

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Mark Schemes

Q1.

(a) $v^2 - 3.1^2 = 2 \times 9.8 \times 6.3$

1

$$v = \sqrt{(3.1^2 + (2 \times 9.8 \times 6.3))}$$

$$\text{allow } v^2 = 3.1^2 + (2 \times 9.8 \times 6.3)$$

1

$$v = 11.5\dots$$

1

$$v = 12 \text{ (m/s)}$$

this mark can only be awarded if the correct equation is used and a value of v is calculated

1

(b) (magnitude) increases (uniformly)

1

direction remains constant

1

(c) drag is greater than weight

allow upward force is greater than downward force

1

(so) there is a resultant force acting in the opposite direction to the velocity
(causing deceleration)

1

as velocity decreases the drag decreases

1

(until) drag is equal to weight (so velocity is constant)

*allow until the resultant force is zero**ignore upthrust*

1

*allow resistive / frictional force for drag throughout***[10]****Q2.**

(a)
$$a = \frac{26 - 0}{5.25 - 2.0}$$

allow any pair of correct points substituted
allow $\pm$ half a small square for reading of time

1

$$a = 8$$

allow 8.0

allow a correct calculation using their acceptable values
from the graph

ignore any minus sign

1

$$\text{m/s}^2$$

1

(b) **thinking distance**

$$s = 26 \times 0.75$$

to award MP1 and MP2 a time of 0.75 must have been
used

1

$$s = 19.5 \text{ (m)}$$

1

braking distance

$$s = \frac{(5.25 - 2.0) \times 26}{2}$$

or

$$s = \frac{26^2 - 0^2}{2 \times 8.0}$$

allow a range of 5.2 to 5.3 for final time

1

$$s = 42.25 \text{ (m)}$$

1

marks for thinking distance and braking distance may be
awarded independently

stopping distance

$$s = 19.5 + 42.25 = 61.75 \text{ (m)}$$

for this mark to be awarded both the thinking distance and
braking distance must have been calculated using correct
equations

allow an answer correctly rounded to 2 or 3 sig figs

1

allow ecf for acceleration and initial velocity from part (a)

(c) the brakes can overheat

1

(so) the brakes will not work properly
dependent on MP1

OR

can lead to loss of control (1)
allow the car may skid

(because) the tyres lose traction / grip (1)
dependent on MP1

OR

the greater the deceleration the greater the force (1)

(and) large forces can cause injury (1)
dependent on MP1
ignore accidents and crashes throughout

1

[10]