

GCSE Biology (9 – 1)

The Eye

Name:

Group:

Instructions

- Read each question carefully before you begin to answer it.
- Use black ink or black ball-point pen for your answers.
- Fill in the boxes at the top of this page with your name and group.
- Attempt to answer every question in the booklet.
- Answer the questions in the spaces provided – there may be more space than you need in some answer spaces.
- Calculators may be used for this booklet.
- For any calculations, you **must** show all your working.
- Any and all drawings or graphs should be completed in pencil.



For markers use	
Question	Mark
1	/4
2	/13
3	/9
4	/8
5	/4
6	/6
Total	/44
%	
Grade	

Information

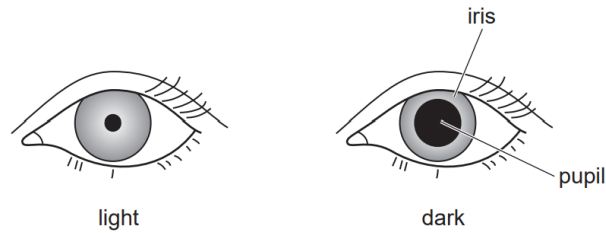
- The maximum mark for this paper is 44 marks.
- The marks for each question are shown in brackets.
- Please be aware that good English and clear presentation are required in your answers.



1. The human eye is an incredibly complex sensory organ that allows us to see by processing light from our environment, playing a vital role in how we interact with and understand our surroundings.

Circle the letter of the correct answer for each question below.

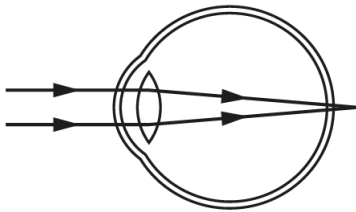
- a) The figure below shows the iris and a pupil of an eye in different light conditions.



Which characteristic of living organisms is this an example of?

- | | | | |
|-----------------|----------|----------|-----------|
| A | B | C | D |
| Sensitivity | Growth | Movement | Excretion |
| (1 mark) | | | |

- b) The figure below shows a common defect of the eye.
What is the defect and which lens could be used to correct it?



- | | |
|-----------------|---|
| A | Short-sightedness, corrected with a convex lens. |
| B | Short-sightedness, corrected with a concave lens. |
| C | Long-sightedness, corrected with a concave lens. |
| D | Long-sightedness, corrected with a convex lens. |
| (1 mark) | |

- c) Which part of the eye is responsible for focusing light rays onto the retina by changing its shape?

- | | | | |
|-----------------|----------|----------|-------------|
| A | B | C | D |
| Iris | Cornea | Lens | Optic nerve |
| (1 mark) | | | |

- d) The retina at the back of the eye contains light-sensitive cells.
Which type of light-sensitive cell is primarily responsible for vision in dim light and detecting movement, but not for colour vision?

- | | | | |
|-----------------|-----------|------------|---------------|
| A | B | C | D |
| Cone cells | Rod cells | Iris cells | Ciliary cells |
| (1 mark) | | | |

(Total for Question 1 is 4 marks)

2. A person walks from a bright space into a dark room.
The figure below shows one of the person's eyes in both of the different light conditions.



- a) Figure 2 shows one of the person's eyes when they enter the dark room.
Explain how this can be determined and how this change occurred.

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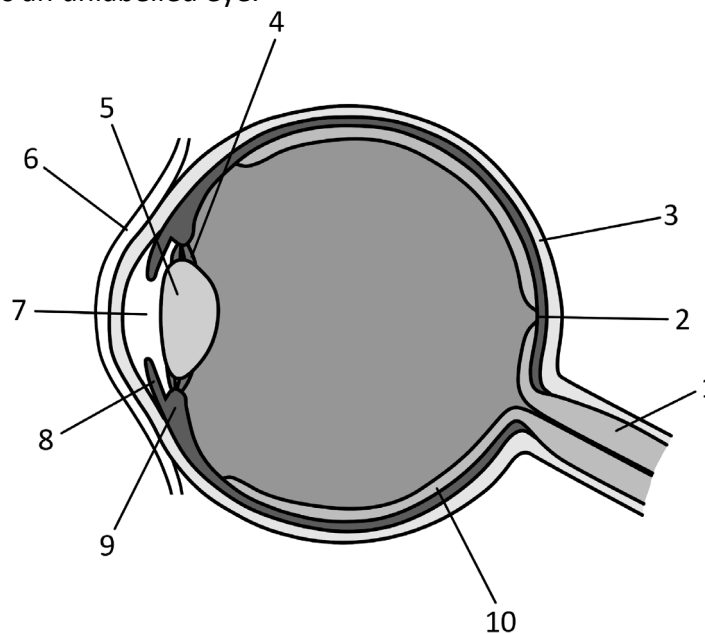
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(2 marks)

- b) The figure below shows an unlabelled eye.



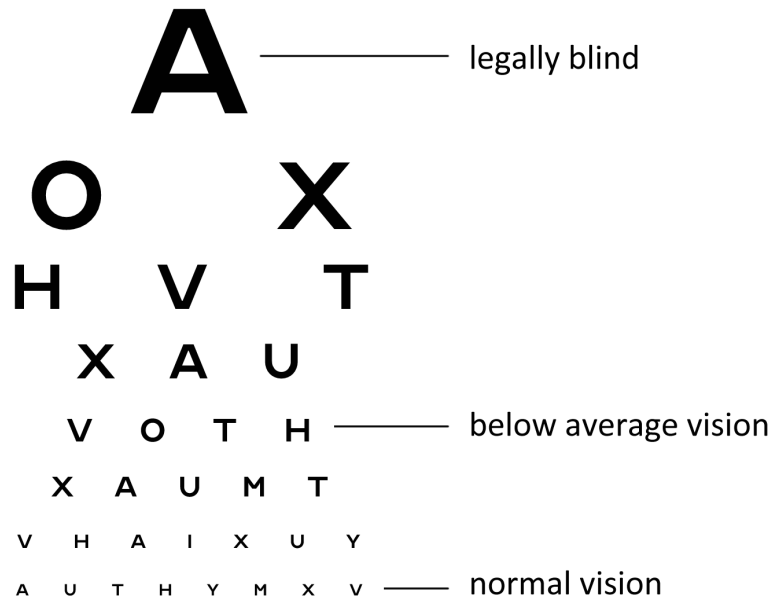
- | | |
|---------|----------|
| 1. | 2. |
| 3. | 4. |
| 5. | 6. |
| 7. | 8. |
| 9. | 10. |

(5 marks)

- [illegible]

(Total for Question 2 is 13 marks)

3. The figure below shows a Snellen chart. A Snellen chart is used by opticians to test a person's vision. The quality of the person's vision is judged by the lowest row of letters they can read.



An optician tested the eyesight of 420 people.

40% of these people could read the normal vision row without wearing glasses.

The rest of the people need glasses to correct their vision.

- a) Determine the number of people who will need glasses to correct their vision.

.....
(2 marks)

An optician can use the chart to diagnose Myopia.

- b) Explain what Myopia is and how would it be corrected.

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(2 marks)

c) Which structure in the eye is capable of changing the shape of the lens.

.....
(1 mark)

Cataracts are a medical condition that can have an adverse effect on a person's vision.

The figure below shows what a person with normal vision and a person with cataracts can see for the top letter on the Snellen chart used by the optician.



d) Cataracts are quite common. Particularly in older people.
State what cataracts are and give the treatment for them.

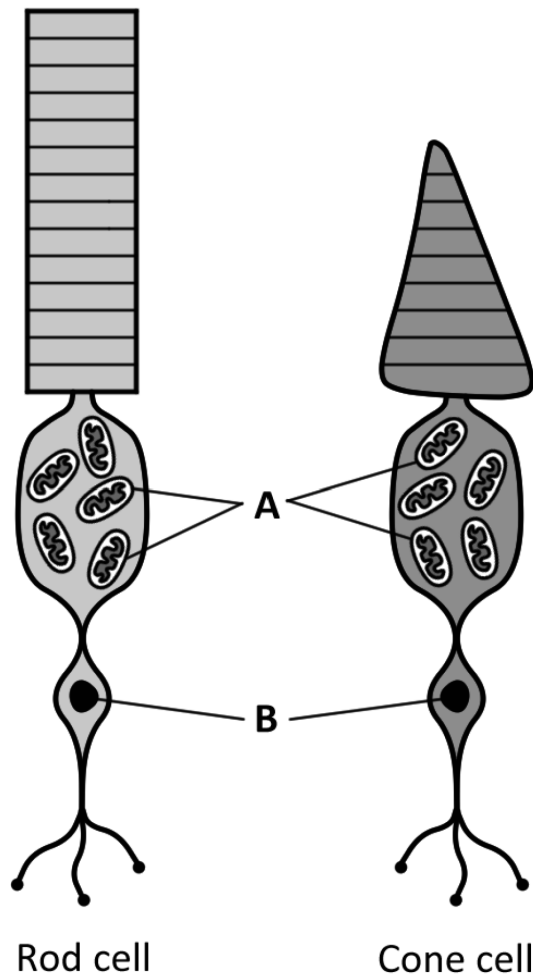
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(2 marks)

e) Describe why a person with cataracts would see the image shown in the figure above.

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.....
.....
(2 marks)

(Total for Question 3 is 9 marks)

4. The figure below shows two light receptor cells from the human eye, rod cells and cone cells.



a) Which part of the eye contains light receptor cells?

.....
(1 mark)

b) Identify organelle Y and state its function.

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.....
.....
.....
(2 marks)

c) Describe how the role of a rod cell is different from the role of a cone cell.

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.....
(2 marks)

- d) Explain how light is focused onto the back of the eye. Your answer should describe the main structures involved and the pathway of light.

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(3 marks)

(Total for Question 4 is 8 marks)

5. The optic nerve carries impulses from the retina to the brain.

The length of a human optic nerve is approximately 4.5 cm. An impulse takes 0.85 milliseconds (ms) to travel this entire distance.

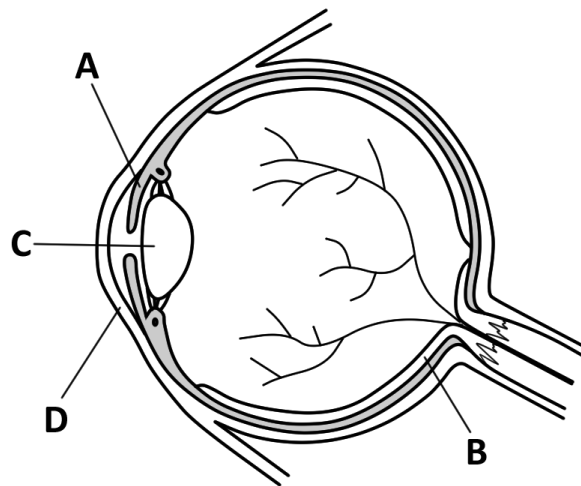
Calculate the speed of this impulse in metres per second (m/s). Show your working.
Give your answer to **two** significant figures.

..... m/s

(4 marks)

(Total for Question 5 is 4 marks)

6. The figure below shows a section through a human eye.



Identify each labelled part of the eye in the figure above and give the function of each of the labelled parts of the eye.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

(6 marks)

(Total for Question 6 is 6 marks)