EdLoop

EdLoop JEE

MATHEMATICS · JEE MAIN

Statics & Dynamics

Previous Year Questions with answers

17 questions · **6** papers · **2002–2007** · newest paper first

Step-by-step solutions for every question: free in the EdLoop JEE app (Google Play) · pyq.edloop.in

What is in this PDF: every Statics & Dynamics question we hold from past JEE Main and AIEEE papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

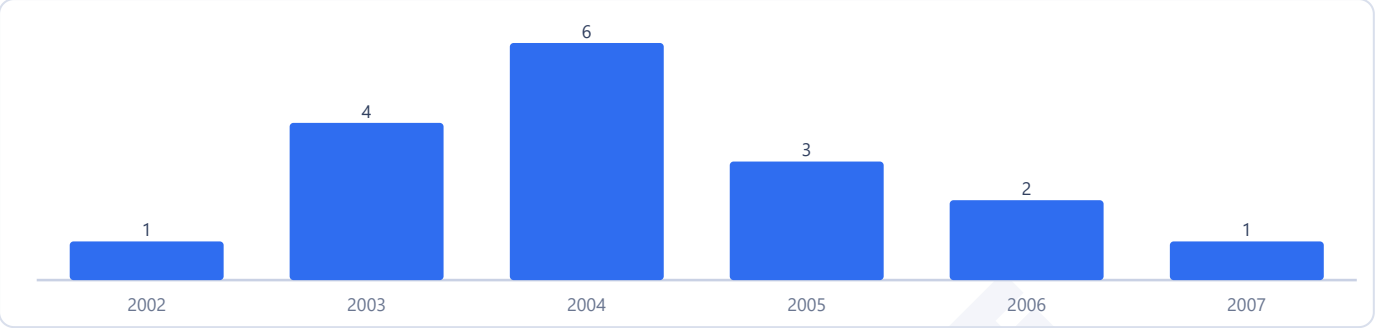
Step-by-step solutions for every question are free in the EdLoop JEE app (Google Play) and on app.edloop.in. More chapters: pyq.edloop.in/free-pdfs/

EdLoop

Chapter at a glance

0%	17	0 of 162	17 / 0
of Mathematics questions, 2019–2026	questions, 2002–2007	papers asked it, 2019–2026	MCQ / numerical, 2002–2007

Questions per year



Counts are the questions we hold: 17 in 6 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2002–2007)

Statics	10
Dynamics	7

How often it comes up

Statics and dynamics is a legacy chapter that appeared exclusively in early AIEEE mathematics papers, placing it at rank 29 among the 29 chapters in the subject. Between 2019 and 2026, zero questions were asked from this chapter across 162 papers, representing 0.0 percent of all mathematics questions. It appeared in 0 of those 162 papers and was not asked in 2019, 2020, 2021, 2022, 2023, 2024, 2025, or 2026. In the 2024 to 2026 testing sessions, 0 questions appeared across 58 papers, averaging 0.0 questions per paper with a 0.0 percent subject share. Comparing the earlier 2002 to 2018 share of 1.3 percent to the 2024 to 2026 share shows that its long-term share is down, while comparing 2019 to 2026 with 2024 to 2026 shows it is about the same. Across the complete archive from 2002 to 2007 spanning 200 papers, 17 questions appeared across 6 papers, with 0 numerical answer questions between 2019 and 2026.

This chapter has not appeared in any modern JEE Main sitting. It was completely dropped from the engineering entrance mathematics syllabus after 2007, when AIEEE streamlined mechanics into the physics paper. Zero questions were asked between 2008 and 2026.

Modern engineering aspirants should devote zero revision time to this chapter under mathematics. All relevant mechanics principles, including equilibrium of concurrent forces and kinematics, are now tested exclusively within the Physics section.

Most-asked topics

Historical questions in old AIEEE papers fell under two categories:

1. **Statics (0 questions, 2019-2026; 10 total, last asked 2007)** Covered equilibrium of coplanar concurrent forces, Lami's theorem, triangle law of forces, moments of forces about a pivot, and finding unknown resultant magnitudes when one component force is reversed.

2. **Dynamics (0 questions, 2019-2026; 7 total, last asked 2006)** Involved relative velocity, resolution of velocity vectors along perpendicular axes, uniform acceleration trajectories, pursuit problems, and work done by constant forces.

What the questions look like

Historical mechanics problems set in mathematics papers followed distinctive physics-style formulations:

- **Resultant of Reversed Forces**: Two forces act at an angle. If one force is reversed in direction, the resultant changes magnitude, requiring students to solve for one force in terms of the other.
- **Equilibrium under Concurrent Forces**: Three coplanar forces directed from triangle centres such as the incentre keep a point in equilibrium, requiring candidates to find their relative ratios using trigonometric sine rules.
- **Relative Pursuit Kinematics**: Calculating the time taken for an accelerating pursuer to catch a uniformly moving target along a straight line.
- **Resultant Direction Bisecting an Angle**: Evaluating the angle between velocity vectors such that altering one magnitude causes the new resultant to bisect the original angle.

How to practise it

Because this chapter does not exist in the current JEE Main mathematics syllabus, students should not practice it as mathematics:

- **Study mechanics in Physics**: Practice vector equilibrium, Newton's laws, and kinematics under the Physics syllabus where they are actively tested.
- **Omit old AIEEE mechanics problems in mathematics**: When practicing past mathematics papers from 2002 to 2007, skip problems labeled Statics or Dynamics.

EdLoop JEE

Q1 AIEEE 2007 MCQ

The resultant of two forces P N and 3 N is a force of 7 N. If the direction of 3 N force were reversed, the resultant would be $\sqrt{19}$ N. The value of P is

(A) 5 N
(B) 6 N
(C) 3 N
(D) 4 N

Answer: (A) 5 N · Key from source paper

Q2 AIEEE 2006 MCQ

ABC is a triangle, right angled at A. The resultant of the forces acting along $\overrightarrow{AB}$, $\overrightarrow{AC}$ with magnitudes $\frac{1}{AB}$ and $\frac{1}{AC}$ respectively is the force along $\overrightarrow{AD}$, where D is the foot of the perpendicular from A onto BC. The magnitude of the resultant is

(A) $\frac{AB^2+AC^2}{(AB)^2(AC)^2}$
(B) $\frac{(AB)(AC)}{AB+AC}$
(C) $\frac{1}{AB}+\frac{1}{AC}$
(D) $\frac{1}{AD}$

Answer: (D) $\frac{1}{AD}$ · Key from source paper

Q3 AIEEE 2006 MCQ

A particle has two velocities of equal magnitude inclined to each other at an angle θ. If one of them is halved, the angle between the other and the original resultant velocity is bisected by the new resultant. Then θ is

(A) 90°
(B) 120°
(C) 45°
(D) 60°

Answer: (B) 120° · Key from source paper

Q4 AIEEE 2005 MCQ

A lizard, at an initial distance of $21\ \mathrm{cm}$ behind an insect, moves from rest with an acceleration of $2\ \mathrm{cm/s^2}$ and pursues the insect which is crawling uniformly along a straight line at a speed of $20\ \mathrm{cm/s}$. Then the lizard will catch the insect after

(A) $20\ \text{s}$
(B) $1\ \text{s}$
(C) $21\ \text{s}$
(D) $24\ \text{s}$

Answer: (C) $21\ \text{s}$ · Key from source paper

Q5 AIEEE 2005 MCQ

ABC is a triangle. Forces P, Q, R acting along IA, IB and IC respectively are in equilibrium, where I is the incentre of $\triangle ABC$. Then $P : Q : R$ is

(A) $\sin A : \sin B : \sin C$
(B) $\sin \frac{A}{2} : \sin \frac{B}{2} : \sin \frac{C}{2}$
(C) $\cos \frac{A}{2} : \cos \frac{B}{2} : \cos \frac{C}{2}$
(D) $\cos A : \cos B : \cos C$

Answer: (C) $\cos \frac{A}{2} : \cos \frac{B}{2} : \cos \frac{C}{2}$ · Key from source paper

Q6 AIEEE 2005 MCQ

The resultant R of two forces acting on a particle is at right angles to one of them and its magnitude is one third of the other force. The ratio of larger force to smaller one is

(A) $2 : 1$
(B) $3 : \sqrt{2}$
(C) $3 : 2$
(D) $3 : 2\sqrt{2}$

Answer: (D) $3 : 2\sqrt{2}$ · Key from source paper

Q7 AIEEE 2004 MCQ

A particle moves towards east from a point A to a point B at the rate of 4 km/h and then towards north from B to C at the rate of 5 km/h. If $AB = 12$ km and $BC = 5$ km, then its average speed for its journey from A to C and resultant average velocity direct from A to C are respectively

(A) $\frac{17}{4}$ km/h and $\frac{13}{4}$ km/h
(B) $\frac{13}{4}$ km/h and $\frac{17}{4}$ km/h
(C) $\frac{17}{9}$ km/h and $\frac{13}{9}$ km/h
(D) $\frac{13}{9}$ km/h and $\frac{17}{9}$ km/h

Answer: (A) $\frac{17}{4}$ km/h and $\frac{13}{4}$ km/h · Key from source paper

Q8 AIEEE 2004 MCQ

A particle is acted upon by constant forces $4I + J - 3k$ and $3I + J - k$ which displace it from a point $\hat{i} + 2\hat{j} + 3\hat{k}$ to the point $5\hat{i} + 4\hat{j} + \hat{k}$. The work done in standard units by the forces is given by

(A) 40
(B) 30
(C) 25
(D) 15

Answer: (A) 40 · Key from source paper

Q9 AIEEE 2004 MCQ

With two forces acting at a point, the maximum effect is obtained when their resultant is 4 N. If they act at right angles, then their resultant is 3 N. Then the forces are

(A) $(2+\sqrt{2})N$ and $(2-\sqrt{2})N$
(B) $(2+\sqrt{3})\mathrm{N}$ and $(2-\sqrt{3})\mathrm{N}$
(C) $\left(2+\frac{1}{2}\sqrt{2}\right)\mathrm{N}$ and $\left(2-\frac{1}{2}\sqrt{2}\right)\mathrm{N}$
(D) $\left(2+\frac{1}{2}\sqrt{3}\right)\mathrm{N}$ and $\left(2-\frac{1}{2}\sqrt{3}\right)\mathrm{N}$

Answer: (C) $\left(2+\frac{1}{2}\sqrt{2}\right)\mathrm{N}$ **and** $\left(2-\frac{1}{2}\sqrt{2}\right)\mathrm{N}$ · Key from source paper

---

Q10 AIEEE 2004 MCQ

In a right angle $\triangle$ABC, $\angle\mathrm{A}=90^{\circ}$ and sides a, b, c are respectively 5 cm, 4 cm and 3 cm. If a force $\vec{F}$ has moments 0,9 and 16 in N cm. units respectively about vertices A, B and C, then magnitude of $\vec{F}$ is

(A) 3
(B) 4
(C) 5
(D) 9

Answer: (C) 5 · Key from source paper

Q11 AIEEE 2004 MCQ

Three forces $\vec{P},\vec{Q}$ and $\vec{R}$ acting along IA, IB and IC, where I is the incentre of a $\triangle ABC$, are in equilibrium. Then $\vec{P}:\vec{Q}:\vec{R}$ is

(A) $\cos\frac{A}{2}:\cos\frac{B}{2}:\cos\frac{C}{2}$
(B) $\sin\frac{A}{2}:\sin\frac{B}{2}:\sin\frac{C}{2}$
(C) $\sec\frac{A}{2}:\sec\frac{B}{2}:\sec\frac{C}{2}$
(D) $\mathrm{cosec}\frac{A}{2}:\mathrm{cosec}\frac{B}{2}:\mathrm{cosec}\frac{C}{2}$

Answer: (A) $\cos\frac{A}{2}:\cos\frac{B}{2}:\cos\frac{C}{2}$ · Key from source paper

---

Q12 AIEEE 2004 MCQ

A velocity $\frac{1}{4}$ m/s is resolved into two components along OA and OB making angles 30° and 45° respectively with the given velocity. Then the component along OB is

(A) $\frac{1}{8}$ m/s
(B) $\frac{1}{4}(\sqrt{3}-1)$m/s
(C) $\frac{1}{4}$ m/s
(D) $\frac{1}{8}(\sqrt{6}-\sqrt{2})$m/s

Answer: (D) $\frac{1}{8}(\sqrt{6}-\sqrt{2})$**m/s** · Key from source paper

Q13 AIEEE 2003 MCQ

Let R_1 and R_2 respectively be the maximum ranges up and down an inclined plane and R be the maximum range on the horizontal plane. Then R_1, R, R_2 are in

(A) H.P
(B) A.G.P
(C) A.P
(D) G.P.

Answer: (A) H.P · Key from source paper

Q14 AIEEE 2003 MCQ

A couple is of moment $\vec{G}$ and the force forming the couple is $\vec{P}$. If $\vec{P}$ is turned through a right angle the moment of the couple thus formed is $\vec{H}$. If instead, the force $\vec{P}$ are turned through an angle α, then the moment of couple becomes

(A) $\vec{H}\sin\alpha - \vec{G}\cos\alpha$
(B) $\vec{G}\sin\alpha - \vec{H}\cos\alpha$
(C) $\vec{H}\sin\alpha + \vec{G}\cos\alpha$
(D) $\vec{G}\sin\alpha + \vec{H}\cos\alpha$

Answer: (C) $\vec{H}\sin\alpha + \vec{G}\cos\alpha$ · Checked by our team

Q15 AIEEE 2003 MCQ

The resultant of forces $\vec{P}$ and $\vec{Q}$ is $\vec{R}$. If $\vec{Q}$ is doubled then $\vec{R}$ is doubled. If the direction of $\vec{Q}$ is reversed, then $\vec{R}$ is again doubled. Then $\mathrm{P}^2 : \mathrm{Q}^2 : \mathrm{R}^2$ is

(A) $2:3:1$
(B) $3:1:1$
(C) $2:3:2$
(D) $1:2:3$

Answer: (C) $2:3:2$ · Key from source paper

Q16 AIEEE 2003 MCQ

A particle acted on by constant forces $4i + j - 3k$ and $3i + j - k$ is displaced from the point $i + 2j + 3k$ to the point $5i + 4j + k$. The total work done by the forces is

(A) 50 units
(B) 20 units
(C) 30 units
(D) 40 units

Answer: (D) 40 units · Key from source paper

Q17 AIEEE 2002 MCQ

The sum of two forces is 18 N and resultant whose direction is at right angles to the smaller force is 12 N. The magnitude of the two forces are

(A) 13, 5
(B) 12, 6
(C) 14, 4
(D) 11, 7

Answer: (A) 13, 5 · Key from source paper

EdLoop JEE