

**2019 Southwestern Regional Mine Rescue Contest  
Ruidoso, NM  
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) Existing ventilation can be altered by the team when:

- A) The team decides;
- B) The team captain decides;
- C) They encounter smoke;
- D) Directed by the command center.

Q#2) What device is used to measure air movement?

- A) Voltmeter;
- B) Smoke tube;
- C) Gas tube;
- D) Gas detector.

Q#3) A rescue team is usually needed to go into the mine to assess and reestablish ventilation after:

- A) A new fan installation;
- B) A new exhaust shaft is put in service;
- C) A fire or explosion has occurred;
- D) All of the above.

Q#4) A plastic curtain that is hung across a passage way and opens to allow miners and equipment to pass through is considered a:

- A) Airlock
- B) Temporary bulkhead;
- C) Line brattice;
- D) Check curtain.

Q#5) Air that is unfit for breathing is considered to be:

- A) Irreplaceable;
- B) Irregular;
- C) Irrespirable;
- D) Irrevocable.

- Q#6) A gas has:
- A) A definite volume, but changes shape;
  - B) A definite shape and volume;
  - C) Neither a definite shape or volume;
  - D) None of the above.
- Q#7) The atmospheric pressure in a mine:
- A) Is constant;
  - B) Doesn't matter;
  - C) Cannot be measured;
  - D) Varies.
- Q#8) A decrease in temperature will cause a gas to:
- A) Not Change;
  - B) Doesn't matter
  - C) Expand
  - D) Contract.
- Q#9) Carbon monoxide can be detected by:
- A) Detector only;
  - B) Smelling it;
  - C) Seeing it;
  - D) Tasting it.
- Q#10) For all mine rescue events, the team **must** know how to test for:
- A) Oxygen and carbon dioxide levels;
  - B) Carbon monoxide and Nitrogen oxides levels;
  - C) Carbon monoxide and Hydrogen sulfide levels;
  - D) Oxygen and carbon monoxide levels.
- Q#11) For the BG4, ice is required:
- A) When the ambient temperature is below 32 Degrees F;
  - B) Always;
  - C) When the ambient temperature is above 32 Degrees F;
  - D) When the ambient temperature is high.
- Q#12) On the BG4 there are 2 sealing relief valves – the Over pressure relief valve and the \_\_\_\_\_.
- A) Air trap vale;
  - B) Moisture trap valve;
  - C) High Pressure valve;
  - D) Low pressure valve.

Q#13) On the BG4, the high pressure steel O2 cylinder is full at \_\_\_\_\_psi.

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

Q#14) The high pressure o2 cylinder contains \_\_\_\_\_ liters of 99% O2.

- A) 400
- B) 300
- C) 200
- D) 100

Q#15) For the BG4 under moderate service conditions for temperatures up to 105 to 140 Degree F the period of use is up to \_\_\_\_\_ with ice in the cooler.

- A) 15 minutes;
- B) 1 hour;
- C) 2 hours;
- D) 4 hours.

Q#16) For the BG4 the temperature for drying must not exceed:

- A) 60 Degree F;
- B) 60 Degree C;
- C) 150 Degree F;
- D) 150 Degree C.

Q#17) If while trouble shooting the BG4 the residual pressure first warning value is incorrect potential remedies include:

- A) Replace battery;
- B) Replace switch box;
- C) Replace Sentinel pressure transducer;
- D) Any of the above.

Q#18) If when doing the BG4 High-pressure leak test the reading is lower than 2600psi / 180 bar:

- A) Charge the oxygen cylinder;
- B) Change the sentinel battery;
- C) Replace the breathing bag;
- D) Replace the CO2 absorber.

Q#19) Exceptionally, if the breathing circuit is opened for more than 5 minutes, the CO2 absorber apertures should be sealed with \_\_\_\_\_ PE plug(s) to prevent escape of gas.

- A) 4
- B) 3
- C) 2
- D) 1

Q#20) The BG4 speech diaphragm must be replaced:

- A) After use of unit;
- B) Yearly;
- C) Shows sign of damage;
- D) Every 4 years.

Q#21) When bump testing the MX6, the sensor being tested within 60 seconds must reach a gas reading of \_\_\_\_\_ or greater.

- A) 10%
- B) 25%
- C) 50%
- D) 75%

Q#22) If there is more than one sensor that failed the MX6 bump test, they are calibrated in what order?

- A) Any depending on the gas used;
- B) Top row left to right, bottom row left to right;
- C) Top row left to right, bottom row right to left;
- D) Bottom row left to right, top row left to right.

Q#23) During calibration of the MX6 the gas should be applied at a flow rate of \_\_\_\_ lpm.

- A) 1.5;
- B) 1.0;
- C) 0.5;
- D) None of the above.

Q#24) The MX6 must be calibrated according to the procedure specified in the:

- A) CFR 3049 Part 49;
- B) Mine rescue Rules book;
- C) Mine rescue Module 2 – Mine gases;
- D) Instruction manual.

Q#25) To start the MX6 Bump Test option, the user must access it by following the menu options:

- A) Data; View Data; Event Log.
- B) Sensor; Calibration.
- C) Sensor; Bump Test.
- D) View; Configure.

Q#26) Zero air must be applied to zero a \_\_\_\_\_ sensor on a MX6.

- A) O<sub>2</sub>;
- B) NO<sub>2</sub>;
- C) CO<sub>2</sub>;
- D) CO.

Q#27) To view MX6 sensor's most recent calibration date and its span trends begin with the following menu options.

- A) Data; View Data.
- B) Sensor; Location.
- C) Sensor; Calibration.
- D) Sensor; Sensors.

Q#28) All sensors on a MX6:

- A) Will last indefinitely;
- B) Should be replaced after every use;
- C) Do not need calibration once in instrument;
- D) Gradually degrade over time.

Q#29) The MX6 should be calibrated:

- A) Before first use and monthly thereafter;
- B) After the installation of new sensors;
- C) After the unit falls;
- D) Any of the above.

Q#30) The MX6 High-level audio gas alarm is a:

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

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Written Test Answers – Team Tech (BG4) Competition**

- A#1) D) Module 3; Page 3; Paragraph 4.
- A#2) B) Module 3; Page 16; Paragraph 3.
- A#3) C) Module 3; Page 3; Paragraph 3.
- A#4) D) Module 3; Page 9; Paragraph 9.
- A#5) C) Module 3; Page 54; Paragraph 2.
- A#6) C) Module 2; Page 5; Paragraph 2.
- A#7) D) Module 2; Page 5; Paragraph 7.
- A#8) D) Module 2; Page 6; Paragraph 3.
- A#9) A) Module 2; Page 8; Paragraph 3.
- A#10) D) Module 2; Page 12; Paragraph 7.
- A#11) C) PSS BG4 Service Manual Rev O Page# 3; Paragraph 5.
- A#12) B) PSS BG4 Service Manual Rev O Page# 50.
- A#13) C) PSS BG4 Service Manual Rev O Page# 45.
- A#14) A) PSS BG4 Service Manual Rev O Page# 45.
- A#15) B) PSS BG4 Service Manual Rev O Page# 42 Technical Data Maximum Temperature ranges.
- A#16) B) PSS BG4 Service Manual Rev O Page# 38 Drying
- A#17) D) PSS BG4 Service Manual Rev O Page# 35 Trouble Shooting #10
- A#18) A) PSS BG4 Service Manual Rev O Page# 28.
- A#19) B) PSS BG4 Service Manual Rev O Page# 22 –3<sup>rd</sup> paragraph under Inserted CO<sub>2</sub> absorber.
- A#20) C) PSS BG4 Service Manual Rev O Page# 10; Paragraph 3.
- A#21) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.38; Paragraph #4.
- A#22) B) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.38; Paragraph #7.
- A#23) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.37; Paragraph #3.
- A#24) D) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.5; 5<sup>th</sup> CAUTION.
- A#25) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.9.
- A#26) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.36; 4<sup>th</sup> Paragraph.
- A#27) D) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.24 &25.
- A#28) D) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.11; Last Paragraph
- A#29) D) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.12; 5th paragraph.
- A#30) C) MX6 iBird Op's Guide (ED 17; Aug 10, 2018) Pg.6; Audio Indicator.