

1. Fill in the blanks:

- Friction opposes the \_\_\_\_\_ between the surfaces in contact with each other.
- Friction depends on the \_\_\_\_\_ of surfaces.
- Friction produces \_\_\_\_\_.
- Sprinkling of powder on the carrom board \_\_\_\_\_ friction.
- Sliding friction is \_\_\_\_\_ than the static friction.

- Sol.**
- Friction opposes the relative motion between the surfaces in contact with each other.
  - Friction depends on the nature surfaces.
  - Friction produces heat.
  - Sprinkling of powder on the corrom board reduce friction.
  - Sliding friction is less than the static friction.

2. Four children were asked to arrange forces due to rolling, static and sliding frictions in a decreasing order. Their arrangements are given below.

Choose the correct arrangement.

- Rolling, static, sliding
- Rolling, sliding, static
- Static, sliding, rolling
- Sliding, static, rolling

- Sol.** (d) Sliding, static, rolling.

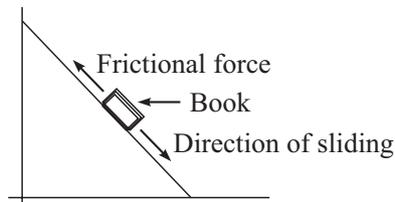
3. Alida runs her toy car on dry marble floor, wet marble floor, newspaper and towel spread on the floor. The force of friction acting on the car on different surfaces in increasing order will be.

- Wet marble floor, dry marble floor, newspaper and towel.
- Newspaper, towel, dry marble floor, wet marble floor.
- Towel, newspaper, dry marble floor, wet marble floor.
- Wet marble floor, dry marble floor, towel, newspaper

- Sol.** (a) Wet marble floor, dry marble floor, newspaper and towel.

4. Suppose your writing desk is tilted a little. A book kept on it starts sliding down. Show the direction of frictional force acting on it.

- Sol.** The frictional force will act parallel to the inclined surface, opposite to the direction of the sliding of book.



5. You spill a bucket of soapy water on a marble floor accidentally. Would it make it easier or more difficult for you to walk on the floor? Why?
- Sol.** Soapy floor reduces the frictional force applied by the floor to maximum. That is why it is difficult to walk on a soapy floor.
6. Explain why sportsmen use shoes with spikes.
- Sol.** Sportsmen use shoes with spike because spikes produces the desired frictional force and thus help in holding the ground firmly.
7. Iqbal has to push a lighter box and Seema has to push a similar heavier box on the same floor. Who will have to apply a larger force and why?
- Sol.** Seema will have to apply a larger force, because her box is heavier and heavier object will have to undergo greater frictional force from the surface of contact.
8. Explain why the sliding friction is less than the static friction.
- Sol.** Suppose a box kept on the surface has to be pushed. If the box is slided then, when the box starts sliding, the contact points on its surface do not get enough time to lock into the contact point on the floor. So, the sliding friction is slightly less than the static friction and we find it easier to move the box already in motion than to get it started.
9. Give examples to show that friction is both a friend and a foe.
- Sol.**
- (i) **Friction as a friend:**
- To hold a glass, we have ridges on our palm, which increase the friction between palm and glass.
  - We do write anything with pen or pencil because there is friction between the surfaces of paper and point of pen or pencil.
  - Teacher writes on black-board with chalk because of friction between blackboard surface and the chalk.
  - If there is no friction, then a moving body would never stop.
- (ii) **Friction as a foe:**
- Friction wears out materials, whether they are screws, ball-bearing or soles of shoes.

(b) Friction can also produce heat, which increases wear and tear of machine parts. It also causes much wastage of energy because this heat is not utilized.

- 10.** Explain why objects moving in fluids must have special shapes.
- Sol.** Birds and the fishes have to move about in fluids all the times. Their bodies must have evolved to shapes which would make them not to lose much energy in overcoming friction. Such shapes are called streamlined. Cars are also designed so that their shapes resemble the streamlined shapes of birds, fishes, etc.

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