

General wave properties

Mark Scheme 3

Level	IGCSE
Subject	Physics
ExamBoard	CIE
Topic	Properties of Waves including Light and Sound
Sub-Topic	General Wave Properties
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 3

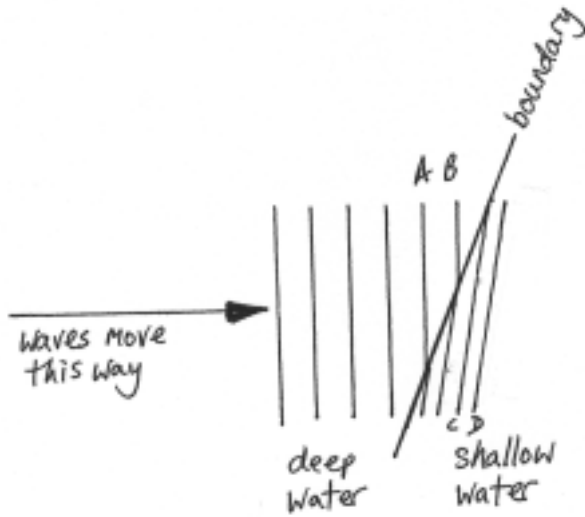
Time Allowed: 48 minutes

Score: /40

Percentage: /100

- 1 (a) (i) 1. compressions and/or rarefactions closer together
OR more compressions and/or rarefactions
ignore wavelength shorter B1
2. layers closer together at compressions B1
layers farther apart at rarefactions B1
OR
compressions narrower (B1)
rarefactions wider (B1)
ignore wavelength shorter ignore 'amplitude greater' ignore 'maximum displacement greater'
- (ii) distance between 2 compressions or 2 rarefactions shown with reasonable accuracy
- (b) time taken by sound in air = $200 / 343 = 0.583$ s C
time taken by sound in steel = $0.583 - 0.544 = 0.039$ s C
5128 m/s A1 [7]
- 2 (a) (i) same / unchanged / nothing B1
- (ii) reduced / slows down B1
- (iii) reduced B1
- (b) $v = f\lambda$ in any form or in words [not numbers]
OR $f = 1/T$ in any form or in words [not numbers] B1
 $0.12 = f \times 0.08$ OR $T = 0.08 / 0.12$ C1
1.5 Hz / cycles per sec / c.p.s. / per s
[only 2 marks if B1 mark above not scored] A1

(c)



(ignore length of waves)
 waves bending in correct direction (be generous)
 A and B correct by eye, straight and parallel
 C and D parallel to A and B by eye

M1
 A1
 A1 [9]

3 (a) (i) R in correct position, by eye

B1

(ii) 3 reflected waves correctly meeting mirror)
 3 reflected wave equidistant, by eye) -1 e.e.o.o
 3 reflected waves centred on candidate's R)

B2

(b) 1st ray + reflection correct by eye
 2nd ray + reflection correct by eye
 reflected rays projected back, to meet behind mirror
 OR labelled I **and** in correct position

B1

B1

B1

[Total: 6]

4	(a)	clear attempt at arcs of circles, at least 3 same wavelength as incoming waves, by eye (ignore shape ignore distance to first wave) centre of curvature of arcs at centre of gap, by eye	B1 B1 B1	
	(b)	speed/wavelength or $20/2.5$ or $v = f\lambda$ 8 Hz or 8 s^{-1} or 8 waves/second	C1 A1	
	(c)	his (b) or "the same"	B1	[6]
5	(a)	straight not circular or WTTE waves not same wavelength/same distance apart waves should extend into shadow area (more) any 2		B2 [2]
	(b)	diagram showing large flat piece with circular edges (ignore any wavelength changes) but straight part must be (very) nearly equal to slit width	M1 A1	[2]
	(c)	speed = 1.2×8 = 9.6 cm/s	C1 A1	[2]
				[Total: 6]
6	(a)	3 more roughly circular all drawn clearly circular, stop (well) clear of barrier and centred on slit wavelength constant throughout, both sides of barrier	B1 B1 B1	3
	(b)	wavelength – speed/frequency in any form values substituted correctly answer $6 \times 10 \text{ m}$	C1 C1 A1	3
				[6]