2. Answer the following problems about gases.

(a) The average atomic mass of naturally occurring neon is 20.18 amu. There are two common isotopes of naturally occurring neon as indicated in the table below.

Isotope	Mass (amu)
Ne-20	19.99
Ne-22	21.99

(i) Using the information above, calculate the percent abundance of each isotope.

(ii) Calculate the number of Ne-22 atoms in a 12.55 g sample of naturally occurring neon.

(b) A major line in the emission spectrum of neon corresponds to a frequency of $4.34 \times 10^{14}\ s^{-1}$. Calculate the wavelength, in nanometers, of light that corresponds to this line.

(c) In the upper atmosphere, ozone molecules decompose as they absorb ultraviolet (UV) radiation, as shown by the equation below. Ozone serves to block harmful ultraviolet radiation that comes from the Sun.

$$O_3(g) \xrightarrow{UV} O_2(g) + O(g)$$

A molecule of $O_3(g)$ absorbs a photon with a frequency of $1.00 \times 10^{15}\ s^{-1}$.

(i) How much energy, in joules, does the $O_3(g)$ molecule absorb per photon?

(ii) The minimum energy needed to break an oxygen-oxygen bond in ozone is 387 kJ mol^{-1}. Does a photon with a frequency of $1.00 \times 10^{15}\ s^{-1}$ have enough energy to break this bond? Support your answer with a calculation.