

Electromagnetic spectrum (rw, mw, ir, visible, UV, X and gamma rays), including elementary ideas about their uses.

CLASS-XII

SUBJECT : PHYSICS

CHAPTER NUMBER: 08

CHAPTER NAME : ELECTROMAGNETIC WAVES

CHANGING YOUR TOMORROW

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Electromagnetic Spectrum:

S. No.	EM Wave	Range of λ	Range of ν	Source	Use
1	Radio Wave	A few km to 0.3 m	A few Hz to 10^9 Hz	Oscillating electronic circuits	Radio and TV broadcasting
2	Microwave	0.3 m to 10^{-3} m	10^9 Hz to 3×10^{11} Hz	Oscillating electronic circuits	Radar, analysis of fine details of atomic and molecular structures & Microwave oven
3	Infra Red wave	10^{-3} m to 7.8×10^{-7} m	3×10^{11} Hz to 4×10^{14} Hz	Molecules and hot bodies	Industry, medicine, astronomy, night vision device, green house, revealing secret writings on ancient walls, etc.
4	Light or Visible Spectrum	7.8×10^{-7} m to 3.8×10^{-7} m	4×10^{14} Hz to 8×10^{14} Hz	Atoms and molecules when electrons are excited	Optics and Optical Instruments, Vision, photography, etc.

S. No.	EM Wave	Range of λ	Range of ν	Source	Use
5	Ultra Violet Rays	3.8×10^{-7} m to 6×10^{-10} m	8×10^{14} Hz to 3×10^{17} Hz	Atoms and molecules in electrical discharges and Sun	Medical application, sterilization, killing bacteria and germs in food stuff, detection of invisible writing, forged documents, finger print, etc.
6	X - Rays	10^{-9} m to 6×10^{-12} m	3×10^{17} Hz to 5×10^{19} Hz	Inner or more tightly bound electrons in atoms	X-ray photography, treatment of cancer, skin disease & tumor, locating cracks and flaws in finished metallic objects, detection of smuggled goods in bags of a person, study of crystal structure, etc.
7	γ -Rays	They overlap the upper limit of the X-Ray. 10^{-10} m to 10^{-14} m	3×10^{18} Hz to 3×10^{22} Hz	Radioactive substances	Information about structure of nuclei, astronomical research, etc.

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