Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Mark Schemes

Q1.

(a) there is a resultant force acting
allow weight/gravity is greater than air resistance
allow (initially) weight/gravity is the only force acting
1

(b) as the velocity of the hailstone increases air resistance increases
allow speed for velocity
1

until air resistance becomes equal to the weight of the hailstone
1

so the resultant force is (equal to) zero
1

(c) as mass increases the weight of a hailstone increases
1

(d) kinetic energy depends on both mass and velocity
allow $E_k = ½ mv^2$
1

as mass increases so does terminal / maximum velocity
a statement is required
1

kinetic energy ∝ m and kinetic energy ∝ v^2 so as mass doubles kinetic energy more than doubles
this mark can be scored by relevant calculations
1

(e) 1 N m
1

(f) mass = 0.0185 (kg)
allow 0.018 to 0.019 inclusive
1

$$F = \frac{0.0185 \times 25}{0.060}$$

allow a correct substitution using an incorrectly / not converted value of m
1

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F = 7.708 (N)

allow 7.7 (N)

allow correct calculation using an incorrectly / not converted value of m

1

if no other marks are awarded

a misreading of the scale giving a value between 15.6 and 15.7 inclusive that is then correctly converted giving an answer between 6.50 and 6.54 scores 2 marks

a misreading of the scale giving a value between 15.6 and 15.7 inclusive that is then not converted giving an answer between 6500 and 6542 scores 1 mark

[12]

Q2.

(a) the point at which weight may be considered to act

allow the point through which the line of action of the weight acts

or

the point where the mass appears to be concentrated

allow the point at which the mass is concentrated

1

(b) mass of 5 tomatoes = 0.425 (kg)

1

mass of 1 tomato = 0.085 (kg)

allow an incorrect and / or not converted reading correctly divided by 5

1

W = (0.085 × 9.8) = 0.833 (N)

allow a correct calculation using their value of mass

1

(c) 6.0 = k × 0.015

1

$$k = \frac{6.0}{0.015}$$

allow correct rearrangement using an incorrectly <u>calculated</u> value of e

1

k = 400 (N/m)

allow a correct calculation using an incorrectly <u>calculated</u> value of e

1

(d) deforms elastically

1

(so) will return to its original length / shape (after force is removed)

OR

compression is directly proportional to the force (applied) (1)

(so) gives a linear scale (1)

allow easy to calibrate

1

[9]

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