

Forces and Elasticity

Mark Scheme

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Physics
Exam Board	AQA
Topic	6.5 Forces
Sub-Topic	Forces and Elasticity
Difficulty Level	Bronze Level
Booklet	Mark Scheme

Time Allowed: 47 minutes

Score: /46

Percentage: /100

Grade Boundaries:

M1.(a)	5.5 (N)	1
(b)	The spring gets shorter	1
(c)	<p>Level 2 (3–4 marks): A detailed and coherent description of the experiment. The response provides a logical sequence.</p> <p>Level 1 (1–2 marks): Simple description of the experiment with some steps missing. The response may not be in a logical sequence and may not lead to the collection of valid results.</p> <p>0 marks: No relevant content.</p> <p>Indicative content</p> <ul style="list-style-type: none">• set up a clamp stand with a clamp and hang a spring on it• use another clamp and boss to fix a half metre rule alongside the spring• record the metre rule reading that is level with the bottom of the spring• hang a weight from the bottom of the spring• record the new reading on the rule and the extension on the spring• remove the weight and check the length of the spring• repeat by adding more weights and record the readings on the rule	4
(d)	Use a pointer from the spring to measure the length.	1
	Make sure the spring is stationary before measuring length.	1
(e)	Extension is directly proportional to force <i>if more than one box ticked apply list principle</i>	1

(f) 0.5 (N)

1

(g) 0.100 m

*if more than **one** box ticked apply list principle*

1

(h) $0.5 \times 20 \times (0.050)^2$

1

= 0.025 (J)

1

allow 0.025 (J) with no working for 2 marks

[13]

M2.(a)

	contact	non-contact
Electrostatic		✓
Friction	✓	
Gravity		✓

one mark for each correct tick

3

(b) Velocity

1

Displacement

1

(c) Use a pointer from the spring to measure the length 1

(d) $25 \text{ g} = 0.025 \text{ kg}$ 1

weight = 0.025×9.8 1

= 0.25 (N) 1

allow 0.25 with no working shown for 3 marks

(e) Extension is directly proportional to force 1

(f) 1.125 (N)
allow values between 1.12 and 1.15 1

(g) elastic potential energy = $0.5 \times 13.5 \times (0.12)^2$ 1

= 0.097 (J)
allow 0.097 with no working shown for 2 marks 1

[13]

M3. (a) **B** or bungee cords 1

C or springs or playground ride

each additional answer loses 1 mark minimum mark zero

1

will go back to original shape/size

1

(b) (i) newton

1

(ii) 0 – 5 (N) or 5
accept 1 – 5 (N)
*do **not** accept 4*

1

(iii) 16 (cm)

1

(iv) 2.5 (N)
accept answer between 2.4 and 2.6 inclusive

1

[7]

##

(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 | | |
| | | <i>for 1 mark</i> | | |
| | | | | 1 |
| | (ii) | 4 cm | | |
| | | <i>for 1 mark</i> | | |
| | | | | 1 |
| | (iii) | 19 cm | | |
| | | <i>for 1 mark</i> | | |
| | | | | 1 |

[9]

- | | | | | |
|------------|-----|--|--|---|
| M5. | (a) | plasticine stretches/snaps | | |
| | | stays stretched/snapped/same | | |
| | | <i>for 1 mark each</i> | | |
| | | | | 2 |
| | (b) | spring compresses OWTTE | | |
| | | returns to original length/gets longer | | |
| | | <i>for 1 mark each</i> | | |
| | | | | 2 |

[4]