AQA A-Level Physics

13.6 Data communication systems

Flashcards

What is a communication system made up of?

What is a communication system made up of?

System blocks, each with an individual function in transferring a signal from source to receiver.

What is modulation?

What is modulation?

The process of impressing information onto a signal carrier.

What is meant by transmission path?

What is meant by transmission path?

The physical medium over which the information is transmitted.

What is demodulation?

What is demodulation?

The process of extracting the original information from the signal carrier.

What are the 4 types of communication channels?

What are the 4 types of communication channels?

- Simplex: one way.
- Duplex: simultaneously two-way.
- Half-duplex: two-way, one at a time.
- Multiplex: several signals at once.

Draw a block diagram of a real-time communication system.

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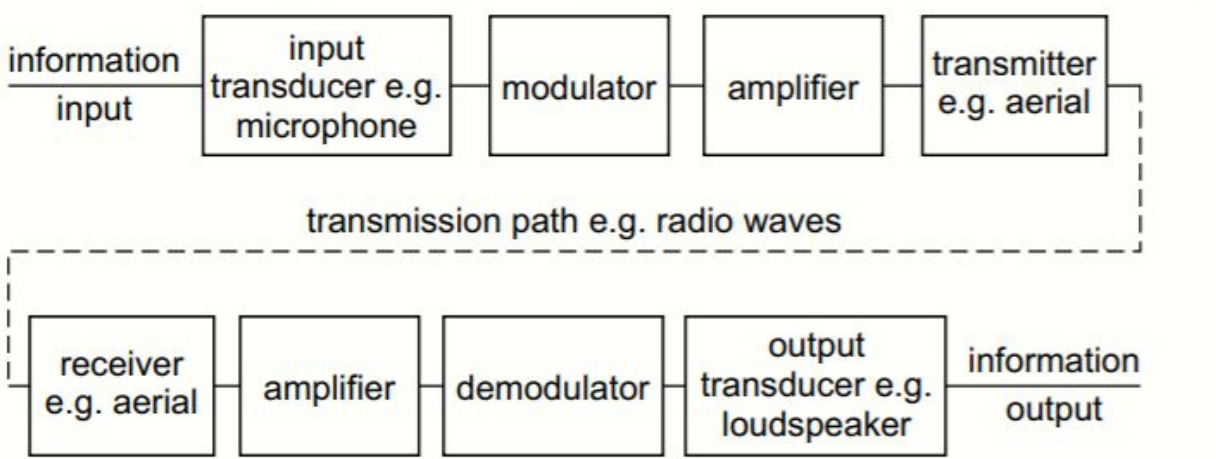

Image: AQA

Give 3 examples of transmission path media.

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Metal wire, optical fibres or radio waves.

Which two forms can metal wire be found as in communication systems?

Which two forms can metal wire be found as in communication systems?

Coaxial cable or twisted pair cable.

How do optical fibres transmit a signal?

How do optical fibres transmit a signal?

By total internal reflection of light in a long, thin glass cable with a core and cladding.

What are ground waves?

What are ground waves?

Radio waves that diffract over the curvature of the earth to cover big distances.

What are sky waves?

What are sky waves?

Radio waves reflected off of the ionosphere by total internal reflection.

What are microwave links?

What are microwave links?

Line of sight transmission paths to receive and transmit information at microwave frequencies.

How do geostationary satellites and ground stations avoid de-sensing?

How do geostationary satellites and ground stations avoid de-sensing?

They transmit at different frequencies.

Are guided or unguided transmission paths more secure?

Are guided or unguided transmission paths more secure?

Guided.

What process do high-frequency carrier radio waves undergo before transmission over long distances?

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Modulation using audio signal information.

What is the relationship between AM bandwidth and the highest frequency in the audio signal, f_H?

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In amplitude modulation (AM), the carrier waveform amplitude is altered depending on variations in the audio signal:

$$AM\ bandwidth = 2f_H$$

What is the effect of frequency modulation (FM) on the amplitude of the carrier wave?

What is the effect of frequency modulation (FM) on the amplitude of the carrier wave?

None, the amplitude is constant but the frequency is varied depending on frequency variations of the audio signal.

What is frequency deviation, Δf ?

What is frequency deviation, Δf ?

The maximum variation in frequency.

Define, by formula, FM bandwidth.

Define, by formula, FM bandwidth

$$FM\ bandwidth = 2 \times (\Delta f + f_M)$$

f_M is the peak frequency of the modulated signal.

Do FM or AM signals have higher noise immunity?

Do FM or AM signals have higher noise immunity?

FM.

What is the advantage of a small FM frequency deviation?

What is the advantage of a small FM frequency deviation?

Less frequency deviation means more channels can fit into the same frequency spectrum.

Which transmission media has the highest bandwidth?

Which transmission media has the highest bandwidth?

Optical fibres.

What is data capacity?

What is data capacity?

The maximum rate that information can be sent via communication channels. Measured in bits per second and equal to 2x the bandwidth of the transition medium.

What is time-division multiplexing (TDM)?

What is time-division multiplexing (TDM)?

A communication method where multiple users are able to send signals over a common transmission frequency and path.

What is a TDM timeframe?

What is a TDM timeframe?

A collection of time slots containing different users' data.

What happens to a TDM timeframe after it is received?

What happens to a TDM timeframe after it is received?

The timeframe is demultiplexed and each signal is sent to its individual receiver.

In TDM, should the data rate of the transmission medium or sending/receiving devices be greater?

In TDM should the data rate of the transmission medium or sending/receiving devices be greater?

The transmission medium.