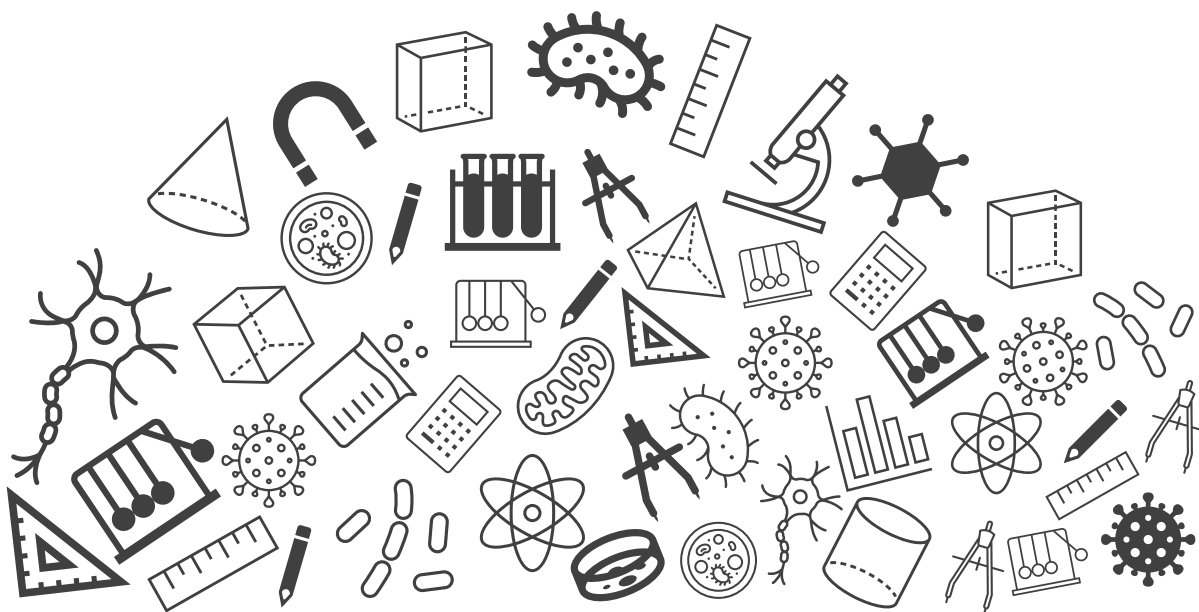




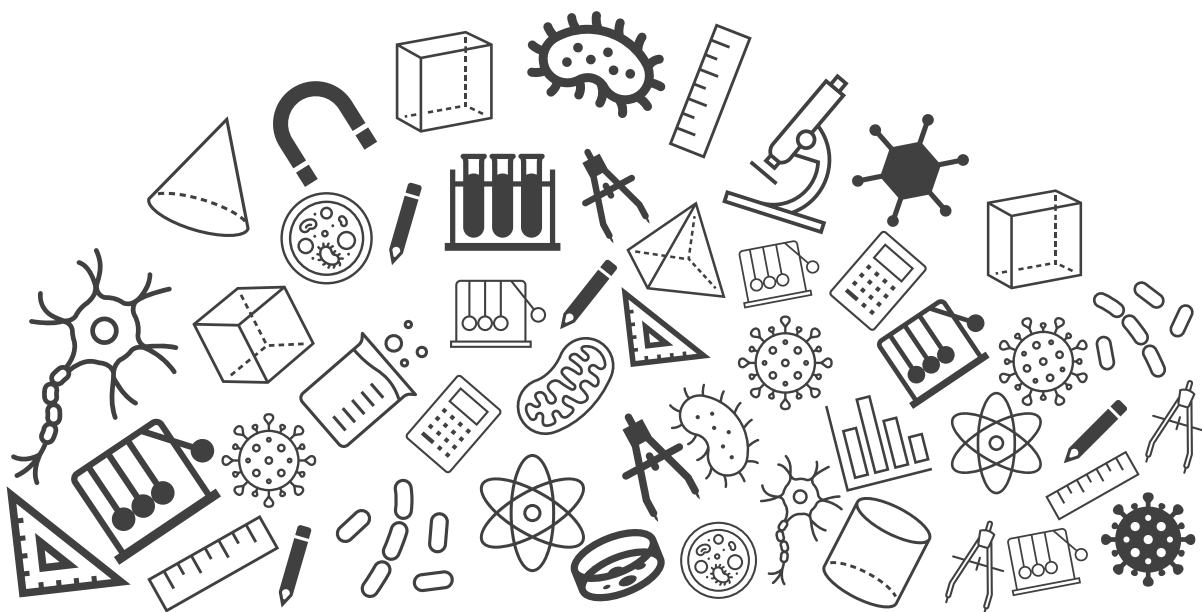
Grade 08 : Science

Exam Important Questions





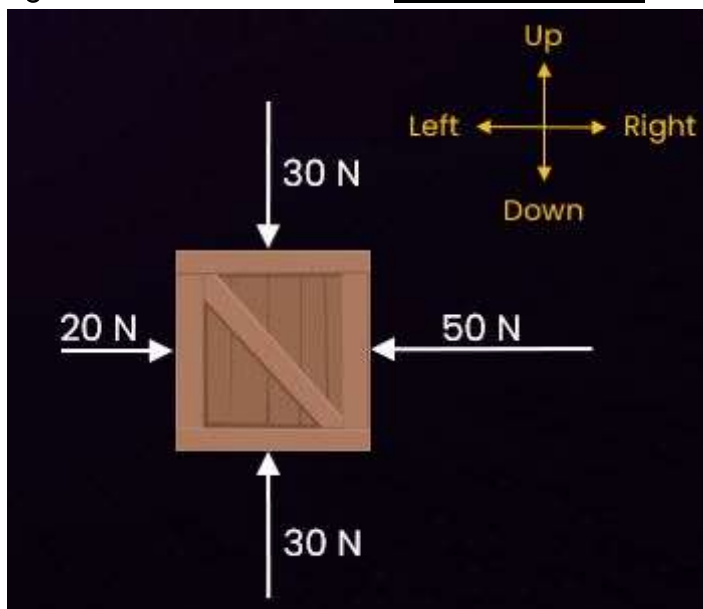
Force and Pressure



Force and Pressure

Topic: Exam Important Questions

1. Four forces are applied on a block which is at rest initially as shown in the figure. The block will move _____ .



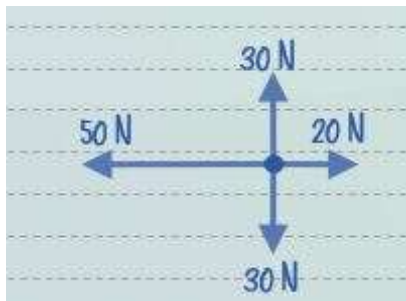
- ☐ A. towards the right
- ☒ B. towards the left
- ☐ C. upwards
- ☐ D. downwards

Force and Pressure

The correct answer is option B.

Forces acting on the block are:

- In horizontal direction: 20 N (rightward) and 50 N (leftward)
- In vertical direction: 30 N (upward) and 30 N (downward)



Net force on the block in horizontal direction

$$= 50 \text{ N (leftward)} - 20 \text{ N (rightward)}$$

$$= 30 \text{ N (leftward)}$$

Hence, the net force acts on the block in the horizontal directions is 30 N in the leftward direction.

Similarly,

Net force on the block in vertical direction

$$= 30 \text{ N (upward)} - 30 \text{ N (downward)}$$

$$= 0 \text{ N}$$

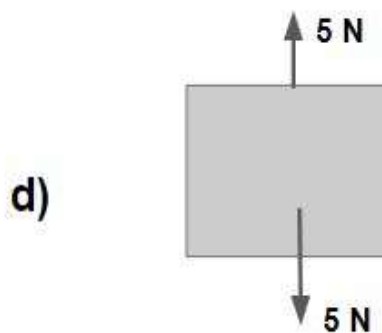
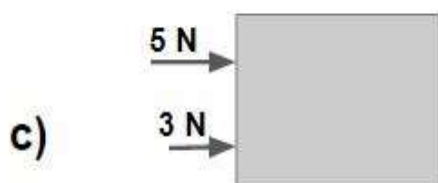
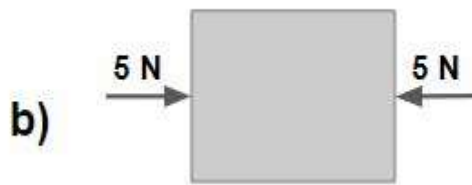
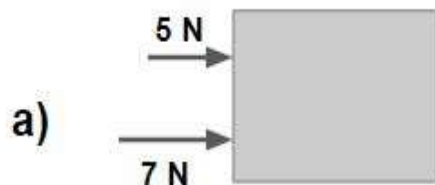
Hence, the net force acting on the block in the vertical directions is 0 N, that means, forces acting in the vertical directions are balanced.

Thus, a net force of magnitude 20 N acts on the block in the leftward direction.

As the block is initially at rest, therefore, in this situation, the block will move towards left.

Force and Pressure

2. Find net forces from the following diagrams.



[4 marks]

When two forces act in the same direction, the net force is the sum of these two forces, and when these forces act in opposite directions, the net force is the difference between these two forces.

a) Net force = $7\text{ N} + 5\text{ N} = 12\text{ N}$ (towards right)

[1 mark]

b) Net force = $5\text{ N} - 5\text{ N} = 0\text{ N}$

[1 mark]

c) Net force = $5\text{ N} + 3\text{ N} = 8\text{ N}$ (towards right)

[1 mark]

d) Net force = $5\text{ N} - 5\text{ N} = 0\text{ N}$

[1 mark]

Force and Pressure

3. The surface area of an object is 20 m^2 and a force of 10 N is applied on it, then what is the pressure?

- ☒ A. 0.5 N/m^2
- ☐ B. 2 N/m^2
- ☐ C. 10 N/m^2
- ☐ D. 20 N/m^2

The correct answer is option A.

We have given,

Force = 10 N, Area = 20 m^2

We know that,

$$\text{Pressure (P)} = \frac{\text{Force}}{\text{Area}}$$

$$P = \frac{10 \text{ N}}{20 \text{ m}^2} = \frac{1}{2} \text{ N/m}^2$$

$$P = 0.5 \text{ N/m}^2$$

Force and Pressure

4. Give reasons for the following:

- a) The foundations of high-rise buildings are wide.
- b) Tools meant for cutting always have sharp edges.

[5 marks]

a) Pressure is defined as the perpendicular force acting per unit area. For a given force, pressure is inversely proportional to the area of contact, i.e., if the area increases, the pressure that is exerted decreases.

[1.5 marks]

The foundations of high-rise buildings are kept wide so that they exert less pressure and thus prevent the building from sinking into the ground.

[1 mark]

b) As pressure is inversely proportional to the area of contact for a given force, a smaller surface area implies a larger pressure.

[1.5 marks]

Therefore, tools meant for cutting have sharp edges, so they can apply large pressure to cut things easily.

[1 mark]

5. If a car is at rest, there must not be any force acting on it.

Is this statement true? Give reason for your answer.

[2 marks]

The given statement is false.

[1 mark]

A body at rest can have balanced forces acting on it. As long as the net force acting on the body is zero, the body will remain at rest.

Therefore, if a car is at rest, it does not mean that no force is acting on it. For example, if a car is at rest on a horizontal surface, the forces acting on it are:

1. Gravitational force (in downward direction)
2. Normal force on all wheels (in upward direction)

As these two forces are equal in magnitude and opposite in directions, cancelling each other and causes net force zero.

[1 mark]

Force and Pressure

6. State an example for a situation mentioned below in which a force:

- a) changes the speed of an object
- b) changes the shape of an object.

[2 marks]

a) Kicking a football – On kicking a football which is at rest, its speed increases.

[1 mark]

b) Stretching a rubber band – On stretching a rubber band, there is a change in shape and its length increases.

[1 mark]

7. How do you increase the pressure by keeping

- (a) area unchanged
- (b) force unchanged

[2 marks]

Pressure is defined as the perpendicular force per unit area.

Mathematically,

Pressure, $P = \text{Force} / \text{Area}$

Therefore, pressure is directly proportional to the force and inversely proportional to the area.

a) To increase the pressure by keeping area unchanged, we must increase the force perpendicular to the area.

[1 mark]

b) To increase the pressure by keeping force unchanged, we must decrease the area of application.

[1 mark]

Force and Pressure

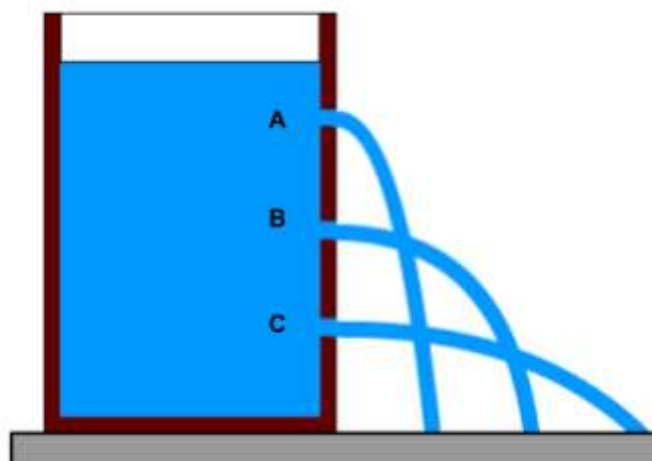
8. How can you differentiate between a contact force and a force at a distance?
[2 marks]

Contact Forces	Non-contact Forces/Forces at a Distance
These forces require a physical touch or contact between the two objects.	These forces do not require any physical contact.
Contact forces include muscular force, normal force, tension, frictional force, etc.	Non-contact forces include magnetic force, gravitational force and electrostatic force.

[1 mark for each difference]

9. A water tank has three holes A, B and C. The water coming out of the three holes is falling at different distances. Explain.

[2 marks]



Solution

The pressure inside the liquid increases when we go deeper into the liquid.
[0.5 marks]

The pressure at point C > pressure at point B > pressure at point A.
[0.5 marks]

Pressure acts in all directions and that is why it acts on the walls of the tank too. So at a point where pressure is more, the force will also be more and hence the jet speed of the water stream will also be more. Due to different speeds, the distance at which the water streams are falling will be different.
[1 mark]

Force and Pressure

10. What is atmospheric pressure? What causes it?
[2 marks]

Solution:

Atmospheric pressure is the force per unit area exerted by the atmosphere on the surface of Earth.

[1 mark]

Atmospheric pressure is exerted due to the weight of air molecules present in the atmosphere.

[1 mark]