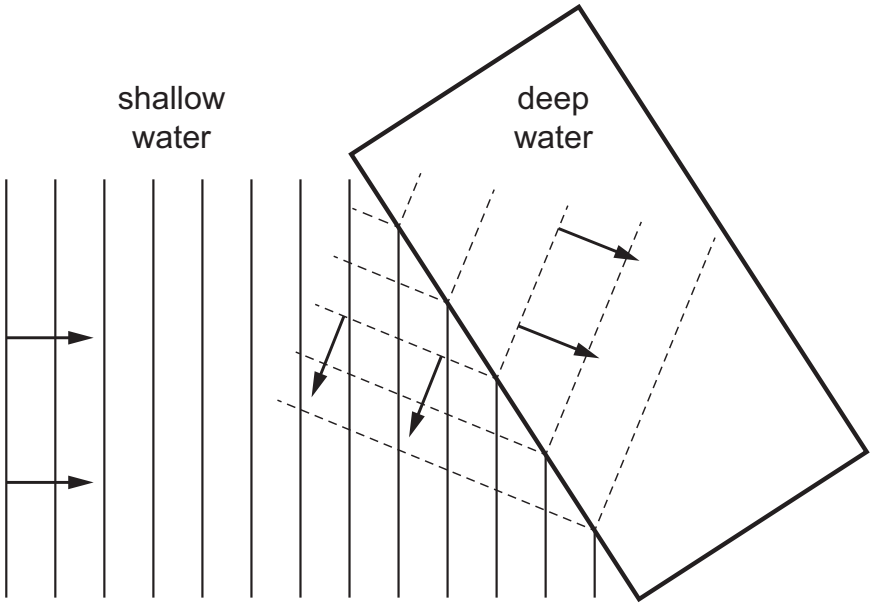
1 A siren is emitting a sound. As time passes, the sound becomes louder and higher pitched.

What is happening to the amplitude and to the frequency of the emitted sound wave?

	amplitude	frequency
A	decreasing	decreasing
B	decreasing	increasing
C	increasing	decreasing
D	increasing	increasing

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2 A student draws a diagram to show two different properties of a water wave. The arrows show the wave directions.



Which two wave properties does the diagram show?

A refraction and diffraction

B reflection and dispersion

C reflection and diffraction

D reflection and refraction

3 A person stands 1.0 m in front of a plane mirror. The mirror is moved away from the person at a speed of 1.0 m / s.

Which statement is correct?

A The image moves away from the person at a speed of 1.0 m / s.

B The image moves away from the person at a speed of 2.0 m / s.

C The image moves towards the person at a speed of 1.0 m / s.

D The image moves towards the person at a speed of 2.0 m / s.

4 Fig. 8.1 represents the pressure at one instant along part of a sound wave.

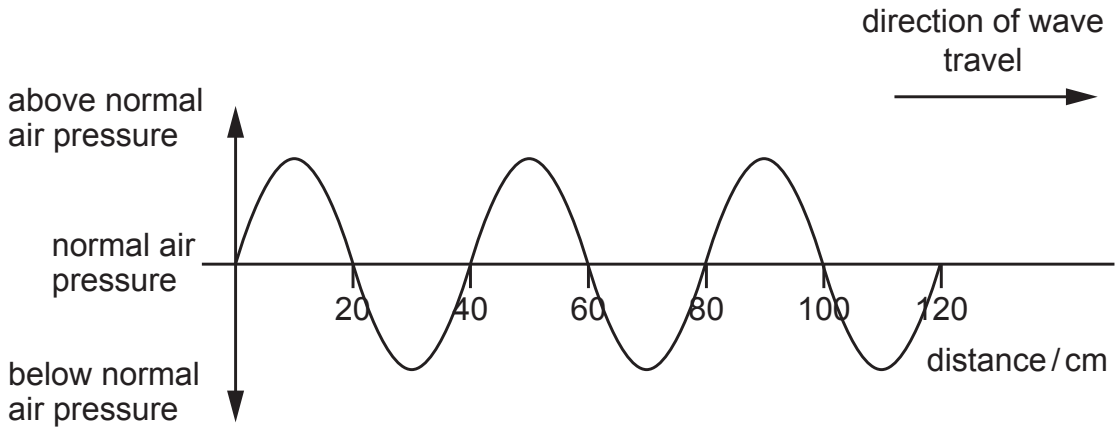


Fig. 8.1

(a) (i) Determine the wavelength of the sound wave.

wavelength of the sound wave = ... cm [1]

(ii) On Fig. 8.1, draw a wave representing a louder sound of the same wavelength. [1]

(b) State the range of audible frequencies for a healthy human ear. Include the unit.

..... [2]

[Total: 4]

5 Fig. 7.1 represents two rays of light striking a thin converging lens. The rays are both parallel to the principal axis.
F_2 and F_1 are the focal points of the lens.

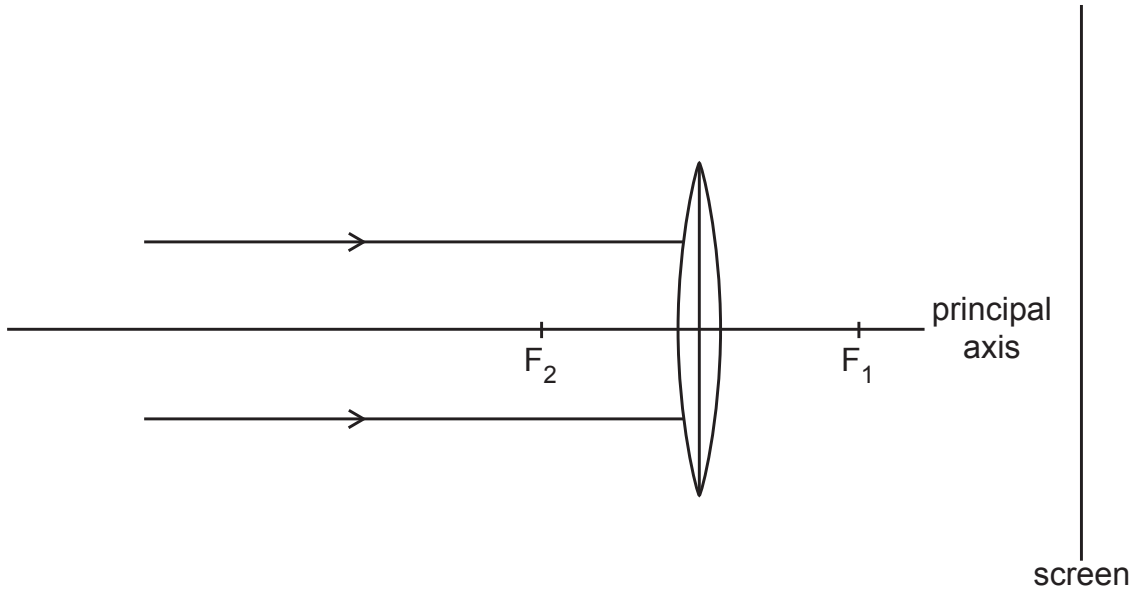


Fig. 7.1

(a) On Fig. 7.1, continue the path of each ray beyond the lens as far as the screen. [2]

(b) Visible light is a region of the electromagnetic spectrum.

State **one** region of the electromagnetic spectrum which has waves of longer wavelength than waves of visible light.

..... [1]

(c) Gamma rays are another region of the electromagnetic spectrum.

(i) Describe **one** use of gamma rays.

..... [1]

(ii) Describe **one** harmful effect on people of excessive exposure to gamma rays.

..... [1]

[Total: 5]

6 **(a)** Table 5.1 shows whether some energy resources are renewable and whether they cause air pollution when being used to generate electrical power.

For each energy resource, complete Table 5.1 by writing **yes** or **no** in each space. The solar energy resource has been done for you.

Table 5.1

energy resource	is it renewable?	does it cause air pollution?
solar	yes	no
fossil fuels		
wind		
nuclear fuel		
tidal		

[4]

(b) A solar cell is one way of using the solar energy resource.

Solar cells use visible light from the Sun to generate electrical power.

(i) State the property that allows visible light to travel through space from the Sun to a solar cell.

..... [1]

(ii) A frequency of visible light for a solar cell is 6.0×10^{14} Hz.

The speed of visible light is 3.0×10^{8} m/s.

Calculate the wavelength of this visible light.

wavelength = ... m [3]

(c) State **one** region of the electromagnetic spectrum which has a frequency lower than that of visible light. Describe a use of this region.

region .....

use of the region .....
[2]

[Total: 10]

7 Fig. 7.1 shows a ray diagram for an object positioned on the principal axis of a thin converging lens.

F_1 and F_2 are the focal points of the lens and C is the centre of the converging lens.

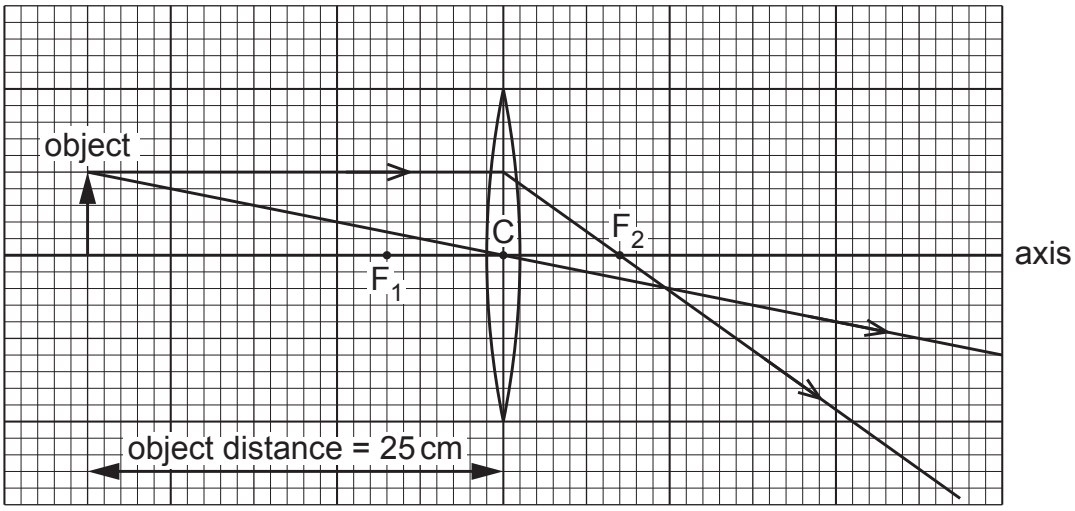


Fig. 7.1

(a) On Fig. 7.1, each small square of the grid represents 1.0 cm.

Determine the focal length of the converging lens.

focal length = ... cm [1]

(b) On Fig. 7.1, draw an arrow to show the position of the image formed by the converging lens. [1]

(c) State **three** characteristics of the image formed by the converging lens.

1 .....

2 .....

3 .....

[3]

[Total: 5]

8 A dolphin communicates with other dolphins underwater by emitting sounds in the range 7–15 kHz.

(a) State the value of the speed of sound in air and state how the speed of sound in water differs from the speed of sound in air.

speed of sound in air ..... m/s

speed of sound in water .....

[1]

(b) State and explain if humans with normal hearing can hear all the sounds emitted by the dolphin.

statement .....

explanation .....

.....

[2]

(c) Complete Table 5.1 to describe differences in loudness and pitch of two different dolphin sounds.

Table 5.1

Frequency /kHz	amplitude	loudness	pitch
14	large		
8	small		

[2]

(d) Complete the sentences to describe how sound is transmitted through water.

Sound waves are made of vibrating ..... which produce

compressions and rarefactions. A compression is a region of .....

and a rarefaction is a region of ..... . The sound waves travel

..... to the direction of the vibrations.

[3]

[Total: 8]

9 Fig. 6.1 shows the path of a ray of visible light travelling from the top of an object and passing through a converging lens.

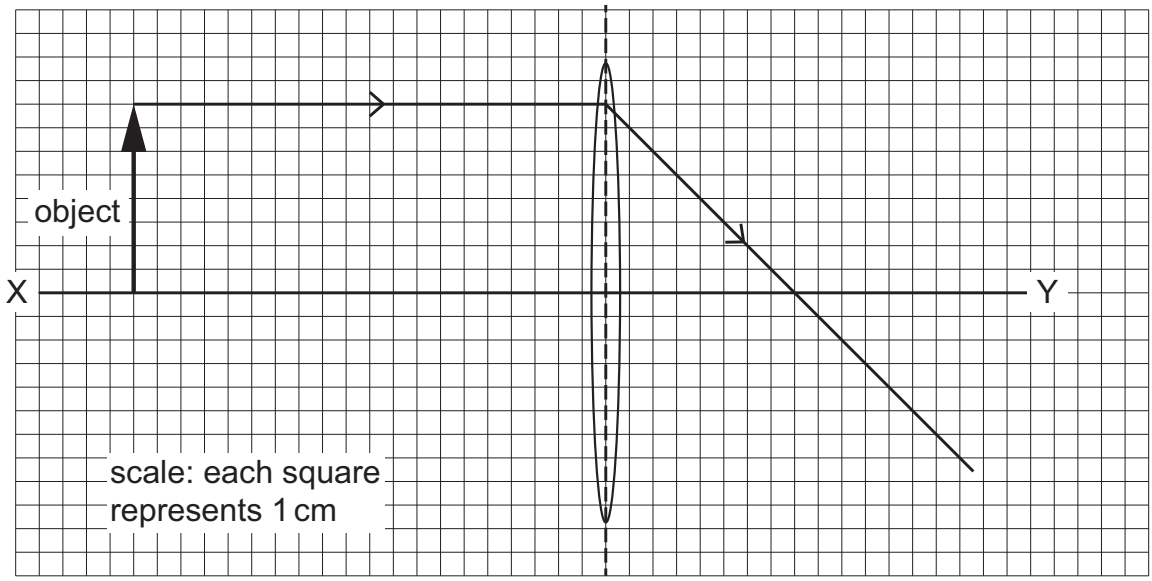


Fig. 6.1

(a) State what the line XY represents.

..... [1]

(b) Determine the focal length of the converging lens.

focal length = ... cm [1]

(c) On Fig. 6.1, draw another ray from the object. Continue the path of the ray through the lens until it crosses the path of the ray shown in Fig. 6.1. [2]

(d) On Fig. 6.1, draw an arrow to represent the image. Label it ‘image’. [2]

[Total: 6]