MASTERJEE CLASSES

Class XII

COMMUNICATION SYSTEMS

BRAIN MAP

MODES OF COMMUNICATION

POINT TO POINT COMMUNICATION
Communication takes place over a link between a single transmitter and a receiver.

BROADCAST MODE COMMUNICATION
Large number of receivers corresponding to a single transmitter.

BASIC COMMUNICATION TECHNIQUE

Transmitter
Converts the message signal suitable for transmission.

Communication Channel
A medium that connects a transmitter to a receiver.

Receiver
Retrieves the message signal into original form.

Modulation

Process of variation of some characteristic of a high frequency wave in accordance with the message signal.

- **Phase Modulation**
- **Frequency Modulation**

Amplitude Modulation

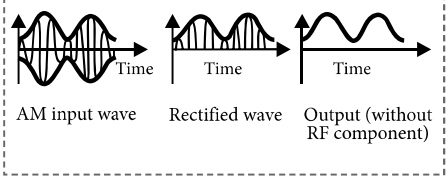
Amplitude of the high frequency carrier wave changes in accordance with modulating signal.

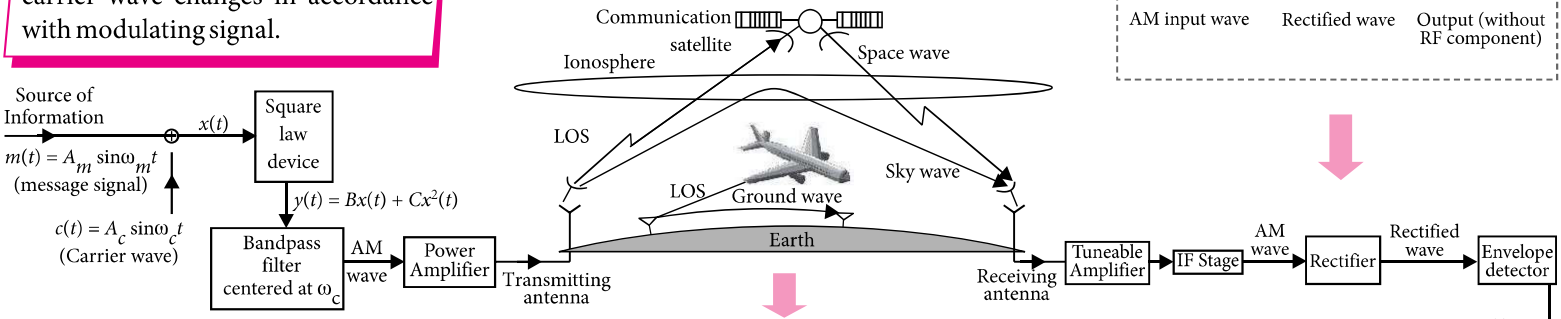
Necessity of Modulation

- *To reduce the size of antenna, need a high frequency carrier wave.*
- *We need high power transmission as $P \propto (1/\lambda)^2$*
- *To avoid the mixing up of signals a band of frequency is allotted to each user for different radio channels.*

Demodulation

Process of recovering the audio signal from the modulated wave is called demodulation or detection.





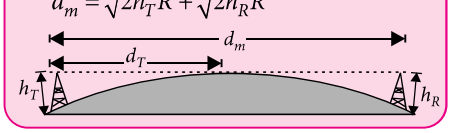
SPACE COMMUNICATION

Space Wave Propagation

A radio wave transmitted from an antenna, directly reaches the receiving antenna by LOS propagation.

- Maximum LOS distance

$$d_m = \sqrt{2h_T R} + \sqrt{2h_R R}$$



Range and Application:
- VHF : 30 MHz - 300 MHz
  TV, FM radio, metrology devices
- UHF : 300 MHz - 3 GHz
  TV, aircraft landing systems

Ground Wave Propagation

Here EM wave glides over the earth surface along its curvature from transmitter to receiver placed close to the surface of earth.

Range and Application:
- LF : 30 kHz - 300 kHz
  Long wave radio communication
- MF : 300 kHz - 3 MHz
  AM radio broadcast for local areas

Sky Wave Propagation

The radio wave directed towards the sky and reflected by the ionosphere towards the desired location on the earth.

- Critical frequency $\upsilon_c = 9(N_{max})^{1/2}$

Range and Application:
- HF : 3 MHz - 30 MHz
  Short wave radio communication, CB radio