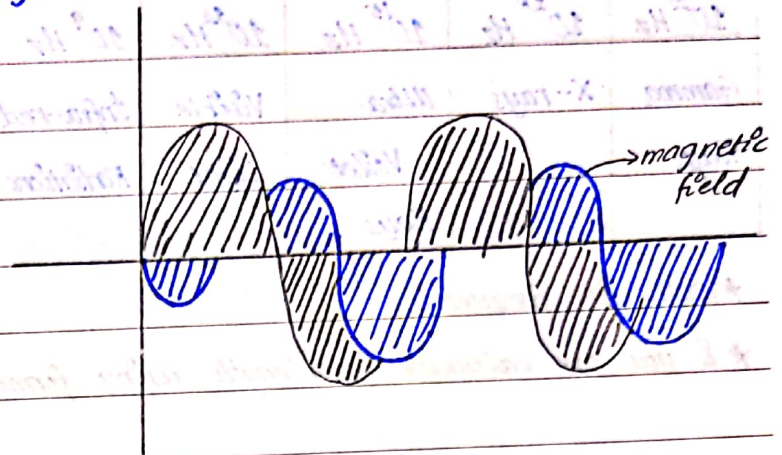


Date: ~~20/10/20~~ 20/10/20

ELECTROMAGNETIC SPECTRUM

→ a wave which consists of oscillating electric and magnetic fields



Properties:

- electromagnetic wave is a transverse wave
- electromagnetic waves are progressive waves
 - ↳ physically move from one place to another
- they transfer energy from one place to another place
- can travel through any medium including vacuum
- all the electromagnetic waves travel with speed of light ($3 \times 10^8 \text{ m/s}$)
- all the electromagnetic waves follow the expression $v = f\lambda$
- when electromagnetic wave travels from one medium to another medium, its speed and wavelength change but frequency remains unchanged
 - ↳ they have fixed frequencies
- they obey laws of reflection and laws of refraction
- they do not carry any charge or have mass
 - ↳ (mass & charge are properties of particles)



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Electromagnetic Spectrum

least wavelength			most wavelength				
10^{21} Hz	10^{18} Hz	10^{15} Hz	10^{12} Hz	10^9 Hz	10^6 Hz	10^4 Hz	Raw meat
Gamma Rays	X-rays	Ultra Violet Rays	Visible Light	Infra-red Radiations	Micro waves	Radio Waves	
Giraffe	Except	Rays	Very	Is	Meal	Raw	

* learn the frequencies ^{Unnecessary}

* & you can calculate wavelength using formulae: $v = f\lambda$

$$\frac{3 \times 10^8}{f} = \lambda$$

Uses of Electromagnetic Waves

(1) Radiowaves

- are used to broadcast radio and television signals
- transferred from transmitters to receivers over several kilometers
-

(2) Microwaves

- are used to transmit satellite television signals and mobile signals
- over very long distances, b/c they have a very high range
-

(3) Infra-Red Waves

- infra-red radiations are used in remote control of devices
- grills and toasters also use infra-red radiations

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④. Visible Light

→ optical fibres use visible light to transfer digital signals from one place to another over

→ telephones

⑤. Ultra-violet Radiations

→ are used to sterilize medical equipment as it destroys micro-organisms

→ sunbeds

⑥. X-rays

→ are used in security scanners / detecting cracks in metal

→ also used in medicine to produce two-dimensional image of inside of the body

⑦. Gamma Rays

→ used in medicine to kill tumors and cancer cells

→ engineering applications such as detecting cracks in metal