PAPER 3 2018 MID-YEAR PHYSICS

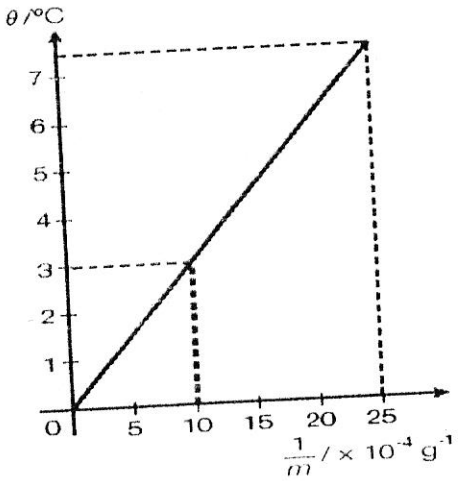
Marking Scheme Physics Paper 3
Mid year exam Form 5 2018
SMJK Yu Hua

No	Section A [28 marks]	Mark
1	(a)(i). Manipulated variable : mass of water, m (ii). Responding variable : Increase in temperature, θ. (iii). Constant variable : Beaker used, thermometer used.	3
	(b) Initial temperature, θ0 = 28° C	1
	(c)	

m/g	1/m/g^{-1}	θ/°C	θ = θ − θ$_0$/° C
400	25×10^{-4}	35.5	7.5
600	17×10^{-4}	33.0	5.0
800	13×10^{-4}	31.5	3.5
1000	10×10^{-4}	31.0	3.0
1200	8×10^{-4}	30.5	2.5
1400	7×10^{-4}	30.0	2.0

5

(d)



5

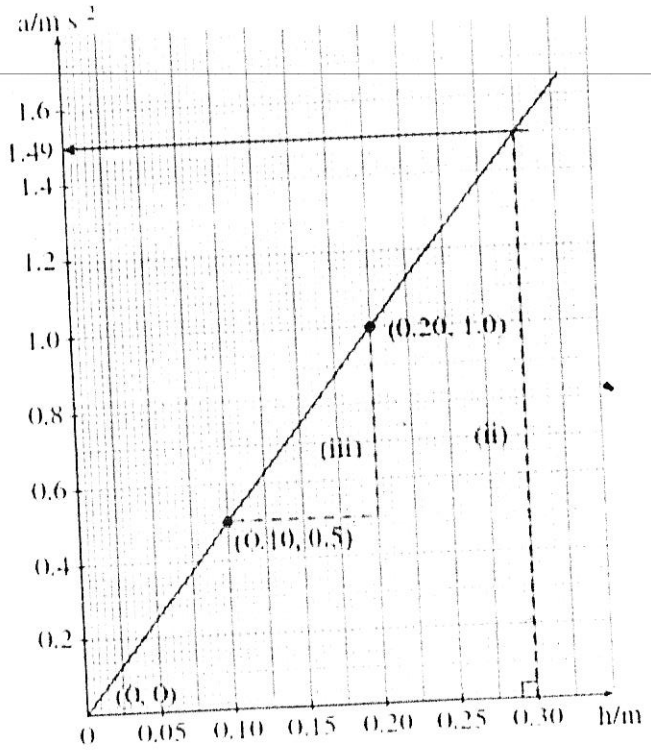
(e) θ is directly proportional to 1/m — 1

(f) The eye should be at the same level and perpendicular to the temperature scale when taking reading from the thermometer, to avoid parallax error. — 1

Total 16

1

2	(a)(i) a is directly proportional to h	1
	(ii) When h = 0.3 m, a = 1.49 m s^{-2}.	3



(iii) Gradient, m = 1.0 − 0.5 / 0.20 − 0.10 = 5.0 s^{-2} — 3

(b) m = g / l
5 = g / 2 ⇒ g = 10 m s^{-2} — 2

(c) $a = \frac{g}{l} \cdot h = \frac{10}{1.5} \cdot 0.10$
= 0.67 m s^{-2} — 2 / 3.

(d) – Make sure the tape runs freely through the ticker timer.
– Repeat the experiment and take the average readings.
– A void parallax error by placing the eye perpendicular to the scale of readings. — 1

Total 12

2

Section B
[12 marks]

3 (a) -The object distance affects the size of the image// -size of the image depends on object distance — 1

(b) The greater the object distance, the smaller the size of the image // object distance increase, image size decrease — 1

(c) (i) To investigate the relationship between the object distance and the size of the image. — 1

(ii) Manipulated variable : object distance, *u* — 1

Responding variable : height of the image, *H*

Fixed variable : Focal length of the lens / thickness of the lens

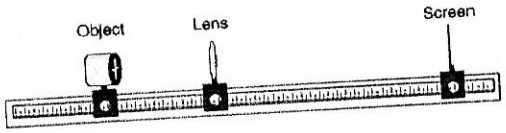
* REJECT - *Diameter of the lens*

(iii) Convex lens, light bulb(+ power supply) / candle, **screen**, **metre rule** — 1

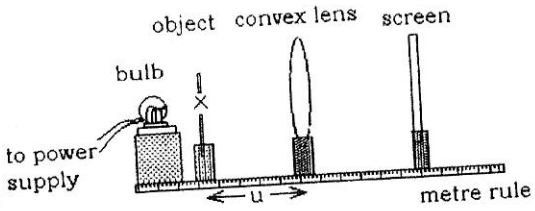
(iv) Light bulb, convex lens and screen, **all in line**. — 1

or

bulb / candle/ object



*If bulb – must be connected to power supply



(v) 1. The convex lens is placed at distance of, ***u* = 15 cm** from the object
2. The screen is **adjusted** until **a sharp image is formed** on it. The size of the image, *H* is **measured** and **record**.
3. Repeat the experiment with values of *u* = **20 cm, 25 cm, 30 cm and 35 cm** — 3

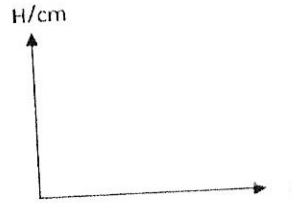
3

(vi)

u / cm	*H* / cm
15	
20	
25	
30	
35	

1

(vii) A graph of *H* against *u* is drawn @



1

Total 12

4 (a) The distance between two successive loud regions depends on the distance between the listener and the two loudspeakers. — 1

(b) The distance between two successive loud regions increases as the distance between the listener and the two loudspeakers increases. — 1

(c) (i)To investigate the relationship between the 'distance between the listener and the two loudspeakers', and the 'distance between two successive loud regions'. — 1

(ii) Manipulated variable : the 'distance between the listener and the two loudspeakers', D. — 1

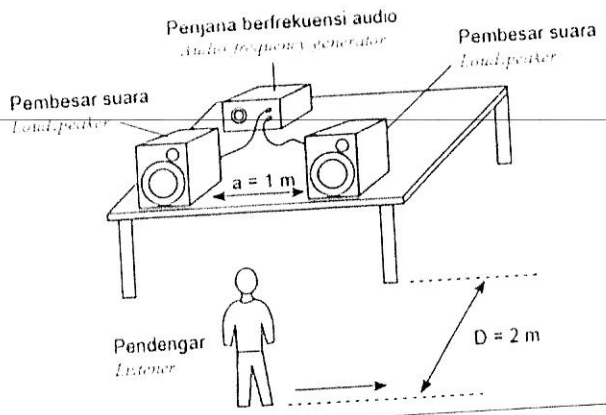
Responding variable : the distance between two successive loud regions, x

Constant variable : the wavelength of sound waves, distance between the two loudspeakers — 1

(iii) Two loudspeakers, audio-frequency generator, connection wires and **metre ruler**, open court or field. — 1

4

(iv)



1

(v) 1. The two loudspeakers are adjusted at 1 m apart.
2. By using a metre rule, the distance between the listener and the loudspeaker, **D = 2.0 m**, is measured.
3. The listener walks in a straight path parallel to the front edge of the table and the **distance between two successive loud regions, x, is measured and recorded.**
4. The experiment is repeated with different distances between the listener and the loudspeakers, **D = 4.0 m, 6.0 m, 8.0 m and 10.0 m.**

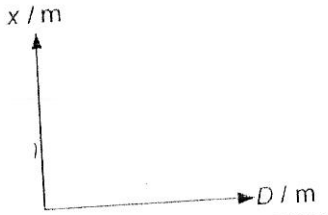
3

(vi)

D / m	2.0	4.0	6.0	8.0	10.0
x / m					

1

(vii)



1

Total 12

~The end~

Happy marking