AQA AS Physics exam practice answers

3 Waves

**1 (a)** frequency of second harmonic = 2 × 73.3 = 146.6 Hz

**(b)** half-way along the string

**(c)** frequency, *f* = (1/2*L*)√(*T*/*m*)

Therefore:

*T* = (2*Lf*)2*m* = (2 × 0.7 × 146.6)2 × 1.5 × 10−3 = 63.2 N

**2** B

**3 (a)** The light from the two bulbs is not coherent.

**(b) (i)** The fringe separation will increase.

**(ii)** The fringe separation will decrease

**(iii)** The fringe separation will increase

**(iv)** The fringe separation will decrease

**(v)** The fringes will be coloured with the blue edges nearest the centre of the

pattern. The central fringe will be white.

**(vi)** A single slit diffraction pattern will be produced.

**(vii)** The pattern will become sharper and dimmer.

**4 (a)** *n* = *d*sin**

*n*1**1 = *n*2**2

So:

3 × 450 = 2 × **2

**2 = 675 nm

**(b)** *d* = *n*sin**= 3 × 450 × 10−9/sin20 = 3.95 × 10−6 m = 3.95 × 10−3 mm

**5** *n* = *d*sin**

Therefore:

sin ** = 4/10

** = 23.6°

separation on the beach = 250 × tan23.6 = 250 × 0.436 = 109 m

**6 (a)** *c*2sin**1 = *c*1sin**2

sin **2 = (2 × 108 × sin40)/(3 × 108) = 0.43

Therefore:

angle of refraction (**2) = 25.4°

**(b)** wavelength = 600 × 2/3 = 400 nm

**(c)** sin**c = *n*2/*n*1 = 1.45/1.5 = 0.96

Therefore:

critical angle = 75.2°

**7** D

**8** The light will refract after diffracting and so the diffracted angle measured as light emerges from the grating will be affected.