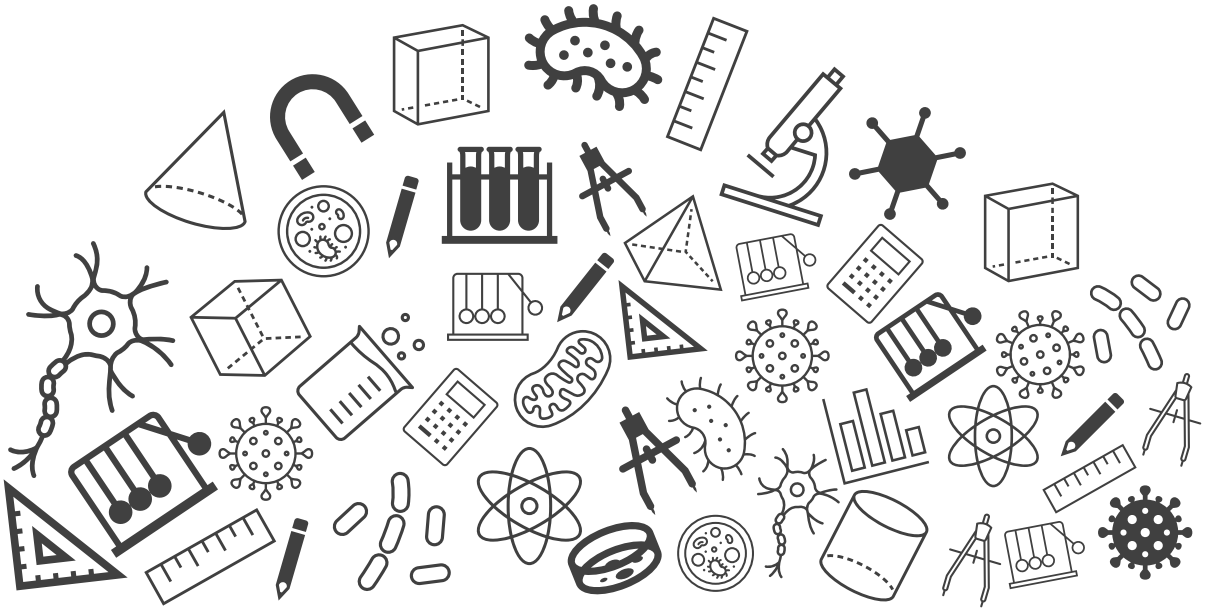
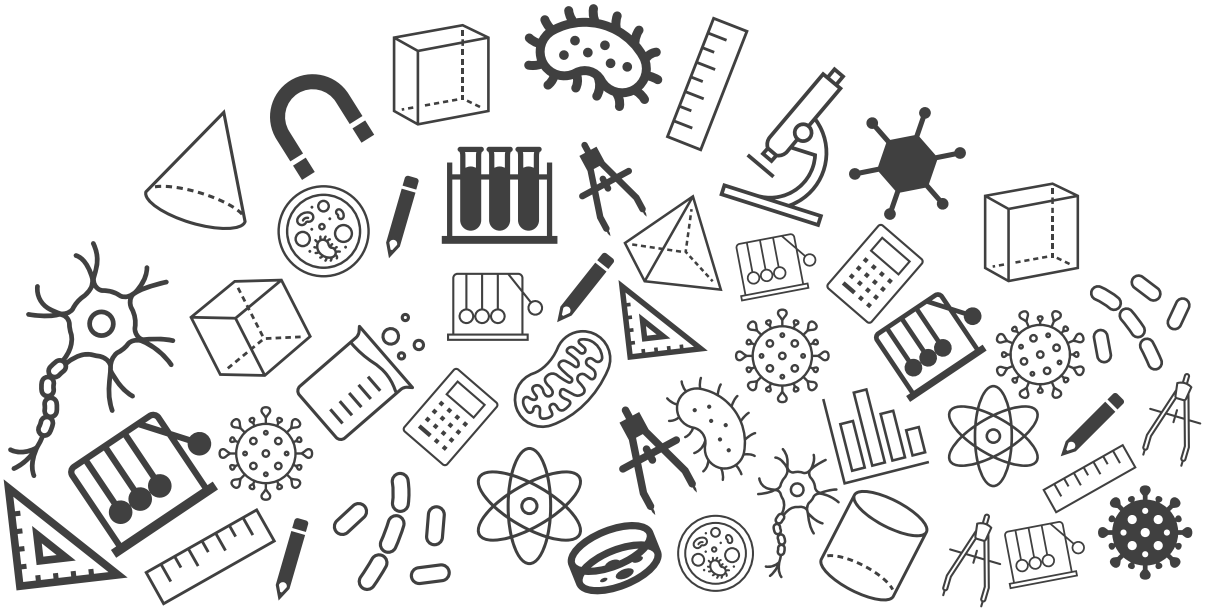
Grade 08 : Science
Exam Important Questions



Friction



Friction: Fluid Friction

Topic : Exam Important Questions

1. Why is it hard to move a filled box than an empty box? [2 MARKS]

   Proper reasoning : 2 Marks

   Friction is caused by the interlocking of irregularities in the two surfaces. It is obvious that the force of friction will increase if the two surfaces are pressed harder. So the heavier box is pressed harder than the empty box so it experiences greater friction.

2. Answer the following questions :

   A. Using a horizontal force of 200 N, we are moving a wooden cabinet across a floor at a constant velocity. What is the friction force that is being exerted on the cabinet?

   B. Ram's bike is moving with a speed of 90 km/hr. In traffic he had to reduce his speed to 30 Km/hr. By how much will the force of friction change? [3 MARKS]

   Part A : 1.5 Marks
   Part B : 1.5 Marks

   A. The cabinet will move with constant velocity only when the net force on it is zero. Therefore, force of friction on the cabinet = 200 N, in a direction opposite to the direction of motion of the cabinet.

   B. Friction force will not change as the friction force doesn't depend upon the velocity of the body.

Friction: Fluid Friction

3. We use ball bearings between the hub and axle of the ceiling fan. Why?
[2 marks]

In the absence of ball bearings, the hub and the axle would rub or slide against each other. This will result in heating them up and even damaging them.
[1 mark]

Since, rolling friction is less than sliding friction. The ball bearings reduce the friction existing between the hub and the axle by rolling between them.
[1 mark]

4. You spill a bucket of soapy water on a marble floor accidentally. Would it make it easier or more difficult for you to walk on the floor? Why? [2 marks]

It is possible to walk on the floor because of the friction present between our feet and the ground. For walking, we push the ground in a backward direction with our feet. The force of friction, in turn, pushes us in the forward direction. (1 mark)

The force of friction decreases between the ground and the feet when there is soapy water present on the floor as the soapy water acts like a lubricant. This does not cause a proper grip with the ground and hence it becomes difficult to walk on a marble floor with soapy water on it. (1 mark)

Friction: Fluid Friction

5. Friction is both a friend and a foe. Justify.

[5 marks]

Friction is both a friend and a foe because it has both advantages and disadvantages.
[1 mark]

Friction as a friend:

- It allows us to hold any object.
- It helps us walk.
- It helps vehicles apply brakes.
- It helps us write.

[2 marks]

Friction as a foe:

- It causes wear and tear of surfaces such as soles of shoes, tyres, etc.
- It causes damage to machine parts and tools.
- It reduces the speed of moving objects, so more force is required to continue the motion.
- It results in wastage of energy by producing heat and hence reduces efficiency.

[2 marks]

6. Explain why sportsmen use shoes with spikes. [2 Marks]

The spikes at the base of shoes acts as a rough surface and increase the friction between the shoes and the ground. [1 mark]

Spikes help in interlocking between the shoe surface and the ground which provides a strong grip to the athletes. This helps the athletes to run with more speed without slipping. [1 mark]

Friction: Fluid Friction

7. Why do meteoroids moving at a very high speed burn up in the atmosphere? [2 Marks]

The meteoroids falling towards Earth pass through its atmosphere. Meteoroids experience drag while falling towards Earth due to the presence of gases in the atmosphere.

(1 mark)

Since meteoroids travel at such high speeds, they experience a strong drag. This strong drag causes fire. So, meteoroids burn out in the earth's atmosphere before it reaches the surface.

(1 mark)

8. Explain why objects moving in fluids must have special shapes.
[2 marks]

When a body moves through a fluid, it experiences drag force.
[0.5 marks]
This drag force depends on the shape of the body. The objects moving in fluid have a special shape to minimise the drag on them. These special shapes are called streamlined shapes.
That is why airplanes have pointed noses. Streamlined shape allows the airplanes to cut through the fluid easily.
[1.5 marks]

Friction: Fluid Friction

9. Which of the following does not have a streamlined shape? [1 Mark]

- **A.** Aeroplane
- **B.** Boat
- **C.** Bird
- **D.** Bus

Solution: Option (d) [1 Mark]
Objects have a streamlined shape, usually when they are designed to travel or move through fluids.

Objects with streamlined shape are smaller towards the front and have a pointy end.

10. Alida runs her toy car on dry marble floor, wet marble floor, newspaper and towel spread on the floor. The force of friction acting on the car on different surfaces in increasing order will be:
[1 mark]

- **A.** Wet marble floor, dry marble floor, newspaper and towel.
- **B.** Newspaper, towel, dry marble floor, wet marble floor.
- **C.** Towel, newspaper, dry marble floor, wet marble floor.
- **D.** Wet marble floor, dry marble floor, towel, newspaper

Option (A) Wet marble floor, dry marble floor, newspaper and towel
[1 mark]

Force of friction depends on the nature of surfaces in contact. Generally more the roughness of surfaces, more is the friction.

A wet marble floor is smoothest of all the given surfaces, followed by dry marble floor, newspaper and then towel.