

Physics 410 - 2002

Thermal Physics

Problem Set 7

1. Chapter 5, p. 145, problem 2 (5 pt)
2. Chapter 5, p. 145, problem 3 (5 pt)
3. In a classical ideal gas, for given temperature pressure is proportional to density, i.e., to the average number of molecules per unit volume n . Show this (5 pt). Use the result to show that, if temperature is constant, in a uniform gravitational field (close to the Earth surface) pressure in a gas depends on height z as $p(z) = p(0) \exp(-mgz/\tau)$, where m is the mass of a molecule (5 pt)

You need to have 20 points (no extra credit points)

The problems are from Kittel & Kroemer, *Thermal Physics*, 2nd edition, (Freeman, NY 1980).