Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic: Further Mechanics

Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Mark Schemes

Q1.

(a) (i) toward B

B1 **1**

(ii) 15 × 0.20 = 3 mm

B1 **1**

(b) (i) period = 0.8 s

C1

use of T = $2\pi\sqrt{L/g}$

C1

0.16 (0.159) m

A1 **3**

(ii) lower initial displacement

B1

lower inertia/more likely to begin moving as the Earth moves

B1

no effect

B1

period of a simple pendulum is independent of the mass of the bob/mass of bob is not in the formula for the period of a simple pendulum/period only depends on length (and *g*)

B1 **4**

(c) (i) clearly states consistency of ratios of successive amplitudes as the test

B1

one ratio of successive amplitudes correctly determined

B1

two ratios correctly determined and conclusion

B1

3

(ii) the oscillations are damped/air resistance mentioned/friction of pen against paper

B1

energy is lost because of air resistance/work is done against air resistance/energy lost moving air out of the way/giving air kinetic energy

B1

2

(iii) it will come to rest quicker

M1

the bob loses a greater proportion of its energy during each oscillation

A1

2

or pendulum has lower inertia so damping force has greater effect

or oscillating pendulum (initially) has less energy

or air resistance (initially) is unchanged

[16]

Q2.

(a) (i) acceleration (not *a*) and displacement (not *x*) are in opposite directions OR restoring force/acceleration always acts toward rest position

B1

1

(ii) (+) sine curve consistent with *a* graph

B1

1

(b) (i) statement that $E_K = E_P$

B1

statement of max values considered

B1

$E_P = ½\ k(\Delta l)^2$ or $E_{Pmax} = ½\ kA^2$

B1

correctly substituted values

B1

$E_K = 3.7 \times 10^{-2}$ J

B1

OR
$f = 1/T$ or $T = 3.97$ s or period equation

B1

leading to $f = 0.252$ Hz

B1

$\omega_{max} = 1.58$ rad s^{-1} or $v_{max} = 0.055 ms^{-1}$ (seen or used)

B1

substituted values into $E_K = ½mA^2\omega^2$ or $E_K = ½mv^2$

B1

$E_K = 3.7 \times 10^{-2}$ J

B1

5

(ii) any attenuation from $t = 0$ seen

M1

10 mJ or $E_0/4$ at either 4s or third hump

M1

consistent period values minima at 1 and 3s
maxima at 0 and 4s

A1

3

[10]