Gas Law I Test C   Name_____

Questions 51 – 58 State whether the following refer to:
(AB) Graham's Law; (A) Boyle's law; (B) Charles' law; (C) Pressure-Temperature law;
(D) combined gas law; (E) Dalton's Law of Partial Pressures; (AB) ideal gas law

B 51. $V_1/T_1 = V_2/T_2$

A 52. Volume is inversely proportional to pressure.

D 53. $P_1V1/T_1 = P_2V_2/T_2$

AB 54. PV=nRT

B 55. Volume is directly proportional to kelvin temperature.

A 56. $P_1V_1 = P_2V_2$

E 57. $P_T = P_1 + P_2 + P_3 ...$

AB 58. $\frac{v1}{v2} = \sqrt{\frac{M2}{M1}}$

59. Gases consist mostly of: a) electron clouds; b) atomic nuclei; c) empty space; d) ions

60. Which of the following is/are characteristic of gases? a) high compressibility;
    b) relatively large distances between molecules; c) formation of homogeneous mixtures;
    d) all of the above; e) none of the above

61. When using the gas laws, temperature must be expressed in:
    a) Fahrenheit; b) Celsius; c) Kelvin; d) either b or c.

62. Correct values for STP would be: a) 273 kPA and 101.3 K; b) 101.3 kPa and 273 °C;
    c) 101.3 kPa and 273 K; d) 273 kPA and 0 °C.

63. If you increase the pressure on a sample of gas, what will happen to its volume?
    a) volume decreases; b) volume increases; c) volume stays constant..

64. If you increase the temperature of a gas, what will happen to the volume?
    a) volume decreases; b) volume increases; c) volume stays constant.

65. If you decrease the temperature of a gas, what will happen to its pressure?
    a) pressure increases; b) pressure decreases; c) pressure stays the same

66. Graham's law of diffusion is explained by the fact that: a) molecules strike the walls of a container more
    often at high temperatures; b) lighter molecules move faster than heavier molecules at the same
    temperature; c) molecules of gas move faster at high temperatures; d) the volume of a gas is
    proportional to its mass.

67. Which of the following gases would diffuse the fastest?
    a) He; b) O_2; c) CO_2; d) Xe

68. Convert 10° C to Kelvins. a) -263 K; b) -90 K; c) 263 K; d) 273 K e) 283 K

69. If you increased the temperature of a gas while keeping pressure constant, what would happen to its
    density? a) density increases; b) density decreases; c) density stays the same.

70. The total pressure of a mixture of gases is equal to the: a) pressure exerted by the gas that has the
    most mass; b) sum of the pressures each gas would exert by itself; c) product of the pressures of each
    individual gas; d) the pressure of the gas with highest density.

71. Which of these could be a gas at room temperature:
    a) ionic compound; b) molecular compound; c) metal

Problems: <u>SHOW ALL WORK – CIRCLE ANSWERS- FILL IN SCANTRON BUBBLE</u>

72. A sample of N_2 has a volume of 125 L at a temperature of 250 K. If pressure is held constant, what will the volume (in L) be if the temperature is increased to 350 K?
    a) 175 ; b) 89.3; c) 700; d) 418; e) none of the above

$$\frac{125\,L}{250\,K} = \frac{V_2}{350\,K}$$

$$\frac{V}{T} = \frac{V}{T}$$

73. A piston contains 2.50 L of O_2 at 3.00 atm. If the volume of the O_2 is reduced to 1.50 L, what would the new pressure of the O_2 be? (Temperature stays constant.)
    a) 1.80 atm; b) 5.00 atm; c) 0.556 atm; d) 0.200 atm; e) none of the above

$$(3\,atm)(2.5\,L) = P_2(1.5\,L)$$

$$PV = PV$$

74. A sample of 4.25 mL of CO_2 has a temperature of 293 K. At what <u>Celsius temperature</u> would the CO_2 have a volume of 3.00 mL? (Pressure stays constant.)
    a) 207; b) 415; c) 480; d) -66; e) none of the above

$$\frac{4.25\,mL}{293\,K} = \frac{3\,mL}{T_2}$$

$$T_2 = 207\,K$$

$$T_2(4.25\,mL) = (293\,K)(3\,mL)$$

$$207 - 273 = -66\,°C$$

$$\frac{V}{T} = \frac{V}{T}$$

75. A sample of gas has a volume of 2.00 L at STP. At what Kelvin temperature will the sample have a volume of 1.50 L and a pressure of 3.00 atm?
    a) 0.00163; b) 819; c) 68.25; d) 614; e) none of the above

$$\frac{T_2(1\,atm)(2\,L)}{273\,K} = \frac{(3\,atm)(1.5\,L)\,273\,K}{T_2}$$

$$T_2 = 614\,K$$

$$\frac{PV}{T} = \frac{PV}{T}$$

76. How many moles of H_2 are in a 17.2 L sample at 300. K and 1.50 atm?
    a) 1.05; b) 0.955; c) 282; d) 18.3; e) none of the above

$$PV = nRT$$

$$(1.5\,atm)(17.2\,L) = n(.0821)(300\,K)$$

77. Calculate the rates of diffusion of CO_2 compared to O_2.
    a) 0.727; b) 0.853 c) 1.17; d) 1.38

$$\frac{rateCO2}{rateO2} = ? \quad \sqrt{\frac{32}{44}} = .853$$