S.4 Physics Test Marking Scheme Section A Multiple Choices (35%)

A 4 D 5 D 6 C 7 C 8 A 9 D 10 A 14 B 15 B 16 B 17 B 18 C 19 D 20 A 24 D 25 A 26 D
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)=40 N	\equiv	Fron	n t = 3.	5 s to	4 s,											14		
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-	
V.	Correct mg
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M	
Y.	
<u>M</u> 4	
Σ	Alt. method:
	Use $F = \frac{mv^2}{r}$ and
	$v = \frac{2\pi r}{T}$
1A	Accept 5.34 s or 5.35 s
Marks	Remarks
⋖	Constant wavelength Correct wavefront and direction of reflection
<u> </u>	Correct circular waves At least 2 nodal lines N and 3 antinodal lines
٧	
ΙĄ	
١٧	Less antinodal lines
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Y.	,
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		Correct position of <i>I</i> Correct rays <i>p</i> and <i>q</i> Correct ray <i>r</i>	•	
∀	¥ Ž 4	ΣΣΣ	<u>X</u> 4	ΣΣ
naalys albedo (ii)	(b) (i) Image distance $v = 54 - 18 = 36$ cm ($D = 54$ cm) Magnification = $\frac{v}{u} = \frac{36}{18} = 2$	(ii) Please refer to the ray diagram in next page	(iii) Focal length = 12 ± 0.5 cm	(iv) Move the lens 18 cm farther away from the object Or move the lens 18 cm closer to / towards the screen

Height ratio = 1:4

	rechooled Parthooled) 1	,
50			
(ii) (q) 9			

(a) (i) Constructive and destructive interferences take place alternatively along BC. |1A This results in alternative maximum and minimum reading being recorded |1A along BC.

(ii) There is background noise.

As PX < QX, the intensity of the sound from P is larger than that from Q. They cannot completely cancel each other.

The loudspeaker is not a point sound source. ŏ Ö

The path difference at Z is QZ -PZ =6.32 $-5.30=1.02~\rm m$ Since Z corresponds to the third order maximum, the frequency f_b is

(p)

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> $\frac{3 \times 340}{f_0} = 1.02$ $3 \frac{v}{f_0} = 1.02$

£ =1000 Hz

		b pu				
		Correct position of I Correct rays p and q				
Y.	41 M 14	≥ ≥ ≥	Ž₹	ΣΣ	1.4	

Remarks

Marks

Grating spacing = $\frac{0.01}{3000}$ =3.33 × 10⁻⁶ m

8 (a)

Solution

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When sound of frequency for eaches X, destructive interference occurs at X

When the frequency is doubled to 2 f_0 , the new wavelength is $\lambda = \lambda_0 / 2$, That means constructive interference occurs at X.
As a result, strong and weak sounds will be detected alternatively at X.
Therefore, Jack is correct.

and the path difference is $\frac{\lambda_0}{2}$

(c)

		OR 590 nm	
₹ ₹	Ξ	Σ ≤	₹ ₹
The bright line at the 45 cm mark corresponds to the zeroth order bright fringe. The bright lines at 9 cm and 81 cm marks correspond to the first order bright fringe	For the 1st order fringe, $\sin \theta = \frac{0.45 - 0.09}{\sqrt{(0.45 - 0.09)^2 + 2^2}} = 0.1772$	By $d \sin \theta = n\lambda$, wavelength = $\frac{d \sin \theta}{n} = \frac{3.33 \times 10^{-6} \times 0.1772}{1} = 5.90 \times 10^{-7} \text{ m}$	From 20 Hz to 20 kHz. It is the vibration of the diaphragm of the drum that gives out the sound Since the vibrating frequency of the diaphragm falls within our audible range, we can hear the drum.
e	<u> </u>	***	9 (a) (b)

End of Marking Scheme