

CIE A-Level Physics

16 - Communication Flashcards

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What are wire pairs?



What are wire pairs?

Wire pairs are links between information transmitters and receivers. Nowadays they are used for low frequency short distance communications, e.g. doorbells.



What are Coaxial cables?



What are Coaxial cables?

Coaxial cables have 2 wire conductors, a signal transmits through a conductor which is surrounded by an insulator. Then an earthed wire braid surrounds this, acting as a return and then another layer of insulation, to protect from any interference.



What are 4 advantages of coaxial cables compared to optical fibres?



What are 4 advantages of coaxial cables compared to optical fibres?

1. Larger bandwidth.
2. Lower attenuation of signal.
3. Cheaper.
4. More secure.



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 are 4 reasons for modulation?



What are 4 reasons for modulation?

1. Less interference.
2. A shorter aerial can be used.
3. Less attenuation.
4. Less distortion.



What is meant by transmission path?



What is meant by transmission path?

The physical medium over which the information is transmitted.



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



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

1. Coaxial cable.
2. 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 surface waves?



What are surface waves?

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



What are sky waves?



What are sky waves?

Radio waves reflected from 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.



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



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

Modulation using audio signal information.



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



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

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

$$\text{AM bandwidth} = 2f_H$$



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, using a formula, FM bandwidth.



Define, using a formula, FM bandwidth.

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

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.



Which transmission media has the highest bandwidth?



Which transmission media has the highest bandwidth?

Optical fibres.



What is an analogue signal?



Which is an analogue signal?

An analogue signal is a signal that has the same variation with time as the data does.



What is a digital signal?



Which is a digital signal?

A digital signal is a signal which consists of a series of highs and lows with no intermediate values.



What is the function of an analogue to digital converter?



What is the function of an analogue to digital converter?

The analogue signal is sampled at a number of regular time intervals and then each is converted to a binary number.



What are some advantages of digital to analogue?



What are some advantages of digital to analogue?

The signal is able to be regenerated so there is minimal noise. Extra data can be added so the signal can be checked for errors.



What are 2 ways to improve the reproduction of input signal?



What are 2 ways to improve the reproduction of input signal?

1. Increase the number of bits in the digital number for each sampling so that the step height is reduced.
2. Increase sampling frequency so that the depth is reduced.



State the equation for the number of decibels.



State the equation for the number of decibels.

$$\text{Number of dB} = 10 \lg \left(\frac{P_1}{P_2} \right)$$

