

Multiple Choice Answers

Q28: C

Multiple Choice Answers

Q31: C

Multiple Choice Answers

Q31: B

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)	$\lambda = ax / D$
	$\lambda = 1.0 \times 10^{-3} \times 3.3 \times 10^{-3} / 4.8$ ($= 6.875 \times 10^{-7}$ m)
	$f = v / \lambda$
	$= 3.0 \times 10^8 / 6.875 \times 10^{-7}$
	$= 4.4 \times 10^{14}$ Hz
4(c)	the light / beams (have different frequencies so) are not coherent / do not have constant phase difference

Multiple Choice Answers

Q31: C

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Q28: B

Multiple Choice Answers

Q27: B

4(a)	(when two or more) waves meet/overlap (at a point)
	(resultant) displacement is sum of the individual displacements
4(b)(i)	Fringe width, $x = 3.2 \times 10^{-2} / 8$
	$= 4.0 \times 10^{-3} \text{ (m)}$
	$D = ax / \lambda$
	$= (4.0 \times 10^{-3} \times 0.16 \times 10^{-3}) / 7.2 \times 10^{-7}$
4(b)(ii)	$= 0.89 \text{ m}$
	Curved line with a negative gradient of decreasing magnitude throughout, from slit separation 0.04 mm to 0.16 mm
	Line of negative gradient ending at (0.16, 0.4), from slit separation 0.04 mm
	Line of negative gradient passing through (0.08, 0.8) <u>and</u> (0.04, 1.6)

Multiple Choice Answers

Q27: C

6(a)(i)	for maximum intensity, waves must be in phase (at detection)
	(phase difference at source means) waves are not in phase / have a 90° phase difference <u>at O</u>
6(a)(ii)	point B labelled on the line PQ below O
	distance OB = distance OA
6(b)(i)	$v = f\lambda$
	$\lambda = (3.00 \times 10^8) / (2.5 \times 10^{10}) = 0.012 \text{ m}$
6(b)(ii)	$\Delta x = 0.012 / 4$
	$= 0.0030 \text{ m}$
6(b)(iii)	$\lambda = ax / D$
	distance $= \lambda D / a = 0.012 \times 2.3 / 0.18$
	$= 0.15 \text{ m}$