Friction

1. **What is Frictional Force?**
   Ans. Frictional force refers to the force generated by two surfaces that contacts and slide against each other.

2. **On which factors the frictional force affected?**
   Ans. A few factors affecting the frictional force:
   - These forces are mainly affected by the surface texture and amount of force impelling them together.
   - The angle and position of the object affect the amount of frictional force.
   - If an object is placed flat against an object, then the frictional force will be equal to the weight of the object.
   - If an object is pushed against the surface, then the frictional force will be increased and becomes more than the weight of the object.

3. **What Causes Friction?**
   Ans. Friction is a force that resists the relative motion between two objects or materials. The causes of the resistive force of friction are:
   - Molecular Adhesion: Adhesion is a molecular force that arises when two materials are brought close to each other.
   - Surface Roughness: No surface can be considered perfectly smooth. The degree of roughness varies from surface to surface. Surface roughness is a factor in friction when the materials are rough enough to cause serious abrasion.
   - Plowing effect: When one or more of the materials are relatively soft, much of the resistance to movement is caused by deformations or a plowing effect.

4. **What are the different types of Friction?**
   Ans. Frictional Force are different types. The friction that takes place between solid surfaces is classified as Static, Kinetic, Rolling, and Sliding Friction. The friction that takes place between fluids and gases are termed as fluid friction. Hence, friction is broadly classified as:
   - Dry Friction
     - Static Friction
     - Kinetic Friction
     - Rolling Friction
     - Sliding Friction
   - Fluid Friction

5. **What is Dry Friction?**
   Ans. Dry Friction
   Dry friction describes the reaction between two solid bodies in contact when they are in motion (kinetic friction) and when they are not (static friction). Both static and kinetic friction is proportional to the normal force exerted between the solid bodies. The interaction of different substances is modelled with different coefficients of friction.

6. **What is Static Friction?**
   Ans. The friction experienced when individuals try to move a stationary object on a surface, without actually triggering any relative motion between the body and the surface which it is on is called Static Friction.
   Ex: Some real-life examples of static friction are given in the points below.
   - Papers on a tabletop
   - A towel hanging on a rack
   - A car parked on a hill

7. **What is Kinetic Friction?**
   Ans. Kinetic friction is defined as a force that acts between moving surfaces. A body moving on the surface experiences a force in the opposite direction of its movement. The magnitude of the force will depend on the coefficient of kinetic friction between the two material.

8. **Write the application of Kinetic Friction.**
   Ans. Applications of Kinetic Friction are:
- Friction also plays a huge role in everyday occurrences like while rubbing of two objects takes place. The resulting motion converts into heat and thus resulting in the fire in some instances.
- It is also responsible for wear and tear and that's why we need oil to lubricate machine parts, as it reduces friction.
- When two objects are rubbed against each other, the frictional force is converted into thermal energy, in few cases giving rise to fire
- Kinetic friction is responsible for the wear and tear of machine parts; hence it is important to lubricate the machine parts with oil.

9. **What is the Difference Between Static Friction and Kinetic Friction?**

Static Friction	Kinetic Friction
Static friction is the friction present between two or more objects that are not moving with respect to each other	Kinetic friction is the friction present between two or more objects that are in motion with respect to each other.
The magnitude of static friction is greater due to the greater value of its coefficient	The magnitude of the kinetic friction is comparatively lesser due to the low value of its coefficient

10. **What is Rolling Friction?**
    Ans. For a moving solid body, there are two principal types of friction that act upon it:
    - The force resisting the motion of a rolling body on a surface is known as rolling friction or rolling resistance. Rolling of ball or wheel on the ground is an example of Rolling friction.
    - The other type of friction is sliding friction. In this type of friction, there is a restriction on the body's movement as only one side of the body is in contact with the surface. Pushing a box across the table is an example of Sliding friction.
      Rolling friction is considerably weaker than sliding friction.

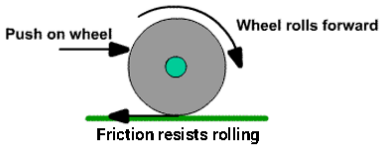
11. What are the main causes of Rolling Friction?

Ans. Cause of Rolling Friction:

When an object is rolled on a surface, certain things happen:

a. The object is deformed at the point of contact with the surface.
b. The surface is deformed at the point of contact with the object.
c. The motion is created below the surface as a result of the above-mentioned points.

The primary cause of this friction is that the energy of deformation is greater than the energy of recovery. Also, there is an adhesive force between the two surfaces which needs to be overcome constantly. The amount of friction is based on a variety of factors such as:



- The quality of the sliding body
- The quality of the surface
- Load
- The diameter of the rolling object
- The surface area of the body

12. What is Sliding Friction?

Ans. We can define sliding friction as the resistance created by any two objects when sliding against each other. This friction is also known as kinetic friction and is defined as the force that is needed to keep a surface sliding along another surface. It depends on two variables- one is material and the other is the weight of the object. Any change in the surface area in contact does not change the sliding friction.

Examples of Sliding Friction

- Rubbing both the hands together to create heat.
- A child sliding down through a slide in a park.
- A coaster sliding against a table.
- A washing machine pushed along with the floor.
- The frame and the edge of the door sliding against one another.
- A block being slid across the floor.
- Two cards in a deck sliding against each other.

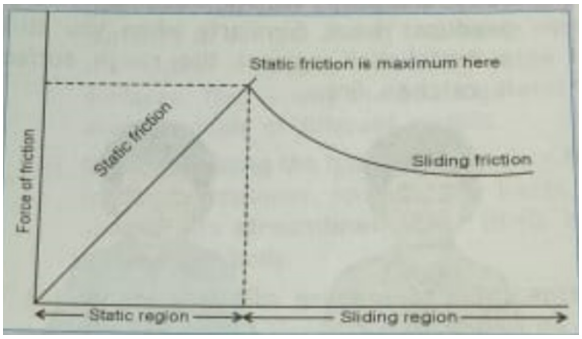
13. On which Factors the Sliding Frictional Force depends?

Ans. Factors affecting sliding friction

- The surface deformation of objects.
- The roughness or smoothness of the surface of the objects.
- The original speed of either object.
- The size of the object.
- Finally, the amount of pressure on either object.

14. Explain why sliding friction is less than static friction.

Ans. Friction comes into play when irregularities present in the surfaces of two objects in contact get interlocked with each other. In sliding, the time given for interlocking is very small. Hence, interlocking is not strong. Therefore, less force is required to overcome this interlocking. Because f this reason, sliding friction is less than static friction.



15. **What are the Differences between Rolling Friction and Sliding Friction?**

Ans.

Rolling friction	Sliding friction
Rolling friction takes place when an object rolls on the surface.	Sliding friction takes place when two surfaces are rubbed against each other.
Rolling friction takes place due to the deformation of surfaces.	Sliding friction takes place due to interlocking between microscopic surfaces.
The coefficient of rolling friction is dependent on the radius of the rolling object, the depth to which the object can sink, and the toughness of the surface.	The coefficient of sliding friction depends on the texture of the surface and temperature to a certain extent. It is independent of external factors.

16. **What is Fluid Friction?**

Ans. Fluid Friction is the force that obstructs the flow of fluid. It is a situation where the fluid provides resistance between the two surfaces. If both the surfaces offer high resistance then it is known as high viscous and, generally, we call them greasy.

17. **What is Streamlined Shape?**

Ans. A streamlined body is a shape that lowers the friction drag between a fluid, like air and water, and an object moving through that fluid. .

It occurs when the fluid closest to the object sticks to its surface, exerting a force that opposes the object's motion.

18. **What are the effects of Friction?**

Ans. Effects of Friction

- It produces heat, that helps in heating parts of any object or to warm ourselves.
- It also causes loss in power.
- It produces noise during any kind of operation.
- It's because of friction that we're able to walk, run, play, etc.

19. **How can we increase Friction?**

Ans. There are two methods of increasing friction: one is by making the surfaces rough and the other by increasing the mass of the object that is moving.

For example, the tyres of vehicles have treads, which increase the friction between the tyre and the road.

20. **How can we reduce Friction?**

Ans. Methods for decreasing friction:

a. Make the surfaces smoother. Rough surfaces produce more friction and smooth surfaces reduce friction.
b. By streamlining the body: To reduce fluid friction vehicles are shaped into streamline.
c. Lubrication is another way to make a surface smoother. ...
d. Make the object more streamlined.
e. Reduce the forces acting on the surfaces.
f. Reduce the contact between the surfaces.