



# PHYSICS

## BOOKS - HT Olympiad Previous Year Paper

### FRICTION

#### Multiple Choice Question

1. Consider the given statements and select the correct option which correctly identifies

true (T) and false (F)

(i) When a body is in steady motion on a surface, the force of friction is dynamic friction

(ii) The force of friction between two bodies always acts parallel to the surface in contact with each other.

(iii) The friction acting on an object placed on a table is equal to its weight. (iv) Limiting friction is greater than sliding friction.

A.  $(i)$   $(ii)$   $(iii)$   $(iv)$   
 $T$   $F$   $T$   $F$

B.  $(i)$   $(ii)$   $(iii)$   $(iv)$   
 $F$   $T$   $F$   $T$

C.  $(i)$   $(ii)$   $(iii)$   $(iv)$   
 $T$   $T$   $T$   $F$

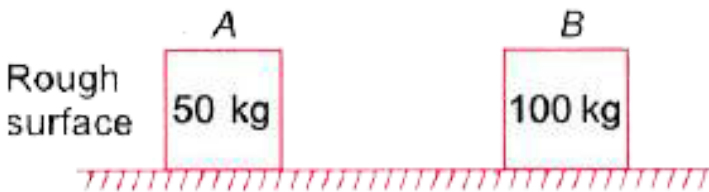
- D. (i) (ii) (iii) (iv)  
T T F T

**Answer: D**



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2. Two objects A and B are moving on a rough surface as shown in figure. Object A has greater velocity than B, then



- A. A experiences more frictional force than B
- B. B experiences more frictional force than A
- C. Both experience same frictional force
- D. Cannot be said because data is insufficient.

**Answer: B**



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3. A box was pushed by equal distance on four different surfaces. The force needed for each surface was recorded in the given table.

Surface	M	N	O	P
Force needed (N)	670	570	320	500

On which surface was the friction least ?

A. M

B. N

C. O

D. P

**Answer: C**



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4. Complete the passage using the suitable words given in option below.

A rough surface will offer a (i) frictional force than a smooth surface. The heavier the object, the (ii) will be the frictional force. Friction is a (iii) force.

- A.    (i)            (ii)            (iii)  
      Lower    Greater    Resistive

- B.  $(i)$        $(ii)$        $(iii)$   
Greater   Lower   Contact
- C.  $(i)$        $(ii)$        $(iii)$   
Greater   Greater   Contact
- D.  $(i)$        $(ii)$        $(iii)$   
Lower   Lower   Resistive

**Answer: C**



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5. A car is travelling at constant speed along a road, and drives onto a large patch of oil. The driver applies the brakes to stop the car.

Compare to braking on a dry road, what may happen?

A. The car slows down more quickly because of the reduced friction between the tyres and the road.

B. The car speeds up because of the reduced friction between the tyres and the road.

C. The car takes longer time to slow down because of the reduced friction between



the tyres and the road.

D. The car takes longer time to slow down

because of the greater friction between

the tyres and the road.

**Answer: C**

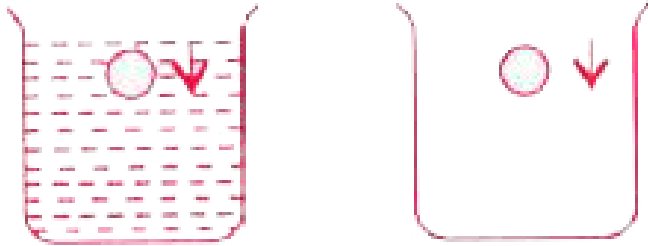


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**6.** Read the passage carefully and answer the following questions.

In the figures shown, there are two jars, one is

filled with honey and other is empty. There are two balls of plasticine of the same size.



In which jar does the ball reach the bottom first ?

- A. In jar filled with honey
- B. In jar without honey
- C. In both the jars at the same time

D. Cannot be said because data is insufficient

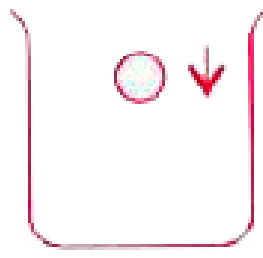
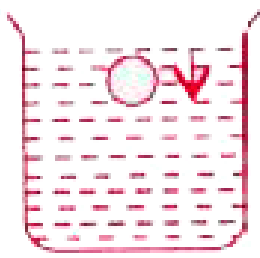
**Answer: B**



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7. Read the passage carefully and answer the following questions.

In the figures shown, there are two jars, one is filled with honey and other is empty. There are two balls of plasticine of the same size.



What do you observe from the given information ?

- A. Friction due to air is much smaller than the friction due to liquid.
- B. Friction due to air is much greater than the friction due to liquid.
- C. Friction due to air is equal to the friction due to liquid.

D. None of these

**Answer: A**



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**8.** Read the given statements and select the correct option.

Statement 1 : When a person walk on a rough surface, the frictional force exerted by the surface on the person is opposite to the direction of motion.

Statement 2: Friction always acts opposite to the direction of motion.

A. Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1

B. Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.

C. Statement 1 is true but statement 2 is false

D. Both the statements 1 and 2 are false.

**Answer: D**



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9. A rectangular wooden box of dimensions  $10\text{cm} \times 20\text{cm} \times 40\text{cm}$  is kept on a horizontal surface with its face of smallest area on the surface. A minimum force of 12 N applied parallel to the surface sets the box in sliding motion along the surface. If the box is now

kept with its face of larger area in contact with the surface, the minimum force applied parallel to the surface, to set the box in motion, is

- A. Less than 12 N
- B. May be greater or less than 12 N
- C. Greater than 12 N
- D. Equal to 12 N.

**Answer: D**



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**10.** A man sharpens his knife as shown in the figure. Which of the following properties of friction are in use?

(i) Friction helps us to hold objects.

(ii) Friction acts in the opposite direction of motion

(iii) Friction causes the surfaces in contact to wear away

(iv) Friction produces heat energy



A. (i) and (ii) only

B. (i), (iii) and (iv) only

C. (iii) and (iv) only

D. (i), (ii), (iii) and (iv)

**Answer: D**



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**11.** John carried out an experiment to find out how different surfaces (P, Q, R and S) affect the distance a car travelling at 50 km/h needed to stop once the brakes are applied.

The results are shown below:

Type of road surfaces	P	Q	R	S
Stopping distance (m)	18	15	19	27

Which type of road will provide the most friction for the car to stop?

A. P

B. Q

C. R

D. S

**Answer: B**



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12. When a bicycle is in motion, the force of friction exerted by the ground on the two wheels is such that it acts

A. In the backward direction on the front wheel and in the forward direction on the rear wheel

B. In the forward direction on the front wheel and in the backward direction on

the rear wheel

C. In the forward direction on both front  
and the rear wheels

D. None of these.

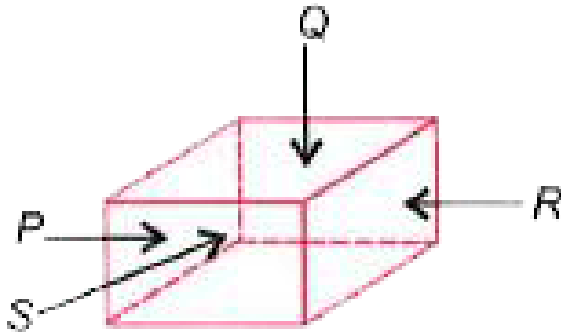
**Answer: A**



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**Achievers Section Hots**

1. When friction is acting in the direction of P, in which direction do you think the force is applied?



A. P

B. Q

C. R

D. S

**Answer: C**



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2. A crate is located in the center of a flatbed truck. The truck accelerates to the east and the crate moves with it, not sliding at all. What is the direction of the friction force exerted by the truck on the crate?

A. It is to the west.

B. It is to the east.



C. No friction force exists because the crate is not sliding.

D. None of these

**Answer: B**



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**3.** A box is given a push across the floor. It comes to stop shortly after. Which one of the following reasons explain why this happen?

A. Gravity is acting on the box in the direction opposite to the box's movement.

B. Friction is acting on the box in the same direction of the box's movement.

C. Friction is acting on the box in the direction opposite to the box's movement.

D. The heat produced during the box's movement slows down the box

**Answer: C**



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