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

1. 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 …

A. photo advancement
B. film revolution
C. artificial technology
D. mechanical innovation

2. 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 …

A. diaphragm
B. aperture
C. shutter
D. lens

3. 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 …

A. rods
B. cones
C. pines
D. iris

4. Surgeons use ***laser surgery*** to correct problems with vision. The doctor will use a laser to reshape this part of the eye …

A. iris
B. pupil
C. retina
D. cornea

5. ***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 …

A. photoreceptors
B. phosphors
C. photophors
D. phosphates

4.2 Other Eyes in the Animal Kingdom

6. 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 …

A. convex lens
B. concave lens
C. flat lens
D. 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 blow 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. retension

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.

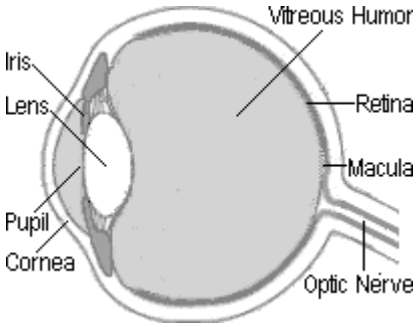
- The **retina** is like the **film** in a camera, covering the back of the eye.

Comparison Chart

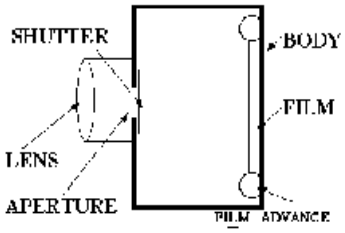
of the

Eye and the Camera

The Eye



The Camera



Functioning Action		
The opening for light.		
Regulates the amount of light coming in.		
Focuses the refracted light.		
Light-sensitive layer that records images.		

Use these words to fill in the chart

lens	shutter	film	retina
pupil	iris	lens	aperture