

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

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Mark Schemes

Q1.

- (a) force / acceleration proportional to displacement / distance from mean position
directed towards mean / fixed position
B1
B1
(2)
- (b) (i) 0.96 s to 0.98 s
B1
(1)
- (ii) 1.02 Hz to 1.04 Hz e.c.f. 1 / (i)
B1
(1)
- (iii) $T = 2\pi\sqrt{m/k}$ or $m = T^2k / 4\pi^2$ in symbols or numbers, seen or used
98 kg to 102 kg e.c.f. $10^6 \times (i)^2$
C1
A1
(2)
- (iv) $a = (-)\omega^2 A$
1.03 m s⁻² to 1.07 m s⁻² e.c.f. 0.99(ii)²
C1
A1
(2)
- (c) time period (of oscillation caused by road markings) = s/v or 1.2 / 7 or 0.17 s
frequency = $1/T$ or 5.8 Hz
(use of $v = f\lambda$ loses both of the 1st two marks)
applied frequency / time period is different from natural / resonant frequency so no resonance
C1
A1
B1
(3)
- (d) (i) KE at P
PE at Q
at R, (nearly all of) energy absorbed by shock absorber / dissipated as internal energy (condone heat) in shock absorber / surroundings (allow lost in damping)
B1
B1
B1
(3)

(ii) energy proportional to (amplitude)²

C1

at **P**, $A = 2.5$;

at t , $A = 1.0$ or 0.9

C1

$5.3 / 6.3 = 0.84$ of energy absorbed at t (or 0.90 , consistent with value of A at t)

A1

(3)

[17]