazard
- A#7) D) Module 3; Page 54; Paragraph 4.
- A#8) B) BioPak 240R Benchman Manuel rev M; pg.8 – 1st bullet
- A#9) D) Module 2; Page 7; Paragraph 5.
- A#10) D) BioPak 240R User Instructions rev K; pg.15 Section 3.6.
- A#11) A) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.38; Paragraph #4.
- A#12) C) Module 3; Page 16; Paragraph 7.
- A#13) A) BioPak 240R Benchman Manuel rev M; pg.10 – Section 1.2 Disassembly
- A#14) D) BioPak 240R User Instructions rev K; pg.16 Section 3.7 Coolant Canister Installation
- A#15) C) BioPak 240R Benchman Manuel rev M; pg.7 – Low Temperature Operation
- A#16) C) BioPak 240R Benchman Manuel rev M; pg.17 – Top of 2nd Column
- A#17) D) Module 3; Page 22; Paragraph 1.
- A#18) B) Module 2; Page 7; Paragraph 2.
- A#19) B) Module 2; Page 9; Paragraph 4
- A#20) B) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.38; Paragraph #5.
- A#21) A) Module 2; Page 6; Paragraph 2.
- A#22) A) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.36; 6th Paragraph
- A#23) C) Module 3; Page 14; Paragraph 7.
- A#24) C) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.6; Audio Indicator.
- A#25) D) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.37; Paragraph #4.
- A#26) A) Module 3; Page 10; Paragraph 8.
- A#27) A) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.3; last Warning.
- A#28) C) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.6; Visual Alarm.
- A#29) B) BioPak 240R Benchman Manuel rev M; pg.12 – Section 1.8 - chart
- A#30) B) MX6 iBird Op’s Guide (ED 17; Aug 10, 2018) Pg.17 Reading the gas-monitoring display screen.