1. Consider two ideal gases in separate containers. The number of moles of each of these ideal gases will be the same if certain quantities are the same for the gases. Which ones should be the same?

a. pressure b. volume c. temperature

A. a only
B. b only
C. c only
D. a and b
E. a and c
F. b and c
G. a, b and c
H. None of the choices listed above

Ans._____

4. Given an ideal gas, if the temperature is doubled and the pressure is held steady, the root mean squared speed of the molecules will

A. remain unchanged
B. increase by a factor of $\sqrt{2}$
C. increase by a factor of 2
D. increase by a factor of 4

Ans._____

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5. What is the temperature of an ideal gas whose molecules in random motion have an average translational kinetic energy of 3.20×10^{-20} joules?

A. 4.65×10^{3} K
B. 1.55×10^{3} K
C. 2.32×10^{3} K
D. 7.24×10^{-23} K
E. 4.82×10^{-23} K
F. Not close to any of the above

Ans._____

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6. A hydrogen balloon at the earth's surface has a volume of 5.0 m^3 on a day when the temperature is 27.0 °C and the pressure is 1.00×10^{5} N/m^2. The balloon rises and expands as the pressure drops. What is the volume of the balloon when it is at an altitude of 40.0 kilometers where the pressure is 0.33×10^{3} N/m^2 and the temperature is –13.0 °C?

A. 1.3×10^{3} m^3
B. 7.3×10^{3} m^3
C. 1.5×10^{3} m^3
D. 7.3×10^{2} m^3
E. 10 m^3

Ans._____

11. How long does it take a hemoglobin molecule to diffuse 1.00 cm in water? The diffusion constant for hemoglobin in water is 6.9×10^{-11} m^2/s.

A. 8.4 days
B. 402 hours
C. 14.48×10^5 s
D. 72.4 s
E. 145 s
F. 17 days

Ans._____

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12. Suppose an activation energy is 31.05×10^{-21} J. First find the average kinetic energy <K> for an ideal gas at 300 K and for the same gas at 375 K. Then find the ratios of the activation energy to these two values of average energy; these ratios represent y in the table on the formula sheet. Use the table to find the fraction of gas molecules having energies greater than the activation energy for the two cases. Make use of this information to find how much greater the reaction rate at 375 K is compared to that at 300 K?

A. 4.2
B. 1.25
C. 3
D. 2.5
E. 7.6
F. 1.8

Ans._____

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13. The escape speed from Earth is 11.2 km/s. At what temperature would 11.2 % of the oxygen molecules in the Earth's atmosphere have speeds greater than the escape speed? Hint: See Table on formula sheet.

A. 1.2×10^4 K
B. 0.8×10^5 K
C. 1.6×10^5 K
D. 2.4×10^5 K
E. 3.2×10^5 K
F. 6.4×10^5 K

Ans._____