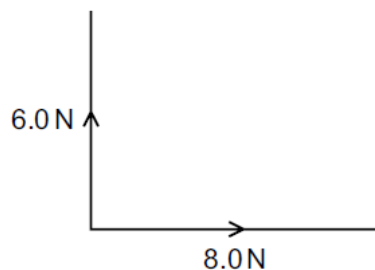


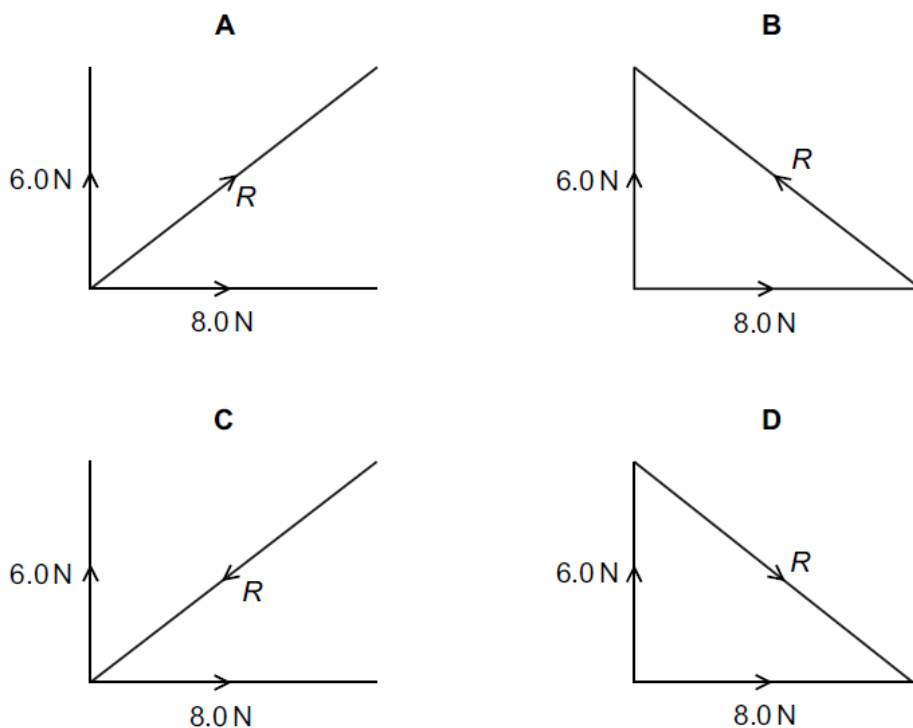
**Forces – 2023 June O Level 5054**

**1. June/2023/Paper\_5054/11/No.3**

Forces of 6.0 N and 8.0 N act as shown.

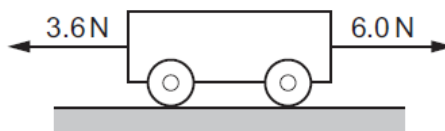


Which diagram shows the resultant  $R$  of these two forces?



**2. June/2023/Paper\_5054/11/No.7**

The diagram shows the only two horizontal forces acting on a trolley that is accelerating at  $0.12 \text{ m/s}^2$ .



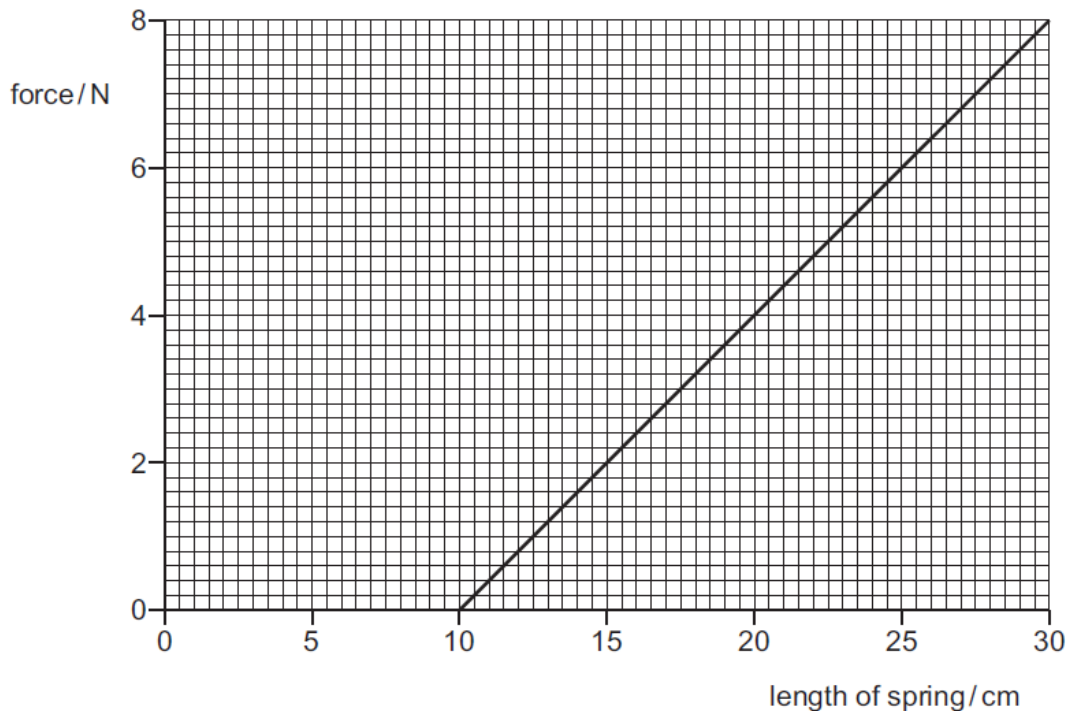
What is the mass of the trolley?

- A** 0.050 kg      **B** 0.13 kg      **C** 20 kg      **D** 80 kg

3. June/2023/Paper\_5054/11/No.8

A spring is stretched to different lengths by a variable force.

The graph shows how the size of the force depends on the length to which the spring is stretched.

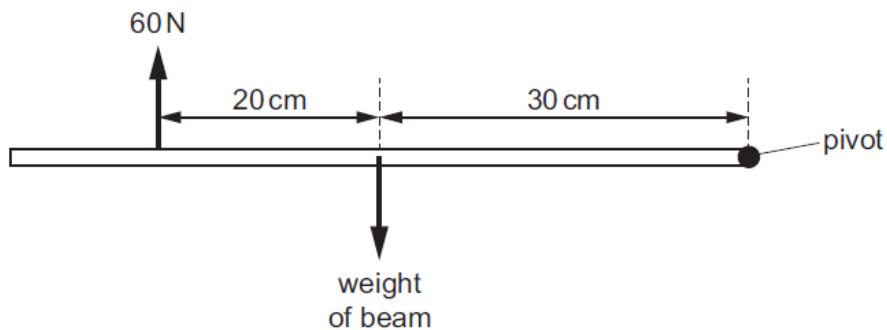


What is the spring constant  $k$  of the spring?

- A 0.27 N/cm    B 0.40 N/cm    C 2.5 N/cm    D 3.8 N/cm

4. June/2023/Paper\_5054/11/No.9

A uniform horizontal beam, pivoted at its right-hand end, is in equilibrium. A force of 60 N acts vertically upwards on the beam as shown.

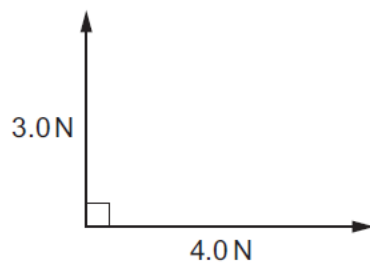


What is the weight of the beam?

- A 36 N    B 40 N    C 90 N    D 100 N

5. June/2023/Paper\_5054/12/No.3

What is the size of the resultant of the two forces shown?



- A** 1.0 N      **B** 3.5 N      **C** 5.0 N      **D** 7.0 N

6. June/2023/Paper\_5054/12/No.8

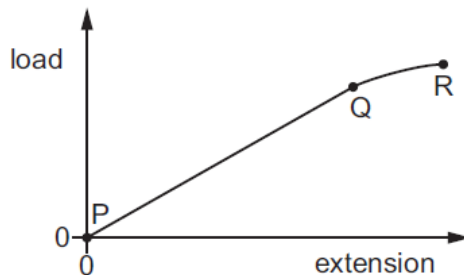
Newton's third law describes a pair of forces.

Which row shows whether the two forces are of the same type and whether they act on the same object?

	the types of forces in the pair	the objects on which they act
<b>A</b>	different	different
<b>B</b>	different	same
<b>C</b>	same	different
<b>D</b>	same	same

7. June/2023/Paper\_5054/12/No.10

A load–extension graph for a spring is shown.

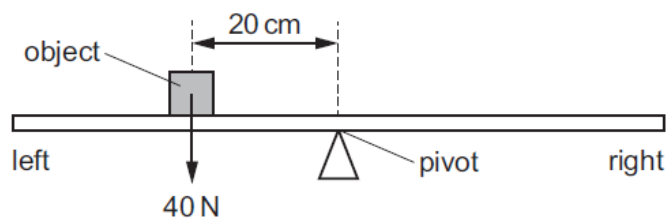


Which point is the limit of proportionality for the spring and what is the spring constant of the spring equal to?

	limit of proportionality	spring constant is equal to
<b>A</b>	Q	the gradient of PQ
<b>B</b>	Q	the gradient of QR
<b>C</b>	R	the gradient of PQ
<b>D</b>	R	the gradient of QR

8. June/2023/Paper\_5054/12/No.11

A uniform beam is pivoted at its midpoint. An object weighing 40 N is placed on the beam 20 cm to the left of the pivot as shown.



Which force and position balances the system?

- A** 20 N acting downwards, 40 cm to the right of the pivot
- B** 20 N acting upwards, 40 cm to the right of the pivot
- C** 50 N acting downwards, 10 cm to the left of the pivot
- D** 50 N acting upwards, 10 cm to the left of the pivot

9. June/2023/Paper\_5054/21/No.1(b, c, d)

An aircraft pulls a glider along a runway as shown in Fig. 1.1.

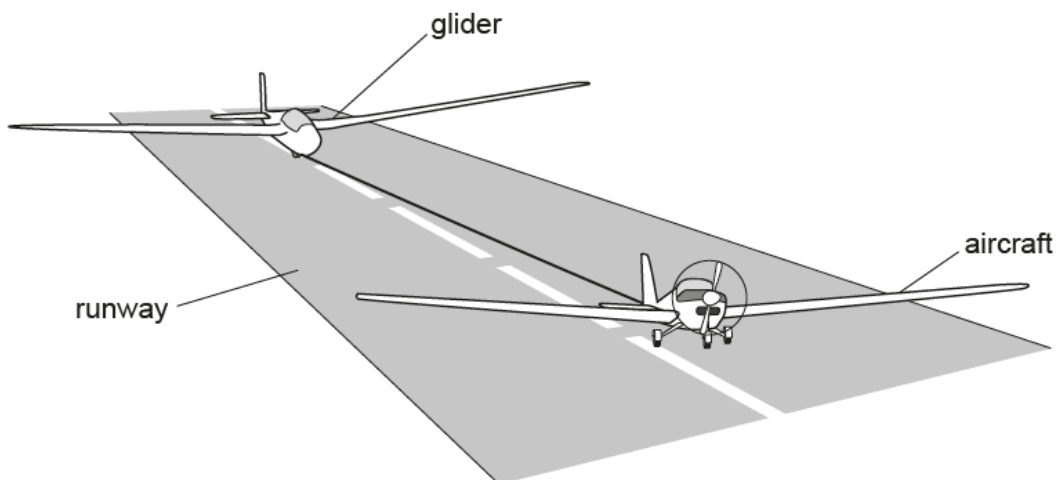


Fig. 1.1

Fig. 1.2 shows the speed of the glider during the first 12 s of the motion.

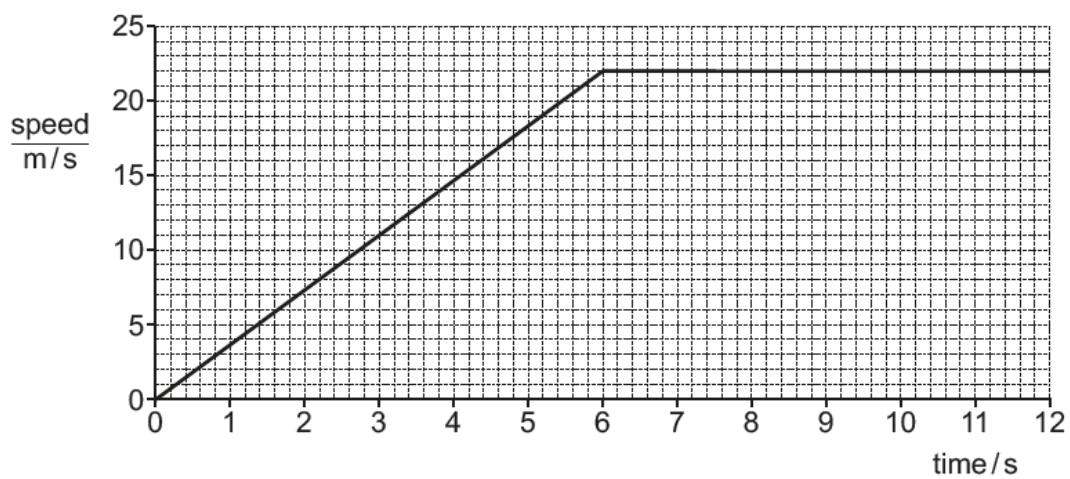


Fig. 1.2

**(b)** In the first 6.0s of the motion, there is a resultant force of 1800N on the glider.

Using the increase in speed in the first 6.0s, calculate the mass of the glider.

mass = ..... kg [3]

**(c)** Determine the distance travelled by the glider in the first 6.0s of its motion.

distance = ..... m [2]

**(d)** The glider has no engine and stays in the air with the use of convection currents.

**(i)** State what is meant by a 'convection current'.

.....  
.....  
..... [1]

**(ii)** Suggest how the convection current that supports the glider is formed.

.....  
.....  
..... [1]