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Exam Preparation and Free Resources

Name of the Student:_____

Max. **Marks : 17 Marks**   **Time : 17 Minutes**

Mark Schemes

Q1.

(a)   will return to its original shape/length

1

when the force is removed
allow (when) the child gets off
the second mark is dependent on scoring the first mark

1

(b)   **Level 3:** The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.

5−6

Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.

3−4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1−2

No relevant content

0

Indicative content

- set up a clamp stand with a clamp
- hang the spring from the clamp
- use a second clamp and boss to fix a (half) metre rule alongside the spring
- record the ruler reading that is level with the bottom of the spring
- hang a 1 N / a known weight from the bottom of the spring
- record the new position of the bottom of the spring
- calculate the extension of the spring
- measure the extension of the spring
- add further weights to the spring so the force increases 1 N at a time up to 5 N
- for each new force record the position of the bottom of the spring and calculate / measure the extension

Risk Assessment

Hazard: Clamp (stand, boss and masses) might fall off desk
Risk: injury to feet
Precaution: Use clamp to fix apparatus to the bench **or**
Ensure that the slotted masses hang over the base/foot of the stand **or**
Ensure that the boss is screwed tightly into the stand and clamp **or**
Put (heavy) masses on the base/foot of the stand **or** Stand up so that you can move out

of the way

Hazard: Spring could break / come loose
Risk: damage eye
Precaution: Wear safety goggles

If a risk assessment / hazard is not given, the answer can still reach level 3, but not full marks.

Full marks may be awarded for alternative feasible methods.

(c)   force = spring constant × extension

1

(d)   5.00 0.125

allow any correct pair of values from the graph

1

$$k = \frac{5.00}{0.125}$$

allow a misread value(s) from the graph

1

$k = 40$ (N/m)

allow a correct calculation using their incorrect value(s)

1

(e)   the line is straight

allow the line does not curve
allow a constant gradient

1

and passes through the origin

1

(f) $e = 0.20$ m

1

$E_e = 0.5 \times 13 \times 0.20^2$

allow an incorrectly / not converted value of e

1

$E_e = 0.26$ (J)

use of two incorrectly/not converted values scores a maximum of 1 mark

1

[17]