Chapter 19.

1. In a student experiment, a constant-volume gas thermometer is calibrated in dry ice (-78.5° C) and in boiling ethyl alcohol (78.0° C). The separate pressures are 0.900 atm and 1.635 atm. (a) What value of absolute zero in degrees Celsius does the calibration yield? What pressures would be found at (b) the freezing and (c) the boiling points of water? *Hint*: Use the linear relationship P = A + BT, where *A* and *B* are constants.

Ans:

 A copper telephone wire has essentially no sag between poles 35.0 m apart on a winter day when the temperature is -20.0°C. How much longer is the wire on a summer day when the temperature is 35.0°C? Ans:

A sample of lead has a mass of 20.0 kg and a density of 11.3 × 10³ kg/m³ at 0°C. (a) What is the density of lead at 90.0°C? (b) What is the mass of the sample of lead at 90.0°C? Ans:

4. A container in the shape of a cube 10.0 cm on each edge contains air (with equivalent molar mass 28.9 g/mol) at atmospheric pressure and temperature 300 K. Find (a) the mass of the gas, (b) the gravitational force exerted on it, and (c) the force it exerts on each face of the cube. (d) Why does such a small sample exert such a great force? Ans:

5. A popular brand of cola contains 6.50 g of carbon dioxide dissolved in 1.00 L of soft drink. If the evaporating carbon dioxide is trapped in a cylinder at 1.00 atm and 20.0°C, what volume does the gas occupy? Ans: