

**2019 Missouri Regional Mine Rescue Contest
Rolla, MO
Written Test – Team Tech Competition (BG4)**

Name _____ Company _____

Team Name _____ Contest Position No. _____

Team Member No. _____

Directions: Use answer sheet & fill in completely.

Q#1) 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#2) The BG4's pressure reducer shall have a thorough overhaul by experts:

- A) Yearly;
- B) Every 3 years;
- C) Every 5 years;
- D) Every 6 years.

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) 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#5) 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#6) On the BG4 there are 2 sealing valves – the Moisture trap valve and the ____.
- A) High pressure relief valve;
 - B) Low pressure relief valve;
 - C) Under pressure relief valve;
 - D) Over pressure relief valve.
- Q#7) 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#8) 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#9) During reducer installation you must ensure the bypass plunger is lubricated with:
- A) White spirit;
 - B) O2 safe grease;
 - C) Universal detergent;
 - D) Acetone.
- Q#10) 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#11) For the BG4 under moderate service conditions for temperatures up to 141 to 194 Degree F the period of use is up to ____ with ice in the cooler.
- A) 4 hours;
 - B) 2 hours;
 - C) 1 hour;
 - D) 15 minutes.
- Q#12) During the MX6 zeroing operation the following sensor is calibrated:
- A) Oxygen;
 - B) Nitrates of Oxygen;
 - C) Carbon Monoxide;
 - D) Carbon Dioxide.

Q#13) 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#14) 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#15) If you are disassembling the drainage valve from the breathing bag; removing the cover lid and checking the valve disk and spring while trouble shooting a BG4 you are trying to correct which fault:

- A) The drainage valve will not open;
- B) The drainage valve opens too late;
- C) The drainage valve opens too early;
- D) Any of the above.

Q#16) 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.

Q#17) 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#18) When checking the BG4 residual pressure warning on the sentinel at approximately 700 psi the sentinel alarms will

- A) The acoustic alarm sounds continuously and the green LEDs flash;
- B) The acoustic alarm sounds intermittently and the green LEDs flash;
- C) The acoustic alarm sounds intermittently and the red LEDs flash;
- D) The acoustic alarm sounds continuously and the red LEDs flash;

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) 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#21) 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#22) On the BG4, the pressure reducer dosage output is _____.

- A) 1.0 to 1.2 L/min;
- B) 1.3 to 1.4 L/min;
- C) 1.5 to 1.9 L/min;
- D) None of the above.

Q#23) 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#24) On the BG4, the "Battery warning 2" indicates:

- A) It is acceptable to use;
- B) It is acceptable to use for a short period of time;
- C) It shall not be used until the battery is replaced;
- D) The battery is OK;

Q#25) The Operation-mode root menu for the MX6 has the following menu tabs, EXCEPT:

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

Q#26) For cleaning of rubber and silicone parts of the BG4 the recommended cleaner is:

- A) Alcohol;
- B) White spirit;
- C) Acetone;
- D) Lukewarm water with a universal detergent.

Q#27) 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#28) 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#29) On the BG4, the high pressure O2 Carbon cylinder is full at _____psi.

- A) 1500
- B) 3000
- C) 3135
- D) 3300

Q#30) If the barometric pressure falls, a gas will:

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

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- A#1) B) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.38; Paragraph #5.
- A#2) D) PSS BG4 Service Manual Rev O Page# 38
- A#3) C) Module 3; Page 16; Paragraph 7.
- A#4) A) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.3; last Warning.
- A#5) B) Module 2; Page 9; Paragraph 4.
- A#6) D) PSS BG4 Service Manual Rev O Page# 50.
- A#7) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.6; Visual Alarm.
- A#8) D) Module 3; Page 22; Paragraph 1.
- A#9) B) PSS BG4 Service Manual Rev O Page# 15; Reducer installation.
- A#10) D) Module 2; Page 12; Paragraph 7.
- A#11) D) PSS BG4 Service Manual Rev O Page# 42 Technical Data Maximum Temperature ranges.
- A#12) A) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.36; 6th Paragraph
- A#13) C) Module 3; Page 14; Paragraph 7.
- A#14) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.6; Audio Indicator.
- A#15) D) PSS BG4 Service Manual Rev O Page# 35 Trouble Shooting #5
- A#16) B) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.17 Reading the gas-monitoring display screen.
- A#17) A) Module 3; Page 10; Paragraph 8.
- A#18) C) PSS BG4 Service Manual Rev O Page# 31; #1
- A#19) D) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.2; MSHA.
- A#20) A) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.38; Paragraph #4.
- A#21) D) Module 3; Page 54; Paragraph 4.
- A#22) C) PSS BG4 Service Manual Rev O Page# 44.
- A#23) D) Module 2; Page 7; Paragraph 5.
- A#24) C) PSS BG4 Service Manual Rev O Page# 32; Paragraph 5.
- A#25) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.21; Paragraph #2.
- A#26) D) PSS BG4 Service Manual Rev O Page# 39 Cleaning
- A#27) B) Module 2; Page 7; Paragraph 2.
- A#28) D) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.37; Paragraph #4.
- A#29) B) PSS BG4 Service Manual Rev O Page# 45.
- A#30) A) Module 2; Page 6; Paragraph 2.