

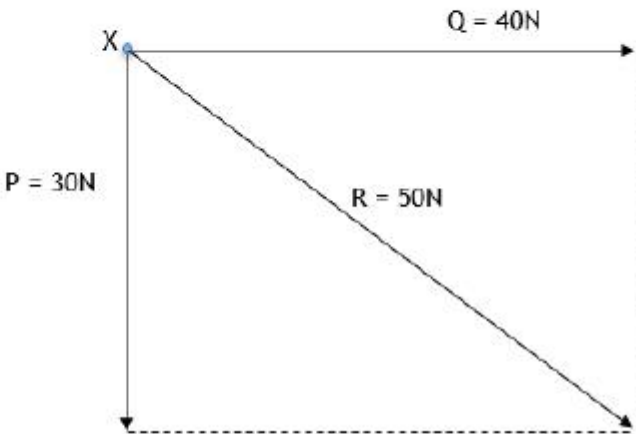
Name of the Student: \_\_\_\_\_

Max. Marks : 19 Marks

Time : 19 Minutes

Mark Schemes

Q1.

| Question number | Answer                                                                                                                             | Additional guidance                                                                                                                                                                                                                                                                                        | Mark                             |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
|                 | <p><b>arrow</b> (any length)<br/>(labelled R) in correct direction<br/>(judge by eye)<br/>(1)</p> <p>(size of R =)<br/>50N (1)</p> | <p>independent marks</p>  <p>construction lines need not be shown<br/>arrow head must be present for MP1</p> <p>accept answers in range 48N to 52N<br/>obtained from scale drawing</p> <p>working need not be shown</p> | <p><b>(2)</b><br/><b>AO1</b></p> |

Q2.

| Question number | Answer                                                                                                                                                                                                                 | Additional guidance                                                                                                            | Mark |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------|
| (i)             | <p>Recall <math>GPE = m \times g \times \Delta h</math> (1)</p> <p>Substitution = <math>400 \times 9.8 \times 1.5</math> (1)</p> <p>Evaluation = 5900 (J) (1)<br/>(which is nearly 6000 J)</p>                         | accept 5880 (J)                                                                                                                | (3)  |
| Question number | Answer                                                                                                                                                                                                                 | Additional guidance                                                                                                            | Mark |
| (ii)            | <p>An explanation that combines identification – knowledge (1 mark) and reasoning (1 mark)</p> <ul style="list-style-type: none"> <li>energy is dissipated/scattered (1)</li> <li>into the surroundings (1)</li> </ul> | <p>energy from a loss of ball's PE / its gain in KE</p> <p>ends up as (kinetic) energy of molecules (of ball / wall / air)</p> | (2)  |
| Question number | Answer                                                                                                                                                                                                                 | Mark                                                                                                                           |      |
| (iii)           | B velocity                                                                                                                                                                                                             | (1)                                                                                                                            |      |

Q3.

| Question number | Answer                                                                                                                                                                    | Additional guidance                                            | Mark |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------|
|                 | <p>An answer that combines the following points of understanding to provide a logical description:</p> <p>named force (acting at a distance) (1)</p> <p>situation (1)</p> | <p>e.g. magnetic</p> <p>force between two (magnetic) poles</p> | (2)  |

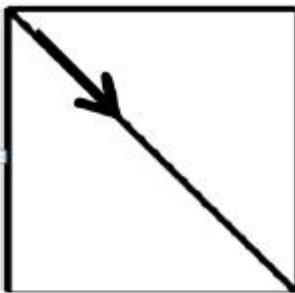
Q4.

| Question number | Answer                                                                                                                                                                                                                                                                                                 | Additional guidance                                                                                                                                                                                                                                  | Mark                                |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|                 | <p>any <b>three</b> from</p> <p>magnetic <b>fields</b> interact (1)</p> <p>(force due to) repulsion (between magnets) (1)</p> <p>(repulsion) force upwards (on upper magnet) (1)</p> <p>weight / gravitational force (downwards on upper magnet) (1)</p> <p>forces equal size / in equilibrium (1)</p> | <p>marks can be awarded from a correctly labelled diagram</p> <p>magnets are in each other's magnetic <b>field</b></p> <p>repel / push away</p> <p>accept gravity (acts downwards)</p> <p>forces are balanced</p> <p>ignore references to charge</p> | <p><b>(3)</b></p> <p><b>AO1</b></p> |

Q5.

| Question number | Answer                                                                        | Additional guidance                                                                                                            | Mark |
|-----------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------|
|                 | (upward) force increases with speed (1)<br><br>relationship is non-linear (1) | allow reverse argument<br><br>changing rate / increases exponentially/ initially no upward force (until 1000 turns per minute) | (2)  |

Q6.

| Question number | Answer                                                                                                                                                                                                                          | Additional guidance                                                                                                                                                                                                                              | Mark |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
|                 | Scale drawing<br><br>two lines at right angles (1)<br><br><br><br><br><br>a correct scaling (for example 10kN equivalent to 1 cm) / a completed square or triangle(1)<br><br>diagonal in correct direction (1)<br><br>28 kN (1) | <br><br>judge by eye<br><br><br>accept answers from 25kN to 30 kN<br><br>accept use of Pythagoras<br><br>award full marks for correct answer without working. | (4)  |