

# Lenses

## Question Paper

Level	GCSE
Subject	Physics
Exam Board	AQA
Unit	P3
Topic	Lenses
Difficulty Level	Bronze Level
Booklet	Question Paper

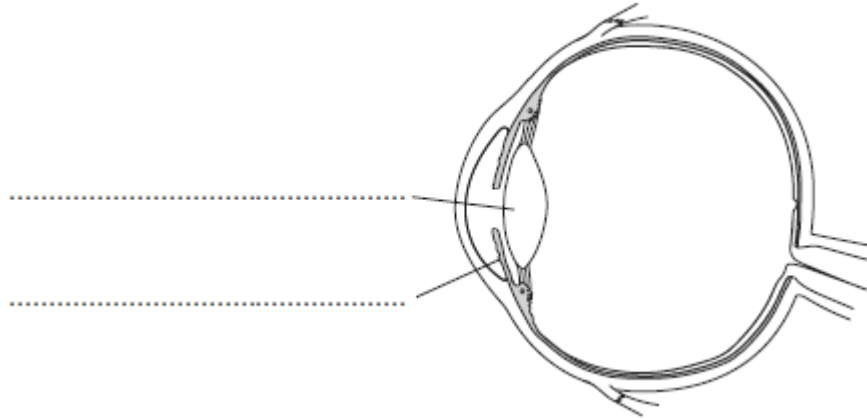
**Time Allowed:** 27 minutes

**Score:** /27

**Percentage:** /100

Q1. Figure 1 shows a diagram of a human eye.

Figure 1



(a) Use words from the box to label **Figure 1**.

Cornea	Iris	Lens	Pupil
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(2)

(b) Draw **one** line from each part of the eye to its correct function.

Part of the eye	Function
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Cornea</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Changes light into electrical signals</div>
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Retina</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Changes the direction of light entering the eye</div>
	<div style="border: 1px solid black; padding: 5px; width: fit-content;">Changes the shape of the lens</div>

(2)

- (c) Some people wear contact lenses to help them to see clearly.

A contact lens has a focal length of 0.2 metres.

Calculate the power of this contact lens.

Use the correct equation from the Physics Equations Sheet.

.....  
.....

Power of the contact lens = ..... dioptries

(2)

- (d) Eye lens replacement is a surgical procedure that can help some people to see clearly.

In this procedure, the surgeon removes the eye lens and replaces it with an artificial lens.

Which statement gives the correct reason for carrying out the procedure?

Tick (✓) **one** box.

The potential benefit of the procedure is greater than the risk.

The procedure involves a recent medical development.

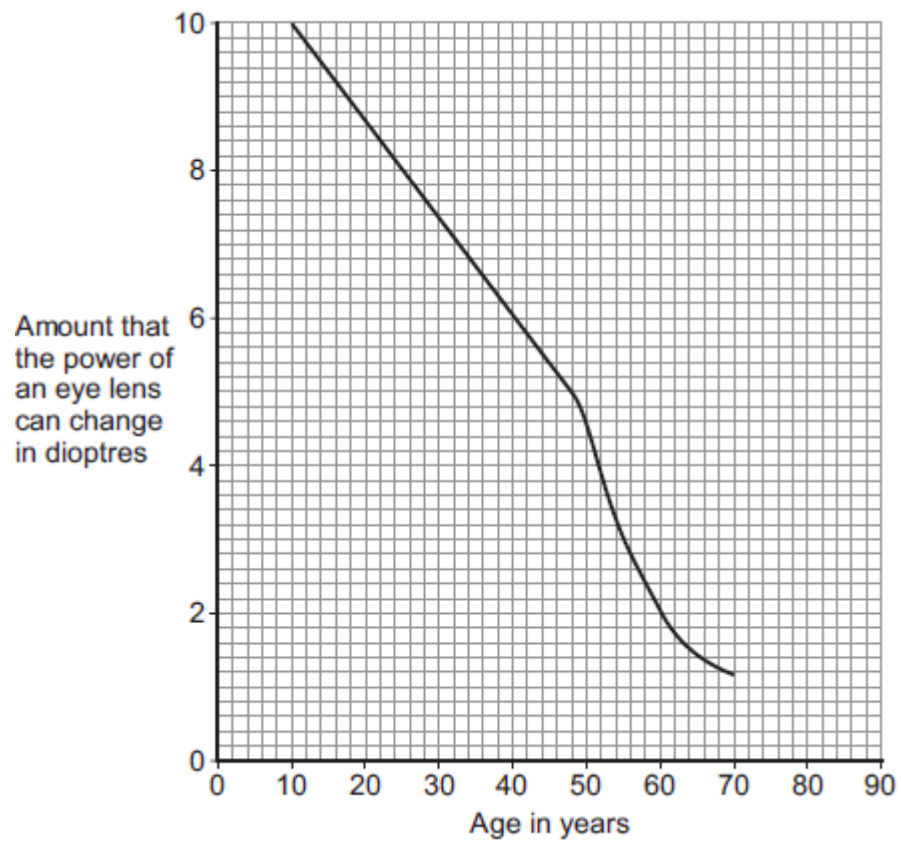
The surgical procedure is totally safe.

(1)

- (e) When a human eye changes focus from a distant object to a close object, the power of the eye lens changes.

**Figure 2** shows how the amount that the power of an eye lens can change depends on age.

Figure 2



- (i) A person is 40 years old.

State the amount that the power of this person's eye lens is able to change.

Change in power = ..... dioptres

(1)

- (ii) Give **one** conclusion that can be made from **Figure 2**.

.....  
 .....

(1)

- (iii) Use **Figure 2** to estimate the amount that the power of the eye lens of an 80-year-old person is able to change.

Tick (✓) **one** box.

2 dioptres

1 dioptre

0 dioptries

(1)  
(Total 10 marks)

**Q2.(a)** Digital cameras and human eyes both form images.

Complete **Table 1** by putting a tick in the correct column(s) to show if the parts are found in the digital camera or in the human eye or in both.

The first part has been completed for you.

**Table 1**

Part	In a digital camera	In the human eye
Cornea		✓
Lens		
Pupil		
Charge-coupled device (CCD)		

(3)

(b) Some humans are short-sighted.

Complete the following sentence.

Short sight can be caused by the eyeball being too .....

(1)

(c) Spectacles can be worn to correct short sight.

**Table 2** gives information about three different lenses that can be used in

spectacles.

**Table 2**

	Lens feature		
	Material	Mass in grams	Type
<b>Lens A</b>	Plastic	5.0	Concave (diverging)
<b>Lens B</b>	Glass	6.0	Convex (converging)
<b>Lens C</b>	Glass	5.5	Convex (converging)

Which lens from **Table 2** would be used to correct short sight?

Draw a ring around the correct answer.

**Lens A**

**Lens B**

**Lens C**

Give the reason for your answer.

.....

.....

(2)

(d) Every lens has a focal length.

Which factor affects the focal length of a lens?

Tick (✓) **one** box.

The colour of the lens

The refractive index of the lens material

The size of the object being viewed

(1)

(e) A lens has a focal length of 0.25 metres.

Calculate the power of the lens.

Use the correct equation from the Physics Equations Sheet.

.....  
.....  
.....

Power of lens = ..... dioptries

(2)

(f) Laser eye surgery can correct some types of eye defect.

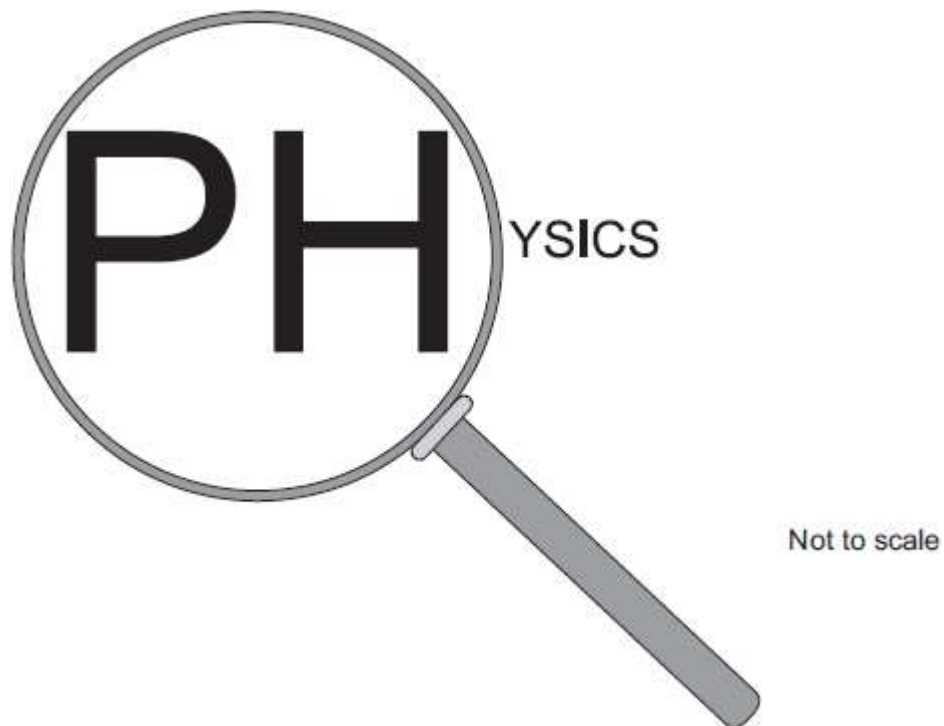
Which of the following is another medical use for a laser?

Tick (✓) **one** box.

- Cauterising open blood vessels
- Detecting broken bones
- Imaging the lungs

(1)

(g) The figure shows a convex lens being used as a magnifying glass.



An object of height 14 mm is viewed through a magnifying glass.

The image height is 70 mm.

Calculate the magnification produced by the lens in the magnifying glass.

Use the correct equation from the Physics Equations Sheet.

.....

.....

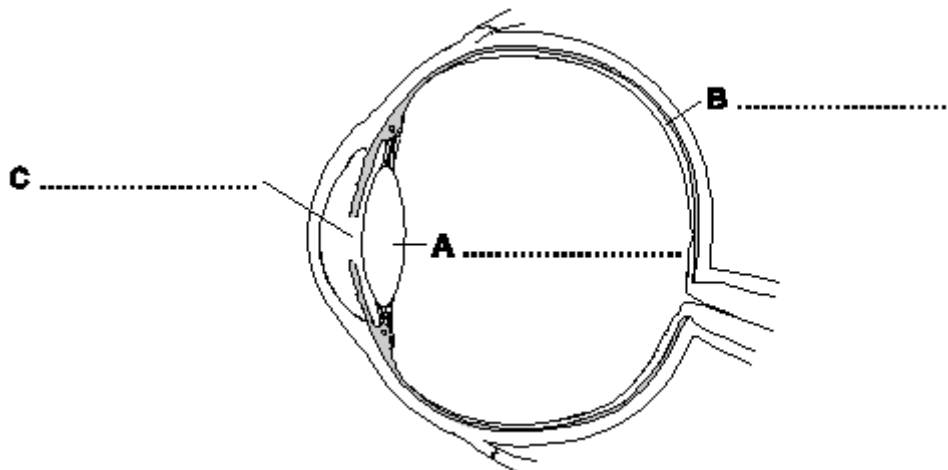
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Magnification = .....

(2)  
(Total 12 marks)

**Q3.** (a) The diagram shows the cross-section of an eye.



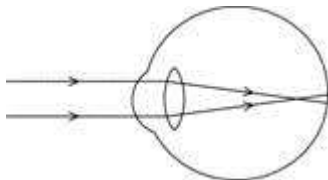


Use words from the box to label the parts, **A**, **B** and **C**.

cornea	iris	lens	pupil	retina
--------	------	------	-------	--------

(3)

(b) The diagram shows one of the eyes of a person who is short-sighted.



Which **one** of the following lenses, **J**, **K** or **L**, could be used to correct the person's eyesight?



**J**



**K**



**L**

Lens .....

Give a reason for your choice.

.....  
 .....

(2)  
 (Total 5 marks)

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