

PHYSICS · JEE MAIN

Friction

Chapter-wise previous year questions, with answer key

14

PYQS

2021-2024

PAPERS

2

TOPICS

Static and Kinetic Friction

Motion on Rough Inclined Plane

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap "Step-by-step solution" under it for the full working.

Stuck on a question?

Every question has a free step-by-step solution on PrepWiser — tap "Step-by-step solution" under it.

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Static and Kinetic Friction · 9 PYQs

Q1 JEE Main 2024 · 5 Apr · Shift 2

A heavy box of mass 50kg is moving on a horizontal surface. If co-efficient of kinetic friction between the box and horizontal surface is 0.3 then force of kinetic friction is :

- (A) 1470 N (B) 147 N
(C) 1.47 N (D) 14.7 N

[Step-by-step solution ► prepwiser.in/questions/2vViayAij7](https://www.prepwiser.in/questions/2vViayAij7)

Q2 JEE Main 2024 · 29 Jan · Shift 1

A block of mass 100kg slides over a distance of 10m on a horizontal surface. If the co-efficient of friction between the surfaces is 0.4, then the work done against friction (in J) is :

- (A) 3900 (B) 4500
(C) 4200 (D) 4000

[Step-by-step solution ► prepwiser.in/questions/CoS_0jfWUu](https://www.prepwiser.in/questions/CoS_0jfWUu)

Q3 JEE Main 2024 · 27 Jan · Shift 2

Given below are two statements :

Statement (I) : The limiting force of static friction depends on the area of contact and independent of materials.

Statement (II) : The limiting force of kinetic friction is independent of the area of contact and depends on materials.

In the light of the above statements, choose the most appropriate answer from the options given below :

- (A) Statement I is incorrect but Statement II is correct
(B) Both Statement I and Statement II are correct
(C) Both Statement I and Statement II are incorrect
(D) Statement I is correct but Statement II is incorrect

[Step-by-step solution ► prepwiser.in/questions/JMIxAhRBcu](https://www.prepwiser.in/questions/JMIxAhRBcu)

Q4 JEE Main 2023 · 1 Feb · Shift 1

A block of mass 5kg is placed at rest on a table of rough surface. Now, if a force of 30N is applied in the direction parallel to surface of the table, the block slides through a distance of 50m in an interval of time 10s. Coefficient of kinetic friction is (given, $g = 10\text{ms}^{-2}$):

- (A) 0.25 (B) 0.75
(C) 0.60 (D) 0.50

[Step-by-step solution ► prepwiser.in/questions/hCvhDleZDZ](https://www.prepwiser.in/questions/hCvhDleZDZ)

Q5 JEE Main 2023 · 31 Jan · Shift 2

A body of mass 10kg is moving with an initial speed of 20m/s. The body stops after 5s due to friction between body and the floor. The value of the coefficient of friction is:

(Take acceleration due to gravity $g = 10\text{ms}^{-2}$)

- (A) 0.3 (B) 0.2
(C) 0.5 (D) 0.4

[Step-by-step solution ► prepwisser.in/questions/408GAAONPQ](https://www.prepwisser.in/questions/408GAAONPQ)

Q6 JEE Main 2022 · 27 Jul · Shift 1

A bag is gently dropped on a conveyor belt moving at a speed of 2m/s. The coefficient of friction between the conveyor belt and bag is 0.4. Initially, the bag slips on the belt before it stops due to friction. The distance travelled by the bag on the belt during slipping motion, is : [Take $g = 10\text{m/s}^{-2}$]

- (A) 2 m (B) 0.5 m
(C) 3.2 m (D) 0.8 ms

[Step-by-step solution ► prepwisser.in/questions/68zS1hitYR](https://www.prepwisser.in/questions/68zS1hitYR)

Q7 JEE Main 2022 · 25 Jun · Shift 1

A uniform chain of 6 m length is placed on a table such that a part of its length is hanging over the edge of the table. The system is at rest. The co-efficient of static friction between the chain and the surface of the table is 0.5, the maximum length of the chain hanging from the table is _____ m.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/RySwwE8eVF](https://www.prepwisser.in/questions/RySwwE8eVF)

Q8 JEE Main 2022 · 24 Jun · Shift 2

Two identical charged particles each having a mass 10 g and charge $2.0 \times 10^{-7}\text{C}$ are placed on a horizontal table with a separation of L between them such that they stay in limited equilibrium. If the coefficient of friction between each particle and the table is 0.25, find the value of L. [Use $g = 10\text{ms}^{-2}$]

- (A) 12 cm (B) 10 cm
(C) 8 cm (D) 5 cm

[Step-by-step solution ► prepwisser.in/questions/rRnnpnZsRIs](https://www.prepwisser.in/questions/rRnnpnZsRIs)

Q9 JEE Main 2022 · 24 Jun · Shift 1

A block of mass 10 kg starts sliding on a surface with an initial velocity of 9.8ms^{-1} . The coefficient of friction between the surface and block is 0.5. The distance covered by the block before coming to rest is : [use $g = 9.8\text{ms}^{-2}$]

- (A) 4.9 m (B) 9.8 m
(C) 12.5 m (D) 19.6 m

[Step-by-step solution ► prepwisser.in/questions/TkaYKSTsZG](https://www.prepwisser.in/questions/TkaYKSTsZG)

Motion on Rough Inclined Plane · 5 PYQs

Q10 JEE Main 2024 · 8 Apr · Shift 2

A given object takes n times the time to slide down 45° rough inclined plane as it takes the time to slide down an identical perfectly smooth 45° inclined plane. The coefficient of kinetic friction between the object and the surface of inclined plane is :

(A) $1 - \frac{1}{n^2}$

(B) $\sqrt{1 - \frac{1}{n^2}}$

(C) $1 - n^2$

(D) $\sqrt{1 - n^2}$

[Step-by-step solution ► prepwisser.in/questions/9JgD3Rt0Y4](https://www.prepwisser.in/questions/9JgD3Rt0Y4)

Q11 JEE Main 2024 · 4 Apr · Shift 2

A 2kg brick begins to slide over a surface which is inclined at an angle of 45° with respect to horizontal axis. The co-efficient of static friction between their surfaces is:

(A) 1

(B) 1.7

(C) 0.5

(D) $\frac{1}{\sqrt{3}}$

[Step-by-step solution ► prepwisser.in/questions/vCX4UWzYAN](https://www.prepwisser.in/questions/vCX4UWzYAN)

Q12 JEE Main 2024 · 30 Jan · Shift 2

A block of mass m is placed on a surface having vertical crosssection given by $y = x^2/4$. If coefficient of friction is 0.5, the maximum height above the ground at which block can be placed without slipping is:

(A) $1/2$ m

(B) $1/3$ m

(C) $1/6$ m

(D) $1/4$ m

[Step-by-step solution ► prepwisser.in/questions/KQ0zXR3UkV](https://www.prepwisser.in/questions/KQ0zXR3UkV)

Q13 JEE Main 2022 · 27 Jul · Shift 2

A block of mass M slides down on a rough inclined plane with constant velocity. The angle made by the incline plane with horizontal is θ . The magnitude of the contact force will be :

(A) Mg

(B) $Mg \cos \theta$

(C) $\sqrt{Mg \sin \theta + Mg \cos \theta}$

(D) $Mg \sin \theta \sqrt{1 + \mu}$

[Step-by-step solution ► prepwisser.in/questions/fA0AtI16wN](https://www.prepwisser.in/questions/fA0AtI16wN)

Q14 JEE Main 2021 · 20 Jul · Shift 2

A body of mass ' m ' is launched up on a rough inclined plane making an angle of 30° with the horizontal. The coefficient of friction between the body and plane is $\frac{\sqrt{x}}{5}$ if the time of ascent is half of the time of descent. The value of x is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/Wb3CPD6icB](https://www.prepwisser.in/questions/Wb3CPD6icB)

Answer key — Friction

Numbers match the question numbers above. For full working, open the solution link under each question.

1	B	2	D	3	A	4	D	5	D	6	B	7	2	8	A
9	B	10	A	11	A	12	D	13	A	14	3				

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