DATA & SIGNALS

1. Base for communication

LECTURE - 11
Data & Signals

Recap

1. Network S  ardisation
2. Standard Organisation

Objectives

- Data & Signals
- Characteristics of Signal
- Analogue & Digital Devices
- Analogue-Digital Conversion
- Digital-Analogue Conversion

DATA & SIGNALS

Data : These are characteristics collected through observation .

Data is a set of values of qualitative or quantitative variables about one or more persons or objects, while a **datum** (singular of data) is a single value of a single variable.

Signal: A signal is an electrical or electromagnetic current that is used for carrying data from one device or network to another.

Analog Signal

Digital Signal

Representation of Signals

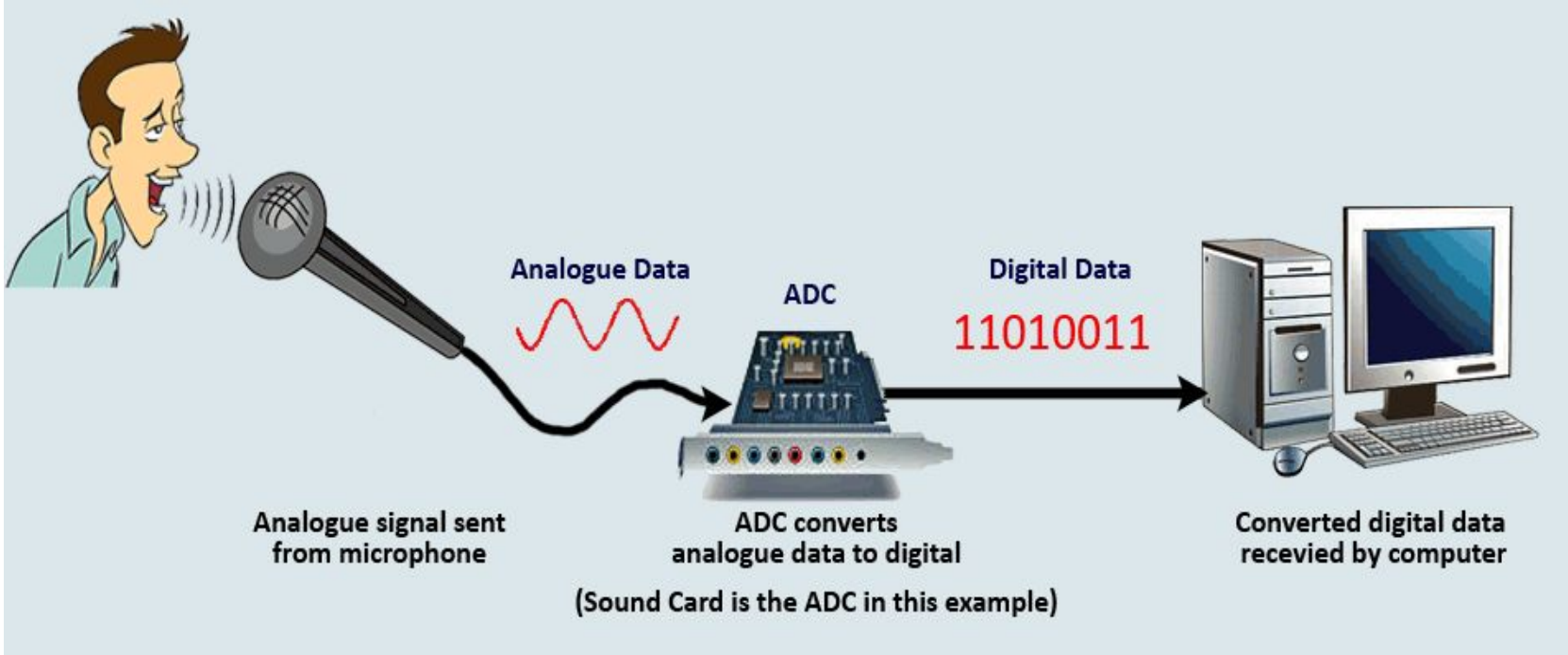
CHARACTERISTICS OF SIGNAL

Analogue Signal	Digital Signal
• Frequency • Wavelength • Amplitude • Phase	• Bit Rate • Bit interval • Bit length

ANALOGUE & DIGITAL DEVICES

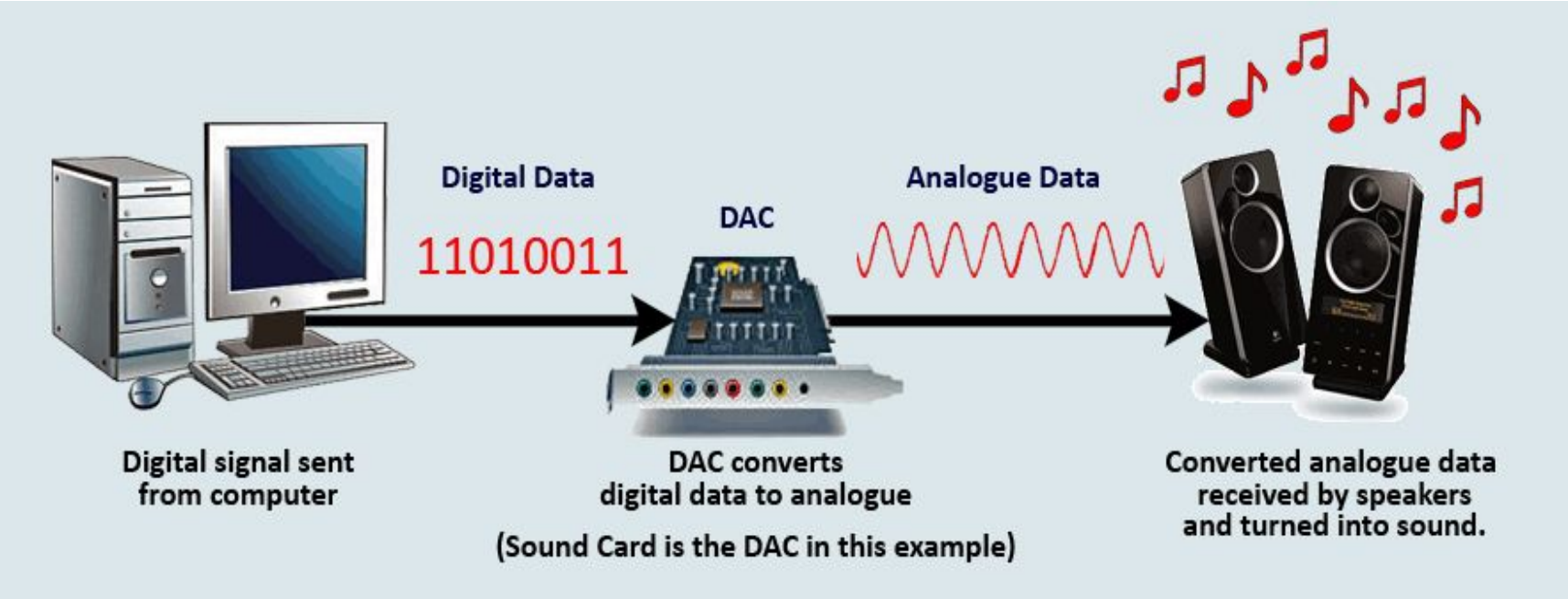
ANALOGUE-DIGITAL CONVERSION

1. Devices used to covert analogue signal to digital signal .



DIGITAL- ANALOGUE CONVERSION

1. Devices used to convert digital signal to analogue signal.



SUMMARY

- Data & Signals

Q.1 What is data?

Q.2 What is signal?

Q.3 What are the types of data & signal?

Q.4 How signals are represented?

Q.5 How data/signal conversion carried out?

ACTIVITY- 9

- Lecture 10 : Data , Signal & Basic of Waves

Reading:

Transmission impairment – attenuation, distortion, noise

Data Rate limits – bandwidth, signal level, quality of the channel

Performance – bandwidth, throughput, latency, bandwidth-delay product.

Waves:

1. https://www.youtube.com/watch?v=R8kCskG7hKI (Characteristics of waves).
2. https://www.youtube.com/watch?v=UMC1EI-2sLo (Characteristics of waves).
3. https://www.youtube.com/watch?v=P798-zzEwT4 (Physics demonstration).

ELECTROMAGNETIC WAVE MODULATION

1. Guided and unguided

LECTURE - 12
Electromagnetic waves ,Bandwidth & Modulation

Recap

1. Data & Si

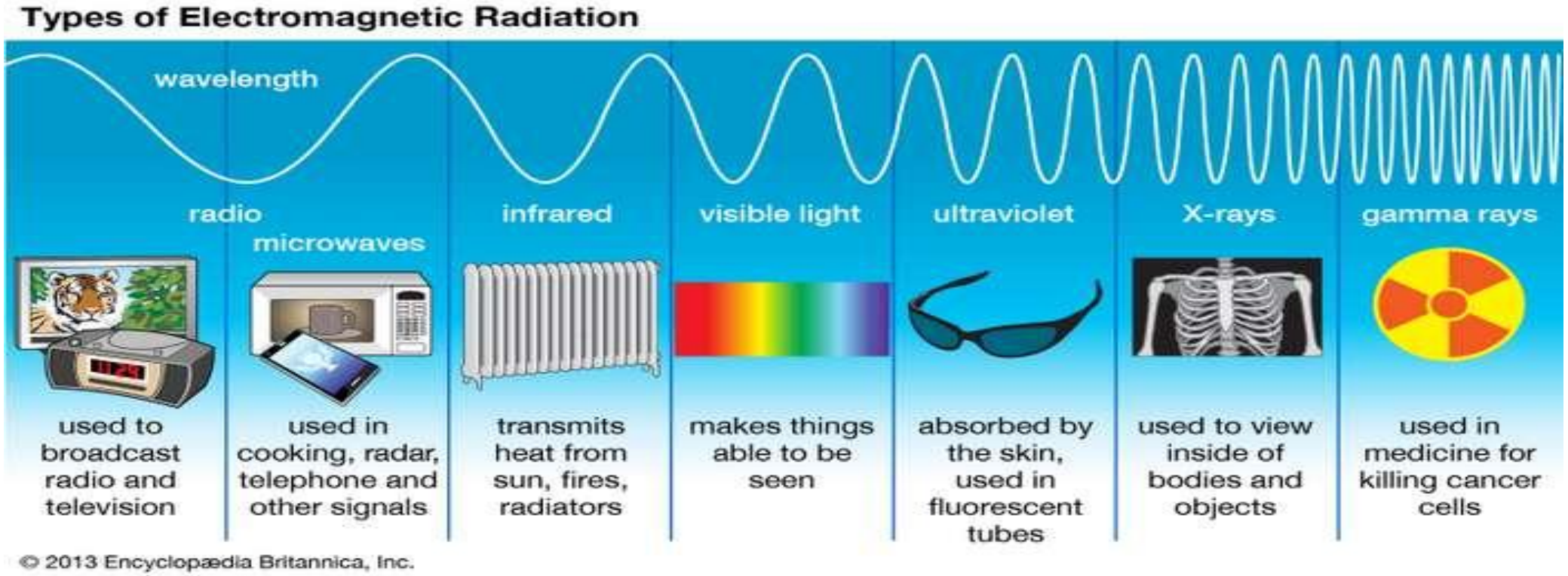
2. Characteristics of Signal
3. Analogue & Digital Devices
4. Analogue-Digital Conversion
5. Digital-Analogue Conversion

Objectives

- Electromagnetic waves
- Bandwidth
- Broadband & Baseband
- Modulation

ELECTROMAGNETIC WAVES

1. - Longitudinal waves, compression rarefaction waves, vacuum waves



BANDWIDTH

1. **Network bandwidth** is the capacity of a wired or wireless network communications link to transmit the maximum amount of data from one point to another over a computer network or internet connection in a given amount of time.

Baseband

- Baseband technology transmits a single data signal, stream, channel at a time
- **General Ex:** Railway track; **Technical ex**: Ethernet (TDM)

Broadband

- Broadband technology transmits multiple data signals/streams/channels simultaneously at the same time.
- **General Ex:** Road ; **Technical Ex:** DSL, Cellular, Cable modern, Satellite (FDM, WDM)

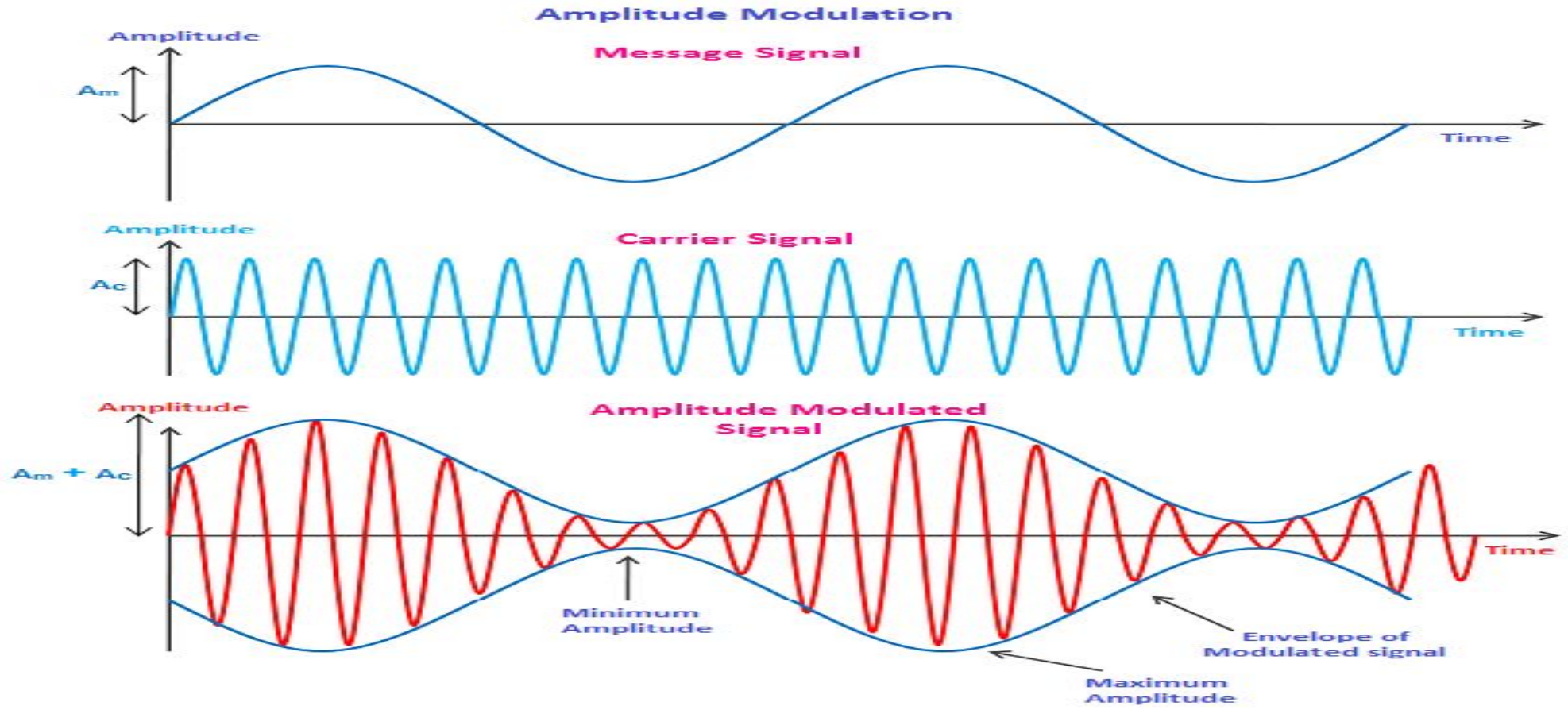
MODULATION

1. It is the process of mixing data signal to the carrier signal to form new signal. Mixing of low frequency signal with high frequency carrier signal is called **Modulation.**
2. **Modulation types :**
    1. Analog modulation
    2. Digital modulation

Message Signal + Carrier Signal = Modulation

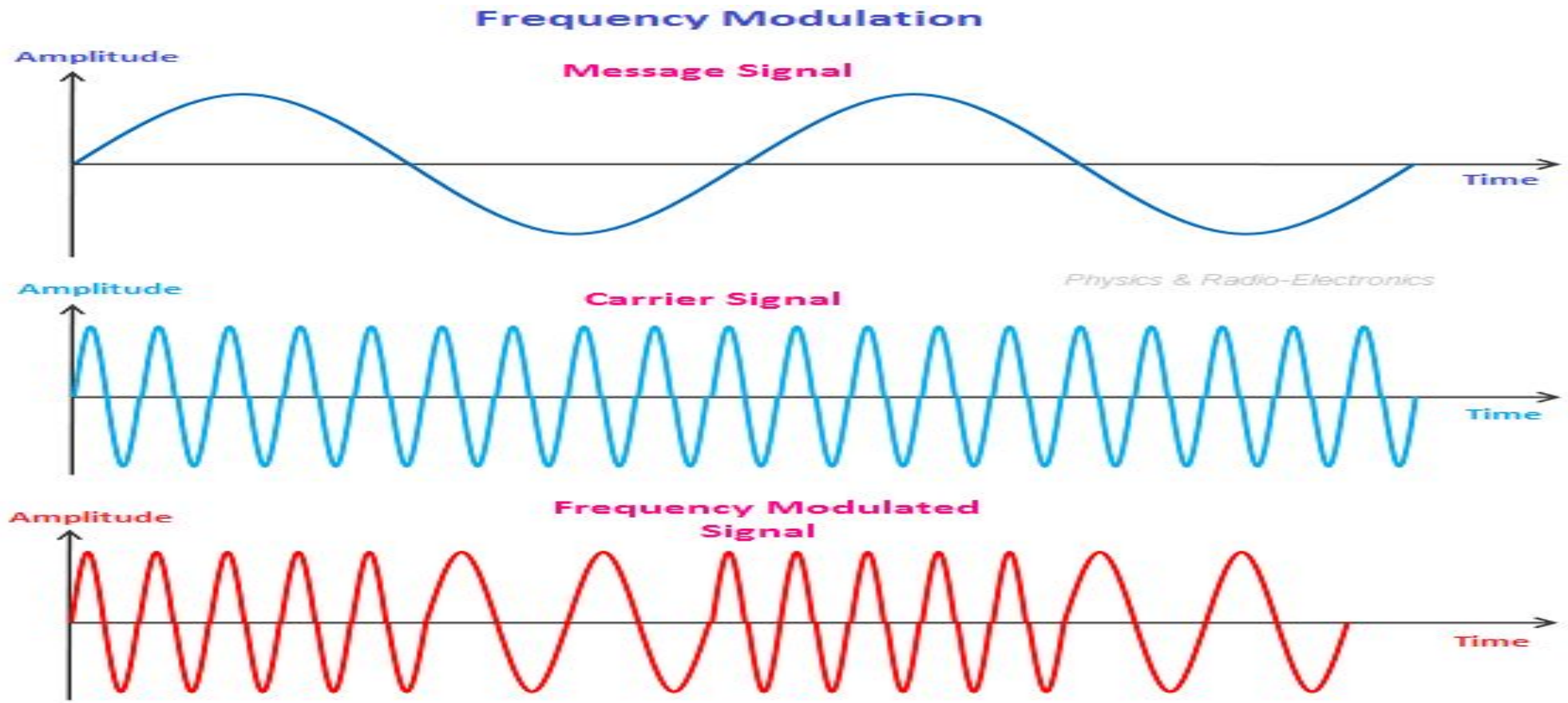
ANALOGUE MODULATION

1. Amplitude modulation where the amplitude of the carrier signal is modulated or altered



ANALOG MODULATION

1.



DIGITAL MODULATION

1. Types of Digital Modulation