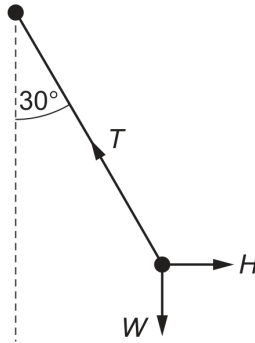


Unit 4: Forces, density and pressure:

Subunit 4.2: Equilibrium of forces:

Topical Question No: 1

- 3 A pendulum bob is held stationary by a horizontal force H . The three forces acting on the bob are shown in the diagram.



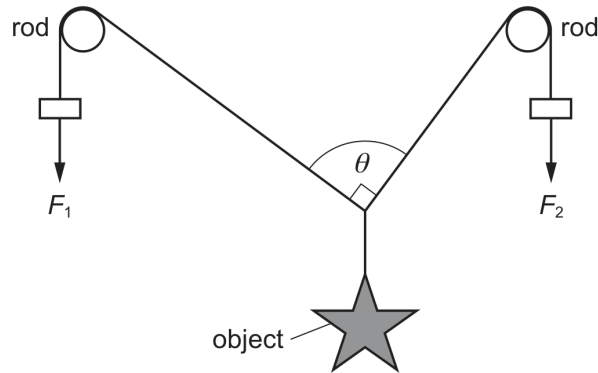
The tension in the string of the pendulum is T . The weight of the pendulum bob is W . The string is held at an angle of 30° to the vertical.

Which statement is correct?

- A $H = T \cos 30$
- B $T = H \sin 30$
- C $W = T \sin 30$
- D $W = T \cos 30$

Topical Question No: 2

14 An object hangs by means of two cords around two rods, as shown.



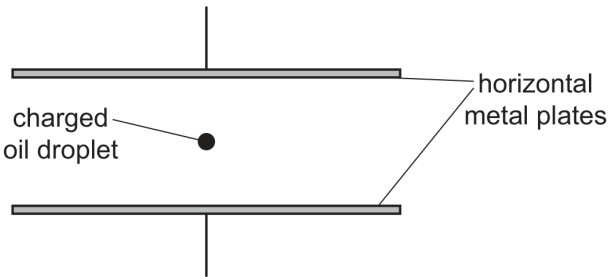
The object is held in equilibrium by the forces F_1 and F_2 . The object weighs 10 N. There is negligible friction between the rods and cords. Angle θ is 90° .

Which row of the table gives an angle θ of 90° ?

	F_1/N	F_2/N
A	4.0	6.0
B	6.0	4.0
C	6.0	8.0
D	8.0	6.0

Topical Question No: 3

31 A constant potential difference is applied between two horizontal metal plates. A charged oil droplet is held stationary by the electric field between the plates.



As some of the oil evaporates, the droplet loses mass and starts to accelerate. Its charge remains constant.

In which direction does the droplet accelerate, and which change needs to be made to the separation of the plates in order to stop this acceleration?

	direction of acceleration	separation of the plates
A	downwards	decrease
B	downwards	increase
C	upwards	decrease
D	upwards	increase

Topical Question No: 4

- 3 Two forces of equal magnitude are represented by two coplanar vectors. One is directed towards the east and the other is directed towards the north.

What is the direction of a single force that will balance these two forces?

- A towards the north-east
- B towards the north-west
- C towards the south-east
- D towards the south-west

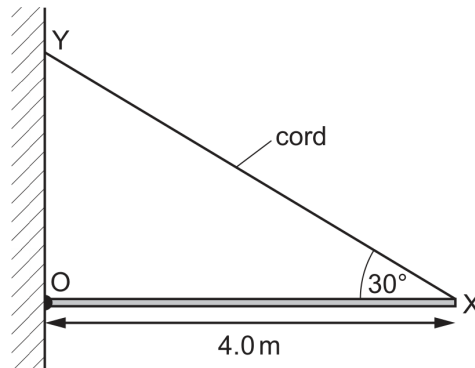
Topical Question No: 5

- 13 In which example is it **not** possible for the underlined body to be in equilibrium?

- A An aeroplane climbs at a steady rate.
- B An aeroplane tows a glider at a constant altitude.
- C A speedboat changes direction at a constant speed.
- D Two boats tow a ship into harbour.

Topical Question No: 6

- 13 A uniform horizontal beam OX, 4.0 m long and weighing 100 N, is hinged at a wall at point O. It is supported by a cord XY which is attached to the wall at Y.



What is the tension in the cord?

- A 50 N
- B 58 N
- C 86 N
- D 100 N

Topical Question No: 7

- 13 Forces of 3 N, 4 N and 5 N act at one point on an object. The angles at which the forces act can vary.

What is the value of the **minimum** resultant force of these forces?

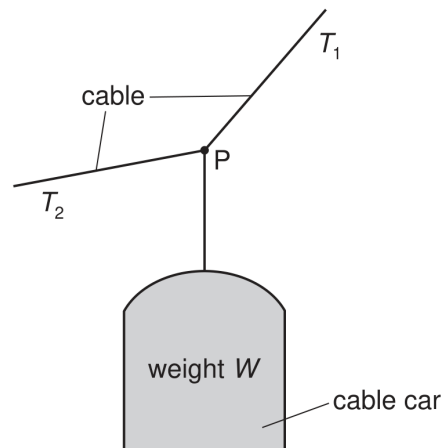
- A 0
- B between 0 and 2 N
- C 2 N
- D between 2 N and 4 N

Space for working

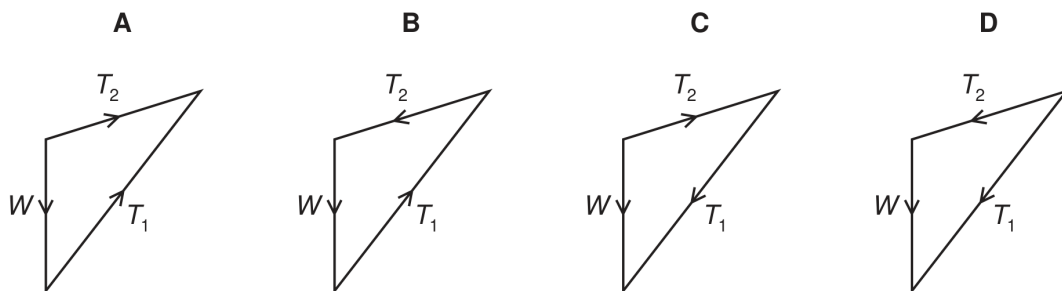
Topical Question No: 8

- 11 A cable car of weight W hangs in equilibrium from its cable at point P.

The cable has tensions T_1 and T_2 as shown.



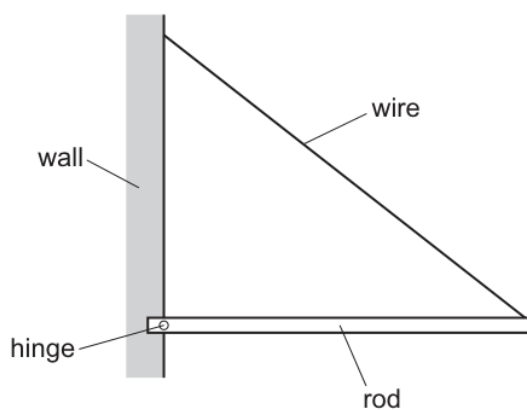
Which diagram correctly represents the forces acting at point P?



Space for working

Topical Question No: 9

- 12** A uniform rod is attached by a hinge at one end to a wall. The other end of the rod is supported by a wire so that the rod is horizontal and in equilibrium.



Which arrow shows the direction of the force on the rod from the hinge?

A



B



C

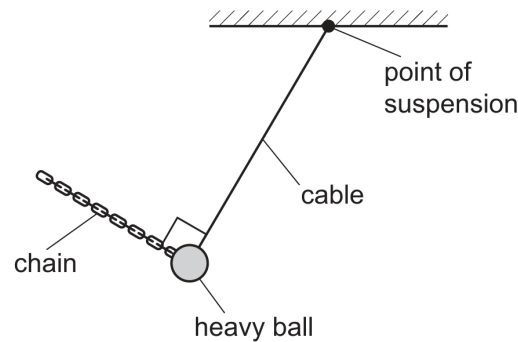


D

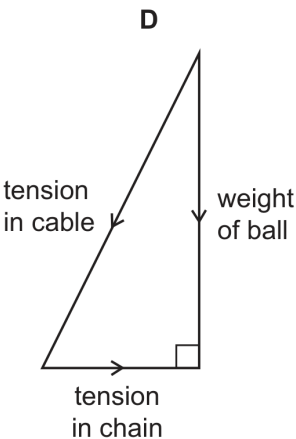
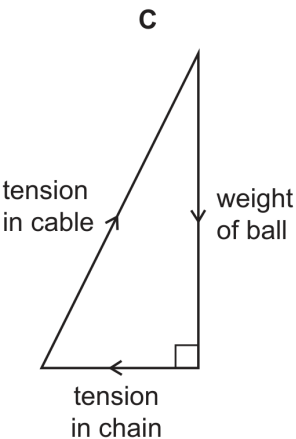
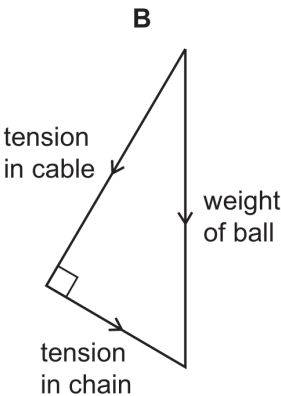
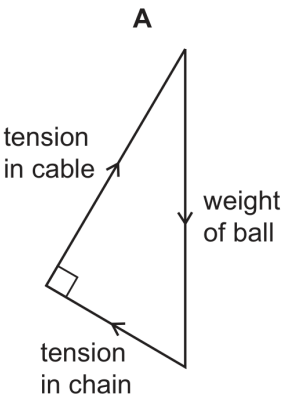


Topical Question No: 10

12 A heavy ball hanging from a cable is held in equilibrium by a chain, as shown.



Which vector diagram shows the three forces acting on the ball?



Answer Key

1. N/A
2. N/A
3. N/A
4. N/A
5. N/A
6. N/A
7. N/A
8. N/A
9. D
10. N/A