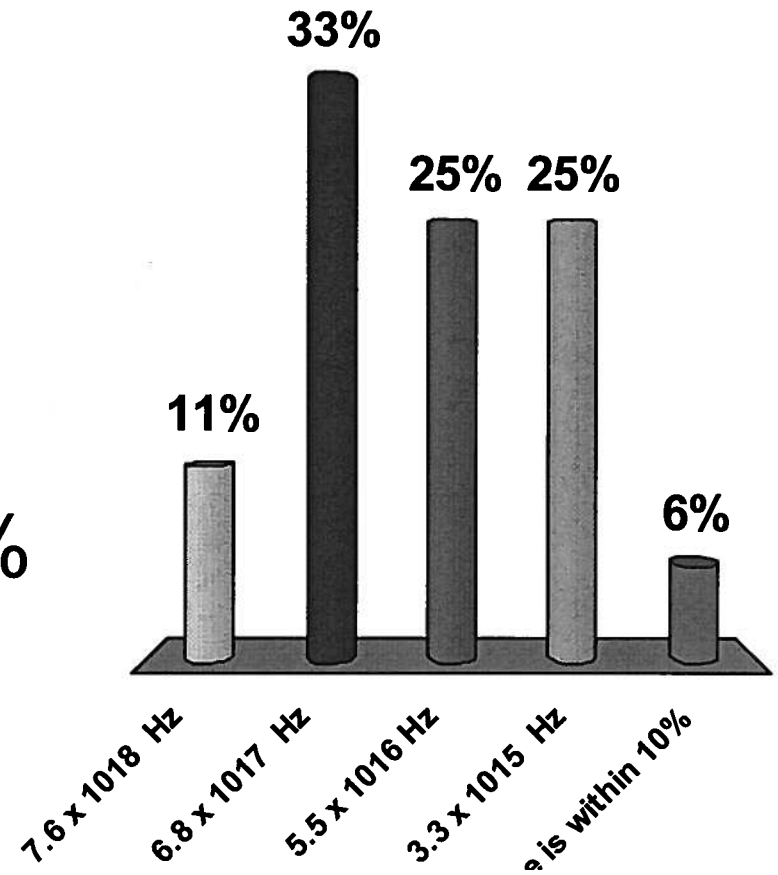
J. GRIFFIN 12/10/07 A ©

Given that h = 6.6×10^{-34} J-sec, and that 1 eV (electron volt) of energy = 1.6×10^{-19} J, what is the frequency of a 13.6 eV photon?

a) 7.6×10^{18} Hz
b) 6.8×10^{17} Hz
c) 5.5×10^{16} Hz
✔d) 3.3×10^{15} Hz
e) None is within 10%



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The correct answer is d); as follows.

- For a photon, Planck's law relates the energy and the frequency: E = h*f;
- Then f = E/h, and we compute
- f = (13.6 ev)/(6.53x10^{-34} J-sec) =
- And multiply by 1 = (1.6x10^{-19} J/ (1 eV),
- to get units, $(sec)^{-1}$= Hz.
- f = (13.6)*(1.6x10^{-19})/(6.53x10^{-34}) $(sec)^{-1}$
- = 3.3x$10^{(34-19)}$ = 3.3 x 10^{15} Hz.
- (and what is the wave length (= c/f) of this photon?)