

Chapter 8. Friction

Very Short Q&A:

Q1: Define friction

Ans: Friction is the "evil" of all motion. No matter which direction something moves in, friction pulls it the other way.

Q2: Why vehicles slow down when brakes are applied?

Ans: Because of friction.

Q3: Friction opposes the _____ between the surfaces in contact with each other.

Ans: Relative motion.

Q4: Friction produces

- a. Light
- b. alpha rays
- c. Heat
- d. All of the above

Ans: Heat.

Q5: The force of friction always opposes the _____ force.

Ans: Applied

Q6: Is friction is same for all the surfaces?

Ans: No

Q7: Force of friction is greater in case of rough surface or smooth surface?

Ans: Rough surface.

Q8: Define static friction.

Ans: Static friction is the friction between two or more solid objects that are not moving relative to each other. For example, static friction can prevent an object from sliding down a sloped surface.

Q9: Define sliding friction.

Ans: Sliding friction is friction caused by moving two flat surfaces against each other.

Q10: Give examples to support the statement that- "friction is important for most of our day to day activities".

Ans: For writing with pen or pencil, for fixing nail in the wall, for lightening of a matchstick etc. friction is used.

Q11: Give an example to show friction produces heat.

Ans: Rubbing of our palm makes we feel warm.

Q12: Why trucks tyres are treaded?

Ans: Trucks tyres are treaded to increase friction so as to provide better grip with the ground.

Q13: Why sole of shoes are grooved?

Ans: Sole of shoes are grooved to increase friction so as to provide shoes, a better grip on the floor.

Q14: _____ is used to increase friction in the brake system of automobiles.

Ans: Brake pads.

Q15: Why kabbadi players should rub their hand with soil before they start playing?

Ans: For a better grip of their opponent.

Q16: Powder is sprinkled on the carom board to reduce _____.

Ans: Friction

Q17: Define lubricants.

Ans: A lubricant is a substance used to reduce friction between moving surfaces. It may also have the function of transporting foreign particles.

Q18: Can we reduce friction to zero by using lubricants?

Ans: No it is not possible to entirely eliminate friction.

Q19: What is spring balance?

Ans: Spring balance is the weighing device which is used for measuring the force acting on an object.

Q20: Rolling increases friction. True / False

Ans: False.

Q21: Why sliding is replaced by rolling in most of the machines?

Ans: Because rolling friction is smaller than sliding friction.

Q22: Give some examples showing replacement of sliding with rolling in machines.

Ans: The use of ball bearings between hubs and the axles of ceiling fans and bicycles.

Q23: Common name of gases and liquid is _____.

Ans: Fluids

Q24: Define drag.

Ans: The frictional forces exerted by fluids are called drag.

Q25: Water and other liquid exerts _____ when objects move through them.

Ans: Force of friction

Q26: Sliding friction is _____ than the static friction.

Ans: Smaller

Q27: Arrange forces due to rolling, static and sliding frictions in a decreasing order.

- a. rolling, sliding , static
- b. sliding, static, rolling
- c. static, sliding, rolling
- d. None of these

Ans: static, sliding, rolling.

Q28: Name the force responsible to fall down a boy when he steps on a banana peel.

Ans: Force of friction

Q29: Friction depends upon _____ of the surface.

Ans: Nature

Q30: Name the device used for measuring force acting on an object.

Ans: Spring balance.

Short Q&A:

Q1: Why a vehicle slows down when brakes are applied?

Ans: This is because of the force of friction between the brake and the wheel of the moving vehicles.

Q2: Why it is difficult to move on wet floor?

Ans: It is difficult to walk on a wet floor because layer of water makes floor smooth. The coating of water reduces the friction and the foot cannot make a proper grip on the floor and it starts getting to slip on the floor.

Q3: Define force of friction with an example.

Ans: Friction: Friction is the force which resists the relative motion of solid surfaces, fluid layers, and material elements sliding against each other.

Q4: What are the factors affecting friction?

Ans: Friction depends partly on the smoothness of the contacting surfaces, a greater force being needed to move two surfaces past one another if they are rough than if they are smooth. However, friction decreases with smoothness only to a degree; friction actually increases between two extremely smooth surfaces because of increased attractive electrostatic forces between their atoms. Friction does not depend on the amount of surface area in contact between the moving bodies or (within certain limits) on the relative speed of the bodies. It does, however, depend on the magnitude of the forces holding the bodies together.

Q5: Give an example to show that friction increases if the two surfaces are pressed harder.

Ans: Dragging a mat when nobody is sitting on it easier than dragging the same mat when a person is sitting on it.

Q6: Why sliding friction is slightly smaller than static friction?

Ans: Sliding friction is slightly smaller than static friction because two sliding objects find less time to get interlocked against each other's irregularities of surfaces as a result of which they experience less friction.

Q7: What would have happened if there were no friction between chalk and board?

Ans: We could not write with chalk on board.

Q8: When we strike a matchstick against the rough surface, it produces fire. Why so?

Ans: Striking a matchstick produces fire by friction.

Q9: Give an example to support that friction leads to wastage of energy.

Ans: Friction produces heat, when a machine is operated, heat is generated which causes much wastage of energy.

Q10: How can we increase friction of soles of shoes?

Ans: Soles of shoes are grooved so that a better grip is provided to the surface and thus can move safely and freely on floors.

Q11: How can we increase friction of tyres of vehicles?

Ans: The tyres of vehicles are treaded to provide better grip with the ground.

Q12: Give an example where we have to minimise friction.

Ans: Powder is sprinkled on the carom board to reduce friction and increase efficiency.

Q13: What is the function of lubricants?

Ans: A lubricant is a substance introduced to reduce friction between moving surfaces. It performs following functions

- Reduce friction
- Transfer heat
- Carry away contaminants & debris
- Transmit power
- Protect against wear
- Prevent corrosion
- Seal for gases
- Stop the risk of smoke and fire of objects

Q14: Why friction can never be entirely eliminated?

Ans: Friction can never be entirely eliminated, because no surface is perfectly smooth, there are always some irregularities present in it.

Q15: What is rolling friction?

Ans: Rolling friction is the force that resists the rolling of a wheel or other circular object along a surface caused by deformations in the object and or surface. Generally the rolling friction is smaller than sliding friction. example: One of the most common examples of rolling resistance is the movement of motor vehicle tires on a road.

Q16: Why it is convenient to pull luggage bags fitted with rollers?

Ans: This is because rolling reduces friction; it is always easier to roll than to slide a body over another.

Q17: What do you mean by sliding friction?

Ans: Friction occurs when two objects are moving relative to each other and rub together (like a sled on the ground) is called sliding friction.

Q18: Differentiate between sliding and rolling friction.

Ans: Friction occurs when two objects are moving relative to each other and rub together (like a sled on the ground) is called sliding friction, but Rolling friction is the force that resists the rolling of a wheel or other circular object along a surface caused by deformations in the object and or surface.

Q19: Define fluid friction.

Ans: Fluid friction describes the friction between layers within a viscous fluid that are moving relative to each other.

Q20: How frictions are reduced in machines?

Ans: Frictions are reduced in machines by using rolling in place of sliding; ball bearings are used for this purpose.

Q21: How can we reduce fluid friction?

Ans: The fluid friction can be minimised by giving suitable shapes to bodies moving in fluids.

Q22: Explain why sportsmen use shoes with spikes.

Ans: Sportsman use shoes with spike to increase the friction so that the shoes do not slip while they walk run or play.

Q23: A has to push a lighter box and B has to push same heavier box on the same floor, who will have to apply larger force and why?

Ans: B will have to apply larger force since; B will experience more frictional force because heavy object will be pressed hard against the opposite surface and produces more friction.

Q24: Why objects moving in fluid must have special shapes.

Ans: The fluids like various liquids or air that is; gaseous medium also exerts frictional force known as Drag. To minimize the effect of this Drag, streamlining of the motion of the object in the fluid is necessary which can be achieved by modification in the shape of the body. Objects moving in fluids must have a special shape called streamlined shapes or aerodynamic shapes. Streamlined Shape or Aerodynamic Shape is that shape which overcomes the friction of fluid.

Q25: Why it is difficult to walk on a floor wet with soapy water?

Ans: It is difficult to walk on a floor wet with soapy water because layer of soap makes floor smooth. The coating of soapy water reduces the friction and the foot cannot make a proper grip on the floor and it starts getting to slip on the floor.

Q26: Why it is difficult to walk on an extra smooth floor?

Ans: It is difficult to walk on a floor wet with soapy water because layer of soap makes floor smooth. The coating of soapy water reduces the friction and the foot cannot make a proper grip on the floor and it starts getting to slip on the floor.

Q27: Explain the function of spring balance.

Ans: Spring balance consists of a coiled spring which gets stretched when a force is applied to it, stretching of the spring is measured by a pointer moving on a graduated scale, the reading on the scale provides us with the magnitude of the force.

Q28: What is lubricated friction?

Ans: Fluid friction describes the friction between layers within a viscous fluid that are moving relative to each other.

Q29: What are the factors effecting friction?

Ans: A moving ball on the ground stops after some times because of the force of friction.

Q30: "Friction is an evil too". Justify the statement.

Ans: Friction is an evil too because :

- It causes wear and tear in objects of our daily use including machines.
- It makes movement of heavy objects very difficult.
- We need to spend a lot of time and money for the maintenance of various machines in order to keep their friction low.

Long Q&A:

Q1: Explain why friction is a necessary evil?

Ans: Friction is very important for us it helps in:;It allows us to walk comfortably, It allows us to grip and catch other objects. Things do not move from their places because of the friction. Speeds of moving objects can be controlled due to friction only. But apart from this friction is considered as an evil because; it causes wear and tear in objects of our daily use including machines. It makes movement of heavy objects very difficult.We need to spend a lot of time and money for the maintenance of various machines in order to keep their friction low.

Q2: Force of friction increases when two surfaces are pressed harder? Justify the statement.

Ans: Friction is caused by interlocking of irregularities in the two surfaces, thus it is quite obvious that the Force of friction increases when two surfaces are pressed harder, this can be experienced by dragging a mat when no one is sitting on it, and when a person is sitting on it.

Q3: Explain increasing and reducing friction.

Ans: Soles of shoes are grooved so that a better grip is provided to the surface and thus can move safely and freely on floors. The tyres of vehicles are treaded to provide better grip with the ground. Powder is sprinkled on the carom board to reduce friction and increase efficiency. Friction can never be entirely eliminated, because no surface is perfectly smooth, there are always some irregularities present in it.