Homework 1: Refraction

1. A pupil shone light through a rectangular block as shown

\[ \text{Diagram showing light angles} \]

a) The light changes speed as it passes from air to glass. What is this effect called?
b) What is the name given to the dotted reference line at 90° to the surface?
c) Write down the value of
   (i) the angle of incidence
   (ii) the angle of refraction

2. Copy and complete the sentence by choosing the correct words

   When light travels from air to glass it slows down/speeds up and bends towards/away from the normal

3. a) Copy and complete the diagrams below
   b) Name the lenses

\[ \text{Diagrams of lenses} \]
Homework 2: The Eye

1. Read the passage below on the eye and then answer the questions

The eye

Having two eyes rather than one makes judgement of distances more accurate. Using two eyes is called binocular vision. Each eye sees a slightly different picture and the brain puts the two views together to give a 3-dimensional image.

You need to know the following parts of the eye and what each part does:

- the cornea is the clear layer on the front of the eye - it helps to focus the light
- the iris is the coloured ring near the front of the eye - it can change the size of the pupil in different light levels
- the lens is made of clear jelly with muscles attached to it - the muscles change its thickness to adjust focusing
- the retina is a layer of light sensitive cells at the back of the eye - it changes the light into electrical signals
- the optic nerve is connected to the brain - it carries the electrical impulses from the retina to the brain

(a) What is the cornea?
(b) What is the function of the cornea?
(c) What is the function of the lens?
(d) What is the retina?
(e) What is the function of the retina?
(f) What happens at the optic nerve?
2. John visits the optician. The diagram below shows light entering John’s eye.

(a) Is John long-sighted or short-sighted?
(b) What type of lens should be used to correct this eye defect?
(c) When John wears his glasses, where do the rays of light entering his eye focus?

3. Grace has had problems reading the newspaper but has no problem seeing things in the distance. A diagram representing the rays of light in her eye while reading is shown here.

(a) Is Grace long-sighted or short-sighted?
(b) What type of lens should be used to correct this eye defect?
(c) Grace is looking into the distance. Where do the rays entering her eye focus?
Homework 3: The e.m. Spectrum

1. White light was shone through a triangular prism as shown:

a) Name the seven colours white light splits into.
b) What is this group of colours called?
c) What colour would be made if all 7 colours were shone on to the one spot?
d) Which colour is refracted the least?
e) Which colour has the longest wavelength?

2. Complete the chart to show the parts of the electromagnetic spectrum
Homework 4: The Bar Chart

Use the information in the table below to draw a bar chart to show the approximate wavelength of different colours of light.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Wavelength (nanometres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>650</td>
</tr>
<tr>
<td>Green</td>
<td>500</td>
</tr>
<tr>
<td>Yellow</td>
<td>590</td>
</tr>
<tr>
<td>Blue</td>
<td>480</td>
</tr>
</tbody>
</table>
Homework 5: Using the Spectrum

1. Infrared is all around us.
   (a) What is the other name for infrared?
   (b) Can you see infrared?
   (c) State a medical use for infrared.

2. Ultra-violet is given off by the sun.
   (a) Can you see ultra-violet?
   (b) How does the body benefit from exposure to ultra-violet?
   (c) Why is too much exposure to ultra-violet dangerous?

3. Gamma radiation is invisible to the eye.
   (a) State one uses of gamma radiation in medicine
   (b) What does gamma do to living cells?
   (c) What is a tracer?

4. X-rays are used to look inside the body.
   (a) What type of film detects x-rays?
   (b) Why do bones show up white on an x-ray film?
   (c) What type of scan gives a 3D image?
Homework 6: Calculating Speed

1. Copy the equation for speed then name the symbols and state the unit for each quantity.

\[ v = \frac{d}{t} \]

2. If a car travels 100 metres in 5 seconds calculates it speed.

3. If the speed of sound is 340 metres per second and it travels for 2 seconds how far does the sound travel?

4. How long will it take ultrasound with a speed of 1500ms\(^{-1}\) to travel through 3cm of muscle?
Homework 7: Reading Line Graphs

The speed-time graph in the question shows how the speed of a bus changes during part of a journey.

(a) What was the speed of the bus at 2 seconds?

(b) How many seconds did it take for the car to reach a speed of 8 metres per second?

(c) State the highest speed recorded for the bus.

(d) Complete the following conclusion by selecting the correct option:

Between 5 seconds and 10 seconds the speed of the bus increased/decreased/stayed the same.