



CHAPTER 12

FRICTION

NOTES:

- ❖ Any object moving over the surface of another object slows down when no external force is applied on it. This is due to the force of friction.

FORCE OF FRICTION

- ❖ A force which acts on opposing the motion of an object is called the force of friction.
- ❖ The force of friction always opposes the applied force.

FACTORS AFFECTING FRICTION

- ❖ The rates of irregularities on the two surfaces in contact can affect the friction.
- ❖ Friction is caused by the interlocking of irregularities on the two surfaces.
- ❖ Friction depends on the nature of the two surfaces in contact. The larger the number of irregularities between the surfaces, the greater the force of friction.
- ❖ The force of friction will increase if the two surfaces are pressed harder.
- ❖ The force required to overcome the friction at the instant an object starts moving from rest is a measure of static friction.
- ❖ The force required to keep the object moving with the same speed is a measure of sliding friction.
- ❖ Sliding friction is slightly smaller than the static friction.

FRICTION: A NECESSARY EVIL

- ❖ We can write on a paper using pen or pencil due to the friction.
- ❖ If there were no friction between the tyres of the vehicles and the road, they could not be started or stopped or turned to change the direction of motion.
- ❖ Building could not be constructed without friction.
- ❖ Soles of shoes or ball bearings wear out due to friction.
- ❖ Friction can also produce heat which causes wastage of energy.
- ❖ Striking a matchstick on the rough surface produces fire by friction.

INCREASING AND REDUCING FRICTION

- ❖ Friction can be increased by increasing the roughness of the surfaces in contact.
- ❖ The sole of the shoes and the tyres of the vehicle are treaded to increase friction and provide better grip on the floor and move safely.
- ❖ Sometime friction is undesirable; Friction can be minimised by using lubricants like oil and grease and by using ball bearing between machine parts.
- ❖ A substance that is used between two surfaces in contact to reduce friction is called a lubricant.

WHEELS REDUCE FRICTION

- ❖ When one body rolls over the surface of another body, the resistance to its motion is called rolling friction.
- ❖ Rolling reduces friction.
- ❖ The rolling friction is smaller than the sliding friction.
- ❖ In most machines the sliding is replaced by rolling by the use of ball bearings.

FLUID FRICTION

- ❖ Fluids (gases and liquids) exert force of friction on objects in motion through them.
- ❖ The frictional force exerted by fluids is called drag.
- ❖ The frictional force depends on the shape of the object, nature of the fluid and also on its speed with respect to the fluid.
- ❖ In order to overcome the friction exerted by fluids on object, energy is losing.
- ❖ Fluid friction can be minimized by giving suitable shapes to the objects moving in the fluids.
- ❖ Birds and fishes bodies evolved to shapes which would make them loss less energy in overcoming friction.
- ❖ All vehicles are designed to have shapes which reduce fluid friction.

