

**S2 Physics**  
**TELECOMMUNICATIONS**  
**Study Guide**

***Waves***

At the end of the section I can :

- ☐ 1      give an example which illustrates that the speed of sound in air is less than the speed of light in air, eg thunder and lightning
- ☐ 2      describe a method of measuring the speed of sound in air (using the relationship between distance, time and speed)
- ☐ 3      carry out calculations involving the relationship between distance, time and speed in problems on sound transmission
- ☐ 4      state that waves are one way of transmitting signals
- ☐ 5      use the following terms correctly in context: wave, frequency, wavelength, speed, energy (transfer) , amplitude
- ☐ 6      carry out calculations involving the relationship between distance, time and speed in problems on water waves
- ☐ 7      carry out calculations involving the relationship between speed, wavelength and frequency for water and sound waves.

**S2 Physics**  
**TELECOMMUNICATIONS**  
**Study Guide**

***Communication Using Cables***

At the end of the section I can :

- ☐ 1 describe a method of sending a message using code.
- ☐ 2 state that coded messages or signals are sent out by a transmitter and are picked up by a receiver.
- ☐ 3 state that the telephone is an example of long range communication between transmitter and receiver.
- ☐ 4 state the energy changes
  - a) in a microphone (sound to electrical)
  - b) in a loud speaker (electrical to sound).
- ☐ 5 state that the mouthpiece of a telephone (transmitter) contains a microphone and the earpiece (receiver) contains an earphone (loudspeaker).
- ☐ 6 state that electrical signals can be transmitted along wires during telephone communication
- ☐ 7 explain the electrical signal pattern in telephone wires in terms of loudness and frequency changes in the sound signal
- ☐ 8 state that an electrical signal is transmitted along a wire at a speed  $\gg$  speed of sound (almost 300 000 000 m/s)
- ☐ 9 describe the effect on the signal pattern displayed on an oscilloscope due to a change in
  - a) loudness of sound
  - b) frequency of sound
- ☐ 10 describe, with examples, how the following terms relate to sound: frequency and amplitude

**S2 Physics**  
**TELECOMMUNICATIONS**  
**Study Guide**

***Optical Fibres***

At the end of the section I can:

- ☐ 1 state what is meant by an optical fibre
- ☐ 2 state that optical fibres are used in telecommunication systems
- ☐ 3 state that optical fibres transmit light signals
- ☐ 4 state that signal transmission along an optical fibre takes place at a very high speed (nearly 200 million metres per second)
- ☐ 5 describe the transmission of the light signal along an optical fibre
- ☐ 6 describe one advantage and one disadvantage of using optical fibres for transmission of signals

**S2 Physics**  
**TELECOMMUNICATIONS**  
**Study Guide**

***Radio and Television***

At the end of the section I can :

- ☐ 1 state that mobile telephones, radio and television are examples of long range communication which do not need cables (between transmitter and receiver)
- ☐ 2 state that radio signals, television signals and microwaves are waves which transfer energy
- ☐ 3 state that radio waves, television waves and microwaves are transmitted through the air at 300 000 000 m/s
- ☐ 4 state that the main parts of a radio receiver are: aerial, tuner, decoder, amplifier, loudspeaker, electricity supply; and identify these parts on a block diagram
- ☐ 5 describe in a radio receiver the function of the aerial, tuner, decoder, amplifier, loudspeaker and electricity supply
- ☐ 6 state that the main parts of a television receiver are: aerial, tuner, decoders, amplifiers, screen, loudspeaker, electricity supply; and identify these parts on a block diagram of a television receiver
- ☐ 7 describe in a television receiver the function of: aerial, tuner, decoders, amplifiers, screen, loudspeaker, electricity supply
- ☐ 8 state that mixing red, green and blue lights produces all colours seen on a colour television screen
- ☐ 9 state that both radio and television stations can be identified by the frequency of the signal they transmit

**S2 Physics**  
**TELECOMMUNICATIONS**  
**Study Guide**

***Satellites***

At the end of the section you should be able to:

- ☐ 1 Describe how satellites are used in telecommunication
- ☐ 2 State that a geostationary satellite stays above the same point on the Earth's surface
- ☐ 3 State that curved reflectors on receiving aerials make the signal stronger
- ☐ 4 Explain why curved reflectors on receiving aerials make the signal stronger

S2 Physics  
**TELECOMMUNICATIONS**  
Study Guide

***Skills***

**At the end of the topic I will be able to:**

- 1      Demonstrate that I can carry out practical work in a safe and logical manner.
- 2      Work as part of a team to successfully complete tasks that we are set.
- 3      Form valid conclusions and evaluate my work using my knowledge of Physics.
- 4      Use my notes and study guide in order to fully prepare for an assessment.