

### THEORY

When a body is subjected to a force, it tends to move in the direction of the force. This is the basic principle of mechanics. The force applied to the body is called the load, and the reaction force is called the support reaction. The equilibrium of a body is maintained when the sum of the forces acting on it is zero. This is the condition for static equilibrium. The forces acting on a body can be resolved into components along the x and y axes. The equilibrium equations are given by  $\sum F_x = 0$  and  $\sum F_y = 0$ . These equations are used to determine the unknown forces acting on the body. The forces acting on a body can be represented by a free body diagram. This diagram shows the body and the forces acting on it. The forces are represented by arrows pointing in the direction of the force. The magnitude of the force is represented by the length of the arrow. The free body diagram is used to analyze the forces acting on the body and to determine the equilibrium conditions.

Force	Direction	Magnitude
Weight	Downwards	$W = mg$
Normal force	Perpendicular to the surface	$N$
Friction force	Opposite to the direction of motion	$f = \mu N$
Applied force	Direction of the force	$F$
Reaction force	Opposite to the direction of the force	$R$

The above table shows the forces acting on a body and their directions and magnitudes. The weight force acts downwards and is equal to the mass of the body multiplied by the acceleration due to gravity. The normal force acts perpendicular to the surface and is equal to the weight of the body. The friction force acts opposite to the direction of motion and is equal to the coefficient of friction multiplied by the normal force. The applied force acts in the direction of the force and is equal to the force applied. The reaction force acts opposite to the direction of the force and is equal to the force applied.

### DISCUSSION

