26 Two polarising filters are placed next to each other so that their planes are parallel.

The first polarising filter has its transmission axis at an angle of 50° to the vertical.

The second polarising filter has its transmission axis at an angle of 20° to the vertical. The angle between the transmission axes of the two polarising filters is 30°.

A beam of vertically polarised light of intensity $8.0\,W\,m^{-2}$ is incident normally on the first polarising filter.

What is the intensity of the light that is transmitted from the second polarising filter?

A zero **B** $2.5\,W\,m^{-2}$ **C** $2.9\,W\,m^{-2}$ **D** $6.0\,W\,m^{-2}$

28 What may be observed with light waves but **not** with sound waves?

A diffraction

B interference

C polarisation

D reflection

28 Which group contains only waves that can be polarised?

A infrared waves, radio waves, sound waves

B visible light waves, microwaves, radio waves

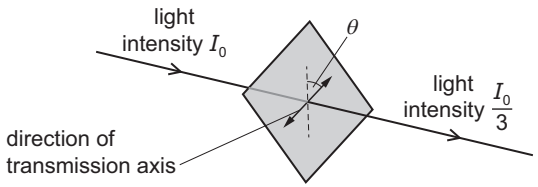
C visible light waves, radio waves, sound waves

D microwaves, visible light waves, sound waves

27 Vertically polarised light of intensity I_0 is incident normally on a polarising filter.

The transmission axis of the filter is at an angle θ to the plane of polarisation of the light.

The intensity of the light after passing through the filter is $\frac{I_0}{3}$.



What is θ?

A 8.4° **B** 55° **C** 71° **D** 84°

25 Which phenomenon is only associated with transverse waves?

A diffraction

B interference

C polarisation

D reflection

24 A horizontal beam of light is incident normally on a polarising filter. The incident light is vertically polarised and has an intensity of $24\,W\,m^{-2}$. The direction of the transmission axis of the filter is at an angle of 30° to the vertical.

What is the intensity of the light in the transmitted beam?

A $18\,W\,m^{-2}$ **B** $21\,W\,m^{-2}$ **C** $28\,W\,m^{-2}$ **D** $32\,W\,m^{-2}$

5 **(a)** State why sound waves **cannot** be polarised.

.....

..... [1]

(b) A plane-polarised light wave is incident on a polarising filter as shown in Fig. 5.1.

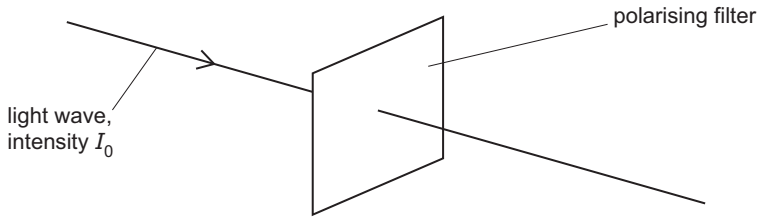


Fig. 5.1

The intensity of the light incident on the filter is I_0.

The light is incident normally on the filter and the transmission axis of the filter is initially perpendicular to the plane of polarisation of the light.

The filter is now rotated through 360° about the direction of travel of the light wave.

(i) On Fig. 5.2, sketch the variation of the intensity I of the transmitted light with the angle of rotation α as the filter is rotated through 360° from its initial position.

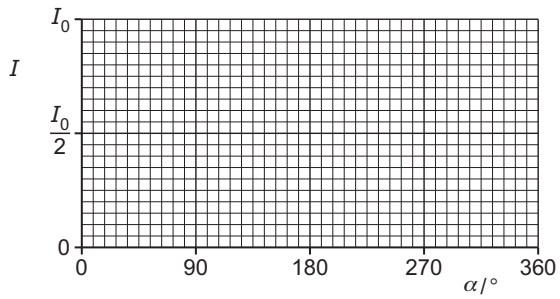


Fig. 5.2

[3]

(ii) The amplitude of the incident light wave is A_0 when the intensity of the wave is I_0.

Use Malus's law to determine, in terms of A_0, the amplitude of the transmitted wave when $\alpha = 20°$.

amplitude = ... A_0 [4]

[Total: 8]

26 A polarised beam of light with intensity I is incident normally on a polarising filter.

The transmitted light has intensity I.

The filter is rotated about the normal axis through an angle θ.

The transmitted light has intensity $0.75I$.

What is the angle θ?

A 30° **B** 42° **C** 49° **D** 60°