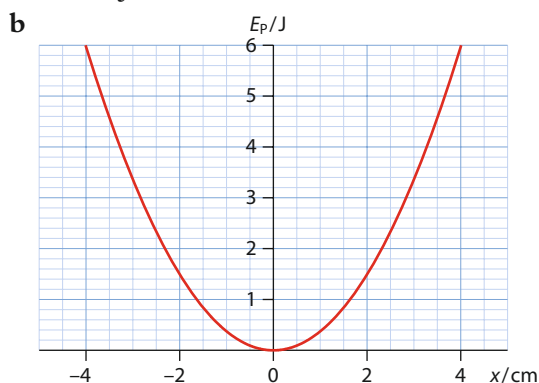


Additional Topic 4 answers

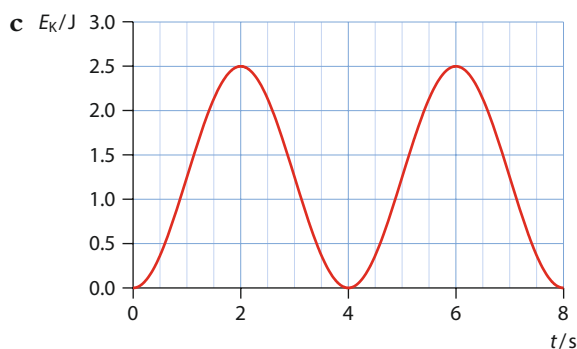
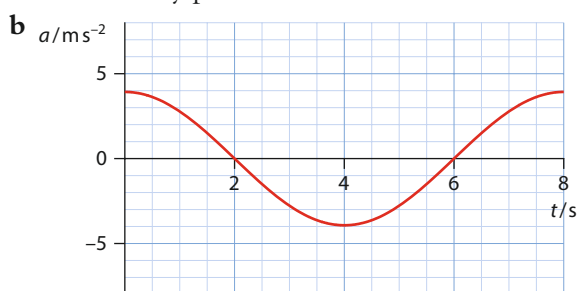
Topic 4 Waves

4.1 Oscillations

- 1 **b** V at the origin
c same graph but from $x = -1$ cm to $x = 1$ cm
 2 **a** **i** 6.9 m s^{-1}
ii 1.5 J



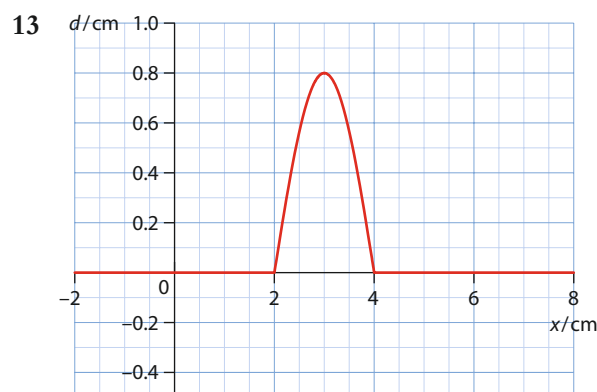
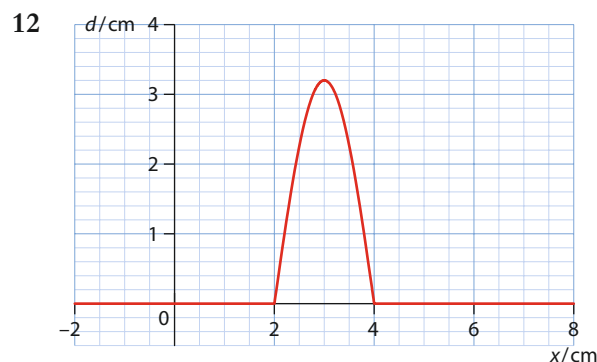
- 3 **a** **i** V at any maximum or minimum of the graph
ii A at any maximum or minimum of the graph
iii K at any point where $x = 0$
iv P at any maximum or minimum of the graph
b **i** a negative cosine curve
ii a negative sine curve
 4 **a** **i** Z at any maximum or minimum of the graph
ii M at any point where $v = 0$



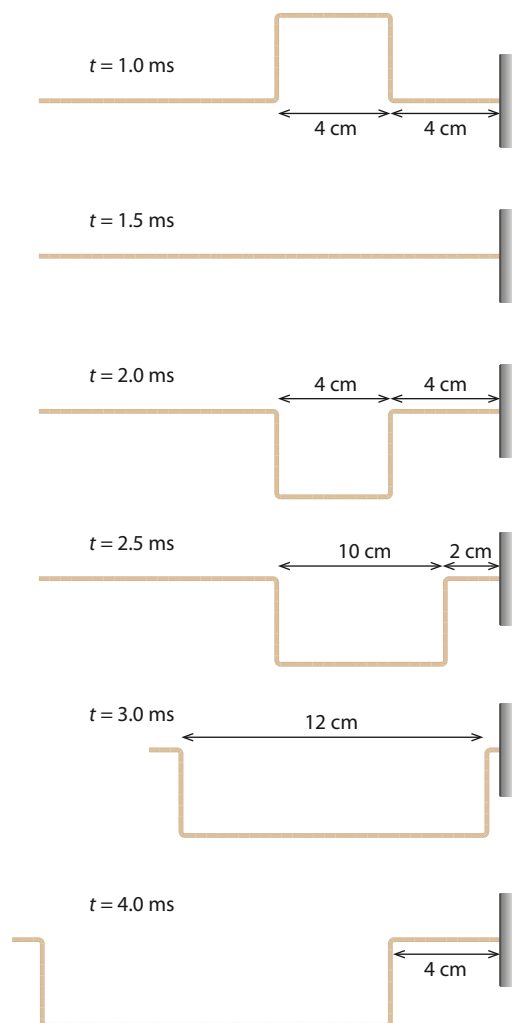
4.2 Travelling waves

- 5 **a** 3.16 m s^{-1}
b K at any point where $x = 0$
 6 **a** **i** 0.6 cm
ii 4.0 m
iii 5.0 m s^{-1}
iv 1.25 Hz
b no
 8 **a** $5.0 \times 10^3 \text{ m s}^{-1}$
b **i** 0 mm
ii -2.00 mm
 9 **a** 3.0 m s^{-1}
b $T = 1.5 \text{ s}; f = 0.667 \text{ Hz}$
c 4.5 m
d 12 cm
 10 **a** 0.66 m
b 2.98 m
 11 **a** 2400 m
b 0.050 m
c 30

4.3 Wave characteristics



14



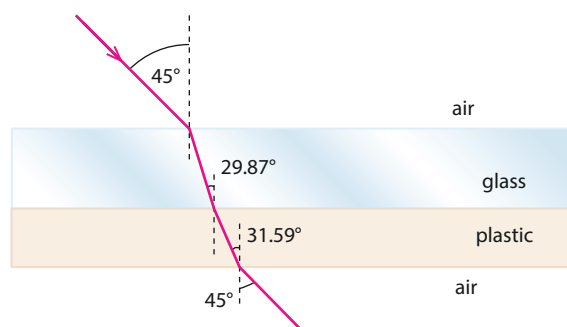
16 $\frac{I_0}{8}$

17 128 additional polarisers

19 45°

4.4 Wave behaviour

22



24 Reflection and diffraction of sound; absence of these for light. P could see Q by using a mirror at the corner.

25 **b** 8.0 m

26 0.83 m

27 **a** The path difference is two wavelengths, so the observer hears a loud sound because of constructive interference.

b The path difference is one and a half wavelengths, so the observer hears no sound because of destructive interference.