

## Pulses Exercise

Do these calculations in the back of your Physics books and just type in the final answer to TWO decimal places.

### Exercise 7-1:

1. A pulse covers a distance of  $5\text{ m}$  in 15 seconds. Calculate the speed of the pulse.
2. A pulse has a speed of  $5\text{ cm}\cdot\text{s}^{-1}$ . How far does it travel in 2,5 seconds?
3. A pulse has a speed of  $0,5\text{ m}\cdot\text{s}^{-1}$ . How long does it take to cover a distance of  $25\text{ cm}$  ?
4. How long will it take a pulse moving at  $0,25\text{ m}\cdot\text{s}^{-1}$  to travel a distance of  $20\text{ m}$  ?
5. The diagram shows two pulses in the same medium. Which has the higher speed?

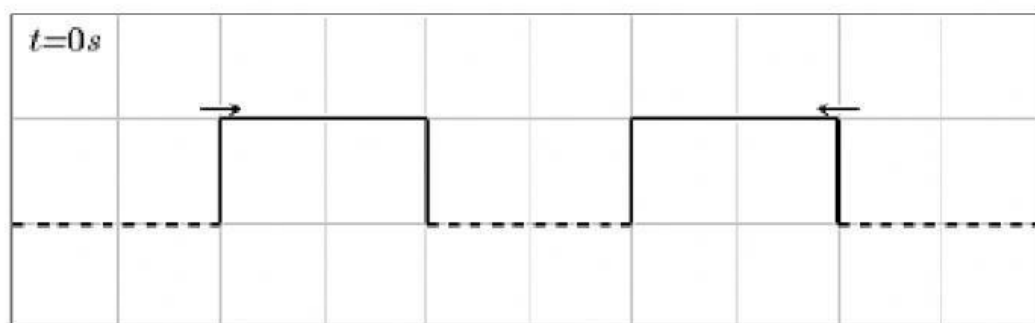


Don't forget to include UNITS in all your answers! (for  $\text{ms}^{-1}$  just type  $\text{ms-1}$ )

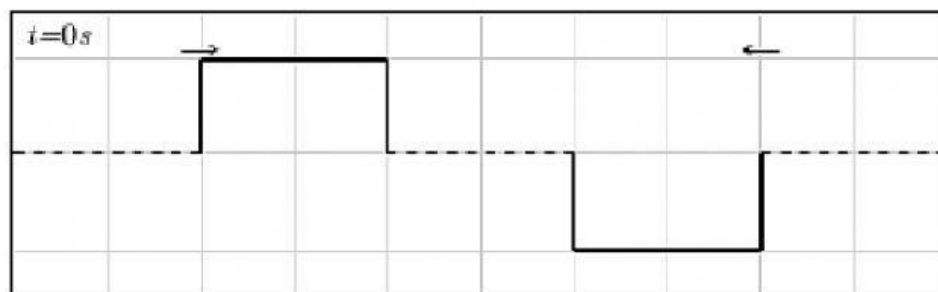
Copy these diagrams into the back of your Physics note book and then complete the questions

### Exercise 7-2:

1. For the following pulse, draw the resulting wave forms after 1 s, 2 s, 3 s, 4 s and 5 s. Each pulse is travelling at  $1 \text{ m} \cdot \text{s}^{-1}$ . Each block represents 1 m. The pulses are shown as thick black lines and the undisplaced medium as dashed lines.



2. For the following pulse, draw the resulting wave forms after 1 s, 2 s, 3 s, 4 s and 5 s. Each pulse is travelling at  $1 \text{ m} \cdot \text{s}^{-1}$ . Each block represents 1 m. The pulses are shown as thick black lines and the undisplaced medium as dashed lines.



## End of chapter exercises:

1. A heavy rope is flicked upwards, creating a single pulse in the rope. Make a drawing of the rope and indicate the following in your drawing:

- a) The direction of motion of the pulse
- b) Amplitude
- c) Pulse length
- d) Position of rest

2. A pulse has a speed of  $2,5 \text{ m}\cdot\text{s}^{-1}$ . How far will it have travelled in 6 s?

3. A pulse covers a distance of 75 cm in 2,5 s. What is the speed of the pulse?

4. How long does it take a pulse to cover a distance of 200 mm if its speed is  $4 \text{ m}\cdot\text{s}^{-1}$ ?


5. In a rope, a pulse of amplitude +20 mm is travelling to the right and a pulse of amplitude -4 mm is travelling to the left.

a) Make a labelled sketch to represent these two pulses.

b) What type of interference will take place when these two pulses meet?

c) Make a labelled sketch to represent the resulting pulse:

- i) when they cross each other
- ii) after they have crossed each other



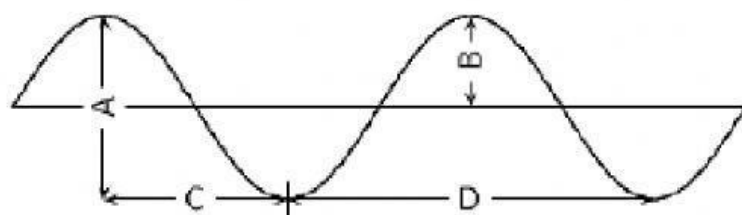
Do any questions  
requiring  
sketches in the  
back of your  
books.



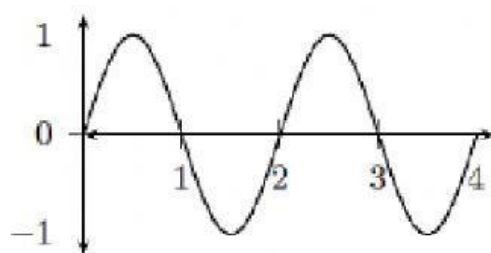
## Transverse Waves Exercise

### Exercise 8-1:

1. When the particles of a medium move perpendicular to the direction of the wave motion, the wave is called a ..... wave.
2. A transverse wave is moving downwards. In what direction do the particles in the medium move?
3. Consider the diagram below and answer the questions that follow:



4. Draw 2 wavelengths of the following transverse waves on the same graph paper. Label all important values.
  - a) Wave 1: Amplitude = 1 cm, wavelength = 3 cm
  - b) Wave 2: Peak to trough distance (vertical) = 3 cm, crest to crest distance (horizontal) = 5 cm
5. You are given the transverse wave below:



Draw the following:

- a) A wave with twice the amplitude of the given wave.
- b) A wave with half the amplitude of the given wave.
- c) A wave travelling at the same speed with twice the frequency of the given wave.
- d) A wave travelling at the same speed with half the frequency of the given wave.
- e) A wave with twice the wavelength of the given wave.
- f) A wave with half the wavelength of the given wave.
- g) A wave travelling at the same speed with twice the period of the given wave.
- h) A wave travelling at the same speed with half the period of the given wave.

6. A transverse wave travelling at the same speed with an amplitude of 5 cm has a frequency of 15 Hz. The horizontal distance from a crest to the nearest trough is measured to be 2,5 cm. Find the
- period of the wave.
  - speed of the wave.
7. A fly flaps its wings back and forth 200 times each second. Calculate the period of a wing flap.
8. As the period of a wave increases, the frequency increases/decreases/does not change
9. Calculate the frequency of rotation of the second hand on a clock.
10. Microwave ovens produce radiation with a frequency of 2 450 MHz (  $1\text{MHz}=10^6\text{Hz}$  ) and a wavelength of 0,122 m. What is the wave speed of the radiation?
11. Tom is fishing from a pier and notices that four wave crests pass by in 8 s and estimates the distance between two successive crests is 4 m. The timing starts with the first crest and ends with the fourth. Calculate the speed of the wave.

### End of chapter exercises:

1. A wave travels along a string at a speed of  $1,5\text{ m}\cdot\text{s}^{-1}$  . If the frequency of the source of the wave is 7,5 Hz, calculate:
- the wavelength of the wave
  - the period of the wave