

## Very Short Answer Questions

**Q. 1. Will force of friction come into play when a rain drop rolls down a glass window pane?**  
[NCERT Exemplar]

**Ans.** Yes

**Q. 2. Two blocks of iron of different masses are kept on a cemented floor as shown in the figure. Which one of them would require a larger force to move it from the rest position?**  
[NCERT Exemplar]

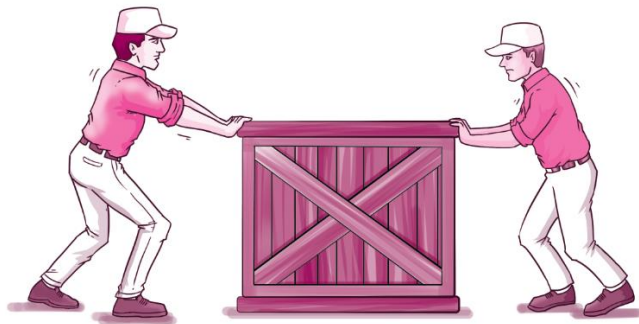


**Ans.** Larger force will be required to move the heavier block.

**Q. 3. Two boys are riding their bicycles on the same concrete road. One has new tyres on his bicycle while the other has tyres that are old and used. Which of them is more likely to skid while moving through a patch of the road which has lubricating oil spilled over it?**  
[NCERT Exemplar]

**Ans.** The bicycle with worn out tyres is more likely to skid.

**Q. 4. The figure given alongside shows two boys applying force on a box. If the magnitude of the force applied by each is equal, will the box experience any force of friction?**  
[NCERT Exemplar]



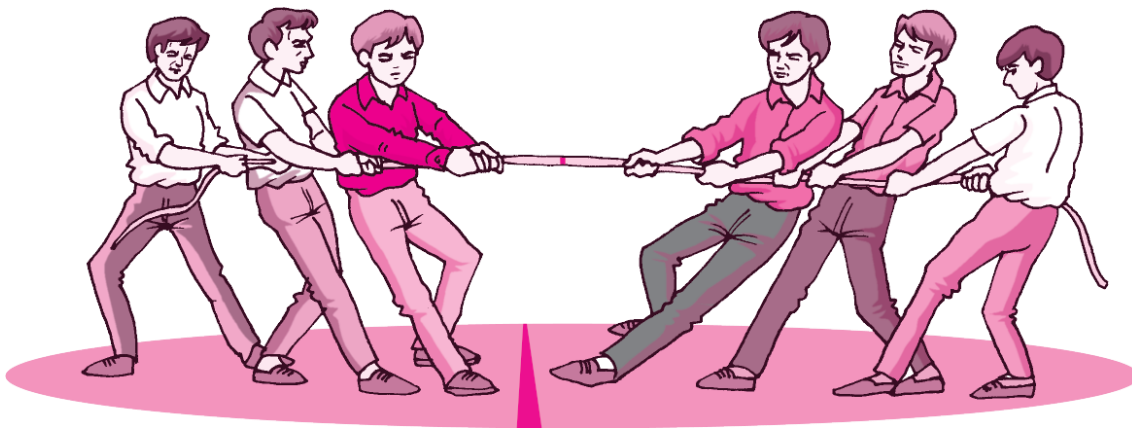
**Ans.** Force of friction will be zero as the net force on the box is zero.

**Q. 5. Imagine that an object is falling through a long straight glass tube held vertical; air has been removed completely from the tube. The object does not touch the walls of the tube. Will the object experience any force of friction?**  
[NCERT Exemplar]

**Ans.** No

**Q. 6. While playing tug of war, Ravi felt that the rope was slipping through his hands. Suggest a way out for him to prevent this. [NCERT Exemplar]**

**Ans.**



**Q. 7. The handle of a cricket bat or a badminton racquet is usually rough. Explain the reason. [NCERT Exemplar]**

**Ans.** To increase friction between handle of the bat and hands, to have a better grip.

**Q. 8. Explain why the surface of mortar and pestle (silbatta) used for grinding is etched again after prolonged use. [NCERT Exemplar]**

**Ans.** To increase friction to make it more effective for grinding again.

**Q. 9. What is drag?**

**Ans.** The frictional force exerted by fluids is also called drag.

## Short Answer Questions

**Q. 1. You might have noticed that when used for a long time, slippers with rubber soles become slippery. Explain the reason. [NCERT Exemplar]**

**Ans.** When rubber soles are used for a long time, their surfaces become smooth. Hence, the friction between the sole and the floor decreases. Therefore, slippers become slippery.

**Q. 2. Is there a force of friction between the wheels of a moving train and iron rails? If yes, name the type of friction. If an air cushion can be introduced between the wheel and the rail, what effect will it have on the friction? [NCERT Exemplar]**

**Ans.** Yes, rolling friction. If an air cushion is introduced between the wheel and the rails, the friction will decrease.

**Q. 3. Cartilage is present in the joints of our body which helps in their smooth movement. With advancing age, this cartilage wears off. How would this affect the movement of joints? [NCERT Exemplar]**

**Ans.** The wearing off of a cartilage will increase the friction. As a result the movement of joints will become difficult which may lead to joint pains.

**Q. 4. A marble is allowed to roll down an inclined plane from a fixed height. At the foot of the inclined plane, it moves on a horizontal surface (a) covered with silk cloth (b) covered with a layer of sand and (c) covered with a glass sheet. On which surface will the marble move the shortest distance? Give reason for your answer. [NCERT Exemplar]**

**Ans.** On the surface covered with sand, it will cover the least distance because sand offers maximum friction against its motion.

**Q. 5. A father and son pushed their car to bring it to the side of road as it had stalled in the middle of the road. They experienced that although they had to push with all their might initially to move the car, the push required to keep the car rolling was smaller, once the car started rolling. Explain. [NCERT Exemplar]**

**Ans.** Because initially they had to apply force to set the car in motion but once the car started rolling, they had to apply force only to balance rolling friction of the car, the value of which is very less.

**Q. 6. When the cutting edge of a knife is put against a fast rotating stone to sharpen it, sparks are seen to fly. Explain the reason. [NCERT Exemplar]**

**Ans.** Friction between grinding stone and the cutting edge of the knife produces heat. As the friction is very large in this case, a large amount of heat is produced and we see sparks flying.

**Q. 7. Why kabbadi players should rub their hand with soil before they start playing?**

**Ans.** To increase friction and to get better grip on their opponent players.

## Long Answer Questions

**Q. 1. Give reason:** [NCERT Exemplar]

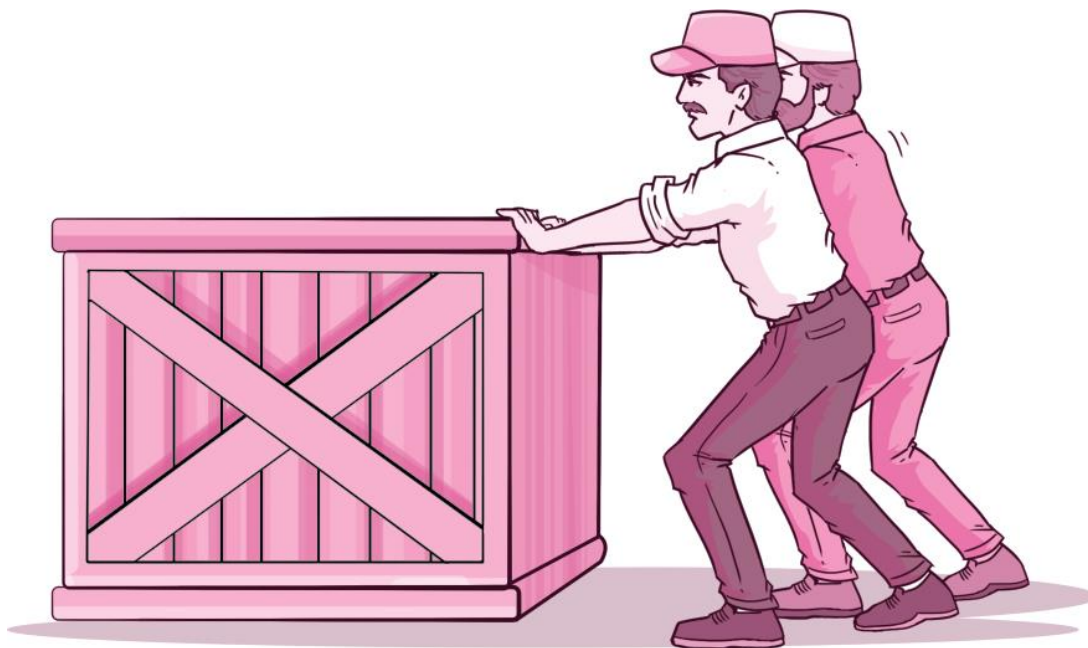
**(i) We have two identical metal sheets. One of them is rubbed with sand paper and the other with ordinary paper. The one rubbed with sand paper shines more than the other.**

**(ii) While travelling on a rickshaw, you might have experienced that if the seat cover is very smooth, you tend to slip when brakes are applied suddenly**

**Ans. (i)** The friction between sand paper and metal sheet is very large, compared to that between the ordinary paper and the metal sheet. Thus, the sand paper is able to remove the outer dull layer from the metal sheet more effectively and makes it more shining.

**(ii)** If the seat cover is very smooth then the friction between our body and the seat is very small. Therefore, when the brakes are applied we tend to slip.

**Q. 2. Two friends are trying to push a heavy load as shown in figure. Suggest a way which will make this task easier for them.** [NCERT Exemplar]



**Ans.** They can put rollers below the heavy load. Because, friction arises when the irregularities in the surfaces of two objects in contact get interlocked with each other. In rolling, the time given for interlocking is very small than sliding. Hence, interlocking is not strong. Therefore, less force is required to overcome it and the task becomes easier. Since, the rolling friction is smaller than the sliding friction, putting rollers below the heavy load will make the task easier for them.

**Q. 3. What are the different methods to reduce friction?**

**Ans.** To reduce friction following methods are commonly used:

- a. **Polishing:** If we polish a surface, it becomes smooth and friction is reduced. Through polishing, unevenness of the surfaces is reduced.
- b. **Lubricating:** By applying lubricants (like oil) to surfaces, friction is reduced. When we apply lubricant to surfaces, a thin layer of lubricant is formed over there and moving surfaces do not directly rub against each other.
- c. **Using ball bearings:** This way of reducing friction involves the principle that an object is rolled instead of sliding. The use of ball bearing converts sliding friction into rolling friction.
- d. **Separation of surfaces by air:** Another way of reducing friction is to separate the surfaces by air. This is how, a hovercraft works. A hovercraft moves on a layer of air between its hull and the water. The layer of air reduces friction allowing the hovercraft to move easily.
- e. **Giving a streamlined shape:** Boats, cars, planes and rockets are streamlined to reduce friction with water or air.

## **Hots (Higher Order Thinking Skills)**

**Q. 1. Why do ladies apply soap solution to their hands to put bangles on?**

**Ans.** With the soap solution, the surface of the hands become smooth and thus the friction is reduced.

**Q. 2. Why is it difficult to balance our body when we accidentally step on a peel of banana?**

**Ans.** Because the friction reduces as the surface of the road becomes slippery.

**Q. 3. Can we reduce friction to zero by using lubricants?**

**Ans.** No, it is not possible to entirely remove friction.