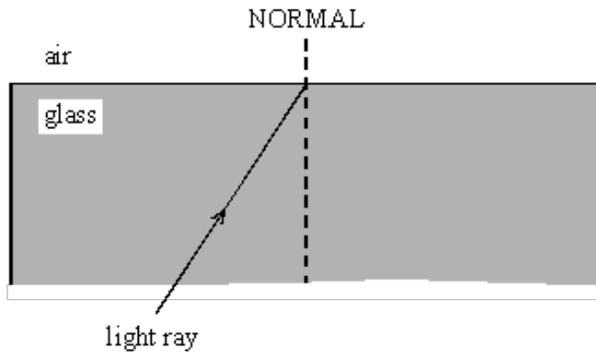


**Q1.** The diagram shows a ray of light travelling through a glass block.



(a) Complete the diagram to show what happens to the ray of light when it comes out of the glass. (2)

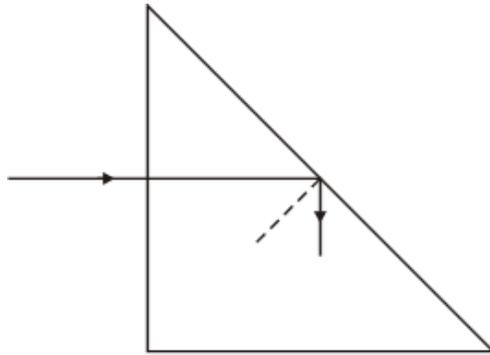
(b) Explain why this happens to the ray of light.

.....

(2)  
(Total 4 marks)

**Q2.** Glass prisms are used in many optical devices.

(a) The diagram shows what happens to a ray of light as it travels through a glass prism.



*To gain full marks for this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

Use the words in the box to help you to explain why the ray behaves in this way.

angle    critical    normal
-----------------------------

.....

.....

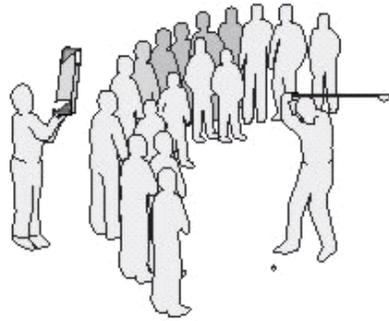
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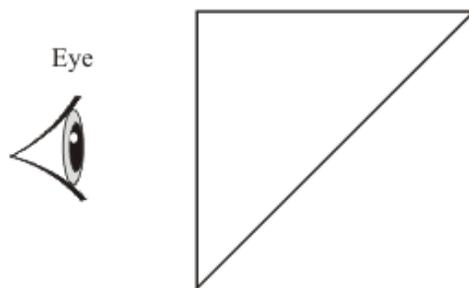
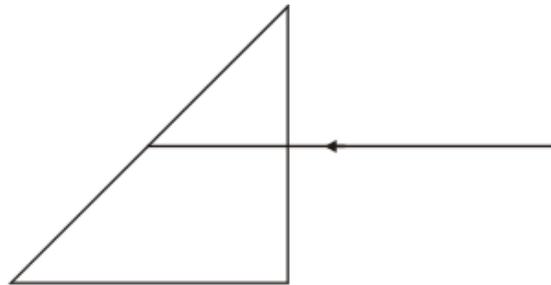
.....

**(3)**

(b) Periscopes can be used to look over the heads of other people.

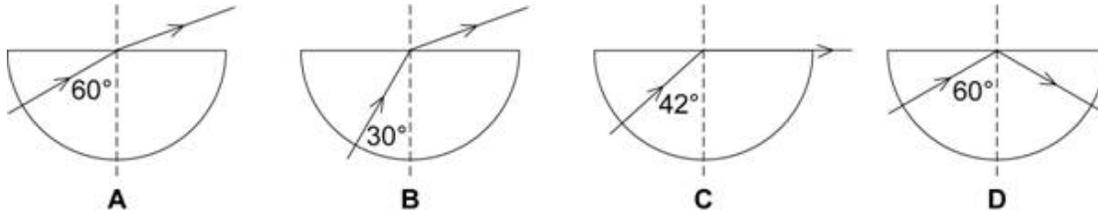


A periscope contains two glass prisms.  
Complete the diagram to show the ray of light reaching the person's eye.



(3)  
(Total 6 marks)

- Q3.** (a) Each diagram shows a light ray incident on a glass-air boundary.  
The critical angle for glass is  $42^\circ$ .

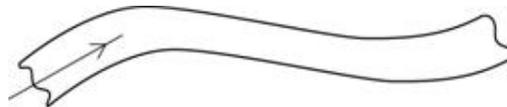


Which **one** of the diagrams, **A**, **B**, **C** or **D**, shows total internal reflection?

Write the correct letter in the box.

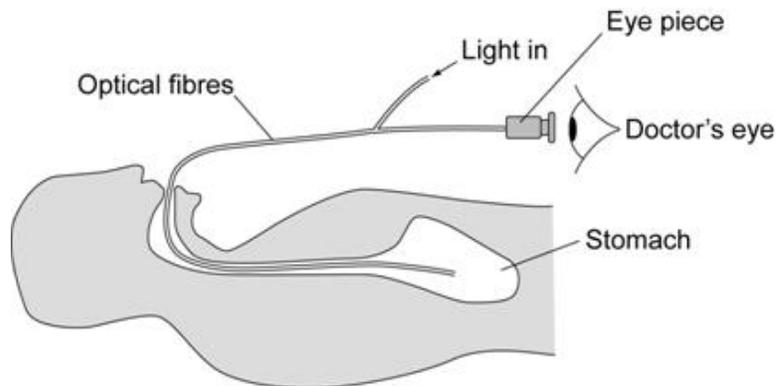
(1)

- (b) (i) Complete the diagram to show the path taken by the light ray as it travels through the optical fibre.



(2)

- (ii) The diagram shows an endoscope being used by a doctor to look inside a patient's stomach. Light travels into the stomach through a bundle of optical fibres.



The following sentences describe how the endoscope allows the doctor to see inside the patient's stomach. The sentences are in the wrong order.

**Q** Light passes through a bundle of optical fibres into the patient's stomach.

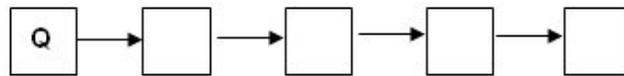
**R** The inside of the stomach reflects some of the light.

**S** The optical fibres take the light to an eyepiece.

**T** The doctor looks through the eyepiece to see inside the patient's stomach.

**U** The reflected light passes through a second bundle of optical fibres.

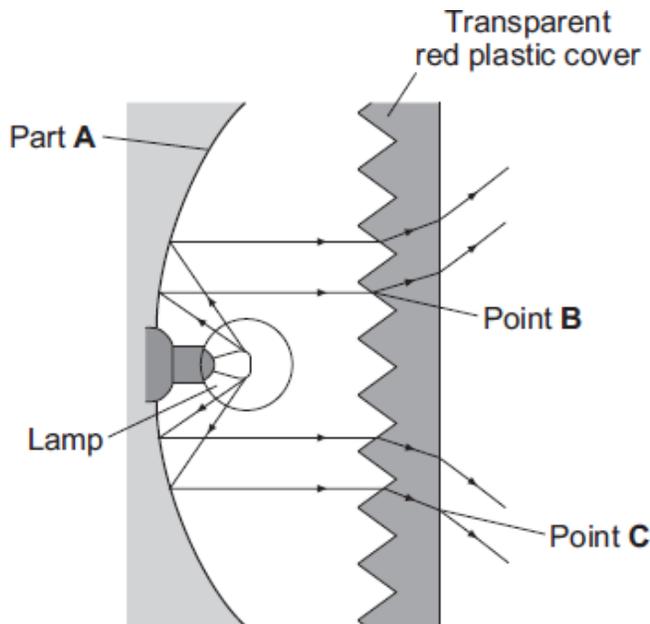
Arrange these sentences in the correct order. Start with letter **Q**.



(3)  
(Total 6 marks)

**Q4.** At night, it is important that the lights of a car can be seen by other drivers but it is dangerous if these lights dazzle them.

The diagram shows a rear light of a car.



(a) (i) Name part **A**.

.....

(1)

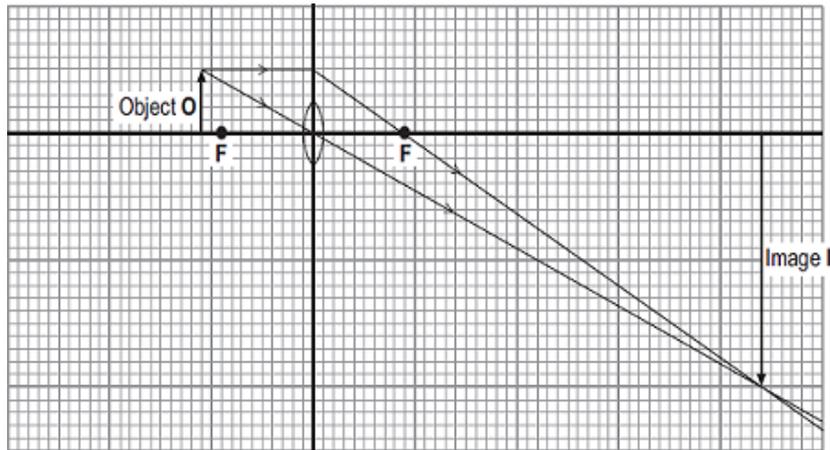
(ii) Name the process which occurs at point **B** and at point **C**.

.....

(1)

- (b) A headlamp of a car contains a lens.

The ray diagram shows the position and size of the image, **I**, of an object, **O**, formed by a lens similar to the one inside a car headlamp.



- (i) What type of lens is shown in the ray diagram?

Draw a ring around your answer.

**converging**                      **diverging**                      **plane**

(1)

- (ii) The ray diagram is drawn to scale.

Use the equation in the box to calculate the magnification produced by the lens.

$$\text{magnification} = \frac{\text{image height}}{\text{object height}}$$

Show clearly how you work out your answer.

.....  
 .....

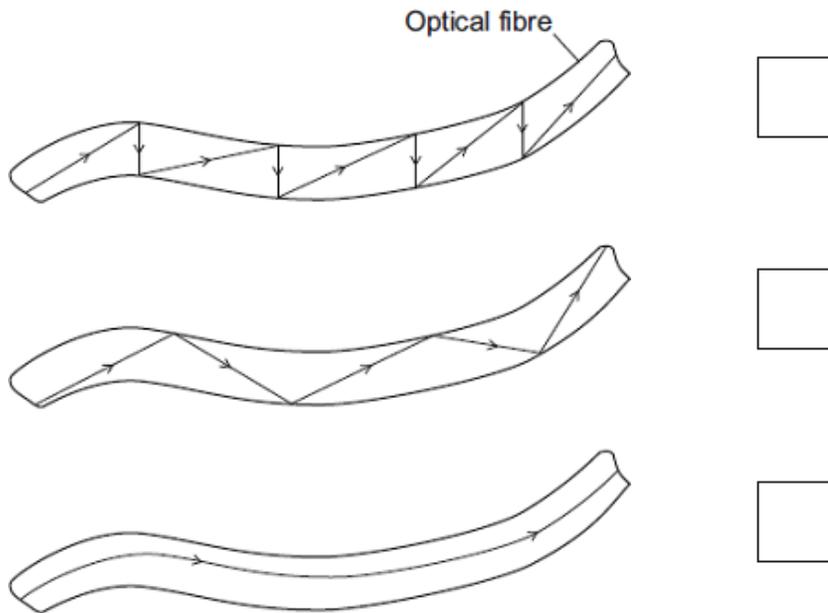
Magnification = .....

(2)  
 (Total 5 marks)

**Q5.** (a) Visible light can be sent along optical fibres.

Which diagram correctly shows the path of light along an optical fibre?

Tick (✓) **one** box.



(1)

(b) Complete the sentence to describe what happens to light as it travels through an optical fibre.

At the walls of the optical fibre, light undergoes total internal .....

(1)

(c) Which device passes light through optical fibres to produce images of the inside of the body?

Draw a ring around the correct answer.

**endoscope**

**stethoscope**

**X-ray machine**

(1)

(d) Lasers are an energy source.

Which **one** of the following is a use for a laser?

Draw a ring around the correct answer.

**CT scanning**

**digital camera**

**eye surgery**

(1)  
(Total 4 marks)

