Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

(a) same wavelength / frequency ✓

constant phase relationship ✓ allow 'constant phase difference' but not 'in phase'

2

(b) (i) ($\lambda = \frac{c}{f}$)

Use of speed of sound gets zero

$3.00 \times 10^8 = 9.4\ (10^9)\ \lambda$ OR $\frac{3.00\times10^8}{9.4\times(10^9)}$ ✓

$= 3.2 \times 10^{-2}$ (3.19×10^{-2} m) ✓

Allow 0.03

2

(ii) 3.2×10^{-2} ✓ (m) ecf from bi

Don't allow '1 wavelength', 1λ, etc
Do not accept: zero, 2 π, 360 °

1

(c) maximum (at position shown) ✓

allow constructive superposition.
'Addition' is not enough

constructive interference / reinforcement ✓

ecf for 'minimum' or for reference to wrong maximum

(the waves meet) 'in step' / peak meets peak / trough meets trough / path difference is (n) λ / in phase ✓

3

(d) $s = \frac{\lambda D}{w}$

Don't allow use of the diagram shown as a scale diagram

$= \frac{0.0319\times0.42}{0.11}$ ✓ ecf bi

Do not penalise s and w symbols wrong way round in working if answer is correct.

= 0.12 (0.1218 m) ✓

Correct answer gains first two marks.

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= **any <u>2sf</u>** number

*Independent sf mark for **any** 2 sf number*

3

(e) a maximum ✓

Candidates stating ' minimum ' can get second mark only

(f × 2 results in) $\lambda/2$ ✓

path difference is an even number of multiples of the new wavelength ($2n\lambda_{new}$) ✓

allow 'path difference is $n\lambda$' / any even number of multiples of the new λ quoted e.g. 'path difference is now 2 λ'

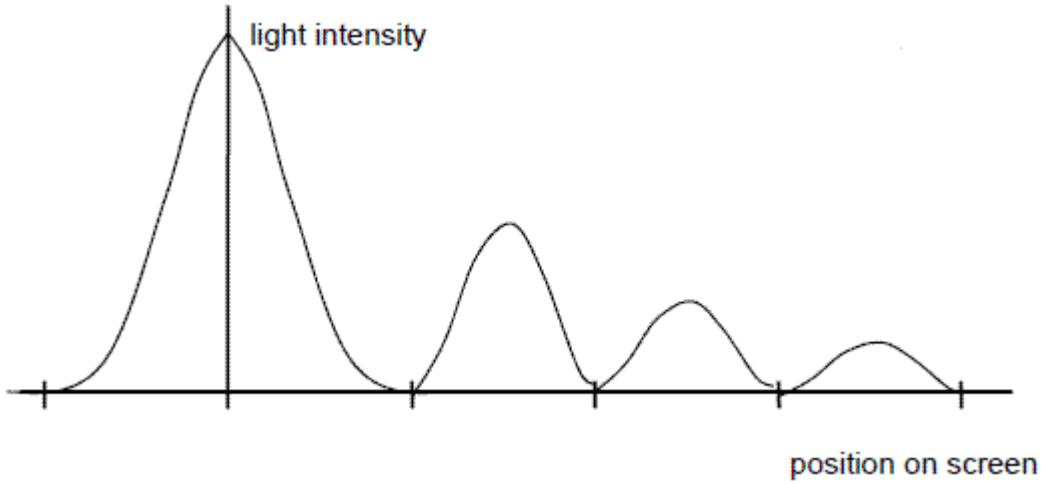
3

[14]

Q2.

(a) 3 subsidiary maxima in correct positions **(1)**

intensity decreasing **(1)**



2

(b) a single wavelength **(1)**

indication that colours are present within each subsidiary maxima **(1)**

blue/violet on the inner edge **or** red outer for at least one subsidiary maximum **(1)**

constant phase relationship/difference **(1)**

2

(c) maxima further apart/central maximum wider/subsidiary maximum wider/maxima are wider **(1)**

1

(d) wider/increased separation **(1)**

lower intensity **(1)**

2

(e) distinct fringes shown with subsidiary maxima **(1)**

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(middle of) central maximum white **(1)**

3

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