

Modern physics Exercises Chapter 5-6

Exercises Chapter 5-6

5.3.1 Calculate the nitrogen molecules most probable velocity at room temperature.

Answer: 420 m/s

5.3.2 Calculate the nitrogen molecules mean velocity at room temperature.

Answer: 470 m/s

5.3.3 Calculate the nitrogen molecules RMS-velocity at room temperature.

Answer: 510 m/s

5.3.4 A glowing body has its intensity maximum at 730 nm. Calculate temperature of the body in K.

Answer: 3970 K

5.3.5 The emitted energy per (s m^2) from a body is e_0 at the temperature 300 K. How large is the radiated energy at the temperature 400 K?

Answer: $3.2 e_0$

6.1.1 Suppose that the principle quantum number of an atom has the value $n = 2$. Calculate possible values of the magnetic quantum number m_l .

Answer: -1, 0, +1

6.1.2 The Schrödinger equation gives for the hydrogen atom the energies E_n . Determine E_2 .

Answer: $-5.4 \times 10^{-19} \text{ J}$ (-3.4 eV)