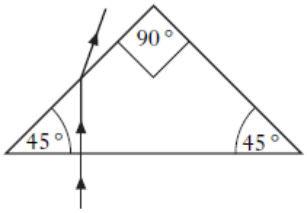
Unit 2 – Particles & Waves
Section 8 – Refraction

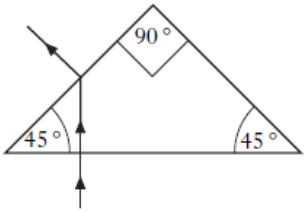
2007 15. A ray of light travels from air into a glass prism. The refractive index of the glass is 1·50.

Which diagram shows the correct path of the ray?

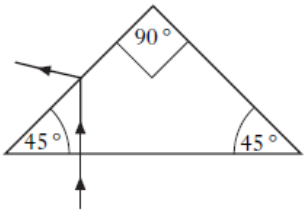
A



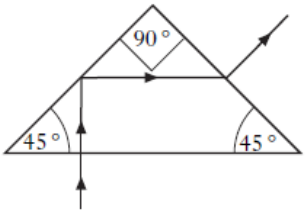
B



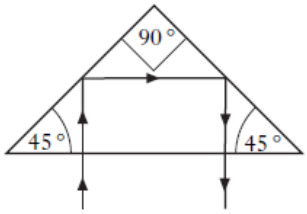
C



D



E



2008 16. The value of the absolute refractive index of diamond is 2·42.

The critical angle for diamond is

A 0·413 °

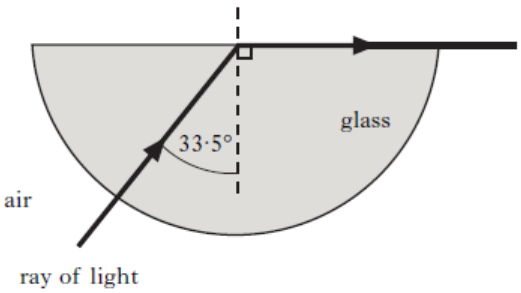
B 24·4 °

C 42·0 °

D 65·6 °

E 90·0 °.

2009 15. A ray of monochromatic light passes into a glass block as shown.



The refractive index of the glass for this light is

A 0·03

B 0·55

C 0·87

D 1·20

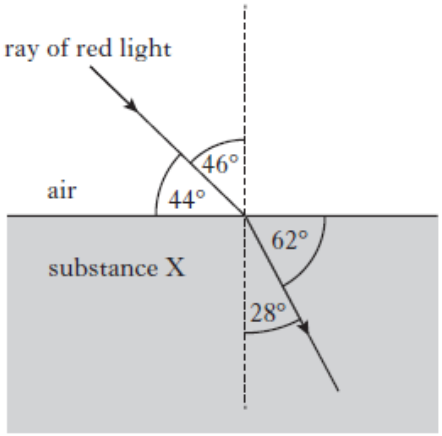
E 1·81.

2013 15. Light travels from air into glass.

Which row in the table describes what happens to the speed, frequency and wavelength of the light?

	Speed	*Frequency*	*Wavelength*
A	increases	decreases	stays constant
B	decreases	stays constant	decreases
C	stays constant	decreases	decreases
D	increases	stays constant	increases
E	decreases	decreases	stays constant

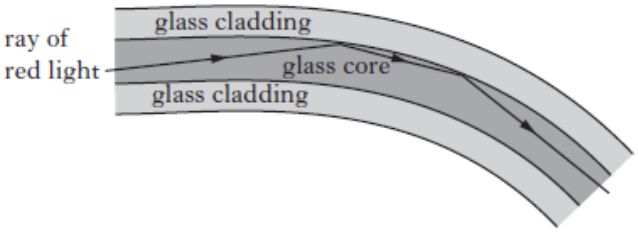
2014 15. The diagram shows the path of a ray of red light as it passes from air into substance X.



The critical angle for the light in substance X is

A 32°
B 41°
C 45°
D 52°
E 90°.

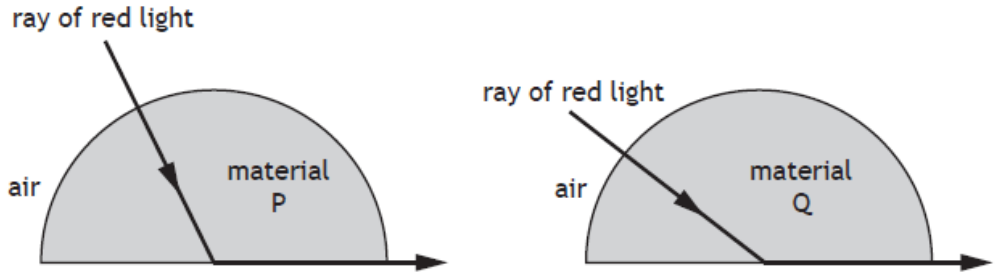
2015 Revised 14. An optical fibre consists of a glass core surrounded by cladding made of different glass. A ray of red light travels through the optical fibre as shown.



The red light travels as shown because

A the speed of light in the core is greater than the speed of light in the cladding
B the refractive index of the core is greater than the refractive index of the cladding
C the refractive index of the core is less than the refractive index of the cladding
D the frequency of light in the core is greater than the frequency of light in the cladding
E the frequency of light in the core is less than the frequency of light in the cladding.

2015 15. Red light is used to investigate the critical angle of two materials P and Q.



A student makes the following statements.

I Material P has a higher refractive index than material Q.
II The wavelength of the red light is longer inside material P than inside material Q.
III The red light travels at the same speed inside materials P and Q.

Which of these statements is/are correct?

A I only
B II only
C III only
D I and II only
E I, II and III

2016 14. Light travels from glass into air.

Which row in the table shows what happens to the speed, frequency and wavelength of the light as it travels from glass into air?

	Speed	*Frequency*	*Wavelength*
A	decreases	stays constant	decreases
B	decreases	increases	stays constant
C	stays constant	increases	increases
D	increases	increases	stays constant
E	increases	stays constant	increases

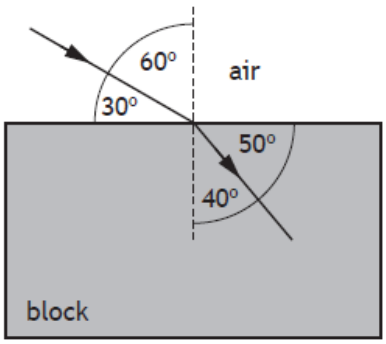
2017 12. A ray of red light passes from a liquid to a transparent solid.

The solid and the liquid have the same refractive index for this light.

Which row in the table shows what happens to the speed and wavelength of the light as it passes from the liquid into the solid?

	Speed	*Wavelength*
A	decreases	decreases
B	decreases	increases
C	no change	increases
D	increases	no change
E	no change	no change

2017 13. A ray of blue light passes from air into a transparent block as shown.



The speed of this light in the block is

A $1{\cdot}80 \times 10^8\ \text{m s}^{-1}$

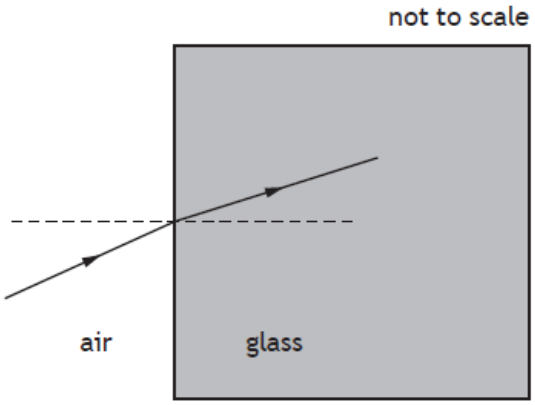
B $1{\cdot}96 \times 10^8\ \text{m s}^{-1}$

C $2{\cdot}00 \times 10^8\ \text{m s}^{-1}$

D $2{\cdot}23 \times 10^8\ \text{m s}^{-1}$

E $2{\cdot}65 \times 10^8\ \text{m s}^{-1}$.

2018 14. A ray of monochromatic light passes from air into a block of glass as shown.



The wavelength of this light in air is $6{\cdot}30 \times 10^{-7}$ m.
The refractive index of the glass for this light is 1·50.
The frequency of this light in the glass is

A $2{\cdot}10 \times 10^{-15}$ Hz
B $1{\cdot}26 \times 10^{2}$ Hz
C $1{\cdot}89 \times 10^{2}$ Hz
D $4{\cdot}76 \times 10^{14}$ Hz
E $7{\cdot}14 \times 10^{14}$ Hz.

2019 18. A ray of monochromatic light passes from air into water.
The wavelength of this light in air is 589 nm.
The speed of this light in water is

A $2{\cdot}56 \times 10^{2}\ \text{m s}^{-1}$
B $4{\cdot}52 \times 10^{2}\ \text{m s}^{-1}$
C $2{\cdot}26 \times 10^{8}\ \text{m s}^{-1}$
D $3{\cdot}00 \times 10^{8}\ \text{m s}^{-1}$
E $3{\cdot}99 \times 10^{8}\ \text{m s}^{-1}$.