Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) (i) $0.15 \times 0.08 = 0.012$

1

(ii) kg m/s

1

(iii) equal to

1

(b) momentum of the air increases
or
force backwards increases
accept air moves faster
accept momentum backwards increases
accept pushes more air back(wards)

1

so momentum of the toy must increase
or
the force forwards (on the toy) increases
accept momentum forwards must increase
it = toy

1

[5]

Q2.

(a) starting / stopping the stopwatch
human error is insufficient
reaction time is insufficient

or
timing over the smaller distances
accept not timing accurately
do not accept references to measuring distance incorrectly

1

(b) (i) before

1

(ii) increasing
accept accelerating
it is not constant is insufficient

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it is less than after four seconds is insufficient
it reaches a constant speed negates

1

(iii) calculate the gradient of the straight/steepest/constant section
accept gradient of any section after 5.5 seconds/30 cm

1

(iv) drag (force) increases (as the ball bearing gets faster)
accept frictional/upward force for drag

1

(until) drag (force) = weight
or
(until) resultant force is zero
accept upward force = downward force
accept till forces are balanced

1

(c) less than

1

ball bearing increases speed at a greater rate
accept it travels the same distance in less time

or
ball bearing has a greater acceleration
accept the ball bearing is going faster

or
terminal velocity has not been reached

1

so resultant force must be greater
or
as weight is the same (the drag must be less)
accept warmer oil has a lower density/viscosity for 1 mark if neither of the two reason marks score

1

[9]

Q3.

(a) 2 protons and 2 neutrons
accept 2p and 2n
accept (the same as a) helium <u>nucleus</u>
symbol is insufficient
do not accept 2 protons and neutrons

1

(b) (i) gamma rays

1

(ii) loses/gains (one or more) <u>electron(s)</u>

1

(c) any **one** from:

- wear protective clothing

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- work behind lead/concrete/glass shielding
- limit time of exposure
- use remote handling

accept wear mask/gloves

wear goggles is insufficient

wear protective equipment/gear is insufficient

accept wear a film badge

accept handle with (long) tongs

accept maintain a safe distance

accept avoid direct contact

1

[4]

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