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“What one man calls God, another calls the laws of physics.”

-Nikola Tesla

TOPIC 14: ELECTROMAGNETIC SPECTRUM

THE ABOUT

CHAPTER ANALYSIS



MASTERY

- Straight forward topic



EXAM

- Tested in MCQ mainly
- Closely linked to chapter like General Properties of Waves



WEIGHTAGE

- Light overall weightage
- Constitute to around **2%** of marks for past 5 year papers

KEY CONCEPT

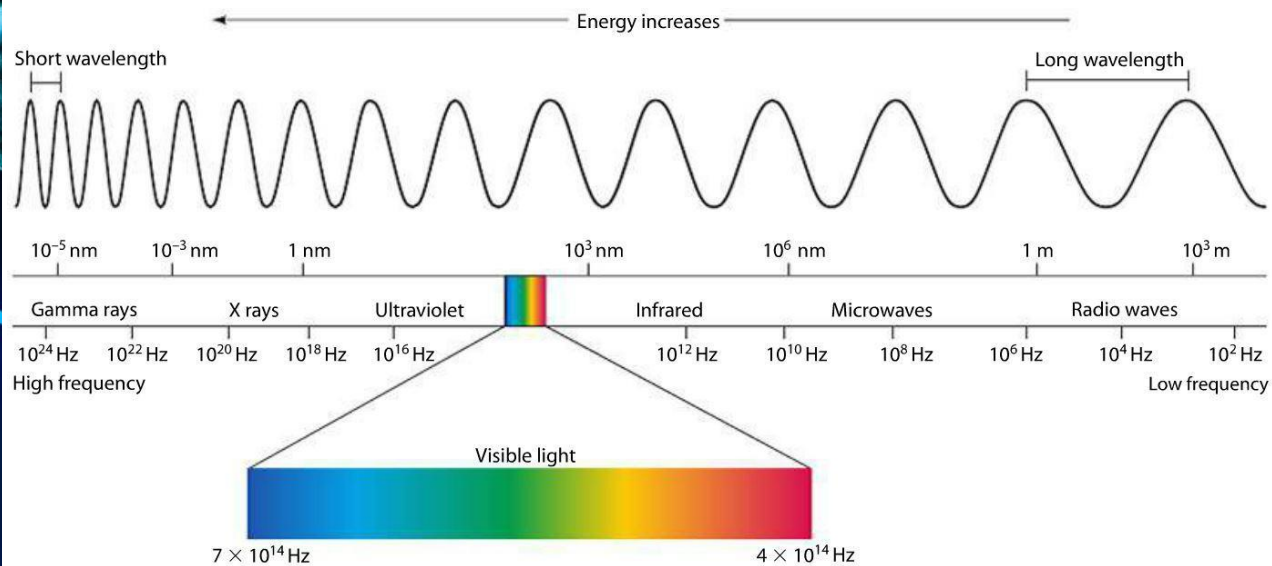
EM WAVES

PROPERTIES OF EM WAVES

EM WAVE SPECTRUM & APPLICATION



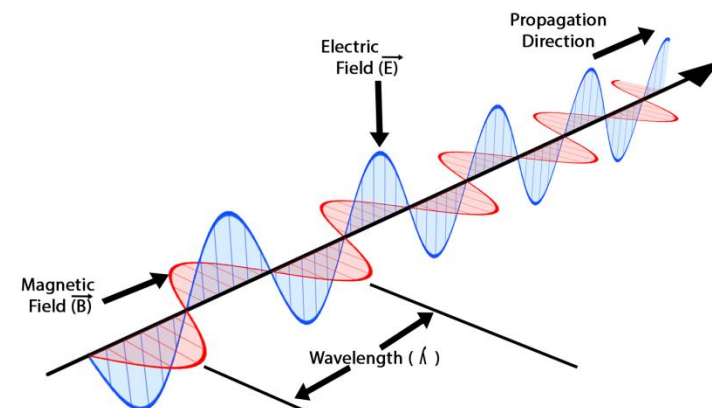
ELECTROMAGNETIC WAVES



PROPERTIES OF EM WAVES

- EM waves are **transverse waves**
- Travel at the speed of 3.0×10^8 in vacuum
- **Transfer energy** from one place to another
- Possess **wave properties** like reflection and refraction
- Obey the wave equation, **velocity = frequency \times wavelength**

Electromagnetic Wave



KEY CONCEPT

EM WAVES APPLICATION

Components	Application
Radio Waves	Radio and television communication
Microwaves	Satellite television and mobile phone networks Microwave oven - microwaves of a particle wavelength are very strongly absorbed by water molecules, heats up the water and cooks food
Infrared Radiation	Infrared sensors used in thermal imaging equipment Remote control for television Intruder alarm & surveillance systems to detect intruders
Visible Light (violent – 380nm, red – 700nm)	Laser light - Light Amplification by Stimulated Emission of Radiation Telecommunication through optical fibres using short pulses of light Medical equipment using laser or optic fibre
Ultraviolet Ray Main source: sunlight	Sun lamps & sun beds Sterilise surgical instruments in UV sterilisation boxes Fluorescent chemicals to coat inside of fluorescent light tubes
X-rays	Diagnostic tool in medicine and dentistry , to observe the inner parts of one’s body (fractures etc...) Examine flaws and cracks in metal parts joined together Inspect insides of articles such as the insides of luggage Cancer treatment
Gamma rays	Emitted due to the decay of radioactive nuclei, released during nuclear reactions. Cause serious damage when absorbed by living tissues. Used under controlled conditions to kill cancerous cells and sterilise hospital equipment Check for flaws in metals

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