1. B

Explanation: To become ideal, there must be negligible interaction among gas molecules and collisions among gas molecules must be perfectly elastic. At high temperature, the molecules acquire energy which makes them move so fast that when they collide with other gas molecules, the collision is almost perfectly elastic. At low pressure, the gas can occupy a maximum distance between each molecule that reduces any intermolecular interaction (if there is/are any). As a result, conditions of high temperature and low pressure favor ideality among gases.

2. C

Explanation: Recall that among the empirical gas laws, only the Amonton's law (or the Gay-Lussac's law) relates the pressure and temperature of a fixed amount of gas at constant volume.

3. D

Explanation: To prove that option A is true, let's consider 298K which is 25 °C in Celcius scale. Increasing the temperature by 1K gives 299K, which is equal to 26 °C in Celcius scale, making option A true. Option B is practically Boyle's law while option C is practically Charles's law.

4. C

Explanation: Other than the amount of gas inside the balloon, all the three variables vary as it ascends, which gives us a clue that we probably need to use the combined gas law. We are given P_1 = 756 mmHg, V_1 = 20 L, T_1 = 17 ℃ = 290 K, P_2 = 75 mmHg, and T_2 = -33 ℃ = 240 K. However, recall that when using any gas law equations, the temperature must be in Kelvin scale. Always bear in mind that temperature should be in Kelvin scale, and the unit of pressure must be the same to be able to cancel the unit in the calculation. Isolating V_2 (the missing variable) in the combined gas law gives us:

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$
$$V_2 = \frac{P_1V_1T_2}{P_2T_1}$$

Upon substitution of known values, we will get an expression similar to option C.

5. B

Explanation: The following values are given in the problem: V = 2L, n = 1 mole, and T = 300 K. Using the ideal gas equation:

$$PV = nRT$$
$$P = \frac{nRT}{V} = \frac{(1)(300)R}{2}$$

Simplifying the numerical components of the expression, we will have P = 150R.