5.2.3 The eye

AQA GCSE Biology (Higher)
Question and answer notes

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How to use these notes

These notes cover everything you need to know for this part of the specification. They have been written in question-answer format to make them easier for you to study from.

In order to study successfully, I recommend you do the following for each question and answer:

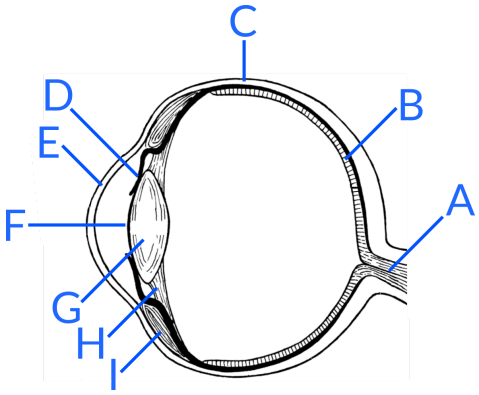
- Read it carefully and make sure you **understand** it.
- **Memorise** the answer.
- **Practice** applying your understanding to past exam questions.

A good way to memorise information is to use **retrieval practice**. This is when you practise retrieving information from your memory. You could do this by making a flashcard for each question with the question on one side and the answer on the other. Or you could use a flashcard app. Alternatively, use a sheet of paper to cover up the answer so you can only see the question. Try to answer the question and then check how you did.

You should practise retrieving each answer from your memory until you can do it perfectly. Even once you can retrieve the answer perfectly, your ability to retrieve it will probably fade as time passes without practising. Therefore you will need to keep going back to the questions that you have previously mastered and practising them again. However, each time you re-learn the answer, the memory will be stronger and will last longer than the time before.

What is the role of the eye?
The eye is a sense organ that detects light. It contains receptors that are able to detect light intensity and colour.

What are the names of the structures labelled A to I below?



A = Optic nerve
B = Retina
C = Sclera
D = Iris
E = Cornea
F = Pupil
G = Lens
H = Suspensory ligament
I = Ciliary muscle

What is the sclera?
The sclera is the white outer layer of the eye. It protects the eye.

What is the pupil?
The pupil is the hole that lets light into the eye. It is located in the center of the iris.

What is the iris?
The iris is a coloured ring of tissue around the pupil. It contains muscles that contract and relax to change the size of the pupil in order to control how much light enters the eye.

What is the cornea?
The cornea is the transparent outer layer that covers the iris and pupil. It protects the eye and also helps to refract light, which helps with focussing the image.

What is the retina?
The retina is the back surface of the inside of the eye. It contains light receptors that detect light.

What is the optic nerve?
The optic nerve is the nerve that carries the visual information, in the form of electrical impulses, from the eye to the brain.

What is the lens?
The lens is a curved transparent structure just behind the pupil. It focuses the light rays onto the retina. The shape of the lens can be changed to focus objects at different distances.

What is the ciliary muscle?
The ciliary muscle is a ring of muscle around the lens. The ciliary muscle can contract and relax to change the shape of the lens. This allows objects at different distances to be focussed.

What are the suspensory ligaments?
The suspensory ligaments are a set of ligaments that connect the ciliary muscle to the lens.

How does the eye respond to bright light?
In bright light, the muscles in the iris constrict the pupil (make it smaller). This reduces the amount of light entering the eye to protect the retina from damage.

How does the eye respond to dim light?
In dim light, the muscles in the iris dilate the pupil (make it larger). This increases the amount of light entering the eye, which improves vision in dim light.

What is the process by which the eye forms an image?
The process by which the eye forms and image is as follows:

- Light rays bounce off an object and hit the eye.
- The cornea slightly bends the light rays as they pass through it, beginning the process of focussing the image.
- The light rays then pass through the pupil.
- The lens then bends the light rays further as they pass through it. This completes the process of focussing the image.
- The light rays hit the retina.
- The light receptors on the retina detect the light and send electrical impulses through the optic nerve to the brain.

What is accommodation (when talking about the eye)?
Accommodation is the process of changing the shape of the lens to focus on near or distant objects.

How does the eye carry out accommodation to focus on a near object?
To focus on a near object, the following happens in the eye:

- The ciliary muscles contract
- This causes the suspensory ligaments to loosen
- This allows the lens to become thicker
- The lens then refracts light rays more strongly, allowing the near object to be focussed

How does the eye carry out accommodation to focus on a distant object?
To focus on a distant object, the following happens in the eye:

- The ciliary muscles relax
- This causes the suspensory ligaments to tighten
- This pulls the lens thinner
- The lens then refracts light rays less strongly, allowing the distant object to be focussed

What is short-sightedness? What is it also known as?
Short-sightedness is when a person's eyes are not able to focus distant objects. It is also known as myopia.

What is long-sightedness? What is it also known as?
Long-sightedness is when a person's eyes are not able to focus near objects. It is also known as hyperopia.

What treatments exist for myopia and hyperopia?
The following treatments exist for myopia and hyperopia:

- The use of glasses (spectacles) that have lenses that refract the light rays so that they do focus on the retina.
- Hard contact lenses
- Soft contact lenses
- Laser eye surgery
- Replacement lenses for the eye