

***Epreuve de discipline non linguistique : mathématiques en anglais.*****Ultraviolet treatment**

Ultraviolet (UV) radiation is similar to visible light in all physical aspects, except that it does not enable us to see things. The light that enables us to see things is referred to as visible light and is composed of the colors we see in a rainbow. The ultraviolet region starts immediately after the violet end of the rainbow.

In scientific terms, UV radiation is electromagnetic radiation just like visible light, radar signals and radio broadcast signals. Electromagnetic radiation is transmitted in the form of waves.

Different wavelengths<sup>(1)</sup> of electromagnetic radiation cause different types of effects on people. For example, gamma rays are used in cancer therapy to kill cancerous cells and infrared light can be used to keep you warm.

Some UV exposure is essential for good health. It stimulates vitamin D production in the body. In medical practice, UV lamps are used for treating psoriasis<sup>(2)</sup> and for treating jaundice<sup>(3)</sup> in new born babies.

Excessive exposure can damage the skin and the eyes. The severity of the effect depends on the wavelength, intensity, and duration of exposure.

A hospital physiotherapy department gives ultraviolet treatment.

For every patient receiving the treatment, the radiation is administered for 1 minute 9 seconds on day 1.

Each day the amount of time for UV exposure (the dose) is increased by a percentage according to the patient's skin type, as shown in the table below.

Skin type	Percentage increase per day
1 Always burns	10%
2 Tans with care but burns easily	15%
3 Tans easily and rarely burns	20%
4 Always tans, never burns	25%

(The dose is increased until it reaches a maximum of 46 minutes 18 seconds, when it is kept constant from then on.)

*Adapted from Canadian Centre for  
Occupational Health and Safety [www.ccohs.ca](http://www.ccohs.ca)  
and SMP Interact for GCSE mathematics  
Higher, Cambridge University Press*

**Questions:**

1. Janine has skin type 3. Calculate her treatment time on day 3.
2. Karl has skin type 4. On which day will his dose first go above 3 minutes?
3. Rita has skin type 2. What is her dose on day 16?
4. What is your opinion on the use of UV tanning?