

Answer the following in your notes, or on this review paper if there is room to do so.

1. What is the correct order of the colours in the visible spectrum from longest to shortest wavelength?

Red Orange Yellow Green Blue Indigo Violet
 (ROYGBIV)

2. Describe the following light sources:

Natural – natural light is light that comes from nature – the sun is the main source of natural light

Incandescence – light created when an object is heated – example filaments in a light bulb, stove top

Luminescence – emission of light by an object that has not been heated, there are 4 main types of luminescence:

phosphorescence – the source lights up in the presence of UV light but stays lit up after the UV source is removed – example – glow in the dark stickers,

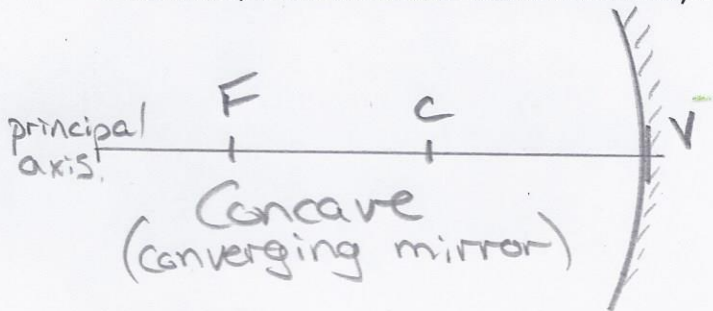
chemiluminescence light that is emitted as the result of a chemical reaction – example – glow sticks

bioluminescence – light that is emitted by biological objects – example – fireflies, jellyfish,

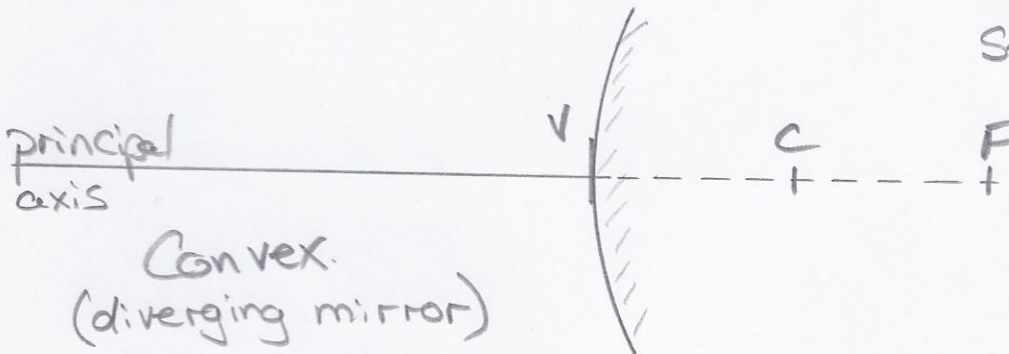
fluorescence – visible light that is created when UV light is absorbed in a material and re-emitted as visible light – example – fluorescent tubes,

triboluminescence

3. Draw an image of a concave and a convex mirror and label the following: principal axis, vertex, focal point, centre of curvature, and the reflective side of the mirror). State one use for each type of mirror.



magnifying mirror



security mirror

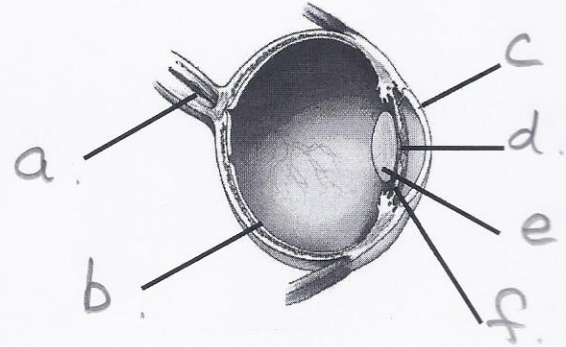
4. Put the following in order according to the electromagnetic spectrum from shortest to longest wavelength

X ray Radio Indigo Infrared Gamma Micro Green

Gamma x-ray Indigo Green Infrared Micro Radio
shortest $\xrightarrow{\hspace{15em}}$ *longest.*

5. Label the diagram of the eye and state the function of each structure.

- a. Optic Nerve
- b. Retina
- c. Cornea
- d. Pupil
- e. Lens
- f. Iris



6. Explain what the blindspot is.

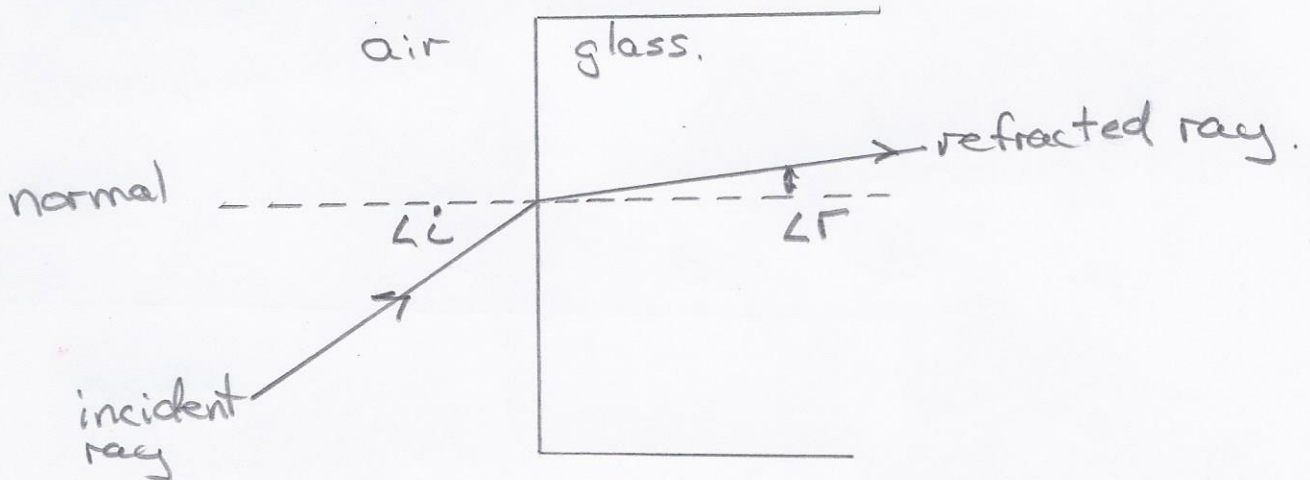
This is the spot on the retina where the optic nerve enters the eye. There are no photoreceptors located here (cones and rods) and therefore focused light cannot be detected at this location.

7. Define the terms refraction and critical angle.

Refraction is the bending of light when it moves from one medium to another (i.e. from glass to air or from air to glass)

Critical angle occurs when the angle of refraction is 90° (only occurs when light travels from a medium with a high refractive index to a medium with a lower refractive index, i.e. from glass to air).

8. Draw a diagram to illustrate an incident light travelling from glass to air (if glass has a slower speed of light). Also, explain what is happening in Diagram D (is the light speeding up or slowing down)



In diagram D the light is slowing down when it moves from air to water (it bends towards the normal)

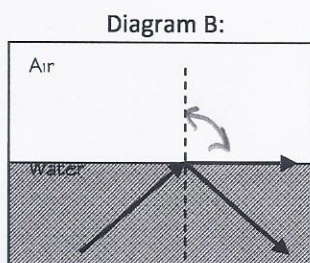
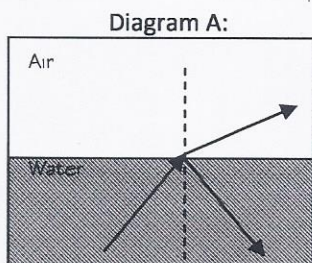
9. Use the formula for index of refraction to answer the questions below:
- The speed of light in a solid is 1.24×10^8 m/s. Calculate the index of refraction.
 - Calculate the speed of light in flint glass if flint glass has an index of refraction of 1.65

$$n = \frac{c}{v}$$

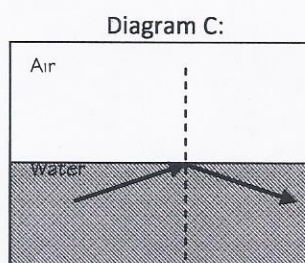
a. $n = \frac{3.0 \times 10^8 \text{ m/s}}{1.24 \times 10^8 \text{ m/s}} = 2.4$

b. $n = \frac{c}{v}$
 $v = \frac{c}{n} = \frac{3.0 \times 10^8 \text{ m/s}}{1.65} = 1.8 \times 10^8 \text{ m/s}$

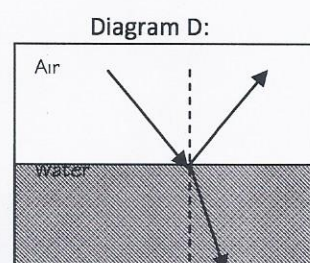
10. What is total internal reflection and what two conditions must occur for this phenomenon to happen? Make sure to make mention of critical angle. Use the diagrams below to help you.



Critical Angle
 - when angle of refraction equals 90°



Total Internal Reflection
 - no refracted ray.



11. Re-try questions on p.436 – Practice Problems for image calculations for mirrors.

see answers on page 571 in text

12. Re-try questions on p.500 – Practice Problems for image calculations for thin lenses.

see answers on page 571 in text.