

**AS Level Physics A**  
**H156/01** Breadth in Physics

**Question Set 16**

1. (a) Fig. 26.1 shows an arrangement used to demonstrate a particular wave phenomenon.

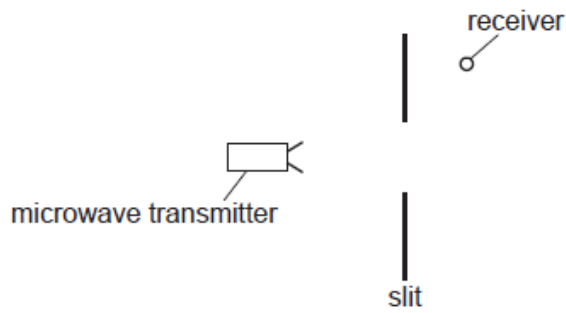


Fig. 26.1

A metal sheet with a wide slit is placed between a microwave transmitter and a receiver. The microwaves have a frequency of 11 GHz.

- (i) Calculate the wavelength  $\lambda$  of the microwaves.

$\lambda =$  \_\_\_\_\_ m [1]

- (ii) The receiver detects no microwaves in the position shown in Fig. 26.1. The metal sheet is replaced by another sheet with a narrow slit of width of a few centimetres, as shown in Fig. 26.2. The positions of the transmitter, receiver and the metal sheet are unchanged.

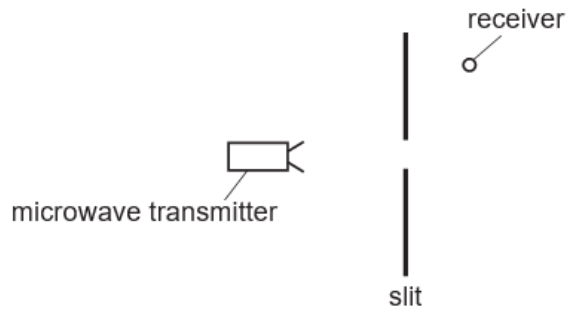


Fig. 26.2

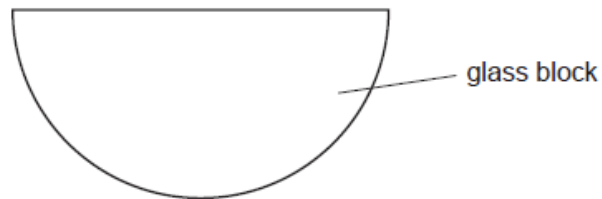
Explain why the receiver now detects microwaves.

[2]

- (b) Light travels from air to water. The refractive index of water is greater than the refractive index of air.  
Compare the speed, frequency and wavelength of light in air and in water.

[3]

- (c) A student is given a semi-circular glass block.  
Describe with the aid of a ray diagram how an experiment can be conducted to accurately determine the critical angle for light within the glass block and hence the refractive index of the glass.



[3]

**Total Marks for Question Set 16: 9**

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