

**Selina Solutions For Class 9 Physics**  
**Chapter 3 – Laws of Motion**

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**Exercise -3(A)**

**1. Explain giving two examples each of:**

**(a) Contact forces, and (b) non-contact forces**

**Solution:**

- (a) Contact forces – These are the forces that act upon bodies when they are in physical contact are known as contact forces. Example-Force exerted on two bodies while the process of collision, frictional force
- (b) Non-contact forces – These are the forces that are experienced by the bodies without any physical contact is known as non-contact force. Example – Electrostatic force and gravitational force.

**2. Classify the following amongst contact and non-contact forces:**

- (a) Frictional force  
(b) Normal reaction force  
(c) Force of tension in a string  
(d) Gravitational force  
(e) Electrostatic force  
(f) Magnetic force

**Solution:**

| Contact force             | Non-contact force   |
|---------------------------|---------------------|
| Frictional force          | Gravitational force |
| Normal reaction force     | Electrostatic force |
| Force tension in a string | Magnetic force      |

**3. Give on example in each case where:**

- (a) The force is of contact, and  
(b) Force is at a distance.

**Solution:**

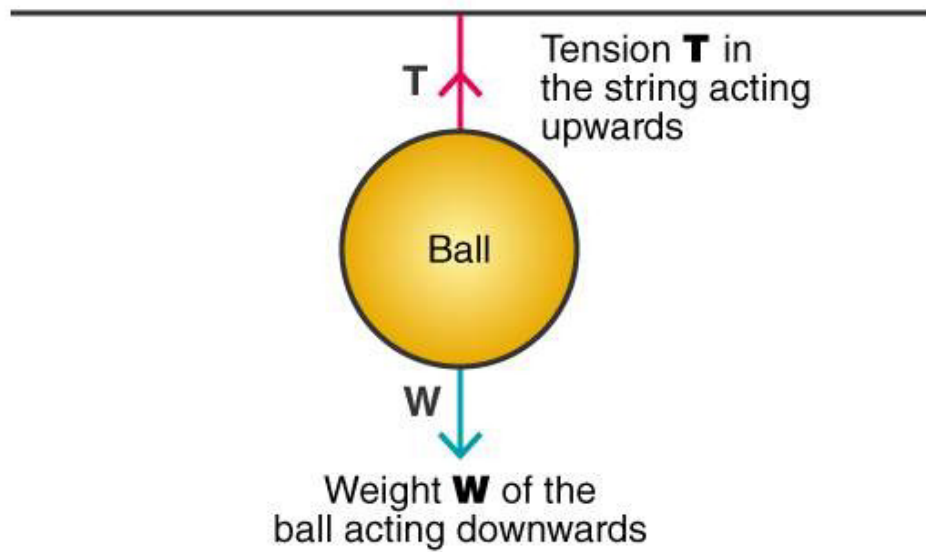
- (a) The force is of contact – force exerted on two bodies during the process of collision  
(b) Force is at a distance – force persistent between magnetic poles – magnetic force

- 4. (a) A ball is hanging by a string from the ceiling of the roof. Draw a neat labelled diagram showing the forces acting on the ball and the string.**  
**(b) A spring is compressed against a rigid wall. Draw a neat labelled diagram showing the forces acting on the spring.**  
**(c) A wooden block is placed on a table top. Name the forces acting on the block and draw a neat and labelled diagram to show the point of application and direction of these forces.**

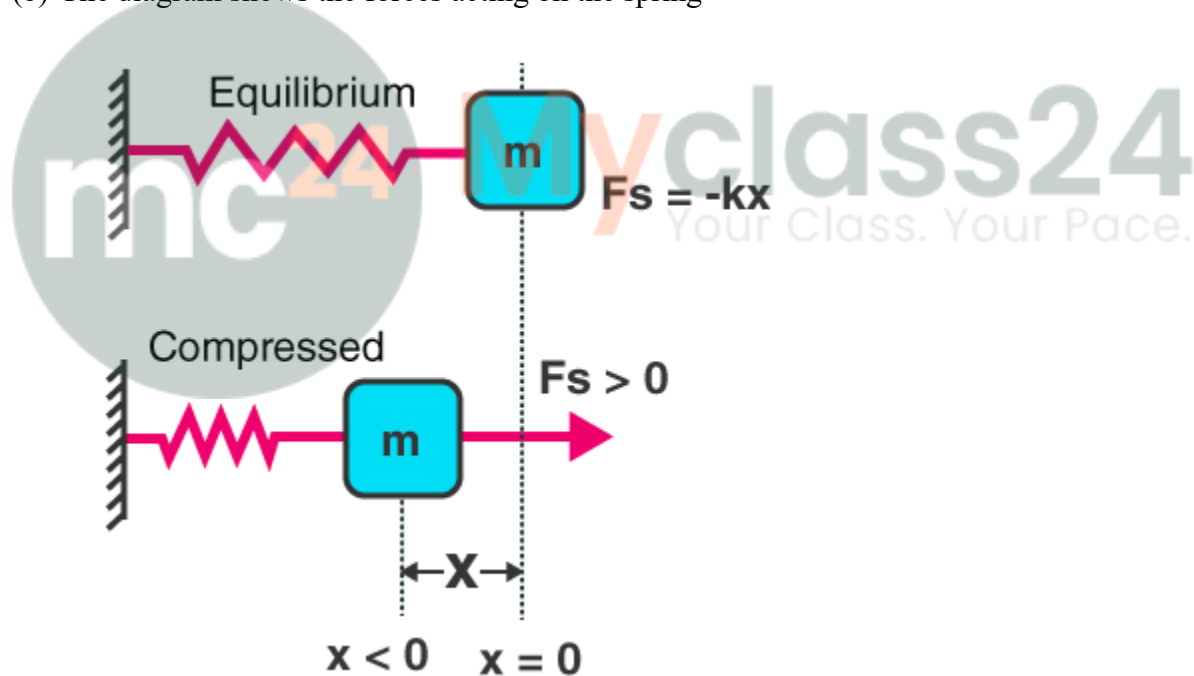
**Solution:**

- (a) The diagram shows the forces acting on the ball and the string

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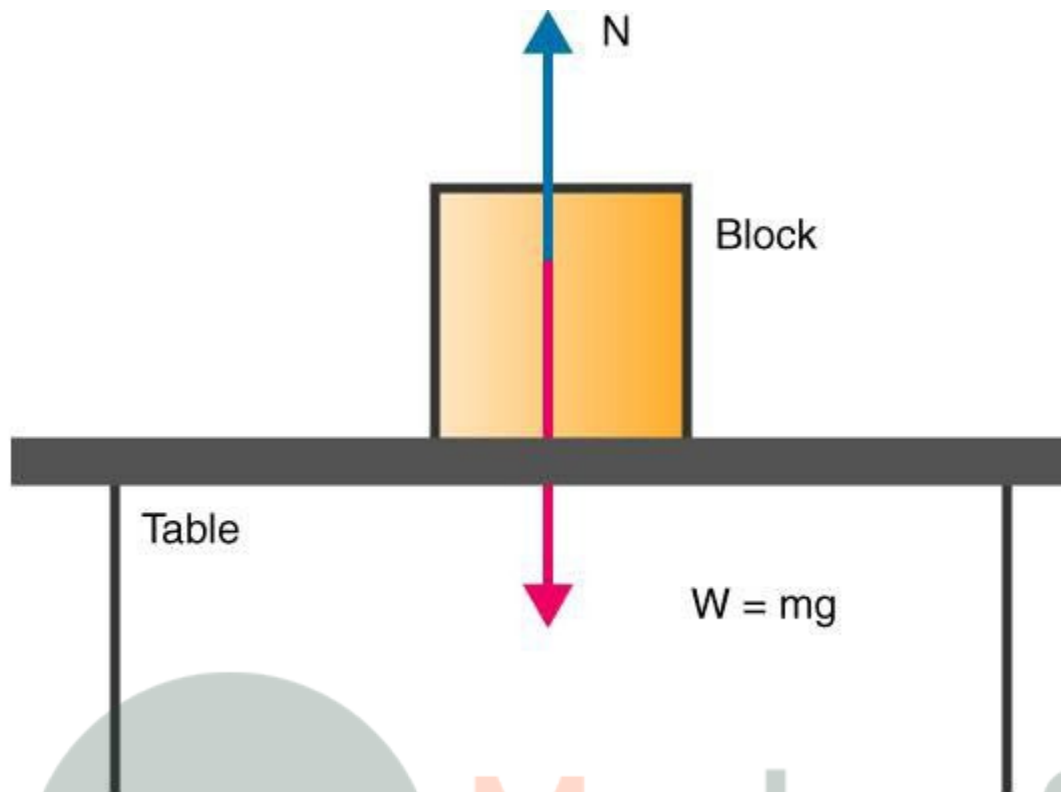


(b) The diagram shows the forces acting on the spring



(c) The diagram shows the point of application and the direction of these forces

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The following are the forces that act on the block

- Reaction force from the table in the upward direction
- Weight of the block in the downward direction

5. **State one factor on which the magnitude of a non-contact force depends. How does it depend on the factor stated by you?**

**Solution:**

The magnitude of non-contact force depends on the distance. Distance and magnitude of force are inversely related. The magnitude of force decreases as the distance increases.

6. **The separation between two masses is reduced to half. How is the magnitude of gravitational force between them affected?**

**Solution:**

The magnitude of gravitational force is four times between two masses as gravitational force is inversely proportional to the square of the distance of separation.

7. **State the effects of a force applied on (i) a non-rigid, and (ii) a rigid body. How does the effect of the force differ in the two cases?**

**Solution:**

- Non-rigid force – When a non-rigid force is applied on a body, it changes the inter-spacing amongst its constituent particles and hence induces a modification in its dimension and hence can also generate motion in it.
- Rigid-force – When a rigid force is applied on a body, it does not change the inter-spacing

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amongst its constituent particles and consequently it does not change its dimensions but motion is induced.

**8. Give one example in each of the following cases where a force:**

- (a) Stops a moving body**
- (b) Moves a stationary body**
- (c) Changes the size of a body**
- (d) Changes the shape of a body**

**Solution:**

Listed below are the examples for the following cases:

- (a)** In the game of cricket, a fielder, by applying force with his hands stops a moving ball.
- (b)** Moving of a cart when a pull is exerted by a horse
- (c)** When the piston is lowered in a cycle pump, the air is compressed to cover less volume
- (d)** Rubber changes its shape on pressing a piece of it

**Multiple Choice Type**

**1. Which of the following is a contact force:**

- (a) Electrostatic force**
- (b) Gravitational force**
- (c) Frictional force**
- (d) Magnetic force**

**Solution:**

- (c) Frictional force**

These are the forces that act upon bodies when they are in physical contact with each other.

**2. The non-contact force is:**

- (a) Force of reaction**
- (b) Force due to gravity**
- (c) Tension in string**
- (d) Force of the friction**

**Solution:**

- (b) Force due to gravity**

These are the forces that are experienced by the bodies without any physical contact with each other.