Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Mark Schemes

Q1.

(a) (resultant) force = mass × acceleration
allow F = ma
symbols must be correct
1

(b) (2.7 – 1.5) = 0.75 × a
*an answer of 1.6 scores **3** marks*
1

$a = \frac{1.2}{0.75}$
allow compensation marks for correct use of incorrect resultant force
1

a = 1.6
1

m/s^2
1

(c) transverse
1

the oscillation / vibration is perpendicular to the direction of energy transfer
allow wave travel for energy transfer
1

(d) use springs with a smaller spring constant
allow use weaker springs

or
use a trolley with greater mass
allow use a heavier trolley
do not accept use a larger trolley
allow add a mass / weight to the trolley
1

(Total 8 marks)

Q2.

(a) double
1

(b) the hypothesis does not say how increasing / decreasing the force increases / decreases the acceleration

1

(c) appropriate equipment to apply and measure force

*eg newtonmeter **or** slotted masses + string + pulley*

1

appropriate equipment to measure change in velocity and time

*eg ticker timer + tape **or** light gates + datalogger*

1

(d) to reduce the effect of friction on the trolley

1

(e)

Level 3: The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.	5-6
Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the plan is not fully logically sequenced.	3-4
Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.	1-2
No relevant content	0
Indicative content • method by which the trolley is to be accelerated • how the accelerating force is varied to give a suitable range of results • how the accelerating force is measured • the use of suitable apparatus to measure the change in velocity of the trolley over a given distance or time • what data is to be collected in order to calculate acceleration • how the data required is to be measured	

6

(f) so that the mass is constant

fair test is insufficient

1

as changing mass would change the acceleration (produced by a given force)

or

so there is only one independent variable

1

(f) hypothesis A because

***A** must be identified to gain either mark*

1

the results give a straight line that passes through the origin

showing direct proportionality

1

[15]