

Case Study 1:

Rahul is a cyclist who participates in racing events. He noticed that his cycle's tires were worn out, which was affecting his speed and control. He decided to replace the tires with new ones that had a better grip on the road.

After replacing the tires, Rahul observed that his cycle was moving more smoothly and he had better control over it. However, he also noticed that it was more difficult to pedal the cycle, especially when starting from rest.

Questions:

1. What type of friction was Rahul experiencing before replacing the tires?
 - a) Static friction
 - b) Kinetic friction
 - c) Rolling friction
 - d) Fluid friction

2. Why did Rahul experience more difficulty in pedaling the cycle after replacing the tires?
 - a) Because the new tires had a better grip on the road
 - b) Because the new tires were heavier
 - c) Because the new tires had a higher rolling friction
 - d) Because the new tires had a lower rolling friction

3. What type of friction is responsible for the wear and tear of Rahul's cycle tires?
 - a) Static friction
 - b) Kinetic friction
 - c) Rolling friction
 - d) Fluid friction

4. How does the force of friction affect Rahul's cycle when he is starting from rest?
 - a) It helps the cycle to move
 - b) It opposes the motion of the cycle
 - c) It has no effect on the cycle
 - d) It increases the speed of the cycle

5. What can Rahul do to reduce the friction between his cycle tires and the road?
 - a) Use a lubricant on the tires
 - b) Increase the air pressure in the tires
 - c) Use tires with a smoother surface
 - d) All of the above

Case Study 2:

A hydraulic lift is used to lift heavy cars in a garage. The lift works on the principle of pressure exerted by a fluid (oil) on a piston. When the piston is pushed down, the oil is forced into a narrow cylinder, which then lifts the car.

One day, the garage owner noticed that the lift was not working properly. The piston was not moving down, and the car was not being lifted. After checking, it was found that the area of the piston had decreased due to wear and tear.

Questions:

1. What is the principle on which the hydraulic lift works?

- a) Force exerted by a solid on a surface
- b) Pressure exerted by a fluid on a surface
- c) Friction between two surfaces
- d) Gravity acting on an object

2. Why did the hydraulic lift stop working properly?

- a) Because the force applied to the piston decreased
- b) Because the area of the piston decreased
- c) Because the pressure exerted by the oil decreased
- d) Because the car being lifted was too heavy

3. What happens to the pressure exerted by the oil when the area of the piston decreases?

- a) It increases
- b) It decreases
- c) It remains the same
- d) It becomes zero

4. How is the pressure exerted by the oil related to the force applied to the piston?

- a) Pressure is equal to force divided by area
- b) Pressure is equal to force multiplied by area
- c) Pressure is equal to force minus area
- d) Pressure is equal to force plus area

5. What can be done to increase the pressure exerted by the oil in the hydraulic lift?

- a) Increase the force applied to the piston
- b) Decrease the area of the piston
- c) Increase the area of the piston
- d) Decrease the force applied to the piston