Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic: Waves

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Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Mark Schemes

Q1.

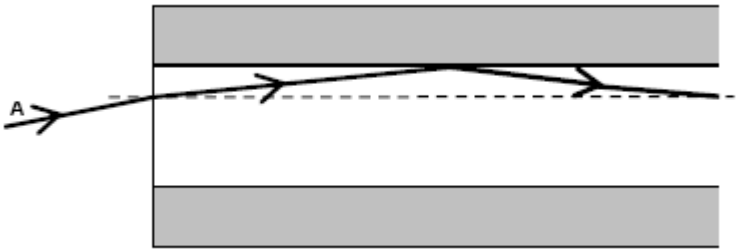
(a) decrease ✓

constant ✓

decrease ✓

3

(b)



straight ray (ignore arrow) reflecting to the right ✓

reflected angle = incident angle ✓

(accept correct angle labels if reflected angle is outside tolerance)

2

(c) (i) ($n = \frac{c}{c_s}$) use of 3 ($\times 10^8$) ✓ = $\frac{300(\times 10^8)}{2.04(\times 10^8)}$ = 1.47 ✓ (1.4706)

(must see 3 sf or more)

2

(ii) $\sin\theta_c = \frac{1.45}{1.47(06)}$ or correct substitution in un-rearranged formula ✓

θ_c = 80.4 ✓ (80.401) (80.3 to 80.54) (≈ 80°) must see 3 sf or more

2

(d) angle of refraction = 180 – 90 – 80.4 = 9.6° ✓

$\sin\theta$ = 147(06) sin 9.6 ✓ = 0.25 ecf from first mark

θ = 14 (= 14.194°) ✓ ecf from first mark

range **13 to 15°** due to use of rounded values

3

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(e) (reduced amplitude) due to absorption/energy loss (within the fibre)/attenuation/scattering (by the medium) /loss from fibre ✓

(pulse broadening caused by) multi-path (modal) dispersion /different rays/modes propagating at different angles/non axial rays take longer time to travel same distance along fibre as axial rays ✓

2

[14]

Q2.

(a) (i) one 'loop' (accept single line only, accept single dashed line)

+ nodes at each bridge (± length of arrowhead)

+ antinode at centre **(1)**

1

(ii) $\lambda_0 = 2L$ or $\lambda = 0.64 \times 2$ **(1)**

= 1.3 (m) **(1)** (1.28)

2

(iii) ($c = f\lambda$) = 108 × (a)(ii) **(1)**

= 138 to 140(.4) (m s^{-1}) **(1)** ecf from (a) (ii)

2

(b) (i) four antinodes **(1)** (single or double line)

first node on 0.16 m (within width of arrowhead)

+ middle node between the decimal point and the centre of the 'm' in '0.64 m'

+ middle 3 nodes labelled 'N', 'n' or 'node' **(1)**

2

(ii) ($4 f_0$ =) 430 (Hz) **(1)** (432)

or use of $f = \frac{v}{\lambda}$ gives 430 to 440 Hz correct answer only, no ecf

1

(c) decrease the length/increase tension/tighten string **(1)**

1

[9]

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