TERMINAL VELOCITY MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	gravity	accept weight do not accept mass accept gravitational pull	1
b)i	Initially force L greater than force M (as speed increases) force M increases when M = L, (speed is constant)	accept there is a resultant force downwards accept the resultant force decreases accept resultant force is 0 accept gravity/weighty for L accept drag/ upthrust/ resistance/friction for M do not accept air resistance for M but penalise only once	1 1 1
b)ii)	terminal velocity		1
b)iii)	0.15	accept an answer between 0.14 – 0.16 an answer of 0.1 gains no credit allow 1 mark for showing correct use of the graph	2
Total marks			7

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	750 newton(s) / N		2+1
b)			

0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content.	There is a brief attempt to explain why the velocity / speed of the parachutist changes. **or** the effect of opening the parachute on velocity/speed is given.	The change in velocity/ speed is clearly explained in terms of force(s) **or** a reasoned argument for the open parachute producing a lower speed.	There is a clear and detailed explanation as to why the parachutist reaches terminal velocity **and** a reasoned argument for the open parachute producing a lower speed

examples of the physics points made
in the response to explain first terminal
velocity
• on leaving the plane the only force
acting is weight (downwards)

or
       resistance
resultant force downwards

•   (resultant force downwards) so parachutist accelerates

•   as velocity / speed increases so does air resistance

• terminal velocity reached when   accept terminal velocity
air resistance = weight   reached when forces are
      balanced

to explain second lower terminal
velocity

•   opening parachute increases surface area
•   opening parachute increases air resistance
•   air resistance is greater than weight

•   resultant force acts upwards / opposite direction to motion

•   parachutist decelerates / slows down

•   the lower velocity means a reduced air resistance
•   air resistance and weight become equal but at a lower (terminal) velocity

c)i)	any one from: • mass/weight of the (modelling) clay • material parachute made from • number / length of strings	accept size/amount/volume/ shape of clay accept plasticine for (modelling) clay accept same (plastic) bag	1
c)ii)	C smallest (area) so falls fastest (so taking least time)	reason only scores if C is chosen accept quickest/quicker for fastest if A is chosen with the reason given as 'the largest area so falls slowest' this gains 1 mark	1 1
Total marks			12

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	4 N to the right		1
b)i)	bigger than equal to		1 1
b)ii)	reduces it increases air resistance / drag / force C		1 1
Total marks			5