1 (a) Explain what happens to the wavelength of light when it passes from air into glass.

(2)

.....

.....

.....

.....

*(b) Figure 13 shows a beam of red light approaching one side of a rectangular glass block.

The beam of light will pass through the block and leave through the opposite side.

AB is a wavefront.

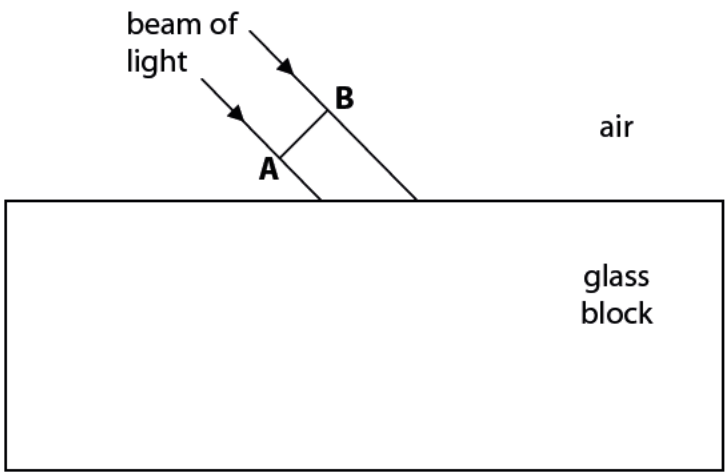


Figure 13

Discuss the path of the wavefront **AB** as it enters and leaves the glass block.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(c) The distance between the Earth and the Sun is 1.50×10^{11} m.

Light takes 500 s to travel from the Sun to the Earth.

The wavelength of red light is 670 nm.

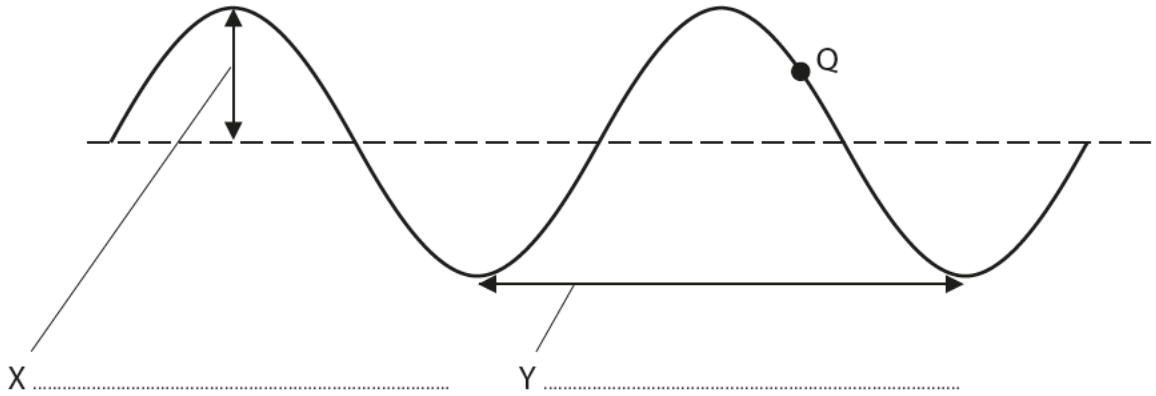
Calculate the frequency of red light, using only the data provided.

(4)

frequency = ... Hz

(Total for Question 9 = 12 marks)

2 (a) The diagram shows a transverse wave.



(i) Use words from the box to label the distances X and Y.

amplitude	frequency	magnification	speed	wavelength

(2)

(ii) Q is a particle in the wave.

Which of these shows the way in which particle Q moves?

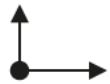
Put a cross (☒) in the box next to your answer.

(1)

☐ **A**



☐ **B**



☐ **C**



☐ **D**



(b) The photographs show a refracting telescope and a reflecting telescope.



refracting telescope reflecting telescope

Both telescopes are used to form an image of a distant object.

(i) The two types of telescope form their images of a distant object in different ways.
A refracting telescope uses a converging lens to form an image of a distant object.

Describe how a reflecting telescope forms an image of a distant object.

(2)

.....

.....

.....

.....

(ii) Both telescopes use a converging lens as an eyepiece.

State what the eyepiece of a telescope is intended to do to the image.

(1)

.....

.....

*(c) A long time ago, astronomers thought that the Earth was the centre of the Universe.

This was called the geocentric model.
The evidence for this model came from observations of the sky using the naked eye.

After the telescope was invented, astronomers quickly gathered evidence which showed that the geocentric model is not correct.

Describe the evidence both for the geocentric model and against the geocentric model.

(6)

(Total for Question 5 = 12 marks)