2021 PRELIMINARY EXAMINATION EOC PHYSICS

ANSWER SCHEME

Question	Answer	Marks
1(a)(i)	**MMO** L = 2.1 ± 0.1 cm	1
1(b)(i)	**MMO** L_1 = 6.1 ± 0.1 cm **ACE** $e = L_1 - L$ = 4.0 cm (1 d.p)	1
1(b)(ii)	**ACE** $T = ke$ = 0.25 x 4.0 = 1.0 N (2 s.f)	1
1(c)(i)	**MMO** x = 60.0 cm y = 40.0 cm z = 80.0 cm	1
1(c)(ii)	**ACE** Correct calculation of W_R with unit i.e. W_R = 0.50 N	1
1(d)	**P** correct constant **and** independent variable change the distance x where the mass W is hanged measure extension e (dependent) variable and does appropriate calculation. Calculate upward force $T = ke$ plots graph of T vs x W_R correctly related to graph i.e. y-intercept	5

2(a)(i)	**MMO** V_o = 2.30 ± 0.2 V	**1**
2(a)(ii)	**MMO** I = 0.24 ± 0.02 A	**1**
2(b)(i)	**ACE** Arrangement of resistors in series	**1**
2(b)(ii)	**ACE** Arrangement of resistors in parallel	**1**
2(c)(i)	**MMO** I = 0.12 ± 0.02 A V = 0.40 ± 0.2 V	**1**
2(c)(ii)	**MMO** I = 0.22 ± 0.02 A V = 2.00 ± 0.2 V	**1**
2(c)(iii)	**PDO** When R increases, values of I decreases (correct to 0.01 A) When R increases, values of V decreases (correct to 0.05 V) Arrangement of resistors tally with value of combine resistance	**1** **1** **1**
2(d)	**ACE** Small change of V in experiment will not be detected using voltmeter that gives readings to 0.1 V only	**1**
3(a)	**MMO** d = 1.3 ± 0.2 cm	**1**
3(c)(i)	**MMO** v = 82.0 ± 0.2 cm	**1**

3(c)(i)	**MMO** D = 5.7 ± 0.2 cm	**1**
	ACE Correct calculation for average diameter D with unit	**1**
3(c)(iii)	**ACE** ● Take a <u>few readings of D</u> with <u>different orientations</u> ● <u>Average</u> the readings of D	**2**
3(c)(iv)	**ACE** Correct calculation of m i.e. m = 4.4 (2 s.f)	**1**
3(d)	**PDO** Correctly labelled tables with units i.e. *x, v, D, m* At least 6 sets of data Degree of accuracy for *v, D* and *m*	**1** **1** **3**
3(e)	**PDO** Correctly labelled axes Scaling of graph Correctly plotted points (all correctly plotted points – 2, only one incorrectly plotted point – 1) Drawing of best-fit line	**1** **1** **2** **1**
3(f)(i)	**ACE** Working for gradient Correct calculation of G (3 s.f)	**2**
3(f)(ii)	**ACE** Correct calculation of $1/G$ i.e. $1/G$ = 18.0 ± 2.0 (3 s.f)	**1**

Note:

MMO – Manipulation, Measurement and Observation
PDO – Presentation of Data and Observation
ACE – Analysis, Conclusions and Evaluation
P - Planning