

2022 Sec 4E Physics Practical (6091/03)

Question	Answer	Marks
1(a)(i)	MMO V_o in the range 4.00 V to 5.00 V and to 2 decimal places with unit. [V]	1
1(a)(ii)	MMO $V_1 < V_o$ and to the correct decimal place[2dp] with unit. [V] (allow ecf for dp and unit) I_1 in the range 0.04 A to 0.12 A and to 2 decimal places with unit. [A]	1 1
1(a)(iii)	ACE correct calculation of P_1 to 2sf (or 3sf) with appropriate unit [W]	1
1(b)(i)	MMO $V_2 < V_1$ and $I_2 > I_1$	1
1(b)(ii)	ACE correct calculation of R with unit [Ω]	1
1(c)	ACE correct calculation of Q with <u>no units</u> for proportion.	1
1(d)	ACE - Set up apparatus as shown in Fig.1.4. - Move the boss upwards till the wooden rod cause the shaft to just stop moving. - Use a ruler to measure the extension of the spring. - Remove the string and the wooden rod. Place slotted mass on the spring till the same extension of the spring is obtained. $F = \text{weight} = \text{mass} \times g$	1 1
1(e)	ACE Replace spring with a spring balance to measure the force directly OR Hang slotted mass on the shaft directly.	1

[illegible]

Question	Answer	Marks
3(a)(i)	ACE Place the light source, object, lens and screen in a straight line. Move the lens until a blurred image is seen on the screen. By moving the <u>lens towards the screen or towards the object (back and forth)</u> in small lengths, adjust the position until a sharp image is obtained	1
3(a)(ii)	MMO u_s recorded to correct decimal place with appropriate unit $u_s \sim 81.8$ cm	1
3(b)(i)	MMO u_L recorded to correct decimal place with appropriate unit $u_L \sim 18.3$ cm	1
3(b)(ii)	ACE correct calculation of d with appropriate unit [cm] correct calculation of y with appropriate unit [cm ²]	1
3(c)	MMO at least 5 sets of data (D , u_s , u_L , d and y) with correct trend. - u_s decreases as D decreases - u_L increases as D decreases PDO Table with quantities D , u_s , u_L , d and y with appropriate units (allow ecf for units for y) MMO range of D of at least 40.0 cm (60.0 cm to 100.0 cm) PDO all values of D , u_s , u_L , d and y given to the correct number of decimal places and significant figures. D (1 dp) u_s (1dp) u_L (1dp) d (1dp) y (3sf) ACE Correct calculation for y	4
3(d)	PDO axes labelled with units and correct orientation (allow ecf for wrong unit in table) PDO suitable scale, not based on 3, 6, 7 etc with plotted data occupying more than half the page in both directions. PDO all points plotted correctly PDO best fit fine line and fine crosses	4
3(e)(i)	ACE Gradient triangle seen that is bigger than <u>half the best fit line</u> and not using the data point ACE correct calculation of gradient with working seen units [cm]	1 1

3(e)(ii)	ACE correct calculation of f to (3sf) with appropriate units [cm] (Accuracy: $15 \text{ cm} \pm 10\% = 13.5 \text{ cm to } 16.5 \text{ cm}$)	1
3(f)	ACE correct description of relationship based on graph drawn explain using of <u>gradient</u> of graph to support their description (y is <u>linearly</u> related to D . The <u>gradient</u> of the graph is constant and positive)	1 1
3(g)	ACE - difficult to visually gauge the position where a clear image is obtained. There is a range of values of u_s and u_L for which the image is focussed. This will affect the calculated value of d and y . - repeat the experiment a few times for the same value of D to identify the sharpest image. Find the average u_s and average u_L .	1 1
3(h)	ACE More than 2 times of focal length ($> 2f$) Answer more than their value of f (in 3(e)(ii)) multiplied by 2 with appropriate units [cm]	1