

SMJK YU HUA
FINAL YEAR EXAMINATION 2017

Subject : Physics Paper 3
Form : 4A – 4F
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(Senior Assistant for Administration)
Class : _____

Name : _____

Section A
[28 marks]

1.

(a) Identify:

- (i) Manipulated variable: Immersion depth 1m
- (ii) Responding variable: Buoyant force / reading of the spring balance 1m
- (iii) Constant variable: Mass of block 1m

(b) (i) $d = 5 \text{ cm}$, $W = 8.3 \text{ N}$

$d = 10 \text{ cm}$, $W = 7.1 \text{ N}$

$d = 15 \text{ cm}$, $W = 5.9 \text{ N}$

$d = 20 \text{ cm}$, $W = 4.7 \text{ N}$ *All corrects 3m

$d = 25 \text{ cm}$, $W = 3.5 \text{ N}$ * 3 corrects 2m / 2 corrects 1m

(ii) $d = 5 \text{ cm}$, $F_B = 9.5 - 8.3 = 1.2 \text{ N}$

$d = 10 \text{ cm}$, $F_B = 9.5 - 7.1 = 2.4 \text{ N}$

$d = 15 \text{ cm}$, $F_B = 9.5 - 5.9 = 3.6 \text{ N}$

$d = 20 \text{ cm}$, $F_B = 9.5 - 4.7 = 4.8 \text{ N}$ *All corrects 2m

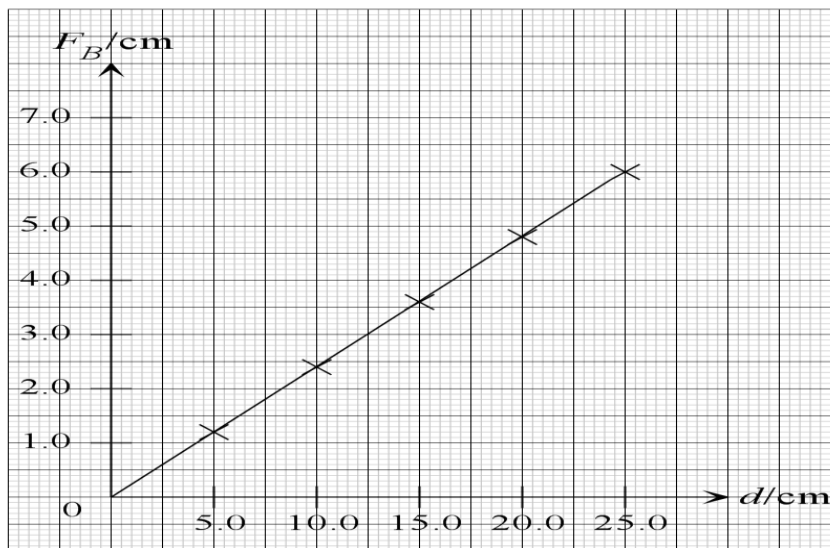
$d = 25 \text{ cm}$, $F_B = 9.5 - 3.5 = 6.0 \text{ N}$ * 3 corrects 1m

(c)

d/cm	W/N	F_B/N
5.0	8.3	1.2
10.0	7.1	2.4
15.0	5.9	3.6
20.0	4.7	4.8
25.0	3.5	6.0

2m

(d)



Ticks	Marks
7	5
5-6	4
3-4	3
2	2
1	1

(e) F_B is directly proportional to d 1m

Question 2 [Forces & Motion / Waves]

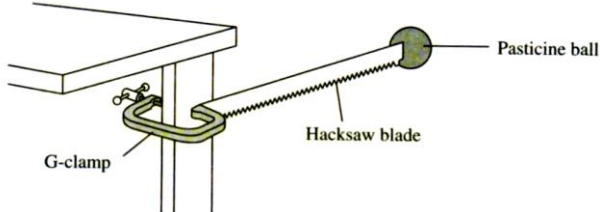
(a) k decreases

(b) (i) $\frac{1}{k} = 0.9$, $T^2 = \dots$ 1m
 $T = 2.1213$ s

(ii) gradient = $\frac{3.7 - 0}{0.8 - 0}$ 3m
 $= 4.625$ kg

(iii) $T^2 = 4\pi^2 \frac{m}{k}$
Gradient = $4\pi^2 m$ 3m
 $4.625 = 4\pi^2 m$
 $m = 0.1172$ kg 4m

(c) Unchanged 1m

Questions		Marking criteria	Mark																		
3	a	The difficulty to move or stop an object (trolley) depends on its mass//The mass affects the difficulty to move or stop an object (trolley).	1																		
	b	The higher//greater the mass, the higher//greater is the inertia.	1																		
	c i	To investigate the relationship between the mass and the inertia of an object	1																		
	ii	Manipulated variable : <i>Mass, m</i> Responding variable : <i>Period of oscillation, T</i> Constant variable : <i>Length of hacksaw blade</i>	1 1																		
	iii	Hacksaw blade, G-clamp, plasticine, weighing balance and stopwatch.	1																		
	iv		1																		
	v	<p>1. A plasticine ball of mass, $m = 20 \text{ g}$ is attached to one end of the hacksaw blade and then allowed to oscillate.</p> <p>2. The time, t, for 10 complete oscillations is measured and the period, $T = \frac{t}{10}$ is then calculated and recorded.</p> <p>3. Steps 1 and 2 are repeated for the mass of plasticine, $m = 40 \text{ g}, 60 \text{ g}, 80 \text{ g and } 100 \text{ g}$.</p>	1 1 1																		
	vi	<table border="1" data-bbox="311 1102 966 1375"> <thead> <tr> <th>m/g</th> <th>t/s</th> <th>$T = \frac{t}{10} \text{ s}$</th> </tr> </thead> <tbody> <tr> <td>20</td> <td></td> <td></td> </tr> <tr> <td>40</td> <td></td> <td></td> </tr> <tr> <td>60</td> <td></td> <td></td> </tr> <tr> <td>80</td> <td></td> <td></td> </tr> <tr> <td>100</td> <td></td> <td></td> </tr> </tbody> </table>	m/g	t/s	$T = \frac{t}{10} \text{ s}$	20			40			60			80			100			1
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	vii	Plot a graph of T^2 against m	1																		
Total			12																		

Question		Marking criteria	Mark														
4	a	The pressure of a liquid <i>depends on</i> its depth//The depth <i>affects</i> the pressure in a liquid.	1														
	b	Pressure in a liquid increases when the depth increases//The greater the depth, the higher is the pressure in a liquid.	1														
	c i	To investigate the relationship between the depth and the pressure in water.	1														
	ii	1. Manipulated variable : <i>Depth, h</i> 2. Responding variable : <i>Pressure (Height difference of water levels in manometer), y</i> 3. Constant variable : <i>Density of water</i>	1														
	iii	Thistle funnel , rubber membrane, rubber tube, manometer , coloured water, water, plastic container and metre rule .	1														
	iv		1														
	v	1. The thistle funnel is pushed into water to a depth, $h = 5.0 \text{ cm}$. 2. The height difference, y between the water levels in the manometer is measured and recorded . 3. Steps 1 and 2 are repeated for $h = 10.0 \text{ cm}, 15.0 \text{ cm}, 20.0 \text{ cm}$ and 25.0 cm .	1 1 1														
	vi	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Depth</th> <th>Height difference</th> </tr> <tr> <th>$h_i \text{ cm}$</th> <th>y/cm</th> </tr> </thead> <tbody> <tr><td>5.0</td><td></td></tr> <tr><td>10.0</td><td></td></tr> <tr><td>15.0</td><td></td></tr> <tr><td>20.0</td><td></td></tr> <tr><td>25.0</td><td></td></tr> </tbody> </table>	Depth	Height difference	$h_i \text{ cm}$	y/cm	5.0		10.0		15.0		20.0		25.0		1
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