O Level Physics Tutorial 11: Electromagnetic Spectrum

Syllabus :
(a) state that all electromagnetic waves are transverse waves that travel with the same speed in vacuum

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(b) describe the main regions of the electromagnetic spectrum in order of wavelength and frequency

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1. (i) State if electromagnetic waves are transverse or longitudinal.

(ii) State the main regions of the electromagnetic spectrum and arrange them from longest to shortest wavelengths.

(c) state examples of typical uses of the following regions of the electromagnetic spectrum:
(i) radio waves (e.g. radio and television communication, astronomy and RFID tags)
(ii) microwaves (e.g. mobile (cell) phones, microwave oven and satellite television)
(iii) infrared (e.g. infrared remote controllers, intruder alarms and thermal imaging)
(iv) visible light (e.g. photography, optical fibres in medicine and telecommunications)
(v) ultraviolet (e.g. sunbeds, bank note authentication and disinfecting water)
(vi) X-rays (e.g. medical radiology, security screening and industrial defect detection)
(vii) gamma (γ) rays (e.g. sterilising food, detection of cancer and its treatment)

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2. State examples of typical uses of the main regions of the electromagnetic spectrum.

(d) describe how over-exposure to electromagnetic waves can have hazardous effects (e.g. heating and ionising effects of radiation) on living cells and tissue.

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3. State what hazardous effects are possible if living cells and tissues are over-exposed to :

(i) microwave
(ii) infra red
(iii) ultra violet
(iv) X ray