

Multiple Choice Answers

Q24: A

Q26: B

Q27: D

4(a)	light diffracts / spreads (at slit(s))
	light (from each slit) superposes / interferes (at screen)
	when phase difference is 0 / path difference is $n\lambda$ (where n is an integer) a bright fringe is formed or
	when phase difference is 180° / path difference is $(n+1)\lambda/2$ (where n is an integer) a dark fringe is formed
4(b)	$\lambda = ax / D$
	$\lambda = 1.0 \times 10^{-3} \times 3.3 \times 10^{-3} / 4.8$
	$(= 6.875 \times 10^{-7} \text{ m})$
	$f = v / \lambda$
	$= 3.0 \times 10^8 / 6.875 \times 10^{-7}$ $= 4.4 \times 10^{14} \text{ Hz}$
4(c)	the light / beams (have different frequencies so) are not coherent / do not have constant phase difference

4(a)	wave passing through gap / aperture
	(wave) spreads (out)
4(b)(i)	$n\lambda = d \sin \theta$
	$\theta = \sin^{-1} [(540 \times 10^{-9}) / (5.0 \times 10^{-6})] = 6.2^\circ$
4(b)(ii)	$\theta = 12^\circ$
4(b)(iii)	peaks / maxima shown at $\theta = 0, \pm 6^\circ$ and $\pm 12^\circ$
	peaks / maxima and zero intensity in between
	central peak / maxima at intensity I_0 and the other peaks all equal to or less than I_0
4(c)	peaks / maxima all at the same angles (as before)
	intensity (of all peaks / maxima) halved

4(a)	when two (or more) waves meet
	(resultant) displacement equals the sum of the displacements of the (two separate) waves
4(b)(i)	the incident and reflected waves superpose
	(the waves superpose so that the resultant) amplitude is maximum at an antinode
	(the waves superpose so that the resultant) amplitude is minimum / zero at a node
4(b)(ii)	$c = f\lambda$
	$f = (3.00 \times 10^8) / 0.026$
	$= 1.2 \times 10^{10} \text{ Hz}$
4(b)(iii)	microwave
4(b)(iv)	distance = $0.026 / 4$
	$= 6.5 \times 10^{-3} \text{ m}$

Multiple Choice Answers

Q6: D

Multiple Choice Answers

Q19: C

5(a)	$T = 5.8 \times 5.0 \times 10^{-4}$ $= 2.9 \times 10^{-3}$
	$\lambda = vT$ or $v = f\lambda$ and $f = 1 / T$
	$\lambda = 330 \times 2.9 \times 10^{-3}$ or $\lambda = 330 / 345$ $= 0.96 \text{ m}$
5(b)	(loudspeaker) moves away (from the microphone)
	at an increasing speed / whilst accelerating