GCSE Physics

Moments

Mark Scheme

Time available: 56 minutes
Marks available: 49 marks

Mark schemes

1.   (a)   moment = 280 × 0.9

               1

           moment = 252

               1

                   *allow 252 with no working shown for **2** marks*
                   *allow 25200 with no working shown for **1** mark*

        (b)   the clockwise moment (of child B) decreases

               1

           making it is less than the anticlockwise moment (of child A)
                 accept so moments are no longer balanced

               1

           so child A moves downwards

           or

           so child B moves upwards

               1

               [5]

2.   (a)   (force on the chain is) smaller (than the force of the toe)

               1

        (b)   Tick in middle box

           The moments are equal and opposite

               1

        (c)   move the toe (up the pedal) away from the pivot

               1

               [3]

3. (a) turning 1

(b) 420

*allow **1** mark for correct substitution, ie 1400 × 0.30 provided no subsequent step shown*

2

(c) **A**

reason only scores if A is chosen

1

any **one** correct reason:
the force is furthest away (from the pivot)

accept distance (from the pivot) is the greatest

accept it is further away (from the pivot)

accept furthest away from the rock

1

[5]

4. (a) 3000

*allow **1** mark for correct substitution, ie 600 × 5 provided no subsequent step*

2

(b) anticlockwise moment

must be both words

1

(c) (i) 3400

allow 3.4 kilo (newtons)

1

(ii) as the distance (of the girl from point A) increases, force F increases

allow gets bigger for increases

force is (directly) proportional to distance will negate any correct response

1

[5]

5. (a) 38 400

*allow 6.4 × 6000 for **1** mark*

2

Nm **or** newton metres

*do **not** credit 'nm', 'mN' or 'metre newtons'*

1

(b)   16 000 (N) **or** 16 <u>k</u>N

>   *allow **1** mark for 38 400 ÷ 2.4*
>   *accept their (a) ÷ 2.4 correctly calculated for **2** marks*
>   *accept their (a) ÷ 2.4 for **1** mark*

2

[5]

6. (a)   960 (Nm)

1

see-saw is in equilibrium

>   *accept see-saw is balanced*
>   *see-saw is stationary is insufficient*

1

(total) clockwise moments = anticlockwise moment

>   *accept no resultant moment*
>   *forces are balanced is insufficient*
>   *an answer clockwise moments balance the anticlockwise moments*
>   *gains **2** marks*

1

(b)   (i)   600 (Nm)

1

        (ii)   375 (N) **or** their (b)(i) ÷ 1.6 correctly calculated

>   *do **not** credit if (b)(i) is larger than 960*
>   *allow **1** mark for correct substitution **and** transformation ie*

$$\frac{600}{1.6} \ or \ \frac{their \ (b)(i)}{1.6}$$

2

[6]

7. (a)   (i)   turning effect

>   *accept turning force*
>   *accept force ✗ distance*
>   *(accept symbols only if correctly defined)*
>   *do **not** accept newtons ✗ metres*

1

        (ii)   stop apparatus falling over

>   *accept holds the stand in place*
>   *accept make it safer / stable*
>   *references to balanced / equilibrium are insufficient*

1

(iii)   as x increases y increases   **1**

in same proportion / ratios
   allow both marks for they are <u>directly</u> proportional
   or
   a specific example eg doubling y, doubles x
   allow both marks for a correct answer giving figures
   eg they increase in the ratio of 1 to 7
   *allow for **1** mark positive correlation*

                                                                          1

(iv)   the centre of mass of the ruler is at the axis of rotation   **1**

                                                                          1

(b)   108
      *allow **1** mark for correct substitution ie 240 × 0.45*

                                                                          2

newton metres / Nm
   symbols must be correct
   for full credit the unit must be consistent with the numerical answer

                                                                          1

                                                                          [8]

8.   300
         *allow **1** mark for rearranging equation **or** correct substitution*

                                                                          [2]

9.   (a)   **A**
                                                                          1

(perpendicular) distance between the camera and pivot is greatest
                                                                          1

(b)   increases
                                                                          1

(c)   5.0 × 9.8
      *an answer of 49 scores **2** marks*
                                                                          1

49
                                                                          1

newton
   allow N
                                                                          1

(d)   moment (of a force) = force × distance
      allow M = Fd
                                                                          1

(e)   144 cm = 1.44 m

*an answer of 70.56 scores **3** marks*

*an answer of 71 scores **3** marks*

1

moment = 49 × 1.44

allow ecf from part (c)

1

moment = 70.56

*answers of 7056 or 7100 score **2** marks*

1

[10]