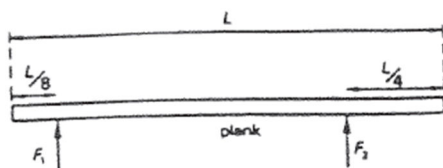


TUTORIAL QUESTIONS FORCES

Question 1

A heavy uniform plank of length L is supported by two forces F_1 and F_2 at points distant $L/8$ and $L/4$ from its ends as shown in the diagram.

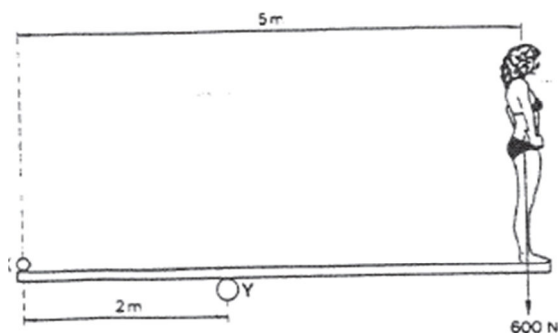


What is the ratio of F_1 to F_2 ?

- A 2 : 5
B 3 : 5
C 5 : 8
D 2 : 3
E 3 : 2

Question 2

The diagram shows a diving-board held in position by two rods X and Y.



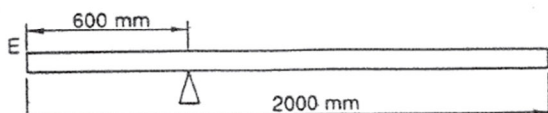
What additional forces do these rods exert on the board when a diver of weight 600 N stands on the right-hand end?

	at X (downwards)	at Y (upwards)
A	400 N	600 N
B	400 N	1000 N
C	600 N	1200 N
D	900 N	600 N
E	900 N	1500 N

Question 3

A uniform plank of weight 60 N is 2000 mm long and rests on a support that is 600 mm from end E.

At what distance from E must a 160 N weight be placed in order to balance the plank?

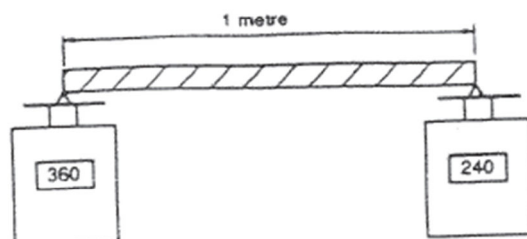


- A 150 mm B 225 mm C 375 mm D 450 mm

Question 4

A rod of length 1 metre has non-uniform composition, so that the centre of gravity is not at its geometrical centre.

The rod is laid on supports across two top-pan balances as shown in the diagram. The balances (previously set at zero) give readings of 360g and 240g.

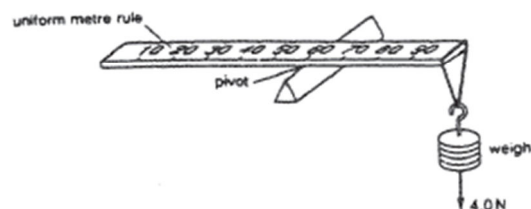


Where is the centre of gravity of the rod relative to its geometrical centre?

- A $\frac{1}{10}$ metre to the left
B $\frac{1}{10}$ metre to the right
C $\frac{1}{6}$ metre to the left
D $\frac{1}{5}$ metre to the right
E $\frac{1}{5}$ metre to the left

Question 5

A uniform metre rule of weight 2.0 N is pivoted at the 60 cm mark. A 4.0 N weight is suspended from one end, causing the rule to rotate about the pivot.

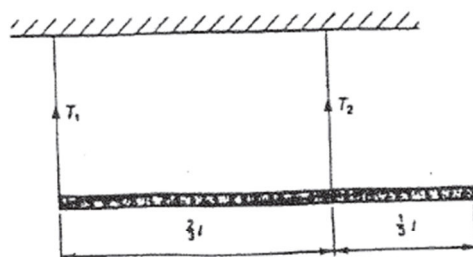


At the instant when the rule is horizontal, what is the value of the resultant turning moment about the pivot?

- A zero
B 1.4 N m
C 1.6 N m
D 1.8 N m

Question 6

A heavy uniform beam of length l is supported by two vertical cords as shown.



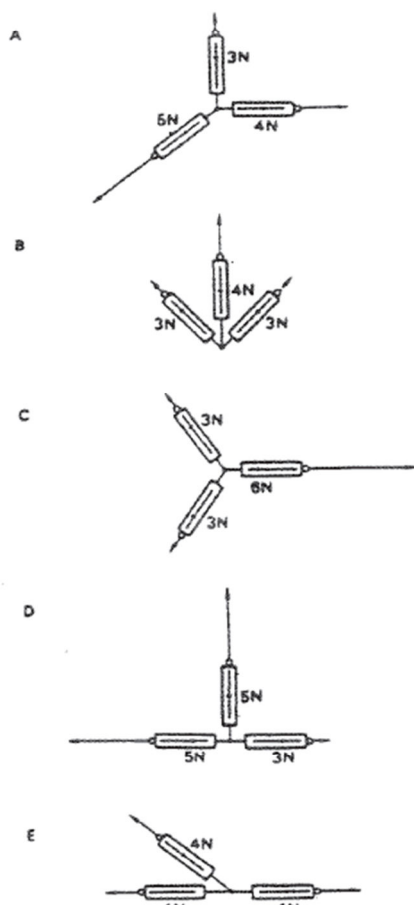
What is the ratio $\frac{T_1}{T_2}$ of the tensions in these cords?

- A $\frac{1}{3}$ B $\frac{1}{2}$ C $\frac{2}{1}$ D $\frac{3}{1}$

Question 7

The diagrams show spring balances joined to demonstrate a system of three coplanar forces acting at a point. The readings represent the magnitudes of the forces.

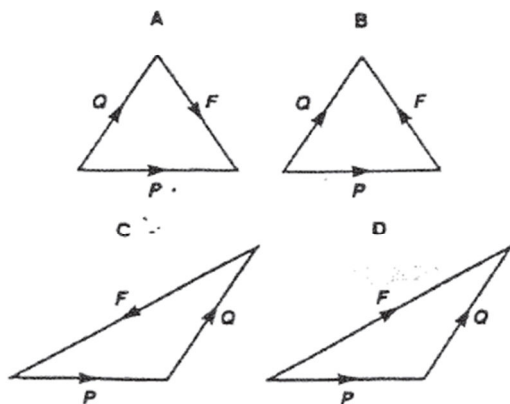
Which system of forces could be in equilibrium?



Question 8

A body is acted on by two forces, P and Q . A frictional force F holds the body in equilibrium.

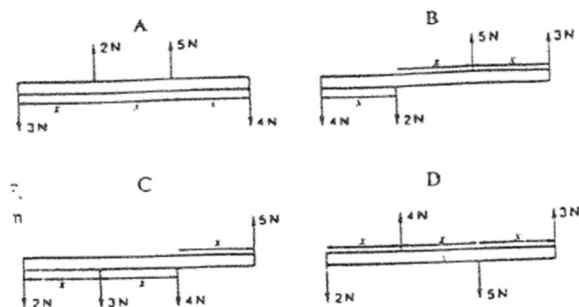
Which vector triangle could represent the relationship between these forces?



Question 9

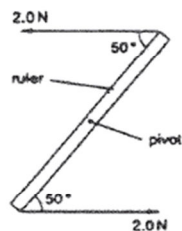
The force diagrams show all the forces acting on a beam of length $3x$.

Which force system causes only rotational motion of the beam without any linear movement?



Question 10

A ruler of length 0.30 m is pivoted at its centre. Equal and opposite forces of magnitude 2.0 N are applied to the ends of the ruler, creating a couple as shown.



What is the magnitude of the torque of the couple on the ruler when it is in the position shown?

A 0.23 Nm B 0.39 Nm C 0.46 Nm D 0.60 Nm

Question 11

A light rod is acted upon by three forces P , Q and R .

Which diagram could show the position and direction of each of the forces when the rod is in equilibrium?

