Gas Laws Problems

For each of the following problems, answer the question and state which gas law (Boyle's Law, Charles' Law, Gay-Lussac's Law, Avogadro's Principle, or the combined gas law) applies to it.

1. A sample of oxygen gas occupies a volume of 250. $m\ell$ at a pressure of 740. torr. What volume will it occupy at 800. torr?

2. A sample of O_2 is at a temperature of 40.0°C and occupies a volume of 2.30 ℓ. To what temperature should it be raised to occupy a volume of 6.50 ℓ?

3. H_2 gas was cooled from 150.°C to 50.°C. Its new pressure is 750 mm Hg. What was its original pressure?

4. A 175 cm^3 sample of H_2 at 1.50 atm had its pressure decrease to 713 torr. What is the new volume of the H_2 gas?

5. A sample of NH_3 has a pressure of 650. torr at 25.0°C. What pressure will it have if its temperature is increased to 95.0°C?

6. A sample of argon gas was cooled, and its volume went from 380. mℓ to 250. mℓ. If its final temperature was $-45.0°$C, what was its original temperature?

7. A 2.00 ℓ container of N_2 had a pressure of 3.20 atm. What volume would be necessary to decrease the pressure to 98.0 kPa?

8. A sample of air has a volume of 60.0 mℓ at STP. What volume will the sample have at 55.0°C and 745 torr?

9. What pressure is needed to change 400. mℓ of a gas at 1.00 atm and 15.0°C to 300. mℓ at $-30.0°$C

10. N_2 gas is enclosed in a tightly stoppered 500. mℓ flask at 20.0°C and 760. mm Hg. The flask, which is rated for a maximum pressure of 3.00 atm, is heated to 680.°C. Will the flask explode?

11. A scuba diver's 10. ℓ air tank is filled to a pressure of 2.1×10^4 kPa at a dockside temperature of 32.0°C. If the diver uses air at the rate of 8.0 ℓ/min at a depth of 10. m, where the pressure is 200. kPa (100 kPa due to the atmosphere plus 100. kPa due to the water pressure) and the temperature 8.0°C, how long can the diver remain safely submerged?