

Light and Optical Systems - Section 4.0 - Quiz

Eyes and cameras capture images using the properties of light.

Student Name _____

Class _____

Complete the comparison chart of the eye and the camera,
using the illustrations/chart at the end of this quiz (5 marks)

4.1 Image Formation in Eyes and Cameras

- The eye and the camera can be thought of as image-producing technologies. One (the eye) happens to be a **natural** technology, while the other (the camera) is a ...
 - photo advancement
 - film revolution
 - artificial technology**
 - mechanical innovation
- When making comparisons between the eye and the camera, different parts have similar functions. The hole in the human eye that lets light in is called the **pupil**, whereas the hole that lets light in the camera is called the ...
 - diaphragm
 - aperture**
 - shutter
 - lens
- The retina in the eye has a thin layer of cells that are light sensitive. These cells are called **photoreceptors**. There are two kinds of photoreceptor cells. The type that detect color are the ...
 - rods
 - cones**
 - pinac
 - iris
- Surgeons use **laser surgery** to correct problems with vision. The doctor will use a laser to reshape this part of the eye ...
 - iris
 - pupil
 - retina
 - cornea**
- Night vision** goggles or scopes are used to get images in the dark. A green image is formed on the screen because these glow green when light particles hit them ...
 - photoreceptors
 - phosphors**
 - photophors
 - phosphates

4.2 Other Eyes in the Animal Kingdom

- The human eye and most other vertebrates have eyes that can be compared to cameras. They are called camera eyes. Fish also have camera eyes, but instead of an **oval-shaped lens**, they have a ...
 - convex lens
 - concave lens
 - flat lens
 - round lens**

7. Humans have **3 types of cones**, each sensing a different wavelength of light. Birds tend to have much sharper vision than humans because they have ...

- A. 4 types of cones
- B. 5 types of cones
- C. 6 types of cones
- D. 7 types of cones

8. **Nocturnal** animals, such as cats and owls have very large pupils to allow them to collect as much light as possible. The purpose of the thin layer inside their eyes, called the **tapetum lucidum**, is to act as this inside their eye ...

- A. a magnifier
- B. a mirror
- C. a lens
- D. a filter

9. An **ommatidia** is a long tube-like structure with a lens on the outer surface, a focusing cone below it and a light sensitive cell below that. Insect eyes have ommatidia facing in almost all directions because their eyes tend to have a ...

- A. round shape
- B. flat shape
- C. concave surface
- D. convex surface

10. One drawback of the **compound eye** is that it has difficulty focusing a single, coherent sharp image. This is because of its ...

- A. round shape
- B. oval shape
- C. multiple lenses
- D. 'mosaic' appearance

4.3 Image Storage and Transmission

11. **Digital** information is stored by a computer converting the information into ...

- A. pictures
- B. numbers
- C. letters
- D. symbols

12. The process of creating a big picture out of smaller pictures is similar to the process of digital imaging. The small elements that make up a picture are called **pixels**. The more pixels that make up a picture the higher the ...

- A. resolution
- B. restoration
- C. resolve
- D. retention

13. CCD is a grid similar to a piece of graph paper. As light falls on a square of the grid, it creates a small amount of electricity in that square. This is then converted into digital information. **CCD** stands for ...

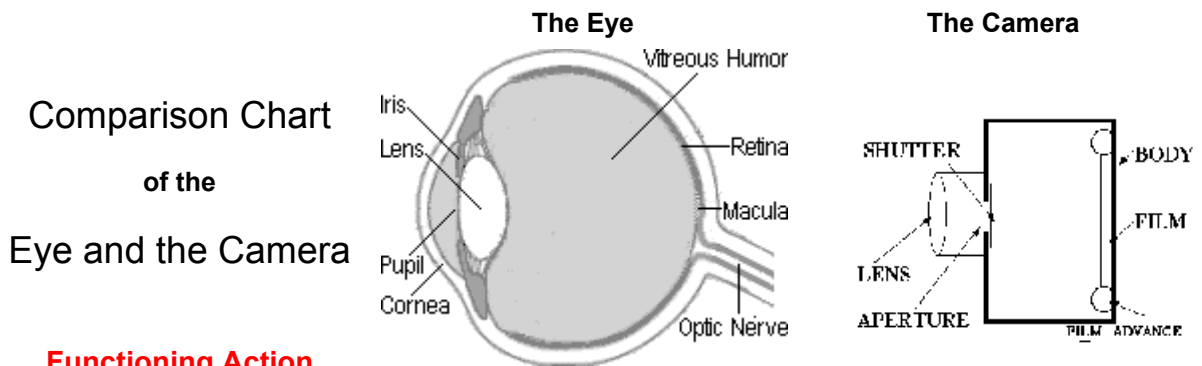
- A. Computer Charged Design
- B. Capture Charge Device
- C. Compact Charge Design
- D. Charge Coupled Device

14. The greatest advantage to **digital imaging** is that the pictures don't have to be ...

- A. translated
- B. recovered
- C. processed
- D. transmitted

The Eye and the Camera have a lot in common.

- They both have compound **lenses** - which are **converging lens** refracting the light to a focal point on the light sensitive layer to record an image.
 - To focus a camera you move the **lens** backward or forward.
 - The eye is focused by the **ciliary muscle**, which stretches the **lens**, changing its shape.
- To control how much light gets in.
 - The **iris** in your eye changes the size of the **pupil** - the dark spot in the center of your eye, which controls the amount of light that enters.
 - Cameras adjust to let different amounts of light in by using the **aperture** and the **shutter** controls how long the light is allowed to get through.
- The **retina** is like the **film** in a camera, covering the back of the eye.



Functioning Action

<i>The opening for light.</i>	pupil	aperture
<i>Regulates the amount of light coming in.</i>	iris	shutter
<i>Focuses the refracted light.</i>	lens	lens
<i>Light-sensitive layer that records images.</i>	retina	film

Use these words to fill in the chart
