

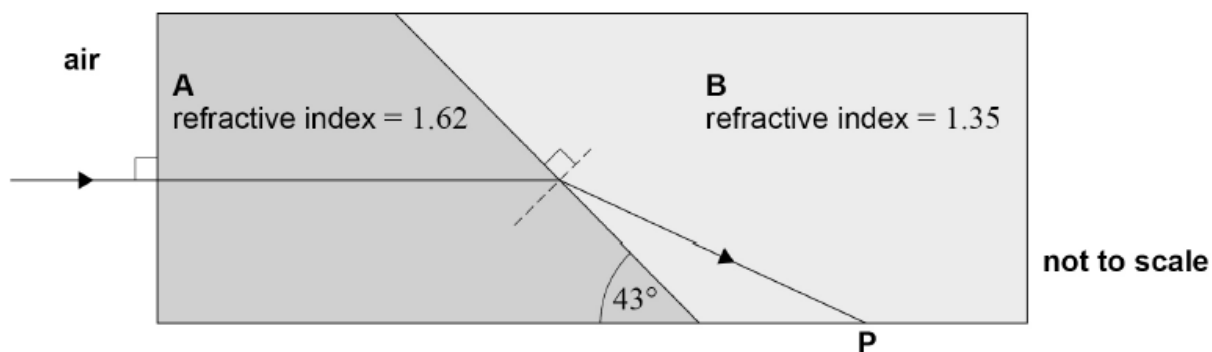
Waves – A2 Physics P1

1. No.6

0 6

Two transparent prisms **A** and **B** of different refractive indices are placed in contact to produce a rectangular block.

Figure 12 shows the path of a ray, incident normally on **A**, refracting as it crosses the boundary between the prisms.

Figure 12

0 6 . 1

Explain how the path of the ray shows that the refractive index of **A** is greater than the refractive index of **B**.

[1 mark]

0 6 . 2

Show that the angle of refraction of the ray in **B** is about 60° .

[2 marks]

0 6 . 3

Draw, on **Figure 12**, the path of the ray immediately after it reaches **P**.
Justify your answer with calculations.

[3 marks]

2. No.18

A longitudinal wave of frequency 660 Hz travels through a medium.
The wave speed is 330 m s^{-1} .

Which statement describes the motion of a particle in the wave?

[1 mark]

- A It is travelling at a speed of 330 m s^{-1} . ☐
- B It moves in phase with a particle in the wave 25 cm away. ☐
- C It oscillates with a time period of 1.5 ms. ☐
- D It changes direction 660 times every second. ☐

3. No.19

The frequency of the first harmonic of a standing wave on a string is f .
The tension in the string is T .
The tension is increased to $4T$ without changing the length or mass of the string.

Which harmonic has a frequency $2f$ after this change?

[1 mark]

- A first ☐
- B second ☐
- C third ☐
- D fourth ☐

4. No.20

Light of wavelength $5.2 \times 10^{-7} \text{ m}$ is used in a Young's double-slit experiment.
The distance from the slits to the screen is 1.5 m .
The width of ten fringes is 3.5 cm .

What is the separation of the two slits?

[1 mark]

A $2.2 \times 10^{-5} \text{ m}$

☐

B $9.9 \times 10^{-5} \text{ m}$

☐

C $1.1 \times 10^{-4} \text{ m}$

☐

D $2.2 \times 10^{-4} \text{ m}$

☐

5. No.21

Monochromatic light of wavelength $5.8 \times 10^{-7} \text{ m}$ is incident normally on a plane transmission diffraction grating that has a slit separation of $2.5 \times 10^{-6} \text{ m}$.

How many maxima are produced by the grating?

[1 mark]

A 4

☐

B 5

☐

C 8

☐

D 9

☐