

Southwest Wyoming Mutual Aid Mine Rescue Contest
Rock Springs WY
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DRAEGER BG4 Team Technician Test Answers

1. *b)* MSHA requires mine rescue stations serving underground M/NM mines to have **four** gas detectors appropriate for each gas which may be encountered at the mines served. *MSHA Publication 3027, Page 2-3*

2. *a)* In addition, gas detectors must measure concentrations of methane from 0.0 percent to 100 percent of volume, oxygen from 0.0 percent to at least 20 percent of volume, and carbon monoxide from 0.0 parts per million to at least 9,999 parts per million. *MSHA Publication 3027, Page 2-3*

3. *b)* The volume of a gas changes in response to any change in atmospheric pressure or temperature. For example: An increase in temperature causes a gas to **expand**. *MSHA Publication 3027, Page 2-5*

4. *c)* The specific gravity of normal air is **1.0**
MSHA Publication 3027, Page 2-6

5. *b)* Sulfur dioxide, for example, has a specific gravity of **2.2638**. *MSHA Publication 3027, Page 2-6*

6. *d)* The explosive range of hydrogen, for example, is **4.0 to 74.2** percent in the presence of normal air. *MSHA Publication 3027, Page 2-7*

7. *b)* In order to get the air to flow from the intake to the exhaust, the exhaust air must be at a **lower** pressure than the intake. *MSHA Publication 3027, Page 3-5*

8. *a)* Bulkheads are used to direct air to where it is needed and to keep intake air from short circuiting to the exhaust before it reaches the working area. *MSHA Publication 3027, Page 3-8*

9. *a)* Check curtains are used to deflect the **intake** air current into a working area. *MSHA Publication 3027, Page 3-9*

10. *b)* Any teams working beyond the established time period will be notified by the #1 Judge that they must leave the field. 2014 Metal/Non Metal Mine Rescue Rules *Page 7*

11. d) Charging the Oxygen Cylinder, Permissible impurities in depressurized gas: Max. water vapor concentration: **50** mg/m³. PSS BG 4 Service Manual *Page 17*

12. c) Fitting the Oxygen Cylinder The cylinder must be full for operational usage, **3000** PSI (206 BAR) is required. PSS BG 4 Service Manual *Page 20*

13. b) Testing the PSS BG 4 with Inserted CO₂ Absorber Exceptionally, if the breathing circuit is opened for more than **5** minutes, the CO₂ absorber apertures should be sealed with three PE plugs to prevent escape of gas. PSS BG 4 Service Manual *Page 23*

14. a) Low Pressure Warning Indication – Backlight turns on including red LED PSS BG 4 Service Manual *Page 24*

15. d) Checking the Exhalation Valve 1 Set “negative pressure pumping”. 2 Tightly pinch the inhalation hose with your hand. 3 Pump once until **-10** mbar is indicated on the pressure gauge. PSS BG 4 Service Manual *Page 24*

16. d) Leak Test with Positive Pressure 1 Set “Leak test” 2 Press the button to reduce the pressure to 7 mbar. Start the stopwatch. The pressure must not change by more than **1** mbar during one minute. PSS BG 4 Service Manual *Page 26*

17. b) . High-Pressure Leak Test 1 Set “Leak test”. 2 Open the cylinder valve. 3 Watch the Sentinel: the cylinder pressure is indicated here. If cylinder pressure is lower than **2600** psi / 180 bar: Charge the oxygen cylinder. PSS BG 4 Service Manual *Page 28*

18. b) When Checking the Minimum Valve Watch the pressure gauge: the minimum valve should open at a value between **0.1** and **2.5** mbar. PSS BG 4 Service Manual *Page 29*

19. c) Checking the Residual Pressure Warning • Close the cylinder valve. 1 Watch the Sentinel. A warning should be generated at approximately **700** psi / **48** bar. The acoustic alarm sounds intermittently and the red LEDs flash. PSS BG 4 Service Manual *Page 31*

20. a) Symbol “Battery warning 2”– In this case the red LEDs flash constantly. On Power up 5 short beeps will sound and the display will show the “Battery warning 2” icon. Sentinel automatically powers off and blocks any further operation. PSS BG 4 Service Manual *Page 32*

21. b) If a battery warning 2 is displayed, the battery must be **replaced** before any new operation. PSS BG 4 Service Manual *Page 32*

22. d) Switching Off the Sentinel • Simultaneously press the right and left hand button until a single sharp audible “bleep” sounds. • Release buttons. • For **3** seconds Sentinel shows the battery status. • Sentinel switches off. PSS BG 4 Service Manual *Page 33*

23. c) The O ring on plug –in coupling should be replaced **yearly** when in constant use. PSS BG 4 Service Manual *Page 38*

24. b) The Major Component Groups for the BG4 are Pneumatics, **Breathing loop**, Sentinel System, and Case & Harness. PSS BG 4 Service Manual *Page 43*

25. c) BG 4 High Pressure O2 Cylinders • Steel cylinder is hydrotested at **5** year intervals PSS BG 4 Service Manual *Page 44*

26. a) BG 4 Minimum Valve • Activates between .1 and 2.5 mbar PSS BG 4 Service Manual *Page 46*

27. d) BG 4 Minimum Valve • Provides approximately **80** l/min flow
PSS BG 4 Service Manual *Page 46*

28. b) BG 4 Breathing Hoses • EPDM hose material • **Quarter** turn connectors • Single style hose • Anti-crush rings PSS BG 4 Service Manual *Page 47*

29. d) BG 4 Relief Valves • Two sealing valves installed Moisture trap valve Over pressure relief • Components identical • Over pressure valve opens between **2-5** mbar • Moisture trap opens ≥ 15 mbar PSS BG 4 Service Manual *Page 50*

30. b) . BG 4 Breathing Bag • 5.5 Liter volume • Sealed seams • Polyurethane / yellow PSS BG 4 Service Manual *Page 51*