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

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#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#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#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#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#26) D) PSS BG4 Service Manual Rev O Page# 39 Cleaning
A#27) B) Module 2; Page 7; Paragraph 2.
A#29) B) PSS BG4 Service Manual Rev O Page# 45.
A#30) A) Module 2; Page 6; Paragraph 2.