

Atomic physics problems 1.

1. The wavelength range of the visible light is between 400 and 800 nm. What is the frequency range of it? (375-750 THz) What is the photon energy range in eV units? (1.55 – 3.1 eV)
2. The photon energy of argon ion laser used in ophthalmology is 2.42 eV. What is the wavelength of the laser light? Is it visible light? (514 nm, visible)
3. The work function of electron in cesium atom is 1.96 eV. How large is the velocity of electrons leaving the atom if we use argon laser ($\lambda = 514$ nm) or laser diode ($\lambda = 663$ nm) for illumination? ($4 \cdot 10^5$ m/s; the electrons do not leave the atom)
4. The emission maximum of the thermal radiation emitted by the Sun is at 483 nm. The surface temperature of the Sun is 6000 K. At what wavelength is the emission maximum of thermal radiation of human body if its surface temperature is 28°C? (9.6 μ m)
5. How much energy is radiated out by a person of 0,9 m² skin surface in one minute if the temperature of the skin is 28°C? (25.3 kJ)
6. What wavelength of light causes photochemical effect, if the required energy is 240 kJ/mol? (495 nm)
7. Calculate the net energy loss due to thermal radiation in 1 hour for a person, with a surface area of 0.8 m² if the ambient temperature is 20 °C. The temperature of the skin surface is 27 °C. (120 kJ)