

Question 18 (Answer: C)

- A wave spreads most at a gap when its wavelength is close to the gap width.
- So the spreading increases if the wavelength is made *larger* or the gap is made *narrower*.
- Decreasing the wavelength, or widening the gap, both reduce the diffraction.

Question 17 (Answer: D)

- 16 complete waves arriving in 20 s gives $f = 16/20 = 0.80$ Hz.
- $\lambda = v/f$, with $v = 6.0$ km/s = 6000 m/s.
- $\lambda = 6000/0.80 = 7500$ m, that is 7.5 km.

Question 17 (Answer: B)

- In a transverse wave the particles oscillate at right angles to the direction of travel.
- The waves travel horizontally, from X to Y.
- So the cork bobs vertically, up and down – it does not travel across with the wave.

Question 16 (Answer: C)

- A wave carries energy from one place to another.
- The particles of the medium oscillate about fixed positions but do not travel with the wave.
- So a wave transfers energy without transferring matter.

5(a)	any two from: • (longitudinal) vibration / oscillation in wave parallel to propagation direction / direction of travel • transverse wave vibrates / oscillates perpendicular to propagation direction / direction of travel • (longitudinal) consists of compressions and rarefactions • transverse wave consists of crests / peaks and troughs • (longitudinal) needs a medium (to travel)
5(b)(i)	P-wave AND it is longitudinal
5(b)(ii)	1.8×10^4 m OR 18 km
	1.5λ OR $1.5 \times 1.2 \times 10^4$ OR 1.8×10^4
5(b)(iii)	$v = f\lambda$ OR $v = \lambda/t$ OR $(t =) \lambda/v$ OR $f = 4600 / 1.2 \times 10^4$ OR $(t/5 =) 1.2 \times 10^4 / 4600$ OR $(t =) 6(.0) \times 10^4 / 4600$
	13 s
	$t = 1/f$ OR (time for one wave =) 2.6 (s)

Question 17 (Answer: **D**)

- Both light and sound diffract at a gap, so "light does not diffract at all" is wrong.
- How much a wave spreads depends on its wavelength compared with the gap width.
- Sound's wavelength is comparable to the gap so it spreads widely; light's is far smaller, so it barely spreads.

Question 18 (Answer: **B**)

- Amplitude is a distance – the height of a crest above the middle.
- Wavelength is also a distance – from one crest to the next.
- So both are measured in metres; frequency is in hertz and wave speed in m/s.

Question 17 (Answer: **A**)

- Amplitude is the height from the middle line up to a crest.
- Frequency is how many complete cycles fit into the same time, so more cycles means a higher frequency.
- All four graphs share one scale, so pick the tallest wave that also fits the most cycles across.