SCIENCE (PHYSICS)
WORKSHEET_090824
CHAPTER 09 FRICTION (ANSWERS)

SUBJECT: SCIENCE **MAX. MARKS : 40**
CLASS : VIII **DURATION : 1½ hr**

SECTION – A
Questions 1 to 6 carry 1 mark each.

1. In fig. a boy is shown pushing the box from right to left. The force of friction will act on the box:

(a) from right to left (←) (b) from left to right (→)
(c) vertically downwards (↓) (d) vertically upwards (↑)
Ans. (b) from left to right (→)
The force of friction will be from left to right as friction always opposes the motion, working in the opposite direction, and tries to bring it to rest.

2. Whenever the surfaces in contact tend to move or move with respect to each other, the force of friction comes into play
(a) Only if the objects are solid.
(b) Only if one of the two objects is liquid.
(c) Only if one of the two objects is gaseous.
(d) Irrespective of whether the objects are solid, liquid or gaseous.
Ans. (d) Irrespective of whether the objects are solid, liquid or gaseous.
Force of friction acts in solids, liquids and gases and opposes the motion with respect to each other.

3. Which of the following statement is incorrect?
(a) Friction acts on a ball rolling along the ground.
(b) Friction acts on a boat moving on water.
(c) Friction acts on a bicycle moving on a smooth road.
(d) Friction does not act on a ball moving through air.
Ans. (d) Friction does not act on a ball moving through air.
Air is very light and thin, yet it exerts frictional force on objects moving through it.

4. The picture shows four types of shoe soles. Which shoe sole provides the best grip and friction while walking?

(a) Sole1 (b) Sole 2 (c) Sole 3 (d) Sole 4
Ans. (b) Sole 2
From the picture, it can be seen that the surface of shoe sole 2 is rough, hence it will have a good grip.

5. A boy rolls a rubber ball on a wooden surface. The ball travels a short distance before coming to rest. To make the same ball travel longer distance before coming to rest, he may :
(a) spread a carpet on the wooden surface
(b) cover the ball with a piece of cloth.
(c) sprinkle talcum powder on the wooden surface.
(d) sprinkle sand on the wooden surface.
Ans. (c) sprinkle talcum powder on the wooden surface.
Talcum powder will smoothen the surface hence, reducing the frictional force. The ball will then cover longer distance.

6. In the below question, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as
Assertion (A): It is easier to walk on dry marble floor as compared to wet marble floor.
Reason (R): Friction helps us to walk.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A)
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.
Ans. (b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A)
It is true that friction helps us to walk but on wet marble floor friction becomes very less as the surface is very smooth, hence there are more chances to slip.

SECTION – B

Questions 7 to 9 carry 2 marks each.

7. Explain why sliding friction is less than static friction.
Ans. The two sliding objects find less time to get interlocked against each other (objects and irregularities of surface). So they get less friction. Therefore, sliding friction is always less than static friction.

8. Imagine that an object is falling through a long straight glass tube held vertical; air has been removed completely from the tube. The object does not touch the walls of the tube. Will the object experience any force of friction? Justify your answer.
Ans. No, the object will not experience any frictional force because to experience the force of friction two surfaces must be there and there is only one surface in this case.

9. You might have noticed that when used for a long time, slippers with rubber soles become slippery. Explain the reason.
Ans. Due to continuous rubbing of soles with the ground, the spikes on the sole get damaged slowly and the soles become slippery.

SECTION – C

Questions 10 to 13 carry 3 marks each.

10. While playing tug of war Preeti felt that the rope was slipping through her hands. Suggest a way out for her to prevent this.

Ans. To prevent slipping of the rope from hands, Preeti has to make her hands somewhat non-smooth, so she can rub her hands by introducing the sand between them.

11. What is fluid friction? Write the factors on which fluid friction depends.
Ans. The gases and liquids are called fluids. The friction exerted by fluids on an object is called fluid friction. The fluid friction is also called drag. The factors on which fluid friction depends are as following:
(i) The fluid friction of an object depends on its speed with respect to fluid.
(ii) The fluid friction of an object also depends on the shape of the object.
(iii) The frictional force due to fluids also depends on the nature of the fluid.

12. What happens, if the floor we walk on is frictionless?
Ans. We would not be able to walk on the surface if there is no friction on the floor. It is the friction which helps us to stand or walk on the surface. The grooves of our feet or shoes are locked into the irregularities of the floor and make us stand.

13. We observe that in some cases we want to increase friction. Explain why.
Ans. If we do not increase friction, vehicles will slip on the roads and they will never stop. We need to increase friction for better grip and to control the speed of the moving objects. It is not easy to walk and write without friction. We increase friction by making roads with concrete and by applying brakes in vehicles to stop them.

SECTION – D

Questions 14 to 16 carry 4 marks each.

14. Give examples to show that friction is both a friend and a foe.
Ans. Examples to show that friction is a friend and a foe:
Friction is a friend:
(i) Friction allows us to grip and catch different objects.
(ii) It helps us to walk comfortably on the surface.
(iii) It helps to minimise the speed or to stop the moving objects.
(iv) It helps us to write on paper or blackboard.
(v) The things do not move from their place due to the friction between the surfaces.
Friction is a foe:
(i) Friction causes wear and tear in objects.
(ii) It causes damage to the parts of machines.
(iii) The machines or tools require regular maintenance due to which a lot of money is wasted.
(iv) It reduces the speed of moving objects, so more force is required.
(v) It does not allow the free movement of objects.

15. Given below are some situations that we come across in day to day life. Give reason for their occurrence and means of how they can be rectified?
(i) Mixer grinder making lot of noise when in use.
(ii) Boy slipped on a wet floor.
(iii) Air cooler turned hot and stop working.
(iv) Balloon slipping from a silk curtain
Ans. (i) The parts of mixer must have worn off due to friction . It can be rectified by oiling them to make movement smooth.
(ii) The sole of boy's shoes have become smooth due to continuous use, that decreased friction between sole and wet floor . It can be recitified by use of new shoes with proper grooves so as to increase friction.
(iii) Due to friction between parts of air cooler, heat is generated that resulted in wear and tear of these parts and led to disfunctioning of cooler. The parts must be properly greased to reduce friction.
(iv) The smooth surface of curtain reduces friction, thus the balloon drops again and again. Is smooth silk curtain is replaced by cotton cloth then the friction will increase and balloon will stick to the curtain.

16. (a) When the cutting edge of a knife, is put against a fast rotating stone to sharpen it, sparks are seen to fly. Explain the reason.
(b) We have two identical metal sheets. One of them is rubbed with sand paper and the other with ordinary paper. The one rubbed with sand paper shines more than the other. Give reason.
Ans. (a) Due to the friction between knife and stone, the temperature of the knife and hence stone increases and it increases to such a level that the sparks are produced which can be seen while sharpening it.
(b) While rubbing with sand paper, more frictional force is produced between the layers of metal sheet and sand paper which causes more force on dust particles and they are removed easily, so it will shine more. But in case of ordinary paper, the force of friction is not sufficient to remove all the dust, so it will shine less in this case.

SECTION – E (Case Study Based Question)

Question 17 carry 4 mark

17. The Bicycle Race

Ananya and her friend Rohit were excited to participate in the annual school bicycle race. The racecourse was divided into two sections: the first half had a smooth, paved road, and the second half was a rough, gravelly path. At the beginning of the race, they both cycled easily over the smooth road, but when they reached the gravel path, they found it much harder to pedal.

After the race, their coach explained that the friction between the bicycle tires and the road was different in both sections. On the smooth road, there was less friction, making it easier to cycle. However, on the rough gravel path, friction increased, which made it harder to pedal. The coach also mentioned how friction helps them stop their bicycles by applying brakes and keeps them stable while riding.

(a) Why was it easier for Ananya and Rohit to ride on the smooth road compared to the gravel path? (2)

(b) What would happen if there was no friction between the bicycle tires and the road? (2)

OR

(b) How can friction be reduced in machines, and why is it important to do so? (2)

Ans. (a) On the smooth road, the friction between the tires and the surface was less, allowing the bicycle to move easily. However, on the rough gravel path, the friction increased due to the uneven surface, making it harder to pedal as more force was required to overcome the friction.

(b) If there was no friction between the bicycle tires and the road, it would be impossible to control or stop the bicycle. The tires would slip, making it difficult to move forward or turn, and the brakes would not work effectively to stop the bicycle.

OR

(b) Friction in machines can be reduced by using lubricants like oil or grease, using ball bearings, or designing smoother surfaces. Reducing friction is important because it minimizes wear and tear, reduces the amount of energy wasted as heat, and increases the efficiency of machines.