

Subtopic: Acceleration

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Q1.(2018)

a)

uniform acceleration

b)

up(wards)

c)

a group of objects that interact

d)

velocity just after bounce is less
than just before bounce

or

the height at the top of the
bounce is less than the height
from which it was dropped

so the ball has lost energy

correct reference to (loss of) ke
or (reduced) gpe

total energy of ball and Earth /
ground is constant

Q2.(2020)

a)

Move the wooden block to the
left.

b)

use a pulley (on the edge of the
bench)

c)

suitable scale

points plotted correctly

line of best fit

d)

(directly) proportional

e)

repeat the
measurements/investigation

ignore anomalies **and** calculate
the mean / average

f)

resultant force = mass $\times$
acceleration

or

$$F = m a$$

g)

$$0.375 = 0.60 \times a$$

$$a = \frac{0.375}{0.60}$$

$$a = 0.625 \text{ (m/s}^2\text{)}$$

$$a = 0.63 \text{ (m/s}^2\text{)}$$

Q3.(2024)

a)

$$\left(\frac{1}{2} \times 56 \times 220\right) = 6160$$

$$(56 \times 380) = 21280$$

$$(6160 + 21280) = 27\,440 \text{ (m)}$$

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b)

the gradient is less after 720 s

so the deceleration is smaller

so the braking force is smaller

c)

correct section of line identified

attempt to calculate a gradient
using values from the correct
section of the graph

eg

$$\text{gradient} = \frac{(-)36}{120}$$

correct calculation using their
correct values

$$\text{eg } a = (-)0.3 \text{ (m/s}^2\text{)}$$

d)

$$(-)270\,000 = 240\,000 \times a$$

$$a = \frac{(-)270\,000}{240\,000}$$

$$a = (-) 1.125 \text{ (m/s}^2\text{)}$$

$$0 = 60^2 + (2 \times (-1.125) \times s)$$

$$s = \frac{3600}{2.25}$$

$$s = 1600 \text{ (m)}$$

OR

$$E_k = \frac{1}{2} \times 240\,000 \times 60^2 \quad (1)$$

$$= 432\,000\,000 \quad (1)$$

$$\Delta E_k = \text{work done} \quad (1)$$

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$$432\,000\,000 = 270\,000 \times s \quad (1)$$

$$s = \frac{432\,000\,000}{270\,000} \quad (1)$$

$$s = 1600 \text{ (m)} \quad (1)$$

OR

$$p = 240\,000 \times 60 (= 14\,400\,000) \quad (1)$$

$$270\,000 = \frac{14\,400\,000}{t} \quad (1)$$

$$t = 53.333\dots(\text{s}) \quad (1)$$

$$\text{mean speed} = \frac{60}{2} = 30 \quad (1)$$

$$s = 30 \times 53.333\dots \quad (1)$$

$$s = 1600 \text{ (m)} \quad (1)$$

e)

stopping distance includes both
braking distance and thinking
distance

alcohol increases driver's
reaction time

which will increase the thinking
distance so stopping distance
increases