

Atomic Structure- Lesson 1-Practice Questions

- Which describes the visible emission spectrum of hydrogen?
 - A series of lines converging at longer wavelength
 - A series of regularly spaced lines
 - A series of lines converging at lower energy
 - A series of lines converging at higher frequency

- Draw and label an energy level diagram for the hydrogen atom. In your diagram show how the series of lines in the ultraviolet and visible regions of its emission spectrum are produced, clearly labelling each series.

(Total 4 marks)

- Describe the emission spectrum of hydrogen. Outline how this spectrum is related to the energy levels in the hydrogen atom.

(Total 3 marks)

- In the emission spectrum of hydrogen, which electronic transition would produce a line in the visible region of the electromagnetic spectrum?
 - $n = 2 \rightarrow n = 1$
 - $n = 3 \rightarrow n = 2$
 - $n = 2 \rightarrow n = 3$
 - $n = \infty \rightarrow n = 1$

- (a) List the following types of electromagnetic radiation in order of **increasing** wavelength (shortest first). 1
 - Yellow light
 - Red light
 - Infrared radiation
 - Ultraviolet radiation

(b) Distinguish between a continuous spectrum and a line spectrum. 1

- (c) The thinning of the ozone layer increases the amount of UV-B radiation that reaches the Earth's surface.

Type of Radiation	Wavelength / nm
UV-A	320–380
UV-B	290–320

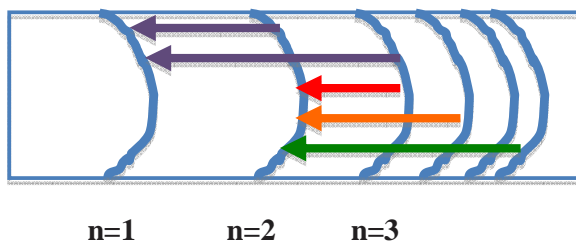
Based on the information in the table above explain why UV-B rays are more dangerous than UV-A.

(3)
(Total 5 marks)

ANSWERS

1. A)

2.



Purple arrows = UV lines
Colourful arrows = Visible lines

3. - discrete lines

- electron transfer/transition of lines from higher levels
- electron transition to $n=1$ cause UV radiation and to $n=2$ cause radiation in visible spectrum
- convergence = a higher frequency, shorter wavelength

4. B)

5. a) UV radiation < yellow < red < Infrared radiation

b) continuous spectrum has all colours/ all wavelengths/ all frequencies whereas a line spectrum has only lines of sharp discrete/specific colours/ specific wavelengths/specific frequencies

c) UV-B has shorter wavelength = higher energy and higher risk of skin cell damage and thus probability of cancer increases