

M1. (a) D 1

(b) C 1

(c) $W = 300 \times 45$ 1

$W = 13\,500$ 1

allow 13 500 with no working shown for 2 marks

(d) straight line drawn from 13 m / s to 0 m / s 1

finishing on x-axis at 65 s 1

[6]

##

- (a) (i) plasticine stretches/snaps
stays stretched/snapped
for 1 mark each 2
- (ii) spring compresses OWTTE
returns to **original** length/shape or gets longer
for 1 mark each 2
- (iii) ruler bends/breaks
returns to original shape or stays broken
for 1 mark each 2
- (b) (i) 1.5N
for 1 mark 1
- (ii) 4 cm
for 1 mark 1
- (iii) 19 cm
for 1 mark 1

[9]

M3. (a) B

more aerodynamic **or** most streamlined shape **or**
smaller (surface) area

*accept less air/wind resistance **or** less drag **or** less friction
clothing traps less air **or** rolled up into ball **or** arms, legs
drawn in*

accept converse

2

(b) (i) gravity

1

(ii) air resistance

1

(iii) go up

1

(iv) stays the same

1

(c) bigger the area, the bigger force Y

accept the converse

or bigger the area more drag

accept when the parachute opens then force Y bigger

or bigger the area more air resistance

need the relation of area to force

1

[7]

M4. (a) (i) friction

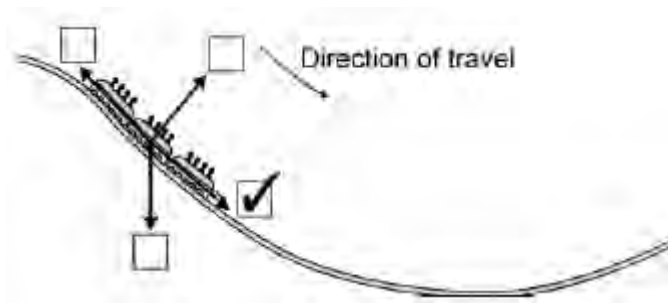
- accept any way of indicating the correct answer* 1
- (ii) gravity
accept any way of indicating the correct answer 1
- (b) (i) accelerates **or** speed / velocity increases
accept faster and faster (1 mark)
*do **not** accept faster pace / falls faster*
or suggestions of a greater but constant speed 1
- downwards / falls
accept towards the Earth / ground
this may score in part (b)(ii) if it does not score here and
there is no contradiction between the two parts 1
- (ii) constant speed / velocity **or** terminal velocity / speed or zero acceleration
stays in the same place negates credit 1

[5]

- M5. (a) (i) 0.6
allow 1 mark for correct substitution 2
- newtons
accept N
*do **not** accept n*
accept Newtons 1
- (ii) the same as 1
- (b) (i) changed velocity
accept increased/ decreased for change
accept speed for velocity
accept change direction
accept getting faster/ slower
accept start/ stop moving
accept correct equation in terms of change in speed or
change in velocity 1
- (ii) down(wards)
accept towards the ground
accept ↓
*do **not** accept south* 1

[6]

M6. (a) correct box ticked



1

(b) (i) 30

ignore added units

1

(ii) 2250 **or** their (b)(i) \times 75 correctly calculated

*allow 1 mark for correct substitution ie 75×30 **or** their (b)(i) \times 75 provided no subsequent step shown*

an answer of 750 gains 1 mark only if answer to (b)(i) is 10

2

[4]

M7. (a) (i) 50 (N)

ignore any units

1

(ii) resultant force

1

(iii) 4000

accept their (a)(i) \times 80 correctly calculated for 2 marks

allow 1 mark for correct substitution i.e. 50×80 or their (a)(i) \times 80

ignore any units

2

(b) (i) joule

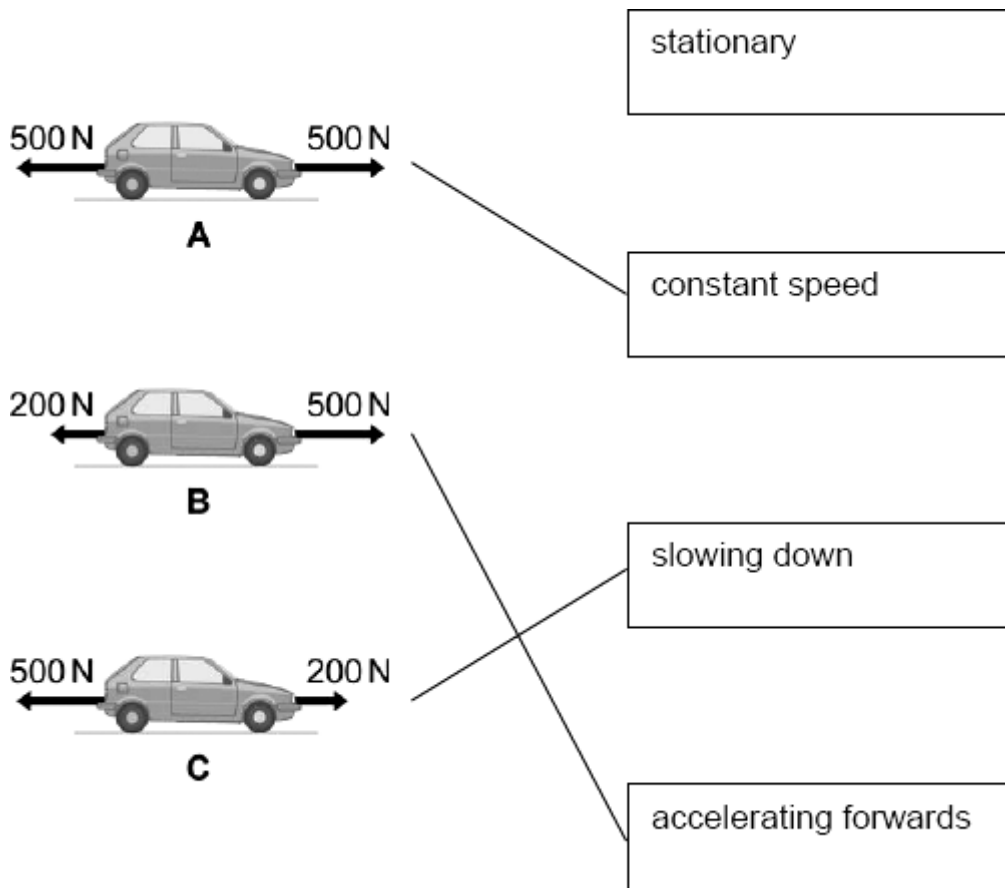
1

(ii) heat

1

[6]

- M8.(a)** 3 lines drawn
 all correct
 allow 1 mark for each correct line
 if two or more lines are drawn from any diagram then all these lines are incorrect



3

- (b) (i) horizontal arrow to the right
judge by eye
accept an arrow drawn outside the box if it is labelled correctly

1

- (ii) horizontal arrow to the left
judge by eye
accept an arrow drawn outside the box if it is labelled correctly

1

- (iii) equal to

1

(iv) to measure the forces exerted on the dummy during the impact

1
[7]

M9. (a) 4 N to the right

1

(b) (i) bigger than 1

equal to 1

(ii) reduces it 1

increases air resistance / drag / force C
accept parachute has large(r) (surface) area 1

[5]

M10. (a) (i) electrons 1

a positive 1

(ii) (forces are) equal
accept (forces are)the same
forces are balanced is insufficient 1

(forces act in) opposite directions
accept (forces) repel
both sides have the same charge is insufficient 1

(b) aluminium 1

