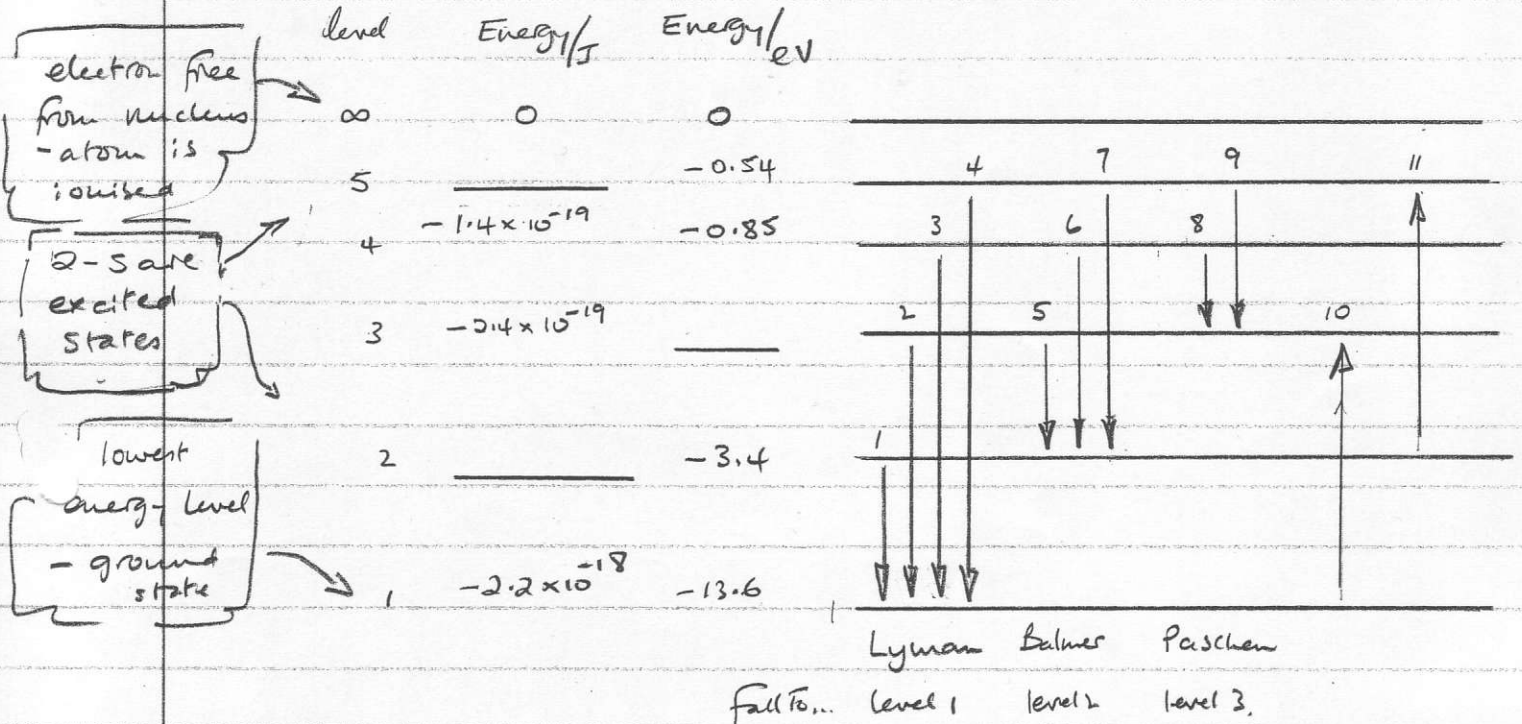


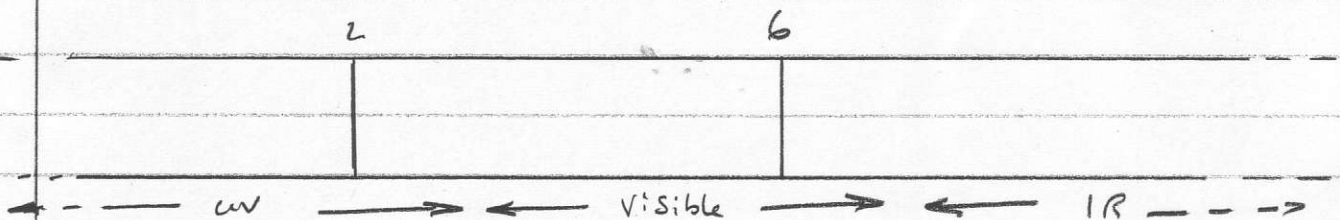
Hydrogen - Energy Levels + Spectra

A Physics

H is the simplest atom - 1p + 1e - which can move between different energy levels.



Hydrogen Line Spectrum.



1. Calculate energies in J + eV
2. locate all lines in the spectrum (no calculations needed)
3. Calculate f and λ for lines 2 + 5.
4. What is happening to make changes 10 + 11?

Calculate energies, f + λ involved.

What spectral lines correspond to these changes?

$$e = 1.6 \times 10^{-19} \text{ C}$$

$$c = 3 \times 10^8 \text{ m/s}$$

$$h = 6.6 \times 10^{-34} \text{ Js}$$



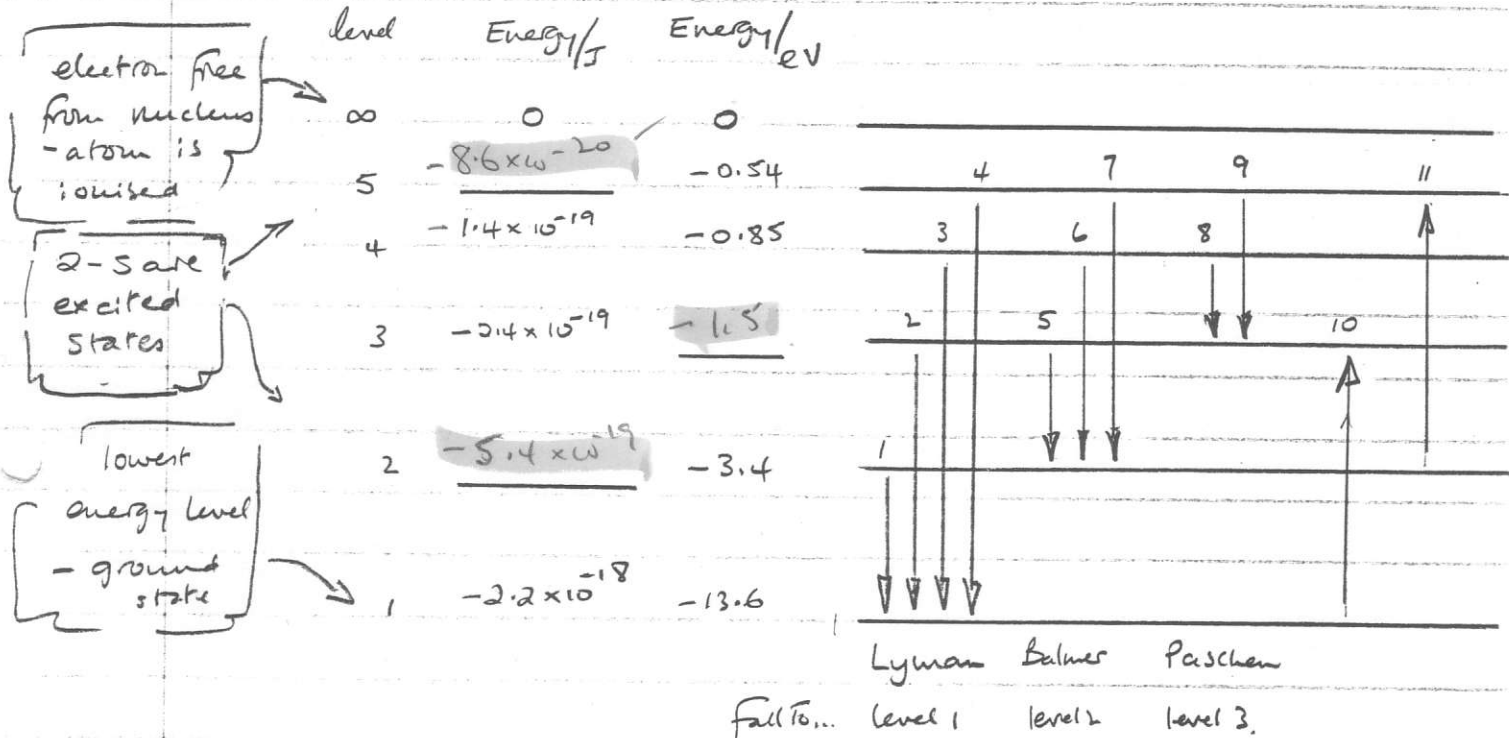
Hydrogen - Energy Levels + Spectra

ANSWERS

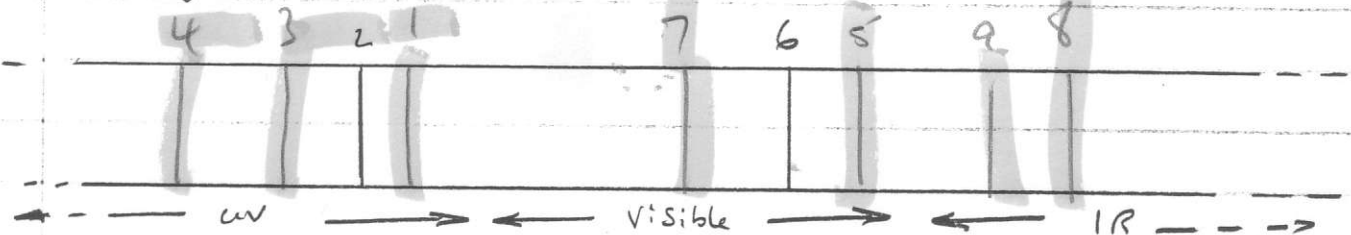
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A Physics

H is the simplest atom - 1p + 1e - which can move between different energy levels.



Hydrogen Line Spectrum.



Energy + f increase

1. Calculate energies in J + eV
2. locate all lines in the spectrum (no calculations needed)
3. Calculate f and λ for lines 2 + 5.
4. What is happening to make changes 10 + 11?

Calculate energies, f + λ involved.

What spectral lines correspond to these changes? $c = f\lambda \Rightarrow \lambda = \frac{c}{f} = 1.0 \times 10^{-7} \text{ m}$

10 = 2
11 = 7
 $\lambda = 4 \times 10^{-7} \text{ m}$

(5) $E_{diff} = 3.0 \times 10^{-19} \text{ J}$

$f = 4.5 \times 10^{14} \text{ Hz} \Rightarrow \lambda = 6.6 \times 10^{-7} \text{ m}$

$e = 1.6 \times 10^{-19} \text{ C}$

$c = 3 \times 10^8 \text{ m/s}$

$h = 6.6 \times 10^{-34} \text{ Js}$

(2) $E_{diff} = 2.4 \times 10^{-19} \text{ J}$
 $= (-2.2 \times 10^{-18})$
 $= 1.96 \times 10^{-18} \text{ J}$

$E = hf \Rightarrow f = 2.97 \times 10^{15} \text{ Hz}$