Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic : Practical Skills

Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Mark Schemes

Q1.

Question Number	Acceptable answers	Additional guidance		Mark
	C	Most alpha particles go straight through.	The atom is mainly empty space.	1
	A the observation is incorrect B the observation is incorrect D the observation is correct but this is not the corresponding conclusion			

Q2.

Question Number	Acceptable Answer	Additional Guidance	Mark
	• No of divisions read from oscilloscope trace (1) • Use of time base setting (1) • Use of $f = 1/T$ (1) • Use of $v = f\lambda$ (1) • $v = 340\ \text{m s}^{-1}$ (1)	MP1: Must be for a recognised part of wave Example of calculation $T = 3 \times 0.20 \times 10^{-3}\ \text{s} = 6.0 \times 10^{-4}\ \text{s}$ $f = \frac{1}{6.0 \times 10^{-4}\ \text{s}} = 1.67 \times 10^{3}\ \text{Hz}$ $v = 1.67 \times 10^{3}\ \text{s}^{-1} \times 0.205\ \text{m} = 342\ \text{m s}^{-1}$	5

Q3.

Question Number	Acceptable Answer		Additional Guidance	Mark
(i)	• Use of y-sensitivity value • $V_0 = 4.0$ V	(1) (1)	Example of calculation: $V_0 = 2 \times 2.0\ V = 4.0$ V	2
(ii)	• Use of $I = \frac{V}{R}$ • Use of $I_{rms} = \frac{I_0}{\sqrt{2}}$ **Or** use of $V_{rms} = \frac{V_0}{\sqrt{2}}$ • $I_{rms} = 0.019$ A ECF from(i)	(1) (1) (1)	Example of calculation $I_0 = \frac{4.0\text{ V}}{150\ \Omega} = 0.0267$ A $I_{rms} = \frac{0.0267\text{ A}}{\sqrt{2}} = 0.0189$ A	3
(iii)	• Use of $R = R_1 + R_2$ • Use of $P = I^2R$ (or other valid power equation) • $P = 0.096$ W ECF from(i) and (ii)	(1) (1) (1)	Example of calculation: $R = 150\ \Omega + 120\ \Omega = 270\ \Omega$ $P = I^2R$ $= (0.019\text{ A})^2$ $\times 270\ \Omega = 0.0964$ A	3

Q4.

Question Number	Acceptable Answer		Additional Guidance	Mark
	Any **TWO** from: • Should have used (a fiducial mark as) a reference point • Should have timed from the equilibrium position of the bob **Or** Shouldn't time from the maximum displaced position of the bob • Only timed one oscillation **Or** should have times more than one oscillation • Should have allowed the pendulum to swing to and fro a few times before starting to time (as the first swing may be different from the others)	(1) (1) (1) (1)	Accept centre/vertical/undisplaced position for equilibrium position	2

Q5.

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)	• Use of $T = 2\pi\sqrt{\frac{L}{g}}$ (1) • $L = 0.994\,\text{m}$ (1)	Example of calculation: $L = \frac{(2.00\,\text{s})^2 \times 9.81\,\text{m s}^{-2}}{4\pi^2} = 0.994\,\text{m}$	2

Question Number	Acceptable Answer	Additional Guidance	Mark
(b)	A description that makes reference to the following points: • Record nT (where n is at least 5) **and** divide by n (to find T) (1) • Time oscillations from equilibrium position of bob using a (fiducial) marker **Or** repeats timings for multiple oscillations and calculate mean (1)		2

Question Number	Acceptable Answer	Additional Guidance	Mark
(c)	• Using the stopwatch there would be reaction time (1) • The uncertainty in the measurement of the time is larger with the stopwatch than with the data logger. (1) • Timing multiple swings (with stopwatch) reduces %U (1) • Light gates are difficult to use with a pendulum bob. (1)	MP2 dependent on MP1	4