

- M1.** (a) Third Law 1
- (b) elastic potential 1
- (c) weight = mass \times gravitational field strength
accept gravity for gravitational field strength 1
- accept $W = mg$*
accept correct rearrangement ie mass = weight /
gravitational field strength or $m = W / g$
- (d) $343 = m \times 9.8$ 1
- $m = \frac{343}{9.8}$
- $m = 35$ 1
- allow 35 with no working shown for 3 marks*
- (e) force = spring constant \times compression
accept force = spring constant \times extension
accept $F = k e$
accept correct rearrangement ie constant = force / extension
or $k = F / e$ 1
- (f) compression = 0.07m 1

$$343 = k \times 0.07$$

1

$$k = 343 \div 0.07$$

1

$$k = 4900$$

1

allow 4900 with no working shown for 4 marks

allow 49 with no working shown for 3 marks

[11]

- M2. (a) A** constant speed / velocity
accept steady pace
*do **not** accept terminal velocity*
*do **not** accept stationary* 1
- B** acceleration
accept speeding up 1
- C** deceleration
accept slowing down
accept accelerating backwards
accept accelerating in reverse
*do **not** accept decelerating backwards* 1
- (b) (i) the distance the car travels under the braking force
accept braking distance 1
- (ii) speed/velocity/momentum 1
- (c) (i) 5000 (N) to the left
both required
accept 5000(N) with the direction indicated by an arrow drawn pointing to the left
accept 5000(N) in the opposite direction to the force of the car (on the barrier)
accept 5000(N) towards the car 1
- (ii) to measure/detect forces exerted (on dummy / driver during the collision) 1

(iii) 4

allow 1 mark for showing a triangle drawn on the straight part of the graph

or *correct use of two pairs of coordinates*

2

m/s²

do not accept mps²

1

[10]