

## Friction class 8 Living Science Solution

### A. MULTIPLE-CHOICE QUESTIONS: Choose the most appropriate answer.

1 Friction is

- a. always a disadvantage. b. always an advantage.  
c. sometimes a disadvantage and sometimes an advantage. d. neither a disadvantage nor an advantage.

2. It is difficult to walk on ice because

- a. pressure is high. b. pressure is low. c. friction is high. d. friction is low.

3. Friction can be increased by

- a. making the surfaces smooth. b. lubricating the surfaces.  
c. using ball bearings. d. making the surfaces rough.

4. Which of these is true about friction?

- a. It can stop a moving object. b. It can change the shape of an object.  
c. It can change the direction of a moving object. d. It can make a moving object move faster.

5. In which case is friction a disadvantage?

- a. running a machine b. walking c. applying brakes d. writing

6. Ball bearings are useful because

- a. rolling friction is more than sliding friction. b. rolling friction is less than sliding friction.  
c. rolling friction is same as sliding friction. d. it is easier to apply grease to ball bearings to reduce friction.

Answer: . 1. c 2.d 3.d 4. a 5.a 6.b .

### B. VERY SHORTANSWER QUESTIONS: Give one word answers.

1. Friction always opposes -----

2. Friction is caused by - ----- on the surfaces in contact.

3. is friction a contact or a non contact force?

4. The smoother a surface is, the (greater/ lesser) will be the friction.

5. Brakes on cars not work best if the friction between the brake shoes and wheels is reduced., True or false?

6. Friction causes wastage of energy. True or false?

7. A machine with moving parts will become less hot while running if it is well lubricate? True or false?

8. Friction due to fluids is called -----

9. Rolling friction is (greater/smaller) than sliding friction.

10. To reduce fluid friction, the object should have a ----- shape.

B. 1. motion 2. movement 3. contact 4. lesser 5. false 6. True 7. True 8. drag 9. smaller 10. streamlined

### C. SHORT-ANSWER QUESTIONS (TYPE I): Answer in a sentence or two.

1. What is friction?

Ans: Friction is a force that oppose the motion of objects.

Properties of friction force are: it slows down moving objects or prevents stationary objects from moving.

2. An object is moving from north to south. What is the direction of the force of friction on the object?

Ans: From south to north.

3. On what principle do ball bearings work?

Ans: Rolling friction is less than sliding friction. This principle is made use in ball bearings.

4. How does lubrication reduce friction?

Ans: Lubrication forms a thin layer of the lubricant between sliding surfaces. This makes the surface smooth and reduces friction.

5. Give an example to show the effect of heat generated in a machine due to excessive friction.

Ans: Engine gets heated due to friction between parts of machines

#### **D. SHORT-ANSWER QUESTIONS (TYPE Answer in about 30 words.)**

1. What is the effect of friction on motion?

Ans: The effects of friction on motion are: (i) it tends to stop a moving object. (ii) it also tends to prevent a stationary object from moving.

2. What causes friction between two surfaces in contact?

Ans: Surfaces are generally rough and have very small irregularities in the form of grooves and ridges. When one surface moves over another, irregularities interlock each other and slow down the motion of object.

3. Why does a rough surface have greater friction than a smooth surface?

Ans: A rough surface has more grooves and ridges than a smooth surface, therefore, greater friction than a smooth surface.

4. Give two situations where it is desirable to increase friction.

Ans: These are the two situations where it is desirable to increase friction.

(i) Increasing friction helps us to walk smoothly on ground (ii) Brakes in cycles or cars work because of friction.

5. What is 'streamlining'? How is it useful?

Ans: Streamline is a kind of shape which is narrow in front and back but broader at middle. For example, bodies of birds and fishes, aeroplanes, missiles, rockets etc.

It reduces the friction force exerted by fluid as drag depends on the shape of the object. Cars, aeroplanes, missiles, rockets etc are streamlined to reduce air resistance. Boats, ships also have streamlined shapes to reduce water resistance.

#### **E. LONG-ANSWER QUESTIONS: Answer in about 60 words.**

1. Discuss three situations in daily life where friction is an advantage

Ans: Advantages of friction:

(i) It would be impossible for us to walk without friction. It is because of friction between our feet or shoes and the ground that we are able to walk by pushing our feet against the ground.

(ii) Brakes on cycles or cars work because of friction. When brakes are applied, the 'shoes' of the brakes rub against the wheels. The friction between them reduces the speed.

(iii) One would not be able to write on paper without friction between the pencil or pen and paper.

2. Explain with example, the disadvantages of friction.

Ans: Disadvantages of friction:

(i) Friction causes wastage of energy. This is because any object that moves, has to overcome the force of friction.

(ii) Friction wears out the rubbing surfaces. The soles of your shoes wear out in a few months due to friction. The moving parts of a machine wear out with time because of friction.

(iii) Friction generates heat. Sometimes this can be harmful. The heat produced in a fast-moving machine is very high. Proper arrangements have to be made to cool the machine. Otherwise it can get damaged.

3. Explain four methods by which friction between two solid surfaces can be reduced.

Ans: Since friction is due to roughness of surfaces, any process that makes the contact surfaces smooth will reduce friction:

(i) By polishing: Polishing a rough surface smoothens it and reduces friction.

(ii) By lubricating: Friction is decreased by lubricating surfaces with oil, grease or graphite. The sliding surfaces then have a thin layer of the lubricant between the surfaces.

(iii) By streamlining to reduce fluid friction: Friction is minimum for a streamlined shape, which is rounded in the front and narrow at the back.

(iv) By using wheels and ball bearings: it is easier to roll an object than to slide it. Rolling friction is therefore less than sliding friction. That is why vehicles are equipped with wheels.

## F. Hots Questions Think and answer.

1. If there was no friction. what would happen to a moving body?

Ans: If there was no friction a moving object would continue moving with a uniform speed in a straight line for ever and will never stop.

2. When You rub your hands together. They became warm. What is this due to?

Ans: When I rub my hands together, they become warm. This is due to the frictional force between two surfaces which generates heat.

3. If you try to hold a glass with oil on your hands. it tends to slip why ?

Ans: . A glass held with oily hands tends to slip because oil is a lubricant and reduces the friction between the hands and the glass.

4. Why do you think rolling friction is less than sliding friction?

Ans: When an object is rolled over a surface, the surfaces in contact do not rub against each other and hence the friction is less. However when an object slides over a surface, the surfaces rub against each other and the friction is more. That is why rolling friction is less than sliding friction

5. Friction is a necessary evil. Explain

Ans: Friction is a necessary evil because, though friction causes loss of energy, and wear and tear, we would not be able to perform several daily activities without friction, for example, it is not possible to walk or write without friction.

## Extra scoring answers:

Q. What are causes of friction?

Answer: Irregularities on the surfaces of objects in contact (asperities) causes friction. When irregularities of two surface interlock cause friction.

Q. How roughness or Irregularities on the surfaces of objects in contact causes friction force?

Answer: When objects move on the rough surface, some of the Irregularities get interlocked and causes friction.

Q. What is force of adhesion?

Answer: Te force of attraction between molecules of matter is called adhesion.

Q. According to Ron Kurtus, what is the main cause of friction?

Answer: Adhesion is main cause of friction.

Q. Why are glue and fevicol good adhesive?

Answer: This is because glue and fevicol have adhesion for many substances.

Q. How can you measure friction force?

Answer: An approximate measurement of friction can be measured by using a spring balance.

Q. Why Friction is called self adjusting force?

Answer: When object is at rest applied force (F) is equal to force of friction (f) or  $\vec{F} = \vec{f}$

So, If the applied force (F) is increases and object does not move, then force of friction (f) will also increases at the same rate. Since, the force of friction adjust itself to applied force it is called a self adjusting force.

Q. What are the factors that affect the friction force?

Answer: Following are the factors that affect the friction force between two surfaces.

(i) Differences between nature of surface (ii) Mass of moving object (iii) Roughness of the two surfaces in contact (iv) Surface area of contact

Q. Aircraft do not flap their wings but they fly. How?

Answer: The powerful engine of aircraft provides push to fly in air. The streamline body shape of aircraft reduces the friction offered by air and help to fly without flapping wings.

Q. Why fishes have streamline shapes?

Answer: The streamline shape of fishes help to overcome friction force offered by water while moving under water.

Q. Maglev train moves without touching ground but experience a friction force name them:

Answer: Drag or friction due to air

Q. What are the different types of frictions?

Answer: The different types of frictions:

(a) Static friction: The force of friction act when object try to move from the position of rest.

(b) Sliding friction: The frictional force act when one object slides over the surface of another object are known as sliding friction.

(c) Rolling friction: The frictional force act when an object rolls over the surface of another object is called rolling friction. **NOTE: Static friction > Sliding friction > Rolling friction.**

Q. Why sliding friction is always less than static friction? Answer: When the object starts sliding, the contact point on its surface, do not get enough time to lock into the contact points on the other object. So sliding friction is always less than static friction.

Q. Write some methods of increasing friction?

Answer: (a) Grooves are made in the soles of shoes, treads are made in the tyres of vehicles, and spikes are made in the shoes of players to increase friction so as to provide a better grip on the ground.

(b) Gymnasts apply some coarse substance on their hands to increase friction for better grip

Q. What does Cause of sliding friction?

Answer: The causes of sliding friction are molecular attraction or adhesion between the materials, roughness of the surface of materials.

Q. It is easy to move an object on a sliding surface (inclined surface) than on a plane surface. Why?

Ans: It is easy to move an object on a sliding surface (inclined surface) than on a plane surface because the irregularities do not get enough time to interlock

Q. Discuss the roll of wheel in reducing friction?

Answer: Wheel reduce the area of contact and surface take less time to interlock during motion and thus help to reduce friction.

Q. Why handles of motor cycle have covering of rubber with spikes?

Answer: Handles of motor cycle have covering of rubber with spikes to increase friction and hence become easy to grip.

Q. The bath room slipper with rubbed off shoe is need to replace immediately Why.

Answer: The bath room slipper with rubbed off shoe offer less friction and became difficult to walk so to increase friction the bath room slipper with rubbed off shoe is need to replace immediately.