

The 549 most repeated JEE Main questions

Ranked by how many shifts asked the same question, or the same pattern with new numbers, from 2020 to 2026. With answer key.

549

QUESTIONS

29×

MOST ASKED

147

SHIFTS COVERED

Asked in	Questions in this PDF
8 or more shifts	12 Q1 to Q12
5 to 7 shifts	20 Q13 to Q32
4 shifts	38 Q33 to Q70
3 shifts	88 Q71 to Q158
2 shifts	391 Q159 to Q549

- 1 Start at Q1: the patterns asked in the most shifts come first. Each question lists every shift that asked it.
- 2 Attempt each one on paper, then check yourself against the answer key at the end.
- 3 Got one wrong? Tap "Step-by-step solution" at the top right of it for the full working, where available.

How we ranked these

We grouped questions matched as near-identical or the same pattern with new numbers into patterns, and counted the shifts that asked each one. These are past repeats only: they say nothing about which questions a future paper will ask.

prepwiser.in/jee-main/repeated-questions/ · the method, the data and the other PDFs

Answers follow NTA's final answer keys. Typing errors are possible, so check doubtful answers against the official key. Spotted a mistake? prepwiser.in/feedback · Terms: prepwiser.in/terms

Asked in 8 or more shifts · 12 PYQs

Q1 Mathematics · Determinants Asked 29×

[Step-by-step solution](#) > [prepwiser.in/questions/O_We7X_jdw](https://www.prepwiser.in/questions/O_We7X_jdw)

Asked 29 times: 7 Jan 2020 S2, 4 Sep 2020 S1, 4 Sep 2020 S2, 6 Sep 2020 S1, 27 Jul 2021 S1, 27 Aug 2021 S1, 26 Jun 2022 S2, 29 Jun 2022 S1, 29 Jul 2022 S2, 24 Jan 2023 S2, 30 Jan 2023 S2, 6 Apr 2023 S1, 11 Apr 2023 S2, 13 Apr 2023 S2, 31 Jan 2024 S1, 1 Feb 2024 S1, 1 Feb 2024 S2, 5 Apr 2024 S1, 5 Apr 2024 S2, 6 Apr 2024 S2, 8 Apr 2024 S2, 9 Apr 2024 S1, 24 Jan 2025 S1, 24 Jan 2025 S2, 2 Apr 2025 S1, 2 Apr 2025 S2, 2 Apr 2026 S2, 4 Apr 2026 S2, **8 Apr 2026 S2 (printed)**

If the system of linear equations:

$$\begin{aligned}x + y + z &= 6 \\x + 2y + 5z &= 10 \\2x + 3y + \lambda z &= \mu\end{aligned}$$

has infinitely many solutions, then the value of $\lambda + \mu$ equals:

- (A) 12 (B) 16 (C) 22 (D) 28

Q2 Mathematics · Statistics Asked 15×

[Step-by-step solution](#) > [prepwiser.in/questions/0nFAefpU1U](https://www.prepwiser.in/questions/0nFAefpU1U)

Asked 15 times: 7 Jan 2020 S2, 4 Sep 2020 S1, 5 Sep 2020 S1, 5 Sep 2020 S2, 20 Jul 2021 S1, 20 Jul 2021 S2, 27 Jul 2021 S1, 26 Aug 2021 S2, 27 Jun 2022 S2, 1 Feb 2023 S1, 8 Apr 2023 S1, 29 Jan 2024 S1, 31 Jan 2024 S2, 2 Apr 2025 S2, **23 Jan 2026 S1 (printed)**

Let the mean and variance of 8 numbers $-10, -7, -1, x, y, 9, 2, 16$ be $\frac{7}{2}$ and $\frac{293}{4}$, respectively.

Then the mean of 4 numbers $x, y, x + y + 1, |x - y|$ is:

- (A) 11 (B) 9 (C) 10 (D) 12

Q3 Mathematics · Three Dimensional Geometry Asked 12×

[Step-by-step solution](#) > [prepwiser.in/questions/eXAbxXLOMK](https://www.prepwiser.in/questions/eXAbxXLOMK)

Asked 12 times: 8 Jan 2020 S1, 27 Jun 2022 S2, 25 Jan 2023 S2, 29 Jan 2023 S2, 1 Feb 2023 S1, 8 Apr 2023 S1, 10 Apr 2023 S1, 6 Apr 2024 S1, 9 Apr 2024 S1, 23 Jan 2025 S2, 2 Apr 2025 S2, **6 Apr 2026 S2 (printed)**

The shortest distance between the lines $\frac{x-4}{1} = \frac{y-3}{2} = \frac{z-2}{-3}$ and $\frac{x+2}{2} = \frac{y-6}{4} = \frac{z-5}{-5}$ is:

- (A) $\frac{5\sqrt{6}}{6}$ (B) $2\sqrt{5}$ (C) $3\sqrt{5}$ (D) $4\sqrt{5}$

Q4 Chemistry · Purification & Characterisation of Organic Compounds Asked 11×

[Step-by-step solution](#) > [prepwiser.in/questions/4zRGcXW6R1](https://www.prepwiser.in/questions/4zRGcXW6R1)

Asked 11 times: 6 Sep 2020 S1, 20 Jul 2021 S2, 27 Jul 2021 S1, 27 Aug 2021 S1, 27 Jun 2022 S2, 28 Jun 2022 S1, 27 Jul 2022 S1, 13 Apr 2023 S2, 22 Jan 2025 S1, 24 Jan 2025 S2, **23 Jan 2026 S2 (printed)**

In Carius method 0.2425 g of an organic compound gave 0.5253 g silver chloride. The percentage of chlorine in the organic compound is

- (A) 87.65% (B) 53.58% (C) 37.57% (D) 34.79%

Q5 Mathematics · Statistics Asked 10×

[Step-by-step solution](#) > [prepwiser.in/questions/HNF3TwD8CN](https://www.prepwiser.in/questions/HNF3TwD8CN)

Asked 10 times: 8 Jan 2020 S2, 26 Aug 2021 S1, 28 Jun 2022 S1, 27 Jul 2022 S1, 8 Apr 2023 S2, 13 Apr 2023 S2, 15 Apr 2023 S1, 27 Jan 2024 S2, 6 Apr 2024 S1, **7 Apr 2025 S1 (printed)**

The mean and standard deviation of 100 observations are 40 and 5.1, respectively. By mistake one observation is taken as 50 instead of 40. If the correct mean and the correct standard deviation are μ and σ respectively, then $10(\mu + \sigma)$ is equal to

- (A) 447 (B) 445 (C) 449 (D) 451

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Q6 Physics · Electromagnetic Waves **Asked 9×**[Step-by-step solution](#) › [prepwiser.in/questions/wslr2YvY44](#)

Asked 9 times: 8 Jan 2020 S2, 16 Mar 2021 S1, 18 Mar 2021 S1, 27 Aug 2021 S2, 11 Apr 2023 S2, 29 Jan 2024 S2, 23 Jan 2025 S2, 28 Jan 2026 S2, **2 Apr 2026 S2 (printed)**

An electromagnetic wave travels in free space along the x-direction. At a particular point in space and time, $\vec{B} = 2 \times 10^{-7} \hat{j}$ T is associated with this wave. The value of corresponding electric field $\vec{E}$ at this point is _____ V/m.

- (A) $60 \hat{k}$ (B) $-60 \hat{k}$ (C) $30 \hat{k}$ (D) $-600 \hat{k}$

Q7 Physics · Experimental Skills **Asked 9×**[Step-by-step solution](#) › [prepwiser.in/questions/iMputP_CeG](#)

Asked 9 times: 16 Mar 2021 S1, 26 Jun 2022 S1, 26 Jun 2022 S2, 29 Jul 2022 S1, 30 Jan 2024 S2, 1 Feb 2024 S1, 8 Apr 2024 S2, 9 Apr 2024 S1, **24 Jan 2026 S2 (printed)**

In a vernier callipers, 50 vernier scale divisions are equal to 48 main scale divisions. If one main scale division = 0.05 mm, then the least count of the vernier callipers is _____ mm.

- (A) 0.002 (B) 0.02 (C) 0.05 (D) 0.005

Q8 Mathematics · Sequences & Series **Asked 8×**[Step-by-step solution](#) › [prepwiser.in/questions/XxWr9LMrOn](#)

Asked 8 times: 27 Jun 2022 S1, 26 Jul 2022 S2, 1 Feb 2023 S1, 31 Jan 2024 S1, 2 Apr 2025 S2, 4 Apr 2025 S2, 28 Jan 2026 S2, **5 Apr 2026 S2 (printed)**

If the sum of the first 10 terms of the series $\frac{1}{1+1^4 \times 4} + \frac{2}{1+2^4 \times 4} + \frac{3}{1+3^4 \times 4} + \frac{4}{1+4^4 \times 4} + \dots$ is $\frac{m}{n}$, $\gcd(m, n) = 1$, then $m + n$ is equal to:

- (A) 256 (B) 264 (C) 276 (D) 284

Q9 Mathematics · Vectors **Asked 8×**[Step-by-step solution](#) › [prepwiser.in/questions/PNhOMTj4lo](#)

Asked 8 times: 8 Jan 2020 S2, 25 Feb 2021 S1, 31 Jan 2023 S2, 1 Feb 2023 S2, 13 Apr 2023 S1, 31 Jan 2024 S1, 8 Apr 2024 S1, **5 Apr 2026 S1 (printed)**

Let $\vec{a} = \sqrt{7}\hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = \hat{j} + 2\hat{k}$. If $\vec{r}$ is a vector such that $\vec{r} \times \vec{a} + \vec{a} \times \vec{b} = \vec{0}$ and $\vec{r} \cdot \vec{a} = 0$, then $|3\vec{r}|^2$ is equal to:

- (A) 44 (B) 54 (C) 86 (D) 132

Q10 Mathematics · Three Dimensional Geometry **Asked 8×**[Step-by-step solution](#) › [prepwiser.in/questions/jjbdIbPCoF](#)

Asked 8 times: 22 Jul 2021 S2, 24 Jun 2022 S2, 24 Jan 2023 S2, 15 Apr 2023 S1, 27 Jan 2024 S1, 1 Feb 2024 S1, 6 Apr 2024 S2, **7 Apr 2025 S1 (printed)**

If the shortest distance between the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x}{1} = \frac{y}{\alpha} = \frac{z-5}{1}$ is $\frac{5}{\sqrt{6}}$, then the sum of all possible values of α is

- (A) $\frac{3}{2}$ (B) 3 (C) -3 (D) $-\frac{3}{2}$

Q11 Mathematics · Three Dimensional Geometry **Asked 8×**[Step-by-step solution](#) › [prepwiser.in/questions/i_3kznBkBQ](#)

Asked 8 times: 5 Sep 2020 S1, 31 Jan 2024 S2, 1 Feb 2024 S2, 5 Apr 2024 S2, 8 Apr 2024 S2, 9 Apr 2024 S2, 28 Jan 2025 S1, **2 Apr 2025 S2 (printed)**

If the image of the point P(1, 0, 3) in the line joining the points A(4, 7, 1) and B(3, 5, 3) is Q(α, β, γ), then $\alpha + \beta + \gamma$ is equal to:

- (A) $\frac{46}{3}$ (B) 18 (C) 13 (D) $\frac{47}{3}$

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Asked 8 times: 7 Jan 2020 S1, 3 Sep 2020 S1, 4 Sep 2020 S2, 6 Sep 2020 S2, 26 Jul 2022 S1, 26 Jul 2022 S2, 30 Jan 2024 S1, 9 Apr 2024 S2 (printed)

The magnetic field in a plane electromagnetic wave is

$$B_y = (3.5 \times 10^{-7}) \sin (1.5 \times 10^3 x + 0.5 \times 10^{11} t) \text{ T}$$

. The corresponding electric field will be:

(A) $E_z = 105 \sin (1.5 \times 10^3 x + 0.5 \times 10^{11} t) \text{ Vm}^{-1}$

(B) $E_y = 10.5 \sin (1.5 \times 10^3 x + 0.5 \times 10^{11} t) \text{ Vm}^{-1}$

(C) $E_y = 1.17 \sin (1.5 \times 10^3 x + 0.5 \times 10^{11} t) \text{ Vm}^{-1}$

(D) $E_z = 1.17 \sin (1.5 \times 10^3 x + 0.5 \times 10^{11} t) \text{ Vm}^{-1}$

Asked in 5 to 7 shifts · 20 PYQs

Asked 7 times: 26 Aug 2021 S2, 25 Jan 2023 S1, 23 Jan 2025 S1, 29 Jan 2025 S2, 21 Jan 2026 S1, 28 Jan 2026 S2, 4 Apr 2026 S2 (printed)

In sulphur estimation, $2.0 \times 10^{-3} \text{ mol}$ of an organic compound (X) (molar mass 76 g mol^{-1}) gave 0.4813 g of barium sulphate (molar mass 233 g mol^{-1}). The percentage of sulphur in the compound (X) is $____ \times 10^{-1} \%$ (Nearest integer)

Asked 7 times: 7 Jan 2020 S2, 2 Sep 2020 S1, 4 Sep 2020 S2, 27 Jun 2022 S1, 30 Jan 2023 S1, 8 Apr 2023 S2, 6 Apr 2026 S2 (printed)

A sphere of capacitance 100 pF is charged to a potential of 100 V . Another identical uncharged metal sphere is brought in contact with the charged sphere, then the change in the total energy stored on these spheres, when they touch is $\alpha \times 10^{-7} \text{ J}$. The value of α is $____$.

(combined capacitance of spheres is 200 pF)

(A) 5

(B) $\frac{5}{2}$

(C) $\frac{7}{2}$

(D) $\frac{9}{2}$

Asked 6 times: 2 Sep 2020 S1, 17 Mar 2021 S1, 26 Jul 2022 S2, 27 Jul 2022 S1, 10 Apr 2023 S2, 28 Jan 2026 S1 (printed)

When both jaws of vernier callipers touch each other, zero mark of the vernier scale is right to zero mark of main scale, 4^{th} mark on vernier scale coincides with certain mark on the main scale. While measuring the length of a cylinder, observer observes 15 divisions on main scale and 5^{th} division of vernier scale coincides with a main scale division. Measured length of cylinder is $____ \text{ mm}$.

(Least count of Vernier calliper = 0.1 mm)

(A) 15.5

(B) 15.4

(C) 15.9

(D) 15.1

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Q16 Physics · Dual Nature of Radiation & Matter **Asked 6×** [Step-by-step solution](#) > prepwiser.in/questions/-zChF2Rw_A
Asked 6 times: 2 Sep 2020 S1, 20 Jul 2021 S2, 25 Jul 2021 S2, 11 Apr 2023 S1, 31 Jan 2024 S1, **2 Apr 2026 S1 (printed)**

For a certain metal, when monochromatic light of wavelength λ is incident, the stopping potential for photoelectrons is $3V_0$. When the same metal is illuminated by light of wavelength 2λ , then the stopping potential becomes V_0 . The threshold wavelength for photoelectric emission for the given metal is $\alpha\lambda$. The value of α is _____.

- (A) 1 (B) 4 (C) 2 (D) 3

Q17 Physics · Electrostatics II: Potential & Capacitance **Asked 6×** [Step-by-step solution](#) > prepwiser.in/questions/6b_96-wF2D
Asked 6 times: 16 Mar 2021 S1, 18 Mar 2021 S1, 28 Jul 2022 S2, 25 Jan 2023 S1, 25 Jan 2023 S2, **21 Jan 2026 S1 (printed)**

A parallel plate capacitor has capacitance C , when there is vacuum within the parallel plates. A sheet having thickness $(\frac{1}{3})^{\text{rd}}$ of the separation between the plates and relative permittivity K is introduced between the plates. The new capacitance of the system is:

- (A) $\frac{3CK^2}{(2K+1)^2}$ (B) $\frac{4KC}{3K-1}$ (C) $\frac{CK}{2+K}$ (D) $\frac{3KC}{2K+1}$

Q18 Chemistry · Purification & Characterisation of Organic Compounds **Asked 6×** **NUMERICAL** [Step-by-step solution](#) > prepwiser.in/questions/XXmWPd6J80
Asked 6 times: 16 Mar 2021 S2, 2 Apr 2025 S2, 3 Apr 2025 S2, 4 Apr 2025 S1, 7 Apr 2025 S2, **24 Jan 2026 S1 (printed)**

In Dumas method for estimation of nitrogen, 0.50 g of an organic compound gave 70 mL of nitrogen collected at 300 K and 715 mm pressure. The percentage of nitrogen in the organic compound is _____ %.

(Aqueous tension at 300 K is 15 mm).

Q19 Mathematics · Three Dimensional Geometry **Asked 6×** [Step-by-step solution](#) > prepwiser.in/questions/EpF-qxggbq
Asked 6 times: 27 Jan 2024 S1, 9 Apr 2024 S2, 23 Jan 2025 S2, 28 Jan 2025 S2, 3 Apr 2025 S2, **4 Apr 2026 S1 (printed)**

The square of the distance of the point $(-2, -8, 6)$ from the line $\frac{x-1}{1} = \frac{y-1}{2} = \frac{z-1}{-1}$ along the line $\frac{x+5}{1} = \frac{y+5}{-1} = \frac{z}{2}$ is equal to:

- (A) 3 (B) 6 (C) 8 (D) 12

Q20 Physics · Wave Optics **Asked 6×** [Step-by-step solution](#) > prepwiser.in/questions/pfHMkJPj65
Asked 6 times: 24 Feb 2021 S1, 1 Sep 2021 S2, 30 Jun 2022 S1, 13 Apr 2023 S2, 4 Apr 2024 S2, **3 Apr 2025 S2 (printed)**

Width of one of the two slits in a Young's double slit interference experiment is half of the other slit. The ratio of the maximum to the minimum intensity in the interference pattern is:

- (A) 3 : 1 (B) $(2\sqrt{2} + 1) : (2\sqrt{2} - 1)$
(C) 9 : 1 (D) $(3 + 2\sqrt{2}) : (3 - 2\sqrt{2})$

Q21 Physics · Electromagnetic Induction **Asked 5×** [Step-by-step solution](#) > prepwiser.in/questions/Zk1p6CtLIIF
Asked 5 times: 31 Aug 2021 S1, 25 Jul 2022 S1, 29 Jan 2023 S1, 31 Jan 2024 S1, **2 Apr 2026 S2 (printed)**

A circular current loop of radius R is placed inside square loop of side length L ($L \gg R$) such that they are co-planar and their centers coincide. The permeability of free space is μ_0 . The mutual inductance between circular loop and square loop is _____.

- (A) $2\sqrt{2}\frac{\mu_0 L^2}{R}$ (B) $\sqrt{2}\frac{\mu_0 L^2}{R}$ (C) $\sqrt{2}\frac{\mu_0 R^2}{L}$ (D) $2\sqrt{2}\frac{\mu_0 R^2}{L}$

Q22 Chemistry · Atomic Structure **Asked 5×**[Step-by-step solution](#) > [prepwisar.in/questions/I9owiCaxIV](https://www.prepwisar.in/questions/I9owiCaxIV)Asked 5 times: 27 Jul 2022 S2, 29 Jul 2022 S2, 31 Jan 2023 S2, 9 Apr 2024 S1, **5 Apr 2026 S1 (printed)**

Arrange the following atomic orbitals of multi electron atoms in order of increasing energy.

A. $n = 3, l = 2, m = +1$

B. $n = 4, l = 0, m = 0$

C. $n = 6, l = 1, m = 0$

D. $n = 5, l = 1, m = +1$

E. $n = 2, l = 1, m = +1$

Choose the correct answer from the options given below:

(A) $C < D < B < A < E$

(B) $B < A < E < C < D$

(C) $E < C < D < B < A$

(D) $E < B < A < D < C$

Q23 Chemistry · Purification & Characterisation of Organic Compounds **Asked 5×**[Step-by-step solution](#) > [prepwisar.in/questions/LoaHJQ0L2k](https://www.prepwisar.in/questions/LoaHJQ0L2k)Asked 5 times: 25 Jul 2021 S2, 29 Jun 2022 S1, 25 Jul 2022 S1, 1 Feb 2024 S2, **22 Jan 2026 S2 (printed)**

When 1 g of compound (X) is subjected to Kjeldahl's method for estimation of nitrogen, 15 mL 1 M H_2SO_4 was neutralized by ammonia evolved. The percentage of nitrogen in compound (X) is:

(A) 0.21

(B) 21

(C) 42

(D) 0.42

Q24 Physics · Fluid Mechanics **Asked 5×**[Step-by-step solution](#) > [prepwisar.in/questions/oTx5g_aI6V](https://www.prepwisar.in/questions/oTx5g_aI6V)Asked 5 times: 27 Jun 2022 S1, 29 Jul 2022 S2, 6 Apr 2023 S1, 6 Apr 2024 S1, **22 Jan 2025 S2 (printed)**

A small rigid spherical ball of mass M is dropped in a long vertical tube containing glycerine. The velocity of the ball becomes constant after some time. If the density of glycerine is half of the density of the ball, then the viscous force acting on the ball will be (consider g as acceleration due to gravity)

(A) $2 Mg$

(B) $\frac{3}{2} Mg$

(C) $\frac{Mg}{2}$

(D) Mg

Q25 Physics · Wave Optics **Asked 5×** **NUMERICAL**[Step-by-step solution](#) > [prepwisar.in/questions/IM_neV9Pq_](https://www.prepwisar.in/questions/IM_neV9Pq_)Asked 5 times: 25 Feb 2021 S1, 25 Jun 2022 S2, 27 Jul 2022 S2, 6 Apr 2024 S2, **3 Apr 2025 S1 (printed)**

Two coherent monochromatic light beams of intensities $4I$ and $9I$ are superimposed. The difference between the maximum and minimum intensities in the resulting interference pattern is xI . The value of x is _____.

Q26 Physics · Units, Dimensions & Errors **Asked 5×**[Step-by-step solution](#) > [prepwisar.in/questions/ACiNpnSqq5](https://www.prepwisar.in/questions/ACiNpnSqq5)Asked 5 times: 29 Jun 2022 S1, 13 Apr 2023 S2, 27 Jan 2024 S2, 5 Apr 2024 S2, **2 Apr 2025 S1 (printed)**

The equation for real gas is given by $(P + \frac{a}{V^2})(V - b) = RT$, where P , V , T and R are the pressure, volume, temperature and gas constant, respectively. The dimension of ab^{-2} is equivalent to that of:

(A) Compressibility

(B) Planck's constant

(C) Energy density

(D) Strain

Q27 Mathematics · Area Under Curves **Asked 5×**[Step-by-step solution](#) > [prepwisar.in/questions/ZRPdwoJrE4](https://www.prepwisar.in/questions/ZRPdwoJrE4)Asked 5 times: 7 Jan 2020 S2, 8 Jan 2020 S2, 27 Jul 2021 S2, 26 Aug 2021 S1, **7 Apr 2025 S1 (printed)**

If the area of the region bounded by the curves $y = 4 - \frac{x^2}{4}$ and $y = \frac{x-4}{2}$ is equal to α , then 6α equals

(A) 210

(B) 250

(C) 240

(D) 220

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Q28 Physics · Moving Charges & Magnetism **Asked 5×** [Step-by-step solution](#) › prepwiser.in/questions/S-DRIMorZv
Asked 5 times: 24 Jun 2022 S1, 28 Jul 2022 S2, 24 Jan 2023 S1, 8 Apr 2023 S2, **2 Apr 2025 S1 (printed)**

Let B_1 be the magnitude of magnetic field at center of a circular coil of radius R carrying current I . Let B_2 be the magnitude of magnetic field at an axial distance ' x ' from the center. For $x : R = 3 : 4$, $\frac{B_2}{B_1}$ is:

- (A) 64 : 125 (B) 25 : 16 (C) 4 : 5 (D) 16 : 25

Q29 Mathematics · Determinants **Asked 5×** [Step-by-step solution](#) › prepwiser.in/questions/WDbTCgLxo0
Asked 5 times: 22 Jul 2021 S2, 25 Jul 2021 S1, 31 Aug 2021 S1, 26 Jun 2022 S1, **23 Jan 2025 S2 (printed)**

The system of equations

$$\begin{aligned}x + y + z &= 6, \\x + 2y + 5z &= 9, \\x + 5y + \lambda z &= \mu,\end{aligned}$$

has no solution if

- (A) $\lambda = 17, \mu = 18$ (B) $\lambda = 17, \mu \neq 18$ (C) $\lambda = 15, \mu \neq 17$ (D) $\lambda \neq 17, \mu \neq 18$

Q30 Physics · Elasticity **Asked 5×** [Step-by-step solution](#) › prepwiser.in/questions/J3P-6rqwtW
Asked 5 times: 24 Feb 2021 S2, 25 Jul 2022 S1, 30 Jan 2023 S2, 15 Apr 2023 S1, **29 Jan 2024 S2 (printed)**

A wire of length L and radius r is clamped at one end. If its other end is pulled by a force F , its length increases by l . If the radius of the wire and the applied force both are reduced to half of their original values keeping original length constant, the increase in length will become:

- (A) 2 times (B) 4 times (C) 3 times (D) $\frac{3}{2}$ times

Q31 Chemistry · Chemical Kinetics **Asked 5×** **NUMERICAL** [Step-by-step solution](#) › prepwiser.in/questions/YJhC2IqjbM
Asked 5 times: 31 Aug 2021 S1, 24 Jun 2022 S2, 28 Jun 2022 S1, 27 Jan 2024 S2, **6 Apr 2024 S1 (printed)**

Time required for 99.9% completion of a first order reaction is _____ times the time required for completion of 90% reaction.(nearest integer)

Q32 Mathematics · Permutations & Combinations **Asked 5×** [Step-by-step solution](#) › prepwiser.in/questions/CgvkK6R-bf
Asked 5 times: 2 Sep 2020 S1, 29 Jan 2023 S2, 6 Apr 2023 S2, 11 Apr 2023 S2, **13 Apr 2023 S2 (printed)**

All words, with or without meaning, are made using all the letters of the word MONDAY. These words are written as in a dictionary with serial numbers. The serial number of the word MONDAY is:

- (A) 324 (B) 328 (C) 326 (D) 327

Asked in 4 shifts · 38 PYQs

Q33 Physics · Electrostatics II: Potential & Capacitance **Asked 4×** [Step-by-step solution](#) › prepwiser.in/questions/GQLnyBvbWH
Asked 4 times: 25 Feb 2021 S1, 25 Jun 2022 S2, 12 Apr 2023 S1, **22 Jan 2026 S2 (printed)**

Three small identical bubbles of water having same charge on each coalesce to form a bigger bubble. Then the ratio of the potentials on one initial bubble and that on the resultant bigger bubble is:

- (A) $1 : 3^{2/3}$ (B) $3^{2/3} : 1$ (C) $1 : 3^{1/3}$ (D) $1 : 2^{2/3}$

Q34 Physics · Work, Energy & Power **Asked 4×** **NUMERICAL** [Step-by-step solution](#) › prepwiser.in/questions/mkUIyH0Ejh
Asked 4 times: 24 Jan 2023 S2, 31 Jan 2024 S2, 7 Apr 2025 S1, **4 Apr 2026 S1 (printed)**

A body of mass 2 kg begins to move under the influence of time dependent force $\vec{F} = (2t\hat{i} + 6t^2\hat{j})$ N, where $\hat{i}$ and $\hat{j}$ are unit vectors along x and y -axis respectively. The power produced by the force at $t = 2$ s is ____ W.

Q35 Physics · Current Electricity **Asked 4×**[Step-by-step solution](#) > [prepwiser.in/questions/CwKYJZa4A5](https://www.prepwiser.in/questions/CwKYJZa4A5)Asked 4 times: 27 Jun 2022 S1, 29 Jan 2023 S2, 4 Apr 2024 S1, **28 Jan 2026 S1 (printed)**

In the potentiometer, when the cell in the secondary circuit is shunted with 4Ω resistance, the balance is obtained at the length 120 cm of wire. Now when the same cell is shunted with 12Ω resistance, the balance is shifted to a length of 180 cm. The internal resistance of cell is ____ Ω

- (A) 4 (B) 12 (C) 6 (D) 3

Q36 Mathematics · Binomial Theorem **Asked 4×**[Step-by-step solution](#) > [prepwiser.in/questions/imB0enRPW9](https://www.prepwiser.in/questions/imB0enRPW9)Asked 4 times: 7 Jan 2020 S2, 25 Jun 2022 S2, 30 Jan 2023 S1, **28 Jan 2026 S2 (printed)**

The sum of the coefficients of x^{499} and x^{500} in $(1+x)^{1000} + x(1+x)^{999} + x^2(1+x)^{998} + \dots + x^{1000}$ is:

- (A) $^{1002}C_{501}$ (B) $^{1001}C_{501}$ (C) $^{1000}C_{501}$ (D) $^{1002}C_{500}$

Q37 Physics · Ray Optics **Asked 4×**[Step-by-step solution](#) > [prepwiser.in/questions/TeIlumUo_u](https://www.prepwiser.in/questions/TeIlumUo_u)Asked 4 times: 29 Jan 2024 S2, 4 Apr 2025 S1, 7 Apr 2025 S2, **24 Jan 2026 S2 (printed)**

Distance between an object and three times magnified real image is 40 cm. The focal length of the mirror used is ____ cm.

- (A) -20 (B) $-15/2$ (C) -10 (D) -15

Q38 Physics · Fluid Mechanics **Asked 4×**[Step-by-step solution](#) > [prepwiser.in/questions/GPDHlcJU2z](https://www.prepwiser.in/questions/GPDHlcJU2z)Asked 4 times: 30 Jun 2022 S1, 28 Jul 2022 S1, 8 Apr 2023 S1, **2 Apr 2026 S2 (printed)**

If an air bubble of diameter 2 mm rises steadily through a liquid of density 2000 kg/m^3 at a rate of 0.5 cm/s, then the coefficient of viscosity of liquid is ____ Poise. (Take $g = 10 \text{ m/s}^2$)

- (A) 0.88 (B) 8.8 (C) 88.8 (D) 0.088

Q39 Physics · Thermodynamics **Asked 4×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/1NLISojwOR](https://www.prepwiser.in/questions/1NLISojwOR)Asked 4 times: 27 Jun 2022 S2, 1 Feb 2024 S2, 8 Apr 2024 S2, **21 Jan 2026 S2 (printed)**

A diatomic gas ($\gamma = 1.4$) does 100 J of work when it is expanded isobarically. Then the heat given to the gas ____ J.

Q40 Physics · Moving Charges & Magnetism **Asked 4×**[Step-by-step solution](#) > [prepwiser.in/questions/MvmGIpnGXG](https://www.prepwiser.in/questions/MvmGIpnGXG)Asked 4 times: 29 Jan 2024 S1, 9 Apr 2024 S1, 23 Jan 2025 S2, **24 Jan 2026 S2 (printed)**

A moving coil galvanometer of resistance 100Ω shows a full scale deflection for a current of 1 mA. The value of resistance required to convert this galvanometer into an ammeter, showing full scale deflection for a current of 5 mA, is ____ Ω

- (A) 25 (B) 2.5 (C) 0.5 (D) 10

Q41 Mathematics · Quadratic Equations & Polynomial Inequalities **Asked 4×**[Step-by-step solution](#) > [prepwiser.in/questions/Hrq6IwYEW8](https://www.prepwiser.in/questions/Hrq6IwYEW8)Asked 4 times: 15 Apr 2023 S1, 7 Apr 2025 S2, 22 Jan 2026 S1, **24 Jan 2026 S1 (printed)**

The number of the real solutions of the equation: $x|x+3| + |x-1| - 2 = 0$ is

- (A) 3 (B) 2 (C) 5 (D) 4

Q42 Physics · Surface Tension **Asked 4×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/oAhOCocpog](https://www.prepwiser.in/questions/oAhOCocpog)Asked 4 times: 29 Jan 2023 S1, 11 Apr 2023 S2, 2 Apr 2026 S2, **4 Apr 2026 S1 (printed)**

The surface tension of a soap solution is $3.5 \times 10^{-2} \text{ N/m}$. The work required to increase the radius of a soap bubble from 1 cm to 2 cm is $\alpha \times 10^{-6} \text{ J}$. The value of α is ____.

($\pi = 22/7$)

Asked 4 times: 9 Jan 2020 S1, 26 Jun 2022 S1, 29 Jan 2024 S1, 28 Jan 2025 S1 (printed)

The molarity of a 70% (mass/mass) aqueous solution of a monobasic acid (X) is _____ $\times 10^{-1}$ M (Nearest integer)

[Given: Density of aqueous solution of (X) is 1.25 g mL^{-1}

Molar mass of the acid is 70 g mol^{-1}]

Asked 4 times: 9 Jan 2020 S1, 6 Apr 2023 S2, 4 Apr 2024 S1, 29 Jan 2025 S1 (printed)

If a_0 is denoted as the Bohr radius of hydrogen atom, then what is the de-Broglie wavelength (λ) of the electron present in the second orbit of hydrogen atom? [n : any integer]

(A) $\frac{8\pi a_0}{n}$

(B) $\frac{2a_0}{n\pi}$

(C) $\frac{na_0}{4\pi}$

(D) $\frac{4\pi a_0}{n}$

Asked 4 times: 1 Feb 2023 S1, 29 Jan 2024 S2, 6 Apr 2024 S2, 22 Jan 2025 S2 (printed)

Density of 3 M NaCl solution is 1.25 g/mL . The molality of the solution is:

(A) 2.79 m

(B) 2 m

(C) 1.79 m

(D) 3 m

Asked 4 times: 5 Sep 2020 S1, 10 Apr 2023 S1, 3 Apr 2025 S2, 8 Apr 2025 S2 (printed)

A quantity Q is formulated as $X^{-2}Y^{+\frac{3}{2}}Z^{-\frac{2}{5}}$. X , Y , and Z are independent parameters which have fractional errors of 0.1, 0.2, and 0.5, respectively in measurement. The maximum fractional error of Q is

(A) 0.6

(B) 0.8

(C) 0.7

(D) 0.1

Asked 4 times: 22 Jul 2021 S2, 29 Jan 2023 S1, 6 Apr 2023 S2, 24 Jan 2025 S2 (printed)

The temperature of a body in air falls from 40°C to 24°C in 4 minutes. The temperature of the air is 16°C . The temperature of the body in the next 4 minutes will be:

(A) $\frac{28}{3}^\circ\text{C}$

(B) $\frac{56}{3}^\circ\text{C}$

(C) $\frac{42}{3}^\circ\text{C}$

(D) $\frac{14}{3}^\circ\text{C}$

Asked 4 times: 25 Feb 2021 S1, 28 Jun 2022 S2, 28 Jul 2022 S1, 8 Apr 2025 S2 (printed)

On combustion 0.210 g of an organic compound containing C, H and O gave 0.127 g H_2O and 0.307 g CO_2 . The percentages of hydrogen and oxygen in the given organic compound respectively are:

(A) 7.55, 43.85

(B) 6.72, 53.41

(C) 6.72, 39.87

(D) 53.41, 39.6

Asked 4 times: 26 Jun 2022 S1, 31 Jan 2023 S1, 3 Apr 2025 S1, 7 Apr 2025 S1 (printed)

An organic compound weighing 500 mg, produced 220 mg of CO_2 , on complete combustion. The percentage composition of carbon in the compound is _____. (nearest integer)

(Given molar mass in g mol^{-1} of C : 12, O : 16)

Q50 Physics · Elasticity **Asked 4×** **NUMERICAL** [Step-by-step solution](#) > prepwiser.in/questions/1SC5k44kF3
Asked 4 times: 26 Feb 2021 S2, 20 Jul 2021 S2, 11 Apr 2023 S1, **2 Apr 2025 S2 (printed)**

The length of a light string is 1.4 m when the tension on it is 5 N. If the tension increases to 7 N, the length of the string is 1.56 m. The original length of the string is _____ m.

Q51 Physics · Heat Transfer **Asked 4×** [Step-by-step solution](#) > prepwiser.in/questions/ATboud1ZRF
Asked 4 times: 27 Jul 2021 S1, 25 Jan 2023 S1, 12 Apr 2023 S1, **29 Jan 2025 S2 (printed)**

A cup of coffee cools from 90°C to 80°C in t minutes when the room temperature is 20°C. The time taken by the similar cup of coffee to cool from 80°C to 60°C at the same room temperature is:

- (A) $\frac{13}{5}t$ (B) $\frac{10}{13}t$ (C) $\frac{5}{13}t$ (D) $\frac{13}{10}t$

Q52 Chemistry · Chemical Equilibrium **Asked 4×** **NUMERICAL** [Step-by-step solution](#) > prepwiser.in/questions/s_O0oI5OS9
Asked 4 times: 6 Sep 2020 S1, 22 Jul 2021 S2, 31 Jan 2023 S1, **29 Jan 2024 S1 (printed)**

For the reaction $\text{N}_2\text{O}_{4(g)} \rightleftharpoons 2\text{NO}_{2(g)}$, $K_p = 0.492 \text{ atm}$ at 300K. K_c for the reaction at same temperature is _____ $\times 10^{-2}$.

(Given: $R = 0.082 \text{ Latmmol}^{-1}\text{K}^{-1}$)

Q53 Physics · Electromagnetic Induction **Asked 4×** **NUMERICAL** [Step-by-step solution](#) > prepwiser.in/questions/KIyHI36RG0
Asked 4 times: 26 Aug 2021 S2, 24 Jun 2022 S2, 30 Jan 2023 S2, **1 Feb 2024 S2 (printed)**

A coil of 200 turns and area 0.20 m^2 is rotated at half a revolution per second and is placed in uniform magnetic field of 0.01T perpendicular to axis of rotation of the coil. The maximum voltage generated in the coil is $\frac{2\pi}{\beta}$ volt. The value of β is _____.

Q54 Chemistry · Solutions & Colligative Properties **Asked 4×** **NUMERICAL** [Step-by-step solution](#) > prepwiser.in/questions/pKkOyrZXB1
Asked 4 times: 26 Aug 2021 S2, 27 Aug 2021 S2, 28 Jul 2022 S1, **1 Feb 2024 S2 (printed)**

Mass of ethylene glycol (antifreeze) to be added to 18.6kg of water to protect the freezing point at -24°C is _____ kg (Molar mass in gmol^{-1} for ethylene glycol 62, K_f of water = $1.86 \text{ K kgmol}^{-1}$)

Q55 Physics · Dual Nature of Radiation & Matter **Asked 4×** [Step-by-step solution](#) > prepwiser.in/questions/ROCa7xfysl
Asked 4 times: 2 Sep 2020 S2, 24 Feb 2021 S2, 18 Mar 2021 S1, **1 Feb 2024 S1 (printed)**

The de Broglie wavelengths of a proton and an α particle are λ and 2λ respectively. The ratio of the velocities of proton and α particle will be:

- (A) 8 : 1 (B) 1 : 2 (C) 1 : 8 (D) 4 : 1

Q56 Mathematics · Area Under Curves **Asked 4×** **NUMERICAL** [Step-by-step solution](#) > prepwiser.in/questions/xps2mQeEH8
Asked 4 times: 6 Sep 2020 S2, 24 Feb 2021 S2, 31 Jan 2024 S2, **5 Apr 2024 S1 (printed)**

The area of the region enclosed by the parabolas $y = x^2 - 5x$ and $y = 7x - x^2$ is _____.

Q57 Physics · Moving Charges & Magnetism **Asked 4×** [Step-by-step solution](#) > prepwiser.in/questions/dnmB41eAIr
Asked 4 times: 20 Jul 2021 S1, 27 Jun 2022 S2, 25 Jul 2022 S1, **9 Apr 2024 S2 (printed)**

A proton and a deuteron ($q = +e, m = 2.0u$) having same kinetic energies enter a region of uniform magnetic field $\vec{B}$, moving perpendicular to $\vec{B}$. The ratio of the radius r_d of deuteron path to the radius r_p of the proton path is:

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

Asked 4 times: 20 Jul 2021 S1, 20 Jul 2021 S2, 28 Jun 2022 S1, 9 Apr 2024 S2 (printed)

The vapor pressure of pure benzene and methyl benzene at 27°C is given as 80 Torr and 24 Torr, respectively. The mole fraction of methyl benzene in vapor phase, in equilibrium with an equimolar mixture of those two liquids (ideal solution) at the same temperature is $\text{_____} \times 10^{-2}$ (nearest integer)

Asked 4 times: 27 Jul 2021 S2, 26 Jun 2022 S1, 25 Jul 2022 S2, 31 Jan 2024 S2 (printed)

The magnetic flux ϕ (in weber) linked with a closed circuit of resistance 8Ω varies with time (in seconds) as $\phi = 5t^2 - 36t + 1$. The induced current in the circuit at $t = 2\text{s}$ is _____ A .

Asked 4 times: 26 Jun 2022 S2, 27 Jan 2024 S1, 31 Jan 2024 S1, 5 Apr 2024 S2 (printed)

The number of moles of methane required to produce $11\text{gCO}_2(\text{g})$ after complete combustion is : (Given molar mass of methane in gmol^{-1} : 16)

- (A) 0.35 (B) 0.25 (C) 0.5 (D) 0.75

Asked 4 times: 4 Sep 2020 S2, 27 Aug 2021 S1, 30 Jun 2022 S1, 24 Jan 2023 S1 (printed)

The distance of the point $(-1, 9, -16)$ from the plane

$2x + 3y - z = 5$ measured parallel to the line

$\frac{x+4}{3} = \frac{2-y}{4} = \frac{z-3}{12}$ is:

- (A) $13\sqrt{2}$ (B) 26 (C) $20\sqrt{2}$ (D) 31

Asked 4 times: 2 Sep 2020 S1, 6 Sep 2020 S2, 27 Jun 2022 S2, 30 Jan 2023 S2 (printed)

The graph of $\log \frac{x}{m}$ vs $\log p$ for an adsorption process is a straight line inclined at an angle of 45° with intercept equal to 0.6020. The mass of gas adsorbed per unit mass of adsorbent at the pressure of 0.4atm is $\text{_____} \times 10^{-1}$ (Nearest integer).
Given: $\log 2 = 0.3010$

Asked 4 times: 16 Mar 2021 S2, 31 Aug 2021 S2, 25 Jun 2022 S1, 31 Jan 2023 S2 (printed)

The amount of thermal energy is developed by a resistor in 10s when a current of 4A is passed through it. If the current is increased to 16A, the thermal energy developed by the resistor in 10s will be:

- (A) $\frac{H}{4}$ (B) 16H (C) H (D) 4H

Asked 4 times: 25 Feb 2021 S1, 29 Jul 2022 S2, 29 Jan 2023 S2, 12 Apr 2023 S1 (printed)

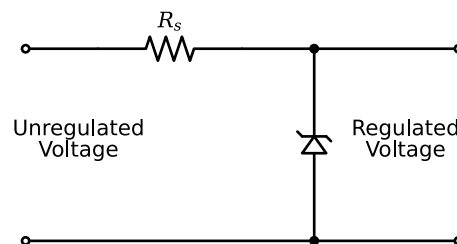
A proton and an α -particle are accelerated from rest by 2V and 4V potentials, respectively. The ratio of their de-Broglie wavelength is:

- (A) 4 : 1 (B) 2 : 1 (C) 8 : 1 (D) 16 : 1

Asked 4 times: 20 Jul 2021 S2, 27 Aug 2021 S2, 30 Jun 2022 S1, 10 Apr 2023 S1 (printed)

A zener diode of power rating 1.6 W is to be used as voltage regulator. If the zener diode has a breakdown of 8V and it has to regulate voltage fluctuating between 3 V and 10 V. The value of resistance R_s for safe operation of diode will be

- (A) 13 Ω (B) 13.3 Ω (C) 10 Ω (D) 12 Ω



Asked 4 times: 27 Jul 2021 S1, 30 Jan 2023 S1, 6 Apr 2023 S2, 10 Apr 2023 S1 (printed)

If the coefficient of x^7 in $(ax - \frac{1}{bx^2})^{13}$ and the coefficient of x^{-5} in $(ax + \frac{1}{bx^2})^{13}$ are equal, then a^4b^4 is equal to:

- (A) 22 (B) 33 (C) 44 (D) 11

Asked 4 times: 25 Jun 2022 S1, 25 Jul 2022 S2, 24 Jan 2023 S1, 6 Apr 2023 S2 (printed)

The weight of a body on the surface of the earth is 100N. The gravitational force on it when taken at a height, from the surface of earth, equal to one-fourth the radius of the earth is:

- (A) 50 N (B) 64 N (C) 25 N (D) 100 N

Asked 4 times: 4 Sep 2020 S2, 5 Sep 2020 S2, 20 Jul 2021 S1, 28 Jul 2022 S1 (printed)

The frequency of echo will be _____ Hz if the train blowing a whistle of frequency 320 Hz is moving with a velocity of 36 km/h towards a hill from which an echo is heard by the train driver. Velocity of sound in air is 330 m/s.

Asked 4 times: 5 Sep 2020 S1, 30 Jun 2022 S1, 28 Jul 2022 S1, 28 Jul 2022 S2 (printed)

Metal M crystallizes into a fcc lattice with the edge length of 4.0×10^{-8} cm. The atomic mass of the metal is _____ g/mol. (Nearest integer)

(Use: $N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$, density of metal, $M = 9.03 \text{ g cm}^{-3}$)

Asked 4 times: 24 Feb 2021 S2, 17 Mar 2021 S1, 26 Aug 2021 S2, 31 Aug 2021 S1 (printed)

Let the equation of the plane, that passes through the point (1, 4, -3) and contains the line of intersection of the

planes $3x - 2y + 4z - 7 = 0$

and $x + 5y - 2z + 9 = 0$, be

$\alpha x + \beta y + \gamma z + 3 = 0$, then $\alpha + \beta + \gamma$ is equal to:

- (A) -23 (B) -15 (C) 23 (D) 15

Q71 Mathematics · Binomial Theorem **Asked 3×**

[Step-by-step solution](#) › [prepwisar.in/questions/askUb0MHD7](https://www.prepwisar.in/questions/askUb0MHD7)

Asked 3 times: 3 Sep 2020 S2, 31 Aug 2021 S1, **4 Apr 2026 S2 (printed)**

In the expansion of $\left(9x - \frac{1}{3\sqrt{x}}\right)^{18}$, $x > 0$, if the term independent of x is $(221)k$, then k is equal to:

- (A) 84 (B) 78 (C) 168 (D) 198

Q72 Physics · Kinetic Theory of Gases **Asked 3×**

[Step-by-step solution](#) › [prepwisar.in/questions/MH3tGsuYBa](https://www.prepwisar.in/questions/MH3tGsuYBa)

Asked 3 times: 27 Aug 2021 S1, 30 Jan 2023 S1, **5 Apr 2026 S2 (printed)**

An ideal gas at pressure P and temperature T is expanding such that $PT^3 = \text{constant}$. The coefficient of volume expansion of the gas is ____.

- (A) $\frac{2}{T}$ (B) $\frac{1}{T}$ (C) $\frac{4}{T}$ (D) $\frac{3}{T}$

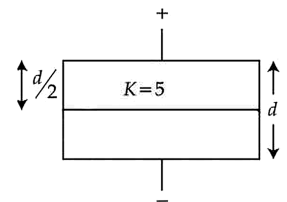
Q73 Physics · Electrostatics II: Potential & Capacitance **Asked 3×**

[Step-by-step solution](#) › [prepwisar.in/questions/mKLajg6i_Y](https://www.prepwisar.in/questions/mKLajg6i_Y)

Asked 3 times: 16 Mar 2021 S2, 26 Jun 2022 S2, **2 Apr 2026 S1 (printed)**

A parallel plate air capacitor has a capacitance C . When it is half filled as shown in figure with a dielectric constant $K = 5$, the percentage increase in the capacitance is ____.

- (A) 33.34 (B) 66.67 (C) 200 (D) 400



Q74 Physics · Nuclear Physics **Asked 3×** **NUMERICAL**

[Step-by-step solution](#) › [prepwisar.in/questions/sAPbAfch75](https://www.prepwisar.in/questions/sAPbAfch75)

Asked 3 times: 2 Sep 2020 S1, 24 Jan 2023 S2, **23 Jan 2026 S2 (printed)**

The average energy released per fission for the nucleus of ${}_{92}^{235}\text{U}$ is 190 MeV. When all the atoms of 47 g pure ${}_{92}^{235}\text{U}$ undergo fission process, the energy released is $\alpha \times 10^{23}$ MeV. The value of α is ____.

(Avogadro Number = 6×10^{23} per mole)

Q75 Physics · Surface Tension **Asked 3×**

[Step-by-step solution](#) › [prepwisar.in/questions/mh8xLolXx5](https://www.prepwisar.in/questions/mh8xLolXx5)

Asked 3 times: 31 Jan 2023 S1, 2 Apr 2025 S2, **5 Apr 2026 S2 (printed)**

Eight mercury drops, each of radius r , coalesce to form a bigger drop. The surface energy released in this process is ____ - (S is the surface tension of mercury).

- (A) $8\pi r^2 S$ (B) $16\pi r^2 S$ (C) $64\pi r^2 S$ (D) $4\pi r^2 S$

Q76 Physics · Experimental Skills **Asked 3×**

[Step-by-step solution](#) › [prepwisar.in/questions/LWj6FvGbeo](https://www.prepwisar.in/questions/LWj6FvGbeo)

Asked 3 times: 9 Jan 2020 S1, 27 Jul 2021 S1, **4 Apr 2026 S1 (printed)**

In a screw gauge when the circular scale is given five complete rotations it moves linearly by 2.5 mm. If the circular scale has 100 divisions, the least count of screw gauge is ____ mm.

- (A) 1×10^{-2} (B) 1×10^{-3} (C) 5×10^{-2} (D) 5×10^{-3}

Q77 Mathematics · Ellipse **Asked 3×**

[Step-by-step solution](#) › [prepwisar.in/questions/KU3MFcjzZG](https://www.prepwisar.in/questions/KU3MFcjzZG)

Asked 3 times: 4 Sep 2020 S1, 7 Apr 2025 S2, **24 Jan 2026 S2 (printed)**

Let the length of the latus rectum of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, ($a > b$), be 30. If its eccentricity is the maximum value of the function $f(t) = -\frac{3}{4} + 2t - t^2$, then $(a^2 + b^2)$ is equal to

- (A) 276 (B) 516 (C) 256 (D) 496

Asked 3 times: 26 Jul 2022 S2, 8 Apr 2023 S1, 4 Apr 2026 S1 (printed)

The two projectiles are projected with the same initial velocities at the 15° and 30° with respect to the horizontal. The ratio of their ranges is $1 : x$. The value of x is

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

Asked 3 times: 29 Jun 2022 S2, 24 Jan 2023 S2, 24 Jan 2026 S1 (printed)

Two resistors of 100Ω each are connected in series with a 9 V battery. A voltmeter of 400Ω resistance is connected to measure the voltage drop across one of the resistors. The voltmeter reading is ____ V.

- (A) 3 (B) 2 (C) 4 (D) 4.5

Asked 3 times: 11 Apr 2023 S1, 23 Jan 2025 S2, 2 Apr 2026 S1 (printed)

The equation of a plane progressive wave is given by $y = 5 \cos \pi \left(200t - \frac{x}{150} \right)$ where x and y are in cm and t is in second. The velocity of the wave is _____ m/s.

- (A) 120 (B) 150 (C) 200 (D) 300

Asked 3 times: 11 Apr 2023 S2, 8 Apr 2024 S2, 24 Jan 2026 S1 (printed)

Sixty four rain drops of radius 1 mm each falling down with a terminal velocity of 10cm/s coalesce to form a bigger drop. The terminal velocity of bigger drop is ____ cm/s .

Asked 3 times: 29 Jul 2022 S2, 25 Jan 2023 S2, 5 Apr 2026 S2 (printed)

A body of mass m is taken from the surface of earth to a height equal to twice the radius of earth (R_e). The increase in potential energy will be ____.

(g is acceleration due to gravity at the surface of earth)

- (A) $\frac{1}{2}mgR_e$ (B) $\frac{3}{4}mgR_e$ (C) $\frac{1}{4}mgR_e$ (D) $\frac{2}{3}mgR_e$

Asked 3 times: 1 Feb 2024 S2, 2 Apr 2025 S2, 24 Jan 2026 S2 (printed)

The number of possible tripeptides formed involving alanine (ala), glycine (gly) and valine (val), where no amino acid has been used more than once is:

- (A) 8 (B) 3 (C) 4 (D) 6

Asked 3 times: 30 Jan 2023 S2, 28 Jan 2025 S1, 23 Jan 2026 S1 (printed)

A thin prism with angle 5° of refractive index 1.72 is combined with another prism of refractive index 1.9 to produce dispersion without deviation. The angle of second prism is ____.

- (A) 5° (B) 4° (C) 4.5° (D) 6°

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Q85 Physics · Electromagnetic Waves **Asked 3×**
Asked 3 times: 27 Jul 2021 S1, 4 Apr 2025 S2, **23 Jan 2026 S2 (printed)**

[Step-by-step solution](#) > [prepwiser.in/questions/MbzwymPK6k](https://www.prepwiser.in/questions/MbzwymPK6k)

The ratio of speeds of electromagnetic waves in vacuum and a medium, having dielectric constant $k = 3$ and permeability of $\mu = 2\mu_0$, is (μ_0 = permeability of vacuum)

- (A) 6 : 1 (B) 3 : 2 (C) $\sqrt{6}$: 1 (D) 36 : 1

Q86 Physics · Kinetic Theory of Gases **Asked 3×**
Asked 3 times: 31 Aug 2021 S2, 27 Jun 2022 S1, **2 Apr 2026 S2 (printed)**

[Step-by-step solution](#) > [prepwiser.in/questions/0U409LeYIq](https://www.prepwiser.in/questions/0U409LeYIq)

A mixture of carbon dioxide and oxygen has volume 8310 cm^3 , temperature 300 K, pressure 100 kPa and mass 13.2 g. The number of moles of carbon dioxide and oxygen gases in the mixture respectively are ____.

(Assume both carbon dioxide and oxygen gases behave like ideal gases) [$R = 8.31 \text{ J/mol K}$]

- (A) 0.15 and 0.18 (B) 0.25 and 0.08 (C) 0.21 and 0.12 (D) 0.13 and 0.20

Q87 Physics · Elasticity **Asked 3×**
Asked 3 times: 24 Jun 2022 S1, 24 Jan 2025 S2, **4 Apr 2026 S1 (printed)**

[Step-by-step solution](#) > [prepwiser.in/questions/AEII4k6MKu](https://www.prepwiser.in/questions/AEII4k6MKu)

The increase in the pressure required to decrease the volume (ΔV) of water is $6.3 \times 10^7 \text{ N/m}^2$. The percentage decrease in the volume is ____.

(Bulk modulus of water = $2.1 \times 10^9 \text{ N/m}^2$.)

- (A) 2 % (B) 3 % (C) 6 % (D) 4 %

Q88 Mathematics · Permutations & Combinations **Asked 3×**
Asked 3 times: 25 Jul 2022 S1, 29 Jan 2024 S1, **24 Jan 2026 S2 (printed)**

[Step-by-step solution](#) > [prepwiser.in/questions/0z83zf9HpB](https://www.prepwiser.in/questions/0z83zf9HpB)

The letters of the word "UDAYPUR" are written in all possible ways with or without meaning and these words are arranged as in a dictionary. The rank of the word "UDAYPUR" is

- (A) 1579 (B) 1578 (C) 1580 (D) 1581

Q89 Mathematics · Permutations & Combinations **Asked 3×**
Asked 3 times: 8 Apr 2023 S1, 2 Apr 2025 S1, **21 Jan 2026 S2 (printed)**

[Step-by-step solution](#) > [prepwiser.in/questions/HIhsDpCwwO](https://www.prepwiser.in/questions/HIhsDpCwwO)

The largest $n \in \mathbb{N}$, for which 7^n divides $101!$, is:

- (A) 18 (B) 15 (C) 19 (D) 16

Q90 Physics · Kinetic Theory of Gases **Asked 3×**
Asked 3 times: 5 Sep 2020 S2, 30 Jan 2024 S1, **21 Jan 2026 S2 (printed)**

[Step-by-step solution](#) > [prepwiser.in/questions/xlkVogKEcl](https://www.prepwiser.in/questions/xlkVogKEcl)

The r.m.s. speed of oxygen molecules at 47°C is equal to that of the hydrogen molecules kept at _____ $^\circ \text{C}$. (Mass of oxygen molecule/mass of hydrogen molecule = 32/2)

- (A) -100 (B) -253 (C) -20 (D) -235

Q91 Physics · Alternating Current **Asked 3×**
Asked 3 times: 25 Jan 2023 S2, 24 Jan 2026 S1, **6 Apr 2026 S1 (printed)**

[Step-by-step solution](#) > [prepwiser.in/questions/7MQi0AUgj2](https://www.prepwiser.in/questions/7MQi0AUgj2)

A LCR series circuit driven with $E_{rms} = 90 \text{ V}$ at frequency $f_d = 30 \text{ Hz}$ has resistance $R = 80 \Omega$, an inductance with inductive reactance $X_L = 20.0 \Omega$ and capacitance with capacitive reactance $X_C = 80.0 \Omega$. The power factor of the circuit is ____.

- (A) 0.8 (B) 0.64 (C) 0.9 (D) 0.5

Q92 Mathematics · Differential Equations **Asked 3×**

[Step-by-step solution](#) › [prepwiser.in/questions/B9OZnBHT1B](https://www.prepwiser.in/questions/B9OZnBHT1B)

Asked 3 times: 29 Jun 2022 S1, 28 Jul 2022 S1, **22 Jan 2026 S1 (printed)**

Let the solution curve of the differential equation $xdy - ydx = \sqrt{x^2 + y^2}dx$, $x > 0$, $y(1) = 0$, be $y = y(x)$. Then $y(3)$ is equal to

- (A) 6 (B) 4 (C) 1 (D) 2

Q93 Mathematics · Area Under Curves **Asked 3×**

[Step-by-step solution](#) › [prepwiser.in/questions/L1bZaAGXij](https://www.prepwiser.in/questions/L1bZaAGXij)

Asked 3 times: 1 Feb 2023 S2, 28 Jan 2026 S1, **5 Apr 2026 S1 (printed)**

The area of the region $R = \{(x, y) : xy \leq 27, 1 \leq y \leq x^2\}$ is equal to:

- (A) $78 \log_e 3 - \frac{52}{3}$ (B) $54 \log_e 3 - \frac{52}{3}$ (C) $54 \log_e 3 - \frac{26}{3}$ (D) $54 \log_e 3 + \frac{26}{3}$

Q94 Physics · Work, Energy & Power **Asked 3×**

[Step-by-step solution](#) › [prepwiser.in/questions/y6l4Tzlt6y](https://www.prepwiser.in/questions/y6l4Tzlt6y)

Asked 3 times: 29 Jun 2022 S1, 25 Jul 2022 S1, **6 Apr 2026 S2 (printed)**

A body of mass 1 kg moves along a straight line with a velocity $v = 2x^2$. The work done by the body during displacement from $x = 0$ to 5 m is ____ J.

- (A) 0 (B) 250 (C) 1250 (D) 1000

Q95 Mathematics · Binomial Theorem **Asked 3×**

[Step-by-step solution](#) › [prepwiser.in/questions/Fv_gSgxjDY](https://www.prepwiser.in/questions/Fv_gSgxjDY)

Asked 3 times: 29 Jul 2022 S1, 6 Apr 2023 S1, **4 Apr 2025 S1 (printed)**

In the expansion of $\left(\sqrt[3]{2} + \frac{1}{\sqrt[3]{3}}\right)^n$, $n \in \mathbb{N}$, if the ratio of 15th term from the beginning to the 15th term from the end is $\frac{1}{6}$, then the value of ${}^nC_3$ is

- (A) 4960 (B) 2300 (C) 1040 (D) 4060

Q96 Physics · Thermodynamics **Asked 3×**

[Step-by-step solution](#) › [prepwiser.in/questions/e6JYQFNsac](https://www.prepwiser.in/questions/e6JYQFNsac)

Asked 3 times: 26 Jul 2022 S1, 13 Apr 2023 S2, **8 Apr 2025 S2 (printed)**

A monoatomic gas having $\gamma = \frac{5}{3}$ is stored in a thermally insulated container and the gas is suddenly compressed to $\left(\frac{1}{8}\right)^{\text{th}}$ of its initial volume. The ratio of final pressure and initial pressure is: (γ is the ratio of specific heats of the gas at constant pressure and at constant volume)

- (A) 16 (B) 32 (C) 28 (D) 40

Q97 Mathematics · Permutations & Combinations **Asked 3×**

[Step-by-step solution](#) › [prepwiser.in/questions/KB5TY27M1R](https://www.prepwiser.in/questions/KB5TY27M1R)

Asked 3 times: 26 Feb 2021 S1, 13 Apr 2023 S1, **29 Jan 2025 S1 (printed)**

Let P be the set of seven digit numbers with sum of their digits equal to 11. If the numbers in P are formed by using the digits 1, 2 and 3 only, then the number of elements in the set P is:

- (A) 164 (B) 158 (C) 161 (D) 173

Q98 Mathematics · Relations & Functions (Basic) **Asked 3×**

[Step-by-step solution](#) › [prepwiser.in/questions/dzISQ5Frb4](https://www.prepwiser.in/questions/dzISQ5Frb4)

Asked 3 times: 24 Jan 2023 S2, 31 Jan 2024 S1, **23 Jan 2025 S1 (printed)**

Let $R = \{(1, 2), (2, 3), (3, 3)\}$ be a relation defined on the set $\{1, 2, 3, 4\}$. Then the minimum number of elements, needed to be added in R so that R becomes an equivalence relation, is:

- (A) 9 (B) 8 (C) 7 (D) 10

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Q99 Physics · Units, Dimensions & Errors **Asked 3×**
Asked 3 times: 27 Jun 2022 S1, 8 Apr 2023 S1, **22 Jan 2025 S2 (printed)**

[Step-by-step solution](#) > prepwiser.in/questions/XwVXbVGj64

The maximum percentage error in the measurement of density of a wire is
[Given, mass of wire = (0.60 ± 0.003) g
radius of wire = (0.50 ± 0.01) cm
length of wire = (10.00 ± 0.05) cm]

- (A) 7 (B) 8 (C) 5 (D) 4

Q100 Physics · Ray Optics **Asked 3×**
Asked 3 times: 25 Jul 2021 S2, 6 Apr 2024 S1, **23 Jan 2025 S2 (printed)**

[Step-by-step solution](#) > prepwiser.in/questions/2uqxGrPHOB

The refractive index of the material of a glass prism is $\sqrt{3}$. The angle of minimum deviation is equal to the angle of the prism. What is the angle of the prism?

- (A) 60° (B) 50° (C) 58° (D) 48°

Q101 Chemistry · Coordination Compounds **Asked 3×**
Asked 3 times: 8 Jan 2020 S1, 11 Apr 2023 S1, **23 Jan 2025 S1 (printed)**

[Step-by-step solution](#) > prepwiser.in/questions/sTnGspaNa3

The complex that shows Facial - Meridional isomerism is:

- (A) $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ (B) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$ (C) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$ (D) $[\text{Co}(\text{en})_3]^{3+}$

Q102 Mathematics · Sequences & Series **Asked 3×**
Asked 3 times: 22 Jul 2021 S2, 30 Jan 2024 S1, **24 Jan 2025 S2 (printed)**

[Step-by-step solution](#) > prepwiser.in/questions/wI4Pkjgab2

In an arithmetic progression, if $S_{40} = 1030$ and $S_{12} = 57$, then $S_{30} - S_{10}$ is equal to:

- (A) 525 (B) 505 (C) 510 (D) 515

Q103 Chemistry · Atomic Structure **Asked 3×**
Asked 3 times: 8 Jan 2020 S2, 29 Jan 2023 S2, **22 Jan 2025 S1 (printed)**

[Step-by-step solution](#) > prepwiser.in/questions/hCcTU6OTks

Radius of the first excited state of Helium ion is given as: $a_0 \rightarrow$ radius of first stationary state of hydrogen atom.

- (A) $r = \frac{a_0}{4}$ (B) $r = 2a_0$ (C) $r = 4a_0$ (D) $r = \frac{a_0}{2}$

Q104 Physics · Moving Charges & Magnetism **Asked 3×**
Asked 3 times: 9 Jan 2020 S1, 8 Apr 2024 S2, **29 Jan 2025 S1 (printed)**

[Step-by-step solution](#) > prepwiser.in/questions/Ldc2aDNM-K

Consider a long straight wire of a circular cross-section (radius a) carrying a steady current I . The current is uniformly distributed across this cross-section. The distances from the centre of the wire's cross-section at which the magnetic field [inside the wire, outside the wire] is half of the maximum possible magnetic field, any where due to the wire, will be:

- (A) $[a/2, 3a]$ (B) $[a/4, 3a/2]$ (C) $[a/2, 2a]$ (D) $[a/4, 2a]$

Q105 Mathematics · Determinants **Asked 3×**
Asked 3 times: 6 Sep 2020 S1, 1 Feb 2023 S1, **29 Jan 2025 S1 (printed)**

[Step-by-step solution](#) > prepwiser.in/questions/BIUegCiaw-

Let M and m respectively be the maximum and the minimum values of

$$f(x) = \begin{vmatrix} 1 + \sin^2 x & \cos^2 x & 4 \sin 4x \\ \sin^2 x & 1 + \cos^2 x & 4 \sin 4x \\ \sin^2 x & \cos^2 x & 1 + 4 \sin 4x \end{vmatrix}, x \in R$$

Then $M^4 - m^4$ is equal to:

- (A) 1280 (B) 1040 (C) 1215 (D) 1295

Q106 Physics · Alternating Current **Asked 3×**
Asked 3 times: 27 Aug 2021 S1, 4 Apr 2024 S1, **7 Apr 2025 S1 (printed)**

[Step-by-step solution](#) › [prepwisar.in/questions/GCuWEfScD1](https://www.prepwisar.in/questions/GCuWEfScD1)

An ac current is represented as

$$i = 5\sqrt{2} + 10 \cos \left(650\pi t + \frac{\pi}{6} \right) \text{ Amp}$$

The r.m.s value of the current is

- (A) 10 Amp (B) $5\sqrt{2}$ Amp (C) 100 Amp (D) 50 Amp

Q107 Physics · Centre of Mass & Linear Momentum **Asked 3×**
Asked 3 times: 2 Sep 2020 S2, 24 Feb 2021 S2, **23 Jan 2025 S1 (printed)**

[Step-by-step solution](#) › [prepwisar.in/questions/77cN85KBun](https://www.prepwisar.in/questions/77cN85KBun)

Consider a circular disc of radius 20 cm with centre located at the origin. A circular hole of radius 5 cm is cut from this disc in such a way that the edge of the hole touches the edge of the disc. The distance of centre of mass of residual or remaining disc from the origin will be

- (A) 1.5 cm (B) 2.0 cm (C) 0.5 cm (D) 1.0 cm

Q108 Physics · Magnetism & Matter **Asked 3×**
Asked 3 times: 25 Jul 2021 S1, 11 Apr 2023 S1, **7 Apr 2025 S1 (printed)**

[Step-by-step solution](#) › [prepwisar.in/questions/hRUGAyKuj3](https://www.prepwisar.in/questions/hRUGAyKuj3)

The percentage increase in magnetic field (B) when space within a current carrying solenoid is filled with magnesium (magnetic susceptibility $\chi_{\text{Mg}} = 1.2 \times 10^{-5}$) is:

- (A) $\frac{5}{3} \times 10^{-5}\%$ (B) $\frac{5}{6} \times 10^{-4}\%$ (C) $\frac{5}{6} \times 10^{-5}\%$ (D) $\frac{6}{5} \times 10^{-3}\%$

Q109 Mathematics · Binomial Theorem **Asked 3×**
Asked 3 times: 18 Mar 2021 S2, 25 Jul 2021 S1, **2 Apr 2025 S1 (printed)**

[Step-by-step solution](#) › [prepwisar.in/questions/uiSr6cavsN](https://www.prepwisar.in/questions/uiSr6cavsN)

The term independent of x in the expansion of $\left(\frac{(x+1)}{(x^{2/3}+1-x^{1/3})} - \frac{(x-1)}{(x-x^{1/2})} \right)^{10}$, $x > 1$, is:

- (A) 240 (B) 120 (C) 150 (D) 210

Q110 Chemistry · Purification & Characterisation of Organic Compounds **Asked 3×**

[Step-by-step solution](#) › [prepwisar.in/questions/WwnaOk8TMO](https://www.prepwisar.in/questions/WwnaOk8TMO)

Asked 3 times: 31 Jan 2024 S1, 2 Apr 2025 S2, **4 Apr 2025 S2 (printed)**

Match List - I with List - II

	List - I (Separation of)		List - II (Separation Technique)
(A)	Aniline from aniline-water mixture	(I)	Simple distillation
(B)	Glycerol from spent-lye in soap industry	(II)	Fractional distillation
(C)	Different fractions of crude oil in petroleum industry	(III)	Distillation at reduced pressure
(D)	Chloroform-Aniline mixture	(IV)	Steam distillation

Choose the correct answer from the options given below:

- (A) (A)-(IV), (B)-(III), (C)-(II), (D)-(I) (B) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(C) (A)-(III), (B)-(IV), (C)-(I), (D)-(II) (D) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)

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Q111 Physics · Alternating Current **Asked 3×** [Step-by-step solution](#) > [prepwiser.in/questions/RYcmEiZBUUp](https://www.prepwiser.in/questions/RYcmEiZBUUp)
Asked 3 times: 26 Feb 2021 S1, 17 Mar 2021 S1, **24 Jan 2025 S1 (printed)**

An alternating current is given by $I = I_A \sin \omega t + I_B \cos \omega t$. The r.m.s current will be

- (A) $\frac{\sqrt{I_A^2 + I_B^2}}{2}$ (B) $\sqrt{\frac{I_A^2 + I_B^2}{2}}$ (C) $\frac{|I_A + I_B|}{\sqrt{2}}$ (D) $\sqrt{I_A^2 + I_B^2}$

Q112 Physics · Rotational Motion **Asked 3×** **NUMERICAL** [Step-by-step solution](#) > [prepwiser.in/questions/EE0zRE7_of](https://www.prepwiser.in/questions/EE0zRE7_of)
Asked 3 times: 31 Aug 2021 S2, 6 Apr 2023 S1, **31 Jan 2024 S2 (printed)**

Two identical spheres each of mass 2kg and radius 50cm are fixed at the ends of a light rod so that the separation between the centers is 150cm. Then, moment of inertia of the system about an axis perpendicular to the rod and passing through its middle point is $\frac{x}{20} \text{ kgm}^2$, where the value of x is _____.

Q113 Physics · Experimental Skills **Asked 3×** [Step-by-step solution](#) > [prepwiser.in/questions/0Q8pZ4xMsi](https://www.prepwiser.in/questions/0Q8pZ4xMsi)
Asked 3 times: 25 Feb 2021 S1, 30 Jan 2023 S1, **8 Apr 2024 S2 (printed)**

There are 100 divisions on the circular scale of a screw gauge of pitch 1mm. With no measuring quantity in between the jaws, the zero of the circular scale lies 5 divisions below the reference line. The diameter of a wire is then measured using this screw gauge. It is found that 4 linear scale divisions are clearly visible while 60 divisions on circular scale coincide with the reference line. The diameter of the wire is:

- (A) 4.65 mm (B) 4.60 mm (C) 4.55 mm (D) 3.35 mm

Q114 Physics · Dual Nature of Radiation & Matter **Asked 3×** [Step-by-step solution](#) > [prepwiser.in/questions/jSODHEFTMc](https://www.prepwiser.in/questions/jSODHEFTMc)
Asked 3 times: 25 Jul 2021 S2, 26 Jun 2022 S1, **29 Jan 2024 S1 (printed)**

The de-Broglie wavelength of an electron is the same as that of a photon. If velocity of electron is 25% of the velocity of light, then the ratio of K.E. of electron and K.E. of photon will be:

- (A) $\frac{1}{4}$ (B) $\frac{8}{1}$ (C) $\frac{1}{8}$ (D) $\frac{1}{1}$

Q115 Physics · Friction **Asked 3×** [Step-by-step solution](#) > [prepwiser.in/questions/9JgD3Rt0Y4](https://www.prepwiser.in/questions/9JgD3Rt0Y4)
Asked 3 times: 1 Sep 2021 S2, 29 Jan 2023 S2, **8 Apr 2024 S2 (printed)**

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

Q116 Physics · Gravitation **Asked 3×** [Step-by-step solution](#) > [prepwiser.in/questions/IvOKOy6MXu](https://www.prepwiser.in/questions/IvOKOy6MXu)
Asked 3 times: 25 Jun 2022 S2, 10 Apr 2023 S1, **8 Apr 2024 S2 (printed)**

Two satellite A and B go round a planet in circular orbits having radii $4R$ and R respectively. If the speed of A is $3v$, the speed of B will be:

- (A) $6v$ (B) $\frac{4}{3}v$ (C) $3v$ (D) $12v$

Q117 Physics · Rotational Motion **Asked 3×** **NUMERICAL** [Step-by-step solution](#) > [prepwiser.in/questions/O479W0yrnq](https://www.prepwiser.in/questions/O479W0yrnq)
Asked 3 times: 26 Jun 2022 S2, 12 Apr 2023 S1, **5 Apr 2024 S2 (printed)**

A hollow sphere is rolling on a plane surface about its axis of symmetry. The ratio of rotational kinetic energy to its total kinetic energy is $\frac{x}{5}$. The value of x is _____.

Asked 3 times: 2 Sep 2020 S1, 10 Apr 2023 S2, 31 Jan 2024 S2 (printed)

A gas mixture consists of 8 moles of argon and 6 moles of oxygen at temperature T . Neglecting all vibrational modes, the total internal energy of the system is:

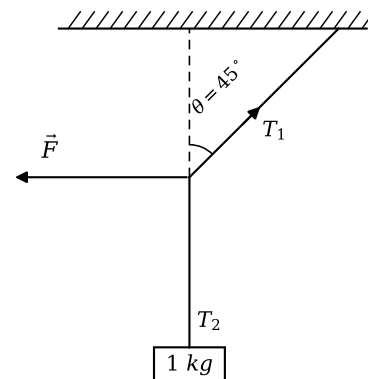
- (A) 29 RT (B) 27 RT (C) 20 RT (D) 21 RT

Asked 3 times: 7 Jan 2020 S2, 27 Jun 2022 S2, 9 Apr 2024 S2 (printed)

A 1 kg mass is suspended from the ceiling by a rope of length 4 m. A horizontal force ' F ' is applied at the mid point of the rope so that the rope makes an angle of 45° with respect to the vertical axis as shown in figure. The magnitude of F is:

(Assume that the system is in equilibrium and $g = 10 \text{ m/s}^2$)

- (A) 1 N (B) 10 N (C) $\frac{10}{\sqrt{2}}$ N (D) $\frac{1}{10 \times \sqrt{2}}$ N



Asked 3 times: 9 Jan 2020 S1, 31 Aug 2021 S1, 8 Apr 2024 S2 (printed)

If $\int \frac{1}{\sqrt[5]{(x-1)^4(x+3)^6}} dx = A \left(\frac{\alpha x - 1}{\beta x + 3} \right)^B + C$, where C is the constant of integration, then the value of $\alpha + \beta + 20AB$ is _____.

Asked 3 times: 26 Jun 2022 S2, 31 Jan 2023 S1, 4 Apr 2024 S2 (printed)

The magnetic moment of a bar magnet is 0.5 Am^2 . It is suspended in a uniform magnetic field of $8 \times 10^{-2} \text{ T}$. The work done in rotating it from its most stable to most unstable position is:

- (A) $4 \times 10^{-2} \text{ J}$ (B) $16 \times 10^{-2} \text{ J}$ (C) $8 \times 10^{-2} \text{ J}$ (D) Zero

Asked 3 times: 25 Jan 2023 S2, 29 Jan 2024 S1, 30 Jan 2024 S2 (printed)

Match List I with List II

	List I		List II
(A)	Gauss's law of magnetostatics	(I)	$\oint \vec{E} \cdot d\vec{a} = \frac{1}{\epsilon_0} \int \rho dV$
(B)	Faraday's law of electro magnetic induction	(II)	$\oint \vec{B} \cdot d\vec{a} = 0$
(C)	Ampere's law	(III)	$\int \vec{E} \cdot d\vec{l} = -\frac{d}{dt} \int \vec{B} \cdot d\vec{a}$
(D)	Gauss's law of electrostatics	(IV)	$\oint \vec{B} \cdot d\vec{l} = \mu_0 I$

Choose the correct answer from the options given below:

- (A) A-III, B-IV, C-I, D-II (B) A-IV, B-II, C-III, D-I (C) A-II, B-III, C-IV, D-I (D) A-I, B-III, C-IV, D-II

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Q123 Physics · Work, Energy & Power **Asked 3×**[Step-by-step solution](#) › [prepwiser.in/questions/arK86jdp0J](https://www.prepwiser.in/questions/arK86jdp0J)Asked 3 times: 18 Mar 2021 S1, 20 Jul 2021 S2, **5 Apr 2024 S2 (printed)**

A body is moving unidirectionally under the influence of a constant power source. Its displacement in time t is proportional to:

- (A) $t^{2/3}$ (B) $t^{3/2}$ (C) t (D) t^2

Q124 Mathematics · Area Under Curves **Asked 3×**[Step-by-step solution](#) › [prepwiser.in/questions/yrz7xINH0L](https://www.prepwiser.in/questions/yrz7xINH0L)Asked 3 times: 24 Jan 2023 S1, 24 Jan 2023 S2, **30 Jan 2024 S1 (printed)**

The area (in square units) of the region bounded by the parabola $y^2 = 4(x - 2)$ and the line $y = 2x - 8$, is:

- (A) 7 (B) 8 (C) 9 (D) 6

Q125 Physics · Units, Dimensions & Errors **Asked 3×**[Step-by-step solution](#) › [prepwiser.in/questions/GRHzdglRxZ](https://www.prepwiser.in/questions/GRHzdglRxZ)Asked 3 times: 24 Feb 2021 S2, 18 Mar 2021 S1, **31 Jan 2024 S2 (printed)**

The measured value of the length of a simple pendulum is 20cm with 2mm accuracy. The time for 50 oscillations was measured to be 40 seconds with 1 second resolution. From these measurements, the accuracy in the measurement of acceleration due to gravity is $N\%$. The value of N is:

- (A) 6 (B) 5 (C) 4 (D) 8

Q126 Physics · Thermodynamics **Asked 3×**[Step-by-step solution](#) › [prepwiser.in/questions/Z-egvNSe9b](https://www.prepwiser.in/questions/Z-egvNSe9b)Asked 3 times: 1 Feb 2023 S1, 4 Apr 2024 S2, **9 Apr 2024 S1 (printed)**

A sample of 1 mole gas at temperature T is adiabatically expanded to double its volume. If adiabatic constant for the gas is $\gamma = \frac{3}{2}$, then the work done by the gas in the process is:

- (A) $RT[2 + \sqrt{2}]$ (B) $RT[2 - \sqrt{2}]$ (C) $\frac{R}{T}[2 - \sqrt{2}]$ (D) $\frac{T}{R}[2 + \sqrt{2}]$

Q127 Mathematics · Probability: Advanced **Asked 3×** **NUMERICAL**[Step-by-step solution](#) › [prepwiser.in/questions/p5uinw3U--](https://www.prepwiser.in/questions/p5uinw3U--)Asked 3 times: 28 Jul 2022 S2, 5 Apr 2024 S1, **6 Apr 2024 S2 (printed)**

From a lot of 12 items containing 3 defectives, a sample of 5 items is drawn at random. Let the random variable X denote the number of defective items in the sample. Let items in the sample be drawn one by one without replacement. If variance of X is $\frac{m}{n}$, where $\gcd(m, n) = 1$, then $n - m$ is equal to _____.

Q128 Physics · Ray Optics **Asked 3×**[Step-by-step solution](#) › [prepwiser.in/questions/wHu1pK7KtW](https://www.prepwiser.in/questions/wHu1pK7KtW)Asked 3 times: 28 Jun 2022 S1, 27 Jan 2024 S1, **31 Jan 2024 S1 (printed)**

The refractive index of a prism with apex angle A is $\cot A/2$. The angle of minimum deviation is:

- (A) $\delta_m = 180^\circ - 3A$ (B) $\delta_m = 180^\circ - 4A$ (C) $\delta_m = 180^\circ - 2A$ (D) $\delta_m = 180^\circ - A$

Q129 Physics · Newton's Laws of Motion **Asked 3×**[Step-by-step solution](#) › [prepwiser.in/questions/LeGum62Fua](https://www.prepwiser.in/questions/LeGum62Fua)Asked 3 times: 31 Jan 2024 S2, 6 Apr 2024 S1, **9 Apr 2024 S1 (printed)**

A light unstretchable string passing over a smooth light pulley connects two blocks of masses m_1 and m_2 . If the acceleration of the system is $\frac{g}{8}$, then the ratio of the masses $\frac{m_2}{m_1}$ is:

- (A) 5 : 3 (B) 8 : 1 (C) 9 : 7 (D) 4 : 3

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Q130 Physics · Surface Tension **Asked 3×** **NUMERICAL**
Asked 3 times: 30 Jan 2024 S2, 1 Feb 2024 S2, 6 Apr 2024 S1 (printed)

[Step-by-step solution](#) > prepwiser.in/questions/BZJqMvz8kp

A big drop is formed by coalescing 1000 small droplets of water. The ratio of surface energy of 1000 droplets to that of energy of big drop is $\frac{10}{x}$. The value of x is _____.

Q131 Mathematics · Three Dimensional Geometry **Asked 3×**
Asked 3 times: 26 Feb 2021 S2, 29 Jun 2022 S1, 11 Apr 2023 S1 (printed)

[Step-by-step solution](#) > prepwiser.in/questions/asD69mxjnr

Let (α, β, γ) be the image of the point $P(2, 3, 5)$ in the plane $2x + y - 3z = 6$. Then $\alpha + \beta + \gamma$ is equal to:

- (A) 10 (B) 9 (C) 5 (D) 12

Q132 Mathematics · Functions (Advanced) **Asked 3×**
Asked 3 times: 25 Feb 2021 S2, 27 Jun 2022 S1, 24 Jan 2023 S2 (printed)

[Step-by-step solution](#) > prepwiser.in/questions/RcDS61ffZB

If $f(x) = \frac{2^{2x}}{2^{2x}+2}$, $x \in \mathbb{R}$, then

$$f\left(\frac{1}{2023}\right) + f\left(\frac{2}{2023}\right) + \dots + f\left(\frac{2022}{2023}\right)$$

is equal to

- (A) 2011 (B) 2010 (C) 1010 (D) 1011

Q133 Chemistry · Solid State **Asked 3×**
Asked 3 times: 18 Mar 2021 S1, 24 Jun 2022 S1, 6 Apr 2023 S1 (printed)

[Step-by-step solution](#) > prepwiser.in/questions/jS46InxKKs

A compound is formed by two elements X and Y. The element Y forms cubic close packed arrangement and those of element X occupy one third of the tetrahedral voids. What is the formula of the compound?

- (A) XY_3 (B) X_3Y_2 (C) X_3Y (D) X_2Y_3

Q134 Physics · Electrostatics I: Charges, Field & Gauss's Law **Asked 3×**

[Step-by-step solution](#) > prepwiser.in/questions/Kl3AZ8rGjm

Asked 3 times: 20 Jul 2021 S1, 27 Jul 2022 S2, 13 Apr 2023 S2 (printed)

A $10\mu\text{C}$ charge is divided into two parts and placed at 1cm distance so that the repulsive force between them is maximum. The charges of the two parts are:

- (A) $9\mu\text{C}, 1\mu\text{C}$ (B) $5\mu\text{C}, 5\mu\text{C}$ (C) $8\mu\text{C}, 2\mu\text{C}$ (D) $7\mu\text{C}, 3\mu\text{C}$

Q135 Physics · Nuclear Physics **Asked 3×** **NUMERICAL**
Asked 3 times: 5 Sep 2020 S2, 26 Jun 2022 S2, 30 Jan 2023 S2 (printed)

[Step-by-step solution](#) > prepwiser.in/questions/b5H8uRk0hn

A radioactive nucleus decays by two different process. The half life of the first process is 5 minutes and that of the second process is 30s. The effective half-life of the nucleus is calculated to be $\frac{\alpha}{11}$ s. The value of α is _____.

Q136 Mathematics · Permutations & Combinations **Asked 3×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/ocweAsMhIn

Asked 3 times: 26 Feb 2021 S2, 26 Jun 2022 S2, 29 Jan 2023 S2 (printed)

The total number of 4-digit numbers whose greatest common divisor with 54 is 2, is _____.

Q137 Physics · Current Electricity **Asked 3×** **NUMERICAL**
Asked 3 times: 27 Aug 2021 S1, 29 Jun 2022 S2, 31 Jan 2023 S1 (printed)

[Step-by-step solution](#) > prepwiser.in/questions/aeZ4ZnnqoM

Two identical cells, when connected either in parallel or in series gives same current in an external resistance 5Ω . The internal resistance of each cell will be _____ Ω .

Q138 Physics · Kinetic Theory of Gases **Asked 3×**[Step-by-step solution](#) > [prepwisar.in/questions/J-dZbI3II-](https://www.prepwisar.in/questions/J-dZbI3II-)Asked 3 times: 26 Jun 2022 S2, 30 Jan 2023 S2, **15 Apr 2023 S1 (printed)**

A flask contains Hydrogen and Argon in the ratio 2 : 1 by mass. The temperature of the mixture is 30°C . The ratio of average kinetic energy per molecule of the two gases ($K_{\text{argon}}/K_{\text{hydrogen}}$) is: (Given: Atomic Weight of Ar = 39.9)

- (A) $\frac{39.9}{2}$ (B) 2 (C) 39.9 (D) 1

Q139 Physics · Gravitation **Asked 3×**[Step-by-step solution](#) > [prepwisar.in/questions/1hX6djPLiI](https://www.prepwisar.in/questions/1hX6djPLiI)Asked 3 times: 27 Jul 2021 S2, 29 Jan 2023 S1, **15 Apr 2023 S1 (printed)**

Two identical particles each of mass ' m ' go round a circle of radius a under the action of their mutual gravitational attraction. The angular speed of each particle will be:

- (A) $\sqrt{\frac{Gm}{2a^3}}$ (B) $\sqrt{\frac{Gm}{a^3}}$ (C) $\sqrt{\frac{Gm}{8a^3}}$ (D) $\sqrt{\frac{Gm}{4a^3}}$

Q140 Physics · Surface Tension **Asked 3×**[Step-by-step solution](#) > [prepwisar.in/questions/oTxqQjaIWZ](https://www.prepwisar.in/questions/oTxqQjaIWZ)Asked 3 times: 28 Jun 2022 S1, 26 Jul 2022 S1, **1 Feb 2023 S1 (printed)**

A mercury drop of radius 10^{-3}m is broken into 125 equal size droplets. Surface tension of mercury is 0.45Nm^{-1} . The gain in surface energy is:

- (A) $28 \times 10^{-5}\text{J}$ (B) $17.5 \times 10^{-5}\text{J}$ (C) $5 \times 10^{-5}\text{J}$ (D) $2.26 \times 10^{-5}\text{J}$

Q141 Mathematics · Three Dimensional Geometry **Asked 3×**[Step-by-step solution](#) > [prepwisar.in/questions/9WRtW7dxLD](https://www.prepwisar.in/questions/9WRtW7dxLD)Asked 3 times: 7 Jan 2020 S1, 10 Apr 2023 S2, **15 Apr 2023 S1 (printed)**

Let the foot of perpendicular of the point $P(3, -2, -9)$ on the plane passing through the points $(-1, -2, -3)$, $(9, 3, 4)$, $(9, -2, 1)$ be $Q(\alpha, \beta, \gamma)$. Then the distance of Q from the origin is:

- (A) $\sqrt{38}$ (B) $\sqrt{29}$ (C) $\sqrt{42}$ (D) $\sqrt{35}$

Q142 Mathematics · Three Dimensional Geometry **Asked 3×**[Step-by-step solution](#) > [prepwisar.in/questions/YJctHNh4aK](https://www.prepwisar.in/questions/YJctHNh4aK)Asked 3 times: 24 Feb 2021 S1, 27 Jul 2021 S1, **11 Apr 2023 S1 (printed)**

If equation of the plane that contains the point $(-2, 3, 5)$ and is perpendicular to each of the planes $2x + 4y + 5z = 8$ and $3x - 2y + 3z = 5$ is $\alpha x + \beta y + \gamma z + 97 = 0$ then $\alpha + \beta + \gamma =$

- (A) 15 (B) 16 (C) 17 (D) 18

Q143 Physics · Work, Energy & Power **Asked 3×** **NUMERICAL**[Step-by-step solution](#) > [prepwisar.in/questions/YG5kwgDtkR](https://www.prepwisar.in/questions/YG5kwgDtkR)Asked 3 times: 25 Jul 2021 S2, 1 Feb 2023 S2, **11 Apr 2023 S1 (printed)**

A force $\vec{F} = (2 + 3x)\hat{i}$ acts on a particle in the x direction where F is in newton and x is in meter. The work done by this force during a displacement from $x = 0$ to $x = 4\text{m}$, is _____ J.

Q144 Physics · Atomic Physics **Asked 3×** **NUMERICAL**[Step-by-step solution](#) > [prepwisar.in/questions/fDDzGB0T-a](https://www.prepwisar.in/questions/fDDzGB0T-a)Asked 3 times: 27 Jun 2022 S1, 30 Jun 2022 S1, **1 Feb 2023 S1 (printed)**

A light of energy 12.75eV is incident on a hydrogen atom in its ground state. The atom absorbs the radiation and reaches to one of its excited states. The angular momentum of the atom in the excited state is $\frac{x}{\pi} \times 10^{-17}\text{eVs}$. The value of x is _____ (use $h = 4.14 \times 10^{-15}\text{eVs}$, $c = 3 \times 10^8\text{ms}^{-1}$).

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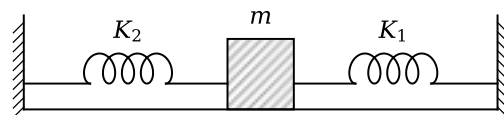
Q145 Physics · Gravitation **Asked 3×**[Step-by-step solution](#) > [prepwiser.in/questions/WvKqwICNjH](https://www.prepwiser.in/questions/WvKqwICNjH)Asked 3 times: 30 Jun 2022 S1, 11 Apr 2023 S1, **13 Apr 2023 S2 (printed)**

Two planets A and B of radii R and $1.5 R$ have densities ρ and $\rho/2$ respectively. The ratio of acceleration due to gravity at the surface of B to A is:

- (A) 2 : 1 (B) 2 : 3 (C) 4 : 3 (D) 3 : 4

Q146 Physics · Simple Harmonic Motion **Asked 3×**[Step-by-step solution](#) > [prepwiser.in/questions/LIMvEbx1LQ](https://www.prepwiser.in/questions/LIMvEbx1LQ)Asked 3 times: 25 Feb 2021 S2, 24 Jan 2023 S1, **6 Apr 2023 S1 (printed)**

A mass m is attached to two strings as shown in figure. The spring constants of two springs are K_1 and K_2 . For the frictionless surface, the time period of oscillation of mass m is:



- (A) $2\pi\sqrt{\frac{m}{K_1 + K_2}}$ (B) $2\pi\sqrt{\frac{m}{K_1 - K_2}}$ (C) $\frac{1}{2\pi}\sqrt{\frac{K_1 + K_2}{m}}$ (D) $\frac{1}{2\pi}\sqrt{\frac{K_1 - K_2}{m}}$

Q147 Chemistry · Electrochemistry **Asked 3×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/l6buQSU39w](https://www.prepwiser.in/questions/l6buQSU39w)Asked 3 times: 25 Jan 2023 S1, 25 Jan 2023 S2, **30 Jan 2023 S1 (printed)**

Consider the cell



When the potential of the cell is 0.712V at 298K, the ratio $[\text{Fe}^{2+}] / [\text{Fe}^{3+}]$ is _____. (Nearest integer)

Given:



$$\frac{2.303RT}{F} = 0.06\text{V}$$

Q148 Physics · Mechanical Waves **Asked 3×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/UI8MH_nRs2](https://www.prepwiser.in/questions/UI8MH_nRs2)Asked 3 times: 9 Jan 2020 S2, 31 Aug 2021 S1, **27 Jul 2022 S2 (printed)**

A wire of length 30 cm, stretched between rigid supports, has its n^{th} and $(n + 1)^{\text{th}}$ harmonics at 400 Hz and 450 Hz, respectively. If tension in the string is 2700 N, its linear mass density is _____ kg/m.

Q149 Mathematics · Quadratic Equations & Polynomial Inequalities **Asked 3×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/c4HjzD-NsA](https://www.prepwiser.in/questions/c4HjzD-NsA)Asked 3 times: 9 Jan 2020 S1, 27 Jul 2021 S2, **28 Jun 2022 S1 (printed)**

The number of real solutions of the equation $e^{4x} + 4e^{3x} - 58e^{2x} + 4e^x + 1 = 0$ is _____.

Q150 Physics · Thermodynamics **Asked 3×**[Step-by-step solution](#) > [prepwiser.in/questions/3FVwCQVB7j](https://www.prepwiser.in/questions/3FVwCQVB7j)Asked 3 times: 25 Jul 2021 S2, 31 Aug 2021 S1, **28 Jul 2022 S1 (printed)**

A Carnot engine has efficiency of 50%. If the temperature of sink is reduced by 40°C , its efficiency increases by 30%. The temperature of the source will be:

- (A) 166.7 K (B) 255.1 K (C) 266.7 K (D) 367.7 K

Q151 Physics · Units, Dimensions & Errors **Asked 3×**[Step-by-step solution](#) > [prepwiser.in/questions/ZL7V6zvde6](https://www.prepwiser.in/questions/ZL7V6zvde6)Asked 3 times: 24 Feb 2021 S1, 26 Feb 2021 S1, **27 Jul 2022 S2 (printed)**

An expression of energy density is given by $u = \frac{\alpha}{\beta} \sin\left(\frac{\alpha x}{kt}\right)$, where α, β are constants, x is displacement, k is Boltzmann constant and t is the temperature. The dimensions of β will be:

- (A) $[\text{ML}^2\text{T}^{-2}\theta^{-1}]$ (B) $[\text{M}^0\text{L}^2\text{T}^{-2}]$ (C) $[\text{M}^0\text{L}^0\text{T}^0]$ (D) $[\text{M}^0\text{L}^2\text{T}^0]$

Asked 3 times: 25 Jul 2021 S1, 24 Jun 2022 S2, **29 Jul 2022 S1 (printed)**

If O_2 gas is bubbled through water at 303K, the number of millimoles of O_2 gas that dissolve in 1 litre of water is _____. (Nearest Integer)

(Given : Henry's Law constant for O_2 at 303K is 46.82 k bar and partial pressure of $O_2 = 0.920$ bar)

(Assume solubility of O_2 in water is too small, nearly negligible)

Asked 3 times: 24 Feb 2021 S2, 26 Feb 2021 S2, **26 Jul 2022 S1 (printed)**

When a particle executes Simple Harmonic Motion, the nature of graph of velocity as a function of displacement will be:

- (A) Circular (B) Elliptical (C) Sinusoidal (D) Straight line

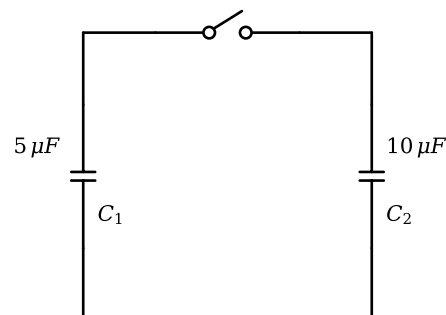
Asked 3 times: 17 Mar 2021 S2, 25 Jun 2022 S2, **27 Jul 2022 S1 (printed)**

Two sources of equal emfs are connected in series. This combination is connected to an external resistance R . The internal resistances of the two sources are r_1 and r_2 ($r_1 > r_2$). If the potential difference across the source of internal resistance r_1 is zero, then the value of R will be:

- (A) $r_1 - r_2$ (B) $\frac{r_1 r_2}{r_1 + r_2}$ (C) $\frac{r_1 + r_2}{2}$ (D) $r_2 - r_1$

Asked 3 times: 17 Mar 2021 S2, 26 Jun 2022 S1, **28 Jun 2022 S2 (printed)**

A capacitor C_1 of capacitance $5 \mu F$ is charged to a potential of 30 V using a battery. The battery is then removed and the charged capacitor is connected to an uncharged capacitor C_2 of capacitance $10 \mu F$ as shown in figure. When the switch is closed charge flows between the capacitors. At equilibrium, the charge on the capacitor C_2 is _____ μC .



Asked 3 times: 18 Mar 2021 S1, 25 Jul 2021 S2, **24 Jun 2022 S1 (printed)**

A resistance of 40Ω is connected to a source of alternating current rated 220 V, 50 Hz. Find the time taken by the current to change from its maximum value to the rms value:

- (A) 2.5 ms (B) 1.25 ms (C) 2.5 s (D) 0.25 s

Asked 3 times: 20 Jul 2021 S2, 25 Jul 2021 S2, **29 Jun 2022 S1 (printed)**

Two vectors $\vec{A}$ and $\vec{B}$ have equal magnitudes. If magnitude of $\vec{A} + \vec{B}$ is equal to two times the magnitude of $\vec{A} - \vec{B}$, then the angle between $\vec{A}$ and $\vec{B}$ will be:

- (A) $\sin^{-1} \left(\frac{3}{5} \right)$ (B) $\sin^{-1} \left(\frac{1}{3} \right)$ (C) $\cos^{-1} \left(\frac{3}{5} \right)$ (D) $\cos^{-1} \left(\frac{1}{3} \right)$

Q158 Physics · Wave Optics **Asked 3×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/NvKLwy_yyz

Asked 3 times: 7 Jan 2020 S2, 26 Feb 2021 S1, **16 Mar 2021 S1 (printed)**

A fringe width of 6 mm was produced for two slits separated by 1 mm apart. The screen is placed 10 m away. The wavelength of light used is 'x' nm. The value of 'x' to the nearest integer is _____.

Asked in 2 shifts · 391 PYQs

Q159 Physics · Moving Charges & Magnetism **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/D3VvB_I moH

Asked 2 times: 26 Jul 2022 S1, **5 Apr 2026 S1 (printed)**

The charged particle moving in a uniform magnetic field of $(3\hat{i} + 2\hat{j})\text{T}$ has an acceleration $(4\hat{i} - \frac{x}{2}\hat{j})\text{m/s}^2$. The value of x is

Q160 Physics · Current Electricity **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/iKUVKBPaw4

Asked 2 times: 5 Sep 2020 S1, **22 Jan 2026 S2 (printed)**

An electric power line having total resistance of 2Ω , delivers 1 kW of power at 250 V. The percentage efficiency of transmission line is _____.

- (A) 96.9 (B) 92.5 (C) 86.5 (D) 100

Q161 Chemistry · Chemical Thermodynamics **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/XY2KXtT9mG

Asked 2 times: 17 Mar 2021 S1, **8 Apr 2026 S2 (printed)**

Consider the reaction



The magnitude of enthalpy change for the reaction in kJmol^{-1} is _____. (Nearest integer)

Given :

$$\begin{aligned}\Delta_f H^\ominus(\text{H}_2\text{S}) &= -20.1\text{kJmol}^{-1} \\ \Delta_f H^\ominus(\text{H}_2\text{O}) &= -286.0\text{kJmol}^{-1} \\ \Delta_f H^\ominus(\text{SO}_2) &= -297.0\text{kJmol}^{-1}\end{aligned}$$

Q162 Physics · Magnetism & Matter **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/MVaXqnFxb

Asked 2 times: 4 Sep 2020 S1, **24 Jan 2026 S1 (printed)**

A short bar magnet placed with its axis at 30° with an external field of 800 Gauss, experiences a torque of 0.016N.m . The work done in moving it from most stable to most unstable position is $\alpha \times 10^{-3}\text{J}$. The value of α is _____.

Q163 Mathematics · Binomial Theorem **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/QDOG0PQT28

Asked 2 times: 1 Feb 2023 S1, **24 Jan 2026 S1 (printed)**

Let $S = \frac{1}{25!} + \frac{1}{3!23!} + \frac{1}{5!21!} + \dots$ up to 13 terms. If $13S = \frac{2^k}{n!}$, $k \in \mathbb{N}$, then $n + k$ is equal to

- (A) 50 (B) 52 (C) 49 (D) 51

Q164 Mathematics · Matrices **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/_e9ee-yPzx

Asked 2 times: 16 Mar 2021 S1, **24 Jan 2026 S1 (printed)**

The number of 3×2 matrices A , which can be formed using the elements of the set $\{-2, -1, 0, 1, 2\}$ such that the sum of all the diagonal elements of $A^T A$ is 5, is

Q165

Physics · Rotational Motion

Asked 2×

NUMERICAL

[Step-by-step solution](https://www.prepwise.in/questions/NKB0DxQm4Q) › prepwise.in/questions/NKB0DxQm4QAsked 2 times: 24 Jan 2023 S1, **28 Jan 2026 S1 (printed)**

A solid sphere of radius 10 cm is rotating about an axis which is at a distance 15 cm from its centre. The radius of gyration about this axis is $\sqrt{n}$ cm. The value of n is

Q166

Physics · Units, Dimensions & Errors

Asked 2×

[Step-by-step solution](https://www.prepwise.in/questions/A9jomPDKkt) › prepwise.in/questions/A9jomPDKktAsked 2 times: 26 Jul 2022 S1, **2 Apr 2026 S1 (printed)**

The diameter of a wire measured by a screw gauge of least count 0.001 cm is 0.08 cm. The length measured by a scale of least count 0.1 cm is 150 cm. When a weight of 100 N is applied to the wire, the extension in length is 0.5 cm, measured by a micrometer of least count 0.001 cm. The error in the measured Young's modulus is $\alpha \times 10^9 \text{ N/m}^2$. The value of α is _____.

(Ignore the contribution of the load to Young's modulus error calculation)

(A) 1.3**(B)** 1.65**(C)** 0.13**(D)** 0.25**Q167**

Physics · Circular Motion

Asked 2×

[Step-by-step solution](https://www.prepwise.in/questions/vBYbIMRa_2) › prepwise.in/questions/vBYbIMRa_2Asked 2 times: 25 Jan 2023 S1, **8 Apr 2026 S2 (printed)**

A car moving with a speed of 54 km/h takes a turn of radius 20 m. A simple pendulum is suspended from the ceiling of the car. Determine the angle made by the string of the pendulum with the vertical during the turning. (Take $g = 10 \text{ m/s}^2$)

(A) $\tan^{-1}(0.5)$ **(B)** $\tan^{-1}(0.75)$ **(C)** $\tan^{-1}(1.125)$ **(D)** $\tan^{-1}(0.25)$ **Q168**

Physics · Elasticity

Asked 2×

[Step-by-step solution](https://www.prepwise.in/questions/vUWKA1YsCL) › prepwise.in/questions/vUWKA1YsCLAsked 2 times: 31 Jan 2023 S2, **28 Jan 2026 S1 (printed)**

Two wires A and B made of different materials of lengths 6.0 cm and 5.4 cm, respectively and area of cross sections $3.0 \times 10^{-5} \text{ m}^2$ and $4.5 \times 10^{-5} \text{ m}^2$, respectively are stretched by the same magnitude under a given load. The ratio of the Young's modulus of A to that of B is $x : 3$. The value of x is _____

(A) 2**(B)** 1**(C)** 4**(D)** 5**Q169**

Mathematics · Parabola

Asked 2×

[Step-by-step solution](https://www.prepwise.in/questions/bVyUT8_IzCl) › prepwise.in/questions/bVyUT8_IzClAsked 2 times: 8 Apr 2023 S1, **28 Jan 2026 S2 (printed)**

Let A be the focus of the parabola $y^2 = 8x$. Let the line $y = mx + c$ intersect the parabola at two distinct points B and C . If the centroid of the triangle ABC is $(\frac{7}{3}, \frac{4}{3})$, then $(BC)^2$ is equal to:

(A) 89**(B)** 80**(C)** 32**(D)** 41**Q170**

Mathematics · Determinants

Asked 2×

[Step-by-step solution](https://www.prepwise.in/questions/2N8gzUWnk1) › prepwise.in/questions/2N8gzUWnk1Asked 2 times: 24 Jan 2023 S1, **22 Jan 2026 S2 (printed)**

Let n be the number obtained on rolling a fair die. If the probability that the system

$$\begin{aligned} x - ny + z &= 6 \\ x + (n-2)y + (n+1)z &= 8 \\ (n-1)y + z &= 1 \end{aligned}$$

has a unique solution is $\frac{k}{6}$, then the sum of k and all possible values of n is:

(A) 22**(B)** 20**(C)** 24**(D)** 21

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Asked 2 times: 27 Jul 2022 S1, 5 Apr 2026 S1 (printed)

An electron of mass m is moving in an electric field $\vec{E} = -2E_0\hat{i}$ ($E_0 = \text{constant} > 0$), with an initial velocity $\vec{V} = v_0\hat{i}$ ($v_0 = \text{constant} > 0$). If $\lambda_0 = \frac{h}{4mv_0}$, its de Broglie wavelength at time t is _____.

(e = charge of electron)

- (A) $\frac{4\lambda_0}{\left[1 - \frac{E_0 e}{2m} \frac{t}{v_0}\right]}$ (B) $\frac{4\lambda_0}{\left[1 + \frac{E_0 e}{2m} \frac{t}{v_0}\right]}$ (C) $\frac{4\lambda_0}{\left[1 + \frac{2E_0 e}{m} \frac{t}{v_0}\right]}$ (D) $\frac{4\lambda_0}{\left[1 - \frac{2E_0 e}{m} \frac{t}{v_0}\right]}$

Asked 2 times: 6 Apr 2023 S2, 6 Apr 2026 S1 (printed)

The number of 4-letter words, with or without meaning, each consisting of two vowels and two consonants that can be formed from the letters of the word INCONSEQUENTIAL, without repeating any letter, is:

- (A) 2670 (B) 2840 (C) 2920 (D) 3600

Asked 2 times: 3 Apr 2025 S1, 21 Jan 2026 S2 (printed)

Keeping the significant figures in view, the sum of the physical quantities 52.01 m, 153.2 m and 0.123 m is:

- (A) 205.3 m (B) 205 m (C) 205.333 m (D) 205.33 m

Asked 2 times: 29 Jun 2022 S2, 6 Apr 2026 S2 (printed)

Decomposition of a hydrocarbon follows the equation $k = (5.5 \times 10^{11} \text{s}^{-1}) e^{\frac{-28000\text{K}}{T}}$. The activation energy of reaction is _____ kJmol^{-1} . (Nearest Integer)

Given: $R = 8.3 \text{JK}^{-1}\text{mol}^{-1}$

Asked 2 times: 30 Jan 2024 S1, 22 Jan 2026 S1 (printed)

Let the set of all values of r , for which the circles $(x+1)^2 + (y+4)^2 = r^2$ and $x^2 + y^2 - 4x - 2y - 4 = 0$ intersect at two distinct points be the interval (α, β) . Then $\alpha\beta$ is equal to

- (A) 21 (B) 24 (C) 20 (D) 25

Asked 2 times: 25 Jun 2022 S2, 2 Apr 2026 S2 (printed)

Let $x = x(y)$ be the solution of the differential equation $2y^2 \frac{dx}{dy} - 2xy + x^2 = 0$, $y > 1$, $x(e) = e$.

Then $x(e^2)$ is equal to:

- (A) $\frac{3}{2}e^2$ (B) $\frac{2}{3}e^2$ (C) e^2 (D) $2e^2$

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Q177 Mathematics · Sequences & Series **Asked 2×**

[Step-by-step solution](#) › [prepwise.in/questions/9TpsoTqfxl](https://www.prepwise.in/questions/9TpsoTqfxl)

Asked 2 times: 6 Sep 2020 S2, **28 Jan 2026 S1 (printed)**

The common difference of the A.P.: $a_1, a_2, \dots, a_m$ is 13 more than the common difference of the A.P.: $b_1, b_2, \dots, b_n$. If $b_{31} = -277$, $b_{43} = -385$ and $a_{78} = 327$, then a_1 is equal to

- (A) 21 (B) 19 (C) 24 (D) 16

Q178 Mathematics · Permutations & Combinations **Asked 2×**

[Step-by-step solution](#) › [prepwise.in/questions/ngOmnj40ha](https://www.prepwise.in/questions/ngOmnj40ha)

Asked 2 times: 31 Jan 2024 S2, **23 Jan 2026 S2 (printed)**

The number of ways, in which 16 oranges can be distributed to four children such that each child gets at least one orange, is

- (A) 384 (B) 403 (C) 429 (D) 455

Q179 Mathematics · Definite Integration **Asked 2×**

[Step-by-step solution](#) › [prepwise.in/questions/vRQP7Bjmpr](https://www.prepwise.in/questions/vRQP7Bjmpr)

Asked 2 times: 25 Jul 2021 S1, **23 Jan 2026 S1 (printed)**

The value of the integral $\int_{\frac{\pi}{24}}^{\frac{5\pi}{24}} \frac{dx}{1 + \sqrt[3]{\tan 2x}}$ is:

- (A) $\frac{\pi}{3}$ (B) $\frac{\pi}{18}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{12}$

Q180 Chemistry · Solutions & Colligative Properties **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) › [prepwise.in/questions/WMIfo7SWx](https://www.prepwise.in/questions/WMIfo7SWx)

Asked 2 times: 4 Sep 2020 S1, **23 Jan 2026 S2 (printed)**

Two liquids A and B form an ideal solution. At 320 K, the vapour pressure of the solution, containing 3 mol of A and 1 mol of B is 500 mm Hg. At the same temperature, if 1 mol of A is further added to this solution, vapour pressure of the solution increases by 20 mm Hg. Vapour pressure (in mm Hg) of B in pure state is _____. (Nearest integer)

Q181 Physics · Ray Optics **Asked 2×**

[Step-by-step solution](#) › [prepwise.in/questions/_KyDsxoIRI](https://www.prepwise.in/questions/_KyDsxoIRI)

Asked 2 times: 22 Jan 2025 S1, **8 Apr 2026 S2 (printed)**

A thin biconvex lens is prepared from the glass ($\mu = 1.5$) both curved surfaces of which have equal radii of 20 cm each. Left side surface of the lens is silvered from outside to make it reflecting. To have the position of image and object at the same place, the object should be placed, from the lens at a distance of _____ cm.

- (A) 10 (B) 12.5 (C) 13 (D) 13.5

Q182 Physics · Electrostatics II: Potential & Capacitance **Asked 2×**

[Step-by-step solution](#) › [prepwise.in/questions/QDmiVty8dR](https://www.prepwise.in/questions/QDmiVty8dR)

Asked 2 times: 31 Jan 2024 S1, **23 Jan 2026 S2 (printed)**

A parallel plate capacitor with plate separation 5 mm is charged by a battery. On introducing a mica sheet of 2 mm and maintaining the connections of the plates with the terminals of the battery, it is found that it draws 25% more charge from the battery. The dielectric constant of mica is _____

- (A) 1.0 (B) 2.5 (C) 1.5 (D) 2.0

Q183 Physics · Kinetic Theory of Gases **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) › [prepwise.in/questions/e3YjGtya_s](https://www.prepwise.in/questions/e3YjGtya_s)

Asked 2 times: 29 Jan 2023 S1, **24 Jan 2026 S1 (printed)**

A gas of certain mass filled in a closed cylinder at a pressure of 3.23 kPa has temperature 50°C . The gas is now heated to double its temperature on the Celsius scale. The modified pressure is _____ Pa.

Q184 Chemistry · Chemical Kinetics **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/5LLok0mL-f](https://www.prepwiser.in/questions/5LLok0mL-f)Asked 2 times: 8 Apr 2025 S2, **28 Jan 2026 S1 (printed)**

An organic compound undergoes first order decomposition. The time taken for decomposition to $\left(\frac{1}{8}\right)^{\text{th}}$ and $\left(\frac{1}{10}\right)^{\text{th}}$ of its initial concentration are $t_{1/8}$ and $t_{1/10}$ respectively.

What is the value of $\frac{t_{1/8}}{t_{1/10}} \times 10$?

($\log 2 = 0.3$)

(A) 30**(B)** 9**(C)** 3**(D)** 0.9**Q185** Mathematics · Relations & Functions (Basic) **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/IVK1sHaw6I](https://www.prepwiser.in/questions/IVK1sHaw6I)Asked 2 times: 6 Apr 2024 S2, **21 Jan 2026 S2 (printed)**

Let $A = \{2, 3, 5, 7, 9\}$. Let R be the relation on A defined by xRy if and only if $2x \leq 3y$. Let l be the number of elements in R , and m be the minimum number of elements required to be added in R to make it a symmetric relation. Then $l + m$ is equal to:

(A) 21**(B)** 25**(C)** 23**(D)** 27**Q186** Physics · Rectilinear Motion **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › [prepwiser.in/questions/mw1-g2OL81](https://www.prepwiser.in/questions/mw1-g2OL81)Asked 2 times: 26 Jun 2022 S1, **5 Apr 2026 S1 (printed)**

From 18 m height above the ground a ball is dropped from rest. The height above the ground at which the magnitude of velocity equal to the magnitude of acceleration (in the same set of units) due to gravity is ____ m.

(Take $g = 10\text{m/s}^2$ and neglect the air resistance)

Q187 Mathematics · Functions (Advanced) **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/DN-IJC66vM](https://www.prepwiser.in/questions/DN-IJC66vM)Asked 2 times: 3 Apr 2025 S2, **24 Jan 2026 S2 (printed)**

Let f be a function such that $3f(x) + 2f\left(\frac{m}{19x}\right) = 5x, x \neq 0$, where $m = \sum_{i=1}^9 (i)^2$. Then $f(5) - f(2)$ is equal to

(A) 36**(B)** 9**(C)** -9**(D)** 18**Q188** Physics · Nuclear Physics **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/LSQil9FTyn](https://www.prepwiser.in/questions/LSQil9FTyn)Asked 2 times: 26 Jul 2022 S2, **6 Apr 2026 S2 (printed)**

The energy released if hydrogen atoms are combined to form ${}^4_2\text{He}$ is ____ MeV.

(Take binding energies per nucleon of ${}^2_1\text{H}$ and ${}^4_2\text{He}$ as 1.1 MeV and 7.2 MeV, respectively)

(A) 6.1**(B)** 24.4**(C)** 26.6**(D)** 5**Q189** Mathematics · Differential Equations **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/o3kPk-xmhC](https://www.prepwiser.in/questions/o3kPk-xmhC)Asked 2 times: 5 Apr 2024 S1, **24 Jan 2026 S2 (printed)**

Let $y = y(x)$ be a differentiable function in the interval $(0, \infty)$ such that $y(1) = 2$, and

$\lim_{t \rightarrow x} \left(\frac{t^2 y(x) - x^2 y(t)}{x - t} \right) = 3$ for each $x > 0$. Then $2y(2)$ is equal to:

(A) 27**(B)** 18**(C)** 23**(D)** 12

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Asked 2 times: 13 Apr 2023 S1, 6 Apr 2026 S2 (printed)

A moving coil of galvanometer when shunted with 2Ω resistance gives a full scale deflection for a current of 500 mA. When a resistance of 470Ω is connected in series it gives a full scale deflection for 10 V potential applied on it. The value of resistance of galvanometer coil is ____ Ω .

Asked 2 times: 25 Feb 2021 S2, 8 Apr 2026 S2 (printed)

Let a line L_1 pass through the origin and be perpendicular to the lines

$$L_2 : \vec{r} = (3 + t)\hat{i} + (2t - 1)\hat{j} + (2t + 4)\hat{k} \text{ and}$$

$$L_3 : \vec{r} = (3 + 2s)\hat{i} + (3 + 2s)\hat{j} + (2 + s)\hat{k}, t, s \in \mathbf{R}.$$

If (a, b, c) , $a \in \mathbf{Z}$, is the point on L_3 at a distance of $\sqrt{17}$ from the point of intersection of L_1 and L_2 , then $(a + b + c)^2$ is equal to ____.

Asked 2 times: 15 Apr 2023 S1, 24 Jan 2026 S1 (printed)

Let R be a relation defined on the set $\{1, 2, 3, 4\} \times \{1, 2, 3, 4\}$ by

$$R = \{((a, b), (c, d)) : 2a + 3b = 3c + 4d\}.$$

Then the number of elements in R is

- (A) 6 (B) 15 (C) 12 (D) 18

Asked 2 times: 24 Jan 2023 S1, 6 Apr 2026 S2 (printed)

For an electromagnetic wave propagating through vacuum, $\vec{k}$, $\vec{E}$ and ω represent propagation vector, electric field and angular frequency, respectively. The magnetic field associated with this wave is represented by:

- (A) $\frac{\vec{E} \times \vec{k}}{\omega}$ (B) $\frac{\vec{k} \times \vec{E}}{\omega}$ (C) $\omega(\vec{E} \times \vec{k})$ (D) $\omega(\vec{k} \times \vec{E})$

Asked 2 times: 29 Jan 2023 S1, 6 Apr 2026 S1 (printed)

If shortest wavelength of hydrogen atom in Lyman series is x , then longest wavelength in Balmer series of He^+ is:

- (A) $\frac{9x}{5}$ (B) $\frac{36x}{5}$ (C) $\frac{x}{4}$ (D) $\frac{5x}{9}$

Asked 2 times: 7 Jan 2020 S2, 8 Apr 2026 S2 (printed)

Let $\alpha = 3 + 4 + 8 + 9 + 13 + 14 + \dots$ upto 40 terms. If $(\tan \beta)^{\frac{\alpha}{1020}}$ is a root of the equation $x^2 + x - 2 = 0$, $\beta \in (0, \frac{\pi}{2})$, then $\sin^2 \beta + 3 \cos^2 \beta$ is equal to:

- (A) 2 (B) $\frac{7}{4}$ (C) $\frac{5}{2}$ (D) $\frac{3}{2}$

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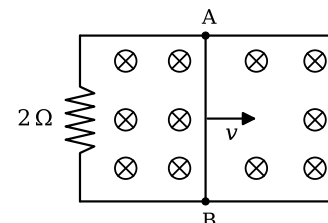
Q196 Mathematics · Limits **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/YAK06OPz_Asked 2 times: 16 Mar 2021 S1, **22 Jan 2026 S2 (printed)**

If $\lim_{x \rightarrow 0} \frac{e^{(a-1)x} + 2 \cos bx + (c-2)e^{-x}}{x \cos x - \log_e(1+x)} = 2$, then $a^2 + b^2 + c^2$ is equal to:

- (A) 3 (B) 5 (C) 9 (D) 7

Q197 Physics · Electromagnetic Induction **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/eFQ088L5CmAsked 2 times: 10 Apr 2023 S1, **21 Jan 2026 S1 (printed)**

A 1 m long metal rod AB completes the circuit as shown in figure. The area of circuit is perpendicular to the magnetic field of 0.10 T. If the resistance of the total circuit is 2Ω then the force needed to move the rod towards right with constant speed (v) of 1.5m/s is ____ N.



- (A) 5.7×10^{-2} (B) 7.5×10^{-3} (C) 5.7×10^{-3} (D) 7.5×10^{-2}

Q198 Physics · Fluid Mechanics **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/uol4chnKe7Asked 2 times: 10 Apr 2023 S2, **4 Apr 2026 S2 (printed)**

A water spray gun is attached to a hose of cross sectional area 30cm^2 . The gun comprises of 10 perforations each of cross sectional area of 15mm^2 . If the water flows in the hose with the speed of 50cm/s , calculate the speed at which the water flows out from each perforation. (Neglect any edge effects)

- (A) 100m/s (B) 10m/s (C) 1000m/s (D) $15 \times 10^2\text{m/s}$

Q199 Chemistry · Chemical Kinetics **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > prepwiser.in/questions/68xHVpajIEAsked 2 times: 31 Aug 2021 S2, **22 Jan 2026 S2 (printed)**

Consider $A \xrightarrow{k_1} B$ and $C \xrightarrow{k_2} D$ are two reactions. If the rate constant (k_1) of the $A \rightarrow B$ reaction can be expressed by the following equation $\log_{10} k = 14.34 - \frac{1.5 \times 10^4}{T/K}$ and activation energy of $C \rightarrow D$ reaction (E_{a2}) is $\frac{1}{5}$ th of the $A \rightarrow B$ reaction (E_{a1}), then the value of (E_{a2}) is ____ kJmol^{-1} . (Nearest Integer)

Q200 Mathematics · Probability: Advanced **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/qB9fYKnRkwwAsked 2 times: 9 Jan 2020 S2, **22 Jan 2026 S1 (printed)**

If a random variable x has the probability distribution

x	0	1	2	3	4	5	6	7
$P(x)$	0	$2k$	k	$3k$	$2k^2$	$2k$	$k^2 + k$	$7k^2$

then $P(3 < x \leq 6)$ is equal to

- (A) 0.34 (B) 0.64 (C) 0.22 (D) 0.33

Q201 Mathematics · Three Dimensional Geometry **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/6phEZO8XmOAsked 2 times: 27 Aug 2021 S2, **23 Jan 2026 S1 (printed)**

Let the direction cosines of two lines satisfy the equations: $4l + m - n = 0$ and $2mn + 10nl + 3lm = 0$.

Then the cosine of the acute angle between these lines is:

- (A) $\frac{10}{7\sqrt{38}}$ (B) $\frac{10}{\sqrt{38}}$ (C) $\frac{10}{3\sqrt{38}}$ (D) $\frac{20}{3\sqrt{38}}$

Q202 Physics · Units, Dimensions & Errors **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/5Bg4hsdNTX](https://www.prepwisar.in/questions/5Bg4hsdNTX)

Asked 2 times: 18 Mar 2021 S2, **6 Apr 2026 S2 (printed)**

The percentage error in the calculated volume of a sphere, if there is 2% error in its diameter measurement, is ____.

- (A) 1 (B) 2 (C) 6 (D) 8

Q203 Physics · Rectilinear Motion **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/eRHQy2HQ5W](https://www.prepwisar.in/questions/eRHQy2HQ5W)

Asked 2 times: 27 Aug 2021 S2, **28 Jan 2026 S1 (printed)**

Water drops fall from a tap on the floor, 5 m below, at regular intervals of time, the first drop strikes the floor when the sixth drop begins to fall. The height at which the fourth drop will be from ground, at the instant when the first drop strikes the ground is ____ m.

$$(g = 10\text{m/s}^2)$$

- (A) 3.8 (B) 4.0 (C) 4.2 (D) 2.5

Q204 Mathematics · Area Under Curves **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/VySf_KiIqu](https://www.prepwisar.in/questions/VySf_KiIqu)

Asked 2 times: 25 Jan 2023 S1, **28 Jan 2026 S2 (printed)**

Let $P_1 : y = 4x^2$ and $P_2 : y = x^2 + 27$ be two parabolas. If the area of the bounded region enclosed between P_1 and P_2 is six times the area of the bounded region enclosed between the line $y = \alpha x$, $\alpha > 0$ and P_1 , then α is equal to:

- (A) 12 (B) 15 (C) 8 (D) 6

Q205 Physics · Nuclear Physics **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/adbWkP2TIZ](https://www.prepwisar.in/questions/adbWkP2TIZ)

Asked 2 times: 4 Sep 2020 S2, **2 Apr 2026 S2 (printed)**

The binding energy per nucleon of ${}^{209}_{83}\text{Bi}$ is ____ MeV.

$$[\text{Take } m({}^{209}_{83}\text{Bi}) = 208.980388\text{u}, m_p = 1.007825\text{u}, m_n = 1.008665\text{u}, 1\text{u} = 931\text{MeV}/c^2]$$

- (A) 7.48 (B) 7.84 (C) 8.79 (D) 6.94

Q206 Physics · Ray Optics **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > [prepwisar.in/questions/ZRggMN6GCE](https://www.prepwisar.in/questions/ZRggMN6GCE)

Asked 2 times: 25 Feb 2021 S1, **23 Jan 2026 S2 (printed)**

The size of the images of an object, formed by a thin lens are equal when the object is placed at two different positions 8 cm and 24 cm from the lens. The focal length of the lens is ____ cm.

Q207 Mathematics · Statistics **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/ioIEcMGHqh](https://www.prepwisar.in/questions/ioIEcMGHqh)

Asked 2 times: 2 Sep 2020 S1, **24 Jan 2026 S2 (printed)**

Let $X = \{x \in \mathbb{N} : 1 \leq x \leq 19\}$ and for some $a, b \in \mathbb{R}$, $Y = \{ax + b : x \in X\}$. If the mean and variance of the elements of Y are 30 and 750, respectively, then the sum of all possible values of b is

- (A) 20 (B) 100 (C) 80 (D) 60

Q208 Physics · Wave Optics **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > [prepwisar.in/questions/338I2EWLBQ](https://www.prepwisar.in/questions/338I2EWLBQ)

Asked 2 times: 6 Apr 2023 S2, **28 Jan 2026 S2 (printed)**

A beam of light consisting of wavelengths 650 nm and 550 nm illuminates the Young's double slits with separation of 2 mm such that the interference fringes are formed on a screen, placed at a distance of 1.2 m from the slits. The least distance of a point from the central maximum, where the bright fringes due to both the wavelengths coincide, is ____ $\times 10^{-5}$ m.

Asked 2 times: 6 Sep 2020 S1, 6 Apr 2026 S1 (printed)

The energy released when $\frac{7}{17.13}$ kg of ${}^7_3\text{Li}$ is converted into ${}^4_2\text{He}$ by proton bombardment is $\alpha \times 10^{32}$ eV. The value of α is _____. (Nearest integer) (Mass of ${}^7_3\text{Li} = 7.0183\text{u}$, mass of ${}^4_2\text{He} = 4.004\text{u}$, mass of proton = 1.008u and $1\text{u} = 931\text{MeV}/c^2$ and Avogadro number = 6.0×10^{23})

Asked 2 times: 29 Jul 2022 S1, 5 Apr 2026 S1 (printed)

$\sum_{n=1}^{10} \left(\frac{528}{n(n+1)(n+2)} \right)$ is equal to:

- (A) 65 (B) 130 (C) 220 (D) 440

Asked 2 times: 25 Jan 2023 S1, 5 Apr 2026 S1 (printed)

The square of the distance of the point $P(5, 6, 7)$ from the line $\frac{x-2}{2} = \frac{y-5}{3} = \frac{z-2}{4}$ is equal to:

- (A) 3 (B) 5 (C) 6 (D) 8

Asked 2 times: 30 Jan 2023 S2, 23 Jan 2026 S2 (printed)

The current passing through a conducting loop in the form of equilateral triangle of side $4\sqrt{3}\text{cm}$ is 2 A. The magnetic field at its centroid is $\alpha \times 10^{-5}\text{T}$. The value of α is _____.

(Given: $\mu_0 = 4\pi \times 10^{-7}$ SI units)

- (A) $3\sqrt{3}$ (B) $2\sqrt{3}$ (C) $\sqrt{3}$ (D) $\frac{\sqrt{3}}{2}$

Asked 2 times: 1 Feb 2024 S2, 5 Apr 2026 S2 (printed)

Let a triangle PQR be such that P and Q lie on the line $\frac{x+3}{8} = \frac{y-4}{2} = \frac{z+1}{2}$ and are at a distance of 6 units from $R(1, 2, 3)$. If (α, β, γ) is the centroid of ΔPQR , then $\alpha + \beta + \gamma$ is equal to:

- (A) 4 (B) 5 (C) 6 (D) 8

Asked 2 times: 29 Jan 2024 S2, 6 Apr 2026 S1 (printed)

A particle is executing simple harmonic motion. Its amplitude is A and time period is 5 sec. The time required by it to move from $x = A$ to $x = \frac{A}{\sqrt{2}}$ is _____ sec.

- (A) $1/4$ (B) $5/4$ (C) $5/8$ (D) $3/8$

Asked 2 times: 29 Jun 2022 S2, 21 Jan 2026 S1 (printed)

A light wave described by $E = 60 [\sin(3 \times 10^{15})t + \sin(12 \times 10^{15})t]$ (in SI units) falls on a metal surface of work function 2.8 eV. The maximum kinetic energy of ejected photoelectron is (approximately)

_____ eV. ($h = 6.6 \times 10^{-34}$ J.s. and $e = 1.6 \times 10^{-19}$ C)

- (A) 3.8 (B) 7.8 (C) 6.0 (D) 5.1

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Q216 Physics · Fluid Mechanics **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/5DKAssqz9tAsked 2 times: 13 Apr 2023 S1, **8 Apr 2026 S2 (printed)**

A liquid of density 600kg/m^3 flowing steadily in a tube of varying cross-section. The cross-section at a point A is 1.0cm^2 and that at B is 20mm^2 . Both the points A and B are in same horizontal plane, the speed of the liquid at A is 10cm/s . The difference in pressures at A and B points is ____ Pa.

- (A) 18 (B) 144 (C) 36 (D) 72

Q217 Mathematics · Definite Integration **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/1qSrWQgg7BAsked 2 times: 2 Apr 2025 S2, **22 Jan 2026 S1 (printed)**

Let $f : [1, \infty) \rightarrow \mathbb{R}$ be a differentiable function. If $6 \int_1^x f(t) dt = 3xf(x) + x^3 - 4$ for all $x \geq 1$, then the value of $f(2) - f(3)$ is:

- (A) 4 (B) 3 (C) -4 (D) -3

Q218 Physics · Surface Tension **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/devngoKGJsAsked 2 times: 4 Apr 2024 S1, **24 Jan 2026 S2 (printed)**

A soap bubble of surface tension 0.04N/m is blown to a diameter of 7 cm . If $(15000 - x)\mu\text{J}$ of work is done in blowing it further to make its diameter 14 cm , then the value of x is ____.

 $(\pi = 22/7)$ **Q219** Physics · Experimental Skills **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/By6qYbmUEOAsked 2 times: 26 Aug 2021 S1, **2 Apr 2026 S2 (printed)**

In a screw gauge the zero of main scale reference line coincides with the fifth division of the circular scale when two studs are in contact. There are 100 divisions in circular scale and pitch of screw gauge is 0.1 mm . When diameter of a sphere is measured, the reading of main scale is 5 mm and 50^{th} division of circular scale coincides with the reference line of main scale. The diameter of sphere is ____ mm.

- (A) 5.045 (B) 5.055 (C) 5.450 (D) 5.550

Q220 Physics · Work, Energy & Power **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/mHAz25k6C1Asked 2 times: 1 Sep 2021 S2, **6 Apr 2026 S1 (printed)**

The rain drop of mass 1 g , starts with zero velocity from a height of 1 km . It hits the ground with a speed of 5m/s . The work done by the unknown resistive force is ____ J.

 $(\text{take } g = 10\text{m/s}^2)$

- (A) -8.75 (B) -8.35 (C) -9.55 (D) -9.98

Q221 Mathematics · Trigonometric Equations **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/q2ETOWDVikAsked 2 times: 25 Jan 2023 S2, **5 Apr 2026 S2 (printed)**

If $S = \left\{ \theta \in [-\pi, \pi] : \cos \theta \cos \frac{5\theta}{2} = \cos 7\theta \cos \frac{7\theta}{2} \right\}$, then $n(S)$ is equal to ____.

Q222 Physics · Ray Optics **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/UidIEdktLGAsked 2 times: 24 Jan 2023 S2, **28 Jan 2026 S1 (printed)**

A convex lens of refractive index 1.5 and focal length $f = 18\text{cm}$ is immersed in water. The difference in focal lengths of the given lens when it is in water and in air is $\alpha \times f$. The value of α is ____.

 $(\text{refractive index of water} = 4/3)$

Q223 Mathematics · Statistics **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/CTVdd2zio0Asked 2 times: 4 Apr 2026 S2, **6 Apr 2026 S1 (printed)**

A data consists of 20 observations $x_1, x_2, \dots, x_{20}$. If $\sum_{i=1}^{20} (x_i + 5)^2 = 2500$ and $\sum_{i=1}^{20} (x_i - 5)^2 = 100$, then the ratio of mean to standard deviation of this data is:

- (A) 2 : 1 (B) 3 : 1 (C) 3 : 2 (D) 4 : 1

Q224 Physics · Thermodynamics **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/XPii3E4myCAsked 2 times: 21 Jan 2026 S1, **2 Apr 2026 S2 (printed)**

5 moles of unknown gas is heated at constant volume from 10°C to 20°C. The molar specific heat of this gas at constant pressure $c_p = 8 \text{ cal/mol.}^\circ\text{C}$ and $R = 8.36 \text{ J/mol.}^\circ\text{C}$. The change in the internal energy of the gas is _____ calorie.

Q225 Mathematics · Quadratic Equations & Polynomial Inequalities **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/r-y550989jAsked 2 times: 23 Jan 2026 S2, **8 Apr 2026 S2 (printed)**

The sum of squares of all the real solutions of the equation $\log_{(x+1)} (2x^2 + 5x + 3) = 4 - \log_{(2x+3)} (x^2 + 2x + 1)$ is equal to _____.

Q226 Mathematics · Sequences & Series **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/U45GjD0Q4TAsked 2 times: 27 Jan 2024 S1, **24 Jan 2025 S2 (printed)**

If $7 = 5 + \frac{1}{7}(5 + \alpha) + \frac{1}{7^2}(5 + 2\alpha) + \frac{1}{7^3}(5 + 3\alpha) + \dots \infty$, then the value of α is:

- (A) $\frac{1}{7}$ (B) 1 (C) $\frac{6}{7}$ (D) 6

Q227 Physics · Wave Optics **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/OGvd5rWbzSAsked 2 times: 24 Jun 2022 S2, **3 Apr 2025 S2 (printed)**

Two monochromatic light beams have intensities in the ratio 1:9. An interference pattern is obtained by these beams. The ratio of the intensities of maximum to minimum is

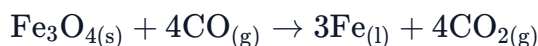
- (A) 8 : 1 (B) 4 : 1 (C) 3 : 1 (D) 9 : 1

Q228 Chemistry · d & f Block Elements **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/NyuUrLnz_wAsked 2 times: 26 Jul 2022 S2, **28 Jan 2025 S2 (printed)**

The spin only magnetic moment (μ) value (B.M.) of the compound with strongest oxidising power among Mn_2O_3 , TiO and VO is _____ B.M. (Nearest integer).

Q229 Chemistry · Mole Concept & Stoichiometry **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/u3gldRyFcEAsked 2 times: 29 Jun 2022 S1, **24 Jan 2025 S1 (printed)**

Consider the following reaction occurring in the blast furnace:



'x' kg of iron is produced when $2.32 \times 10^3 \text{ kg Fe}_3\text{O}_4$ and $2.8 \times 10^2 \text{ kg CO}$ are brought together in the furnace. The value of 'x' is _____. (nearest integer)

{Given: molar mass of $\text{Fe}_3\text{O}_4 = 232 \text{ gmol}^{-1}$

molar mass of $\text{CO} = 28 \text{ gmol}^{-1}$

molar mass of $\text{Fe} = 56 \text{ gmol}^{-1}$ }

Asked 2 times: 5 Sep 2020 S2, 7 Apr 2025 S2 (printed)

If the sum of the second, fourth and sixth terms of a G.P. of positive terms is 21 and the sum of its eighth, tenth and twelfth terms is 15309, then the sum of its first nine terms is:

- (A) 757 (B) 755 (C) 750 (D) 760

Asked 2 times: 12 Apr 2023 S1, 22 Jan 2025 S2 (printed)

Let $A = \{1, 2, 3\}$. The number of relations on A , containing $(1, 2)$ and $(2, 3)$, which are reflexive and transitive but not symmetric, is _____.

Asked 2 times: 8 Apr 2023 S1, 2 Apr 2025 S2 (printed)

If μ_0 and ϵ_0 are the permeability and permittivity of free space, respectively, then the dimension of $\left(\frac{1}{\mu_0 \epsilon_0}\right)$ is:

- (A) T^2/L (B) L^2/T^2 (C) T^2/L^2 (D) L/T^2

Asked 2 times: 30 Jan 2024 S2, 24 Jan 2025 S1 (printed)

A current of 5 A exists in a square loop of side $\frac{1}{\sqrt{2}}$ m. Then the magnitude of the magnetic field B at the centre of the square loop will be $p \times 10^{-6}$ T. where, value of p is _____ [Take $\mu_0 = 4\pi \times 10^{-7} \text{TmA}^{-1}$].

Asked 2 times: 17 Mar 2021 S2, 3 Apr 2025 S1 (printed)

The number of solutions of the equation $2x + 3 \tan x = \pi, x \in [-2\pi, 2\pi] - \left\{\pm \frac{\pi}{2}, \pm \frac{3\pi}{2}\right\}$ is:

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

Asked 2 times: 4 Sep 2020 S2, 7 Apr 2025 S2 (printed)

Match List - I with List - II.

List - I	List - II
(A) Isothermal	(I) ΔW (work done) = 0
(B) Adiabatic	(II) ΔQ (supplied heat) = 0
(C) Isobaric	(III) ΔU (change in internal energy) $\neq 0$
(D) Isochoric	(IV) $\Delta U = 0$

Choose the **correct** answer from the options given below:

- (A) (A)-(III), (B)-(II), (C)-(I), (D)-(IV) (B) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)
 (C) (A)-(IV), (B)-(II), (C)-(III), (D)-(I) (D) (A)-(IV), (B)-(I), (C)-(III), (D)-(II)

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Q236 Chemistry · Mole Concept & Stoichiometry **Asked 2×**[Step-by-step solution](#) > [prepwiset.in/questions/xYh7IWM8Cb](https://www.prepwiset.in/questions/xYh7IWM8Cb)Asked 2 times: 28 Jun 2022 S2, **24 Jan 2025 S2 (printed)**

The elemental composition of a compound is 54.2%C, 9.2%H and 36.6%O. If the molar mass of the compound is 132g mol^{-1} , the molecular formula of the compound is : [Given : The relative atomic mass of C : H : O = 12 : 1 : 16]

- (A) $\text{C}_4\text{H}_8\text{O}_2$ (B) $\text{C}_6\text{H}_{12}\text{O}_6$ (C) $\text{C}_4\text{H}_9\text{O}_3$ (D) $\text{C}_6\text{H}_{12}\text{O}_3$

Q237 Mathematics · Binomial Theorem **Asked 2×**[Step-by-step solution](#) > [prepwiset.in/questions/toPoqyVmsR](https://www.prepwiset.in/questions/toPoqyVmsR)Asked 2 times: 3 Sep 2020 S1, **29 Jan 2025 S1 (printed)**

The least value of n for which the number of integral terms in the Binomial expansion of $(\sqrt[3]{7} + \sqrt[12]{11})^n$ is 183, is:

- (A) 2184 (B) 2172 (C) 2196 (D) 2148

Q238 Physics · Fluid Mechanics **Asked 2×**[Step-by-step solution](#) > [prepwiset.in/questions/tIVqMnZApk](https://www.prepwiset.in/questions/tIVqMnZApk)Asked 2 times: 27 Jul 2022 S1, **3 Apr 2025 S2 (printed)**

Two cylindrical vessels of equal cross sectional area of 2m^2 contain water upto heights 10 m and 6 m, respectively. If the vessels are connected at their bottom then the work done by the force of gravity is (Density of water is 10^3kg/m^3 and $g = 10\text{m/s}^2$)

- (A) $1 \times 10^5\text{J}$ (B) $4 \times 10^4\text{J}$ (C) $8 \times 10^4\text{J}$ (D) $6 \times 10^4\text{J}$

Q239 Physics · Atomic Physics **Asked 2×**[Step-by-step solution](#) > [prepwiset.in/questions/i0AzFw03KY](https://www.prepwiset.in/questions/i0AzFw03KY)Asked 2 times: 27 Aug 2021 S2, **29 Jan 2025 S2 (printed)**

The number of spectral lines emitted by atomic hydrogen that is in the 4th energy level, is

- (A) 3 (B) 6 (C) 1 (D) 0

Q240 Physics · Rotational Motion **Asked 2×**[Step-by-step solution](#) > [prepwiset.in/questions/ZGbNk5Mfyr](https://www.prepwiset.in/questions/ZGbNk5Mfyr)Asked 2 times: 29 Jan 2024 S1, **24 Jan 2025 S1 (printed)**

A uniform solid cylinder of mass 'm' and radius 'r' rolls along an inclined rough plane of inclination 45° . If it starts to roll from rest from the top of the plane then the linear acceleration of the cylinder's axis will be

- (A) $\sqrt{2}g$ (B) $\frac{1}{\sqrt{2}}g$ (C) $\frac{1}{3\sqrt{2}}g$ (D) $\frac{\sqrt{2}g}{3}$

Q241 Mathematics · Ellipse **Asked 2×**[Step-by-step solution](#) > [prepwiset.in/questions/4Nc-eEG7GV](https://www.prepwiset.in/questions/4Nc-eEG7GV)Asked 2 times: 30 Jan 2024 S1, **2 Apr 2025 S2 (printed)**

If the length of the minor axis of an ellipse is equal to one fourth of the distance between the foci, then the eccentricity of the ellipse is:

- (A) $\frac{3}{\sqrt{19}}$ (B) $\frac{\sqrt{3}}{16}$ (C) $\frac{4}{\sqrt{17}}$ (D) $\frac{\sqrt{5}}{7}$

Q242 Physics · Surface Tension **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > [prepwiset.in/questions/GZRxpAMHWP](https://www.prepwiset.in/questions/GZRxpAMHWP)Asked 2 times: 17 Mar 2021 S1, **22 Jan 2025 S1 (printed)**

Two soap bubbles of radius 2 cm and 4 cm, respectively, are in contact with each other. The radius of curvature of the common surface, in cm, is _____.

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Q243 Physics · Electrostatics II: Potential & Capacitance **Asked 2×** [Step-by-step solution](#) > [prepwiser.in/questions/eeWyMx--cV](https://www.prepwiser.in/questions/eeWyMx--cV)

Asked 2 times: 31 Aug 2021 S2, **22 Jan 2025 S1 (printed)**

A parallel-plate capacitor of capacitance $40\mu\text{F}$ is connected to a 100 V power supply. Now the intermediate space between the plates is filled with a dielectric material of dielectric constant $K = 2$. Due to the introduction of dielectric material, the extra charge and the change in the electrostatic energy in the capacitor, respectively, are

- (A) 8 mC and 2.0 J (B) 4 mC and 0.2 J (C) 2 mC and 0.2 J (D) 2 mC and 0.4 J

Q244 Physics · Gravitation **Asked 2×** [Step-by-step solution](#) > [prepwiser.in/questions/AXmLjNgbCs](https://www.prepwiser.in/questions/AXmLjNgbCs)

Asked 2 times: 20 Jul 2021 S2, **24 Jan 2025 S1 (printed)**

A satellite is launched into a circular orbit of radius 'R' around the earth. A second satellite is launched into an orbit of radius $1.03R$. The time period of revolution of the second satellite is larger than the first one approximately by

- (A) 3% (B) 2.5% (C) 4.5% (D) 9%

Q245 Physics · Surface Tension **Asked 2×** **NUMERICAL** [Step-by-step solution](#) > [prepwiser.in/questions/wp3TBihUOV](https://www.prepwiser.in/questions/wp3TBihUOV)

Asked 2 times: 15 Apr 2023 S1, **23 Jan 2025 S2 (printed)**

An air bubble of radius 1.0 mm is observed at a depth 20 cm below the free surface of a liquid having surface tension 0.095J/m^2 and density 10^3kg/m^3 . The difference between pressure inside the bubble and atmospheric pressure is _____ N/m^2 . (Take $g = 10\text{m/s}^2$)

Q246 Physics · Electrostatics II: Potential & Capacitance **Asked 2×** **NUMERICAL** [Step-by-step solution](#) > [prepwiser.in/questions/qtRv_ucDUm](https://www.prepwiser.in/questions/qtRv_ucDUm)

Asked 2 times: 8 Apr 2023 S1, **28 Jan 2025 S2 (printed)**

An electric dipole of dipole moment $6 \times 10^{-6}\text{Cm}$ is placed in uniform electric field of magnitude 10^6V/m . Initially, the dipole moment is parallel to electric field. The work that needs to be done on the dipole to make its dipole moment opposite to the field, will be _____ J.

Q247 Mathematics · Trigonometric Ratios & Identities **Asked 2×** [Step-by-step solution](#) > [prepwiser.in/questions/2e5Gq1cq-i](https://www.prepwiser.in/questions/2e5Gq1cq-i)

Asked 2 times: 18 Mar 2021 S2, **4 Apr 2025 S1 (printed)**

If $10\sin^4\theta + 15\cos^4\theta = 6$, then the value of $\frac{27\operatorname{cosec}^6\theta + 8\sec^6\theta}{16\sec^8\theta}$ is

- (A) $\frac{2}{5}$ (B) $\frac{3}{5}$ (C) $\frac{1}{5}$ (D) $\frac{3}{4}$

Q248 Physics · Ray Optics **Asked 2×** [Step-by-step solution](#) > [prepwiser.in/questions/eDtFqRCB06](https://www.prepwiser.in/questions/eDtFqRCB06)

Asked 2 times: 7 Jan 2020 S2, **7 Apr 2025 S1 (printed)**

A lens having refractive index 1.6 has focal length of 12 cm, when it is in air. Find the focal length of the lens when it is placed in water. (Take refractive index of water as 1.28)

- (A) 355 mm (B) 655 mm (C) 288 mm (D) 555 mm

Q249 Mathematics · Differential Equations **Asked 2×** **NUMERICAL** [Step-by-step solution](#) > [prepwiser.in/questions/i8f14fybJO](https://www.prepwiser.in/questions/i8f14fybJO)

Asked 2 times: 26 Jul 2022 S2, **22 Jan 2025 S2 (printed)**

Let $y = f(x)$ be the solution of the differential equation $\frac{dy}{dx} + \frac{xy}{x^2-1} = \frac{x^6+4x}{\sqrt{1-x^2}}$, $-1 < x < 1$ such that $f(0) = 0$. If $6\int_{-1/2}^{1/2} f(x)dx = 2\pi - \alpha$ then α^2 is equal to _____.

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Q250 Physics · Wave Optics **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/94pZn4RKuI](https://www.prepwiser.in/questions/94pZn4RKuI)Asked 2 times: 4 Apr 2024 S1, **24 Jan 2025 S1 (printed)**

The Young's double slit interference experiment is performed using light consisting of 480 nm and 600 nm wavelengths to form interference patterns. The least number of the bright fringes of 480 nm light that are required for the first coincidence with the bright fringes formed by 600 nm light is

- (A) 8 (B) 4 (C) 5 (D) 6

Q251 Physics · Rectilinear Motion **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/HITKTD8KKg](https://www.prepwiser.in/questions/HITKTD8KKg)Asked 2 times: 11 Apr 2023 S2, **7 Apr 2025 S2 (printed)**

An object with mass 500 g moves along x-axis with speed $v = 4\sqrt{x}$ m/s. The force acting on the object is:

- (A) 8 N (B) 4 N (C) 5 N (D) 6 N

Q252 Mathematics · Area Under Curves **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/8LkV5LF0Vo](https://www.prepwiser.in/questions/8LkV5LF0Vo)Asked 2 times: 25 Jul 2022 S1, **7 Apr 2025 S2 (printed)**

If the area of the region $\{(x, y) : 1 + x^2 \leq y \leq \min\{x + 7, 11 - 3x\}\}$ is A , then $3A$ is equal to:

- (A) 50 (B) 46 (C) 49 (D) 47

Q253 Chemistry · Mole Concept & Stoichiometry **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › [prepwiser.in/questions/keVxqJTFCx](https://www.prepwiser.in/questions/keVxqJTFCx)Asked 2 times: 8 Jan 2020 S1, **4 Apr 2025 S1 (printed)**

Fortification of food with iron is done using $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$. The mass in grams of the $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ required to achieve 12 ppm of iron in 150 kg of wheat is ____ (Nearest integer)

[Given: Molar mass of Fe, S and O respectively are 56, 32 and 16g mol^{-1}]

Q254 Mathematics · Probability: Basic **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/KXKh1zpN3_](https://www.prepwiser.in/questions/KXKh1zpN3_)Asked 2 times: 11 Apr 2023 S1, **24 Jan 2025 S2 (printed)**

Let $A = [a_{ij}]$ be a square matrix of order 2 with entries either 0 or 1. Let E be the event that A is an invertible matrix. Then the probability $P(E)$ is:

- (A) $\frac{3}{8}$ (B) $\frac{1}{8}$ (C) $\frac{3}{16}$ (D) $\frac{5}{8}$

Q255 Physics · Vectors **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/5yTz0moiVx](https://www.prepwiser.in/questions/5yTz0moiVx)Asked 2 times: 29 Jul 2022 S2, **22 Jan 2025 S2 (printed)**

The torque due to the force $(2\hat{i} + \hat{j} + 2\hat{k})$ about the origin, acting on a particle whose position vector is $(\hat{i} + \hat{j} + \hat{k})$, would be

- (A) $\hat{j} + \hat{k}$ (B) $\hat{i} - \hat{k}$ (C) $\hat{i} - \hat{j} + \hat{k}$ (D) $\hat{i} + \hat{k}$

Q256 Mathematics · Binomial Theorem **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/r_kAoRZzUx](https://www.prepwiser.in/questions/r_kAoRZzUx)Asked 2 times: 10 Apr 2023 S2, **23 Jan 2025 S2 (printed)**

If in the expansion of $(1 + x)^p(1 - x)^q$, the coefficients of x and x^2 are 1 and -2, respectively, then $p^2 + q^2$ is equal to:

- (A) 8 (B) 20 (C) 13 (D) 18

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Q257 Physics · Ray Optics **Asked 2×** NUMERICAL[Step-by-step solution](#) › prepwiser.in/questions/oXrhHFw3EAsked 2 times: 30 Jun 2022 S1, **2 Apr 2025 S2 (printed)**

A ray of light suffers minimum deviation when incident on a prism having angle of the prism equal to 60° . The refractive index of the prism material is $\sqrt{2}$. The angle of incidence (in degrees) is _____

Q258 Physics · Circular Motion **Asked 2×** NUMERICAL[Step-by-step solution](#) › prepwiser.in/questions/S_jqs-5hFkAsked 2 times: 29 Jul 2022 S2, **22 Jan 2025 S2 (printed)**

A tube of length 1 m is filled completely with an ideal liquid of mass 2 M, and closed at both ends. The tube is rotated uniformly in horizontal plane about one of its ends. If the force exerted by the liquid at the other end is F then angular velocity of the tube is $\sqrt{\frac{F}{\alpha M}}$ in SI unit. The value of α is _____.

Q259 Mathematics · Permutations & Combinations **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/7e-F1ZfH2Asked 2 times: 31 Aug 2021 S1, **23 Jan 2025 S1 (printed)**

The number of words, which can be formed using all the letters of the word "DAUGHTER", so that all the vowels never come together, is:

- (A) 34000 (B) 37000 (C) 35000 (D) 36000

Q260 Mathematics · Permutations & Combinations **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/eB-rcYCHXFAsked 2 times: 6 Apr 2024 S2, **29 Jan 2025 S2 (printed)**

If all the words with or without meaning made using all the letters of the word "KANPUR" are arranged as in a dictionary, then the word at 440th position in this arrangement is:

- (A) PRNAKU (B) PRKAUN (C) PRKANU (D) PRNAUK

Q261 Chemistry · Chemical Thermodynamics **Asked 2×** NUMERICAL[Step-by-step solution](#) › prepwiser.in/questions/AZnlqSqECKAsked 2 times: 26 Feb 2021 S2, **28 Jan 2025 S1 (printed)**

The formation enthalpies, $\Delta H_f^\ominus$ for $H_{(g)}$ and $O_{(g)}$ are 220.0 and 250.0 kJmol⁻¹, respectively, at 298.15 K, and $\Delta H_f^\ominus$ for $H_2O_{(g)}$ is -242.0 kJmol⁻¹ at the same temperature. The average bond enthalpy of the O – H bond in water at 298.15 K is _____ kJmol⁻¹ (nearest integer).

Q262 Physics · Wave Optics **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/WYXptLRq2XAsked 2 times: 26 Jul 2022 S1, **24 Jan 2025 S2 (printed)**

Young's double slit interference apparatus is immersed in a liquid of refractive index 1.44. It has slit separation of 1.5 mm. The slits are illuminated by a parallel beam of light whose wavelength in air is 690 nm. The fringe-width on a screen placed behind the plane of slits at a distance of 0.72 m, will be:

- (A) 0.63 mm (B) 0.33 mm (C) 0.46 mm (D) 0.23 mm

Q263 Physics · Wave Optics **Asked 2×** NUMERICAL[Step-by-step solution](#) › prepwiser.in/questions/1FKGC9PWWpAsked 2 times: 8 Apr 2024 S2, **4 Apr 2025 S2 (printed)**

In a Young's double slit experiment, two slits are located 1.5 mm apart. The distance of screen from slits is 2 m and the wavelength of the source is 400 nm. If the 20 maxima of the double slit pattern are contained within the central maximum of the single slit diffraction pattern, then the width of each slit is $x \times 10^{-3}$ cm, where x -value is _____.

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Q264 Physics · Alternating Current **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/eCHGCCn3CI](#)Asked 2 times: 8 Apr 2024 S1, **22 Jan 2025 S2 (printed)**

A series LCR circuit is connected to an alternating source of emf E . The current amplitude at resonant frequency is I_0 . If the value of resistance R becomes twice of its initial value then amplitude of current at resonance will be

- (A) $\frac{I_0}{2}$ (B) $\frac{I_0}{\sqrt{2}}$ (C) $2I_0$ (D) I_0

Q265 Mathematics · Three Dimensional Geometry **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/6Nq2WzwOtR](#)Asked 2 times: 30 Jan 2024 S2, **3 Apr 2025 S1 (printed)**

Let a line passing through the point $(4, 1, 0)$ intersect the line $L_1 : \frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ at the point

$A(\alpha, \beta, \gamma)$ and the line $L_2 : x - 6 = y = -z + 4$ at the point $B(a, b, c)$. Then $\begin{vmatrix} 1 & 0 & 1 \\ \alpha & \beta & \gamma \\ a & b & c \end{vmatrix}$ is equal to

- (A) 16 (B) 6 (C) 8 (D) 12

Q266 Physics · Electromagnetic Waves **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/wfvYuo5xZs](#)Asked 2 times: 4 Apr 2024 S2, **24 Jan 2025 S2 (printed)**

Arrange the following in the ascending order of wavelength (λ):

- (A) Microwaves (λ_1)
(B) Ultraviolet rays (λ_2)
(C) Infrared rays (λ_3)
(D) X-rays (λ_4)

Choose the most appropriate answer from the options given below:

- (A) $\lambda_4 < \lambda_3 < \lambda_2 < \lambda_1$ (B) $\lambda_4 < \lambda_2 < \lambda_3 < \lambda_1$ (C) $\lambda_3 < \lambda_4 < \lambda_2 < \lambda_1$ (D) $\lambda_4 < \lambda_3 < \lambda_1 < \lambda_2$

Q267 Physics · Gravitation **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/ryZ4M57_as](#)Asked 2 times: 30 Jan 2024 S2, **28 Jan 2025 S2 (printed)**

Earth has mass 8 times and radius 2 times that of a planet. If the escape velocity from the earth is 11.2 km/s, the escape velocity in km/s from the planet will be:

- (A) 8.4 (B) 11.2 (C) 5.6 (D) 2.8

Q268 Mathematics · Circles **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/xu9KXsZ3Z6](#)Asked 2 times: 27 Jan 2024 S1, **3 Apr 2025 S2 (printed)**

If the four distinct points $(4, 6)$, $(-1, 5)$, $(0, 0)$ and $(k, 3k)$ lie on a circle of radius r , then $10k + r^2$ is equal to

- (A) 34 (B) 32 (C) 35 (D) 33

Q269 Physics · Rotational Motion **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › [prepwiser.in/questions/ivc_YYszKj](#)Asked 2 times: 25 Jul 2022 S1, **4 Apr 2025 S1 (printed)**

A circular ring and a solid sphere having same radius roll down on an inclined plane from rest without slipping. The ratio of their velocities when reached at the bottom of the plane is $\sqrt{\frac{x}{10}}$ where $x =$ _____.

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Q270 Mathematics · Applications of Derivatives **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/2p1iqny4MXAsked 2 times: 27 Jun 2022 S2, **22 Jan 2025 S2 (printed)**

Let $f(x) = \int_0^{x^2} \frac{t^2 - 8t + 15}{e^t} dt$, $x \in \mathbf{R}$. Then the numbers of local maximum and local minimum points of f , respectively, are:

- (A) 3 and 2 (B) 2 and 2 (C) 2 and 3 (D) 1 and 3

Q271 Mathematics · Sequences & Series **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/xxkVOpXMheAsked 2 times: 13 Apr 2023 S2, **3 Apr 2025 S1 (printed)**

Let $a_1, a_2, a_3, \dots$ be a G.P. of increasing positive numbers. If $a_3 a_5 = 729$ and $a_2 + a_4 = \frac{111}{4}$, then $24(a_1 + a_2 + a_3)$ is equal to

- (A) 128 (B) 129 (C) 131 (D) 130

Q272 Chemistry · Electrochemistry **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/KCckPjVjz-Asked 2 times: 10 Apr 2023 S1, **23 Jan 2025 S1 (printed)**

In the above diagram, the standard electrode potentials are given in volts (over the arrow).

The value of $E_{\text{FeO}_4^{2-}/\text{Fe}^{2+}}$ is:

- (A) 1.2 V (B) 2.1 V (C) 1.4 V (D) 1.7 V

Q273 Mathematics · Binomial Theorem **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/i-m7pvC6VPAsked 2 times: 13 Apr 2023 S2, **29 Jan 2025 S2 (printed)**

The remainder, when 7^{103} is divided by 23, is equal to:

- (A) 9 (B) 6 (C) 14 (D) 17

Q274 Physics · Projectile Motion & Relative Motion **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/Qka06CDV4UAsked 2 times: 29 Jul 2022 S1, **23 Jan 2025 S2 (printed)**

A ball having kinetic energy KE, is projected at an angle of 60° from the horizontal. What will be the kinetic energy of ball at the highest point of its flight?

- (A) $\frac{(\text{KE})}{2}$ (B) $\frac{(\text{KE})}{8}$ (C) $\frac{(\text{KE})}{4}$ (D) $\frac{(\text{KE})}{16}$

Q275 Physics · Elasticity **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/MudEMesvr9Asked 2 times: 27 Jan 2024 S1, **29 Jan 2025 S1 (printed)**

The fractional compression $\left(\frac{\Delta V}{V}\right)$ of water at the depth of 2.5 km below the sea level is _____ %.

Given, the Bulk modulus of water = $2 \times 10^9 \text{ N m}^{-2}$, density of water = 10^3 kg m^{-3} , acceleration due to gravity $g = 10 \text{ m s}^{-2}$.

- (A) 1.0 (B) 1.25 (C) 1.75 (D) 1.5

Q276 Physics · Friction **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/w94Ccs6qnNAsked 2 times: 29 Jan 2023 S1, **7 Apr 2025 S1 (printed)**

A cubic block of mass m is sliding down on an inclined plane at 60° with an acceleration of $\frac{g}{2}$, the value of coefficient of kinetic friction is

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

Q277 Chemistry · Chemical Thermodynamics **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/x1LHBaYo1nAsked 2 times: 5 Sep 2020 S2, **7 Apr 2025 S2 (printed)**

The hydration energies of K^+ and Cl^- are $-x$ and $-y$ kJ/mol respectively. If the lattice energy of KCl is $-z$ kJ/mol, then the heat of solution of KCl is:

- (A) $x + y + z$ (B) $z - (x + y)$ (C) $-z - (x + y)$ (D) $x - y - z$

Q278 Mathematics · Trigonometric Equations **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/IsrMiWgspAsked 2 times: 26 Jul 2022 S2, **22 Jan 2025 S2 (printed)**

The sum of all values of $\theta \in [0, 2\pi]$ satisfying $2 \sin^2 \theta = \cos 2\theta$ and $2 \cos^2 \theta = 3 \sin \theta$ is

- (A) π (B) $\frac{5\pi}{6}$ (C) $\frac{\pi}{2}$ (D) 4π

Q279 Physics · Ray Optics **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/fu9PmkRjDPAsked 2 times: 6 Apr 2024 S2, **3 Apr 2025 S1 (printed)**

The radii of curvature for a thin convex lens are 10 cm and 15 cm respectively. The focal length of the lens is 12 cm. The refractive index of the lens material is

- (A) 1.4 (B) 1.8 (C) 1.5 (D) 1.2

Q280 Physics · Electrostatics I: Charges, Field & Gauss's Law **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/ATjNkv9rs1Asked 2 times: 31 Jan 2024 S1, **2 Apr 2025 S1 (printed)**

A point charge $+q$ is placed at the origin. A second point charge $+9q$ is placed at $(d, 0, 0)$ in Cartesian coordinate system. The point in between them where the electric field vanishes is:

- (A) $(3d/4, 0, 0)$ (B) $(d/4, 0, 0)$ (C) $(4d/3, 0, 0)$ (D) $(d/3, 0, 0)$

Q281 Mathematics · Parabola **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/DpYlReWYR5Asked 2 times: 27 Jun 2022 S2, **24 Jan 2025 S2 (printed)**

If the equation of the parabola with vertex $V(\frac{3}{2}, 3)$ and the directrix $x + 2y = 0$ is $\alpha x^2 + \beta y^2 - \gamma xy - 30x - 60y + 225 = 0$, then $\alpha + \beta + \gamma$ is equal to:

- (A) 6 (B) 8 (C) 7 (D) 9

Q282 Chemistry · Chemical Thermodynamics **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > prepwiser.in/questions/ea_6RT_1zAsked 2 times: 6 Apr 2023 S2, **28 Jan 2025 S2 (printed)**

Consider the following data:

Heat of formation of $\text{CO}_2(\text{g}) = -393.5 \text{ kJ mol}^{-1}$

Heat of formation of $\text{H}_2\text{O}(\text{l}) = -286.0 \text{ kJ mol}^{-1}$

Heat of combustion of benzene $= -3267.0 \text{ kJ mol}^{-1}$

The heat of formation of benzene is _____ kJ mol^{-1} . (Nearest integer)

Q283 Physics · Gravitation **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > prepwiser.in/questions/K4IbDUQCnlAsked 2 times: 27 Jan 2024 S1, **24 Jan 2025 S2 (printed)**

Acceleration due to gravity on the surface of earth is ' g '. If the diameter of earth is reduced to one third of its original value and mass remains unchanged, then the acceleration due to gravity on the surface of the earth is _____ g .

Q284 Mathematics · Inverse Trigonometric Functions

Asked 2×

[Step-by-step solution](#) > [prepwiser.in/questions/5EOdP9i3UH](#)Asked 2 times: 3 Sep 2020 S1, **28 Jan 2025 S1 (printed)** $\cos\left(\sin^{-1}\frac{3}{5} + \sin^{-1}\frac{5}{13} + \sin^{-1}\frac{33}{65}\right)$ is equal to:

(A) $\frac{33}{65}$

(B) 1

(C) $\frac{32}{65}$

(D) 0

Q285 Physics · Kinetic Theory of Gases

Asked 2×

[Step-by-step solution](#) > [prepwiser.in/questions/a-luVs62K5](#)Asked 2 times: 25 Jun 2022 S2, **3 Apr 2025 S2 (printed)**

Pressure of an ideal gas, contained in a closed vessel, is increased by 0.4% when heated by 1°C. Its initial temperature must be:

(A) 2500 K

(B) 25°C

(C) 250°C

(D) 250 K

Q286 Mathematics · Vectors

Asked 2×

[Step-by-step solution](#) > [prepwiser.in/questions/UvAjUY-ZsU](#)Asked 2 times: 24 Feb 2021 S1, **24 Jan 2025 S1 (printed)**

Let $\vec{a} = \hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = 3\hat{i} + \hat{j} - \hat{k}$ and $\vec{c}$ be three vectors such that $\vec{c}$ is coplanar with $\vec{a}$ and $\vec{b}$. If the vector $\vec{c}$ is perpendicular to $\vec{b}$ and $\vec{a} \cdot \vec{c} = 5$, then $|\vec{c}|$ is equal to

(A) $\sqrt{\frac{11}{6}}$

(B) $\frac{1}{3\sqrt{2}}$

(C) 18

(D) 16

Q287 Mathematics · Probability: Advanced

Asked 2×

[Step-by-step solution](#) > [prepwiser.in/questions/14oq2XEZNR](#)Asked 2 times: 8 Apr 2023 S2, **3 Apr 2025 S2 (printed)**

If the probability that the random variable X takes the value x is given by

 $P(X = x) = k(x + 1)3^{-x}$, $x = 0, 1, 2, 3, \dots$, where k is a constant, then $P(X \geq 3)$ is equal to

(A) $\frac{1}{9}$

(B) $\frac{8}{27}$

(C) $\frac{7}{27}$

(D) $\frac{4}{9}$

Q288 Chemistry · Ionic Equilibrium

Asked 2×

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/Jr8bzytwaf](#)Asked 2 times: 25 Jan 2023 S1, **7 Apr 2025 S2 (printed)**

One litre buffer solution was prepared by adding 0.10 mol each of NH_3 and NH_4Cl in deionised water. The change in pH on addition of 0.05 mol of HCl to the above solution is _____ $\times 10^{-2}$. (Nearest integer)

Given: pK_b of $\text{NH}_3 = 4.745$ and $\log_{10} 3 = 0.477$

Q289 Mathematics · Ellipse

Asked 2×

[Step-by-step solution](#) > [prepwiser.in/questions/Kz-3mYlpTW](#)Asked 2 times: 27 Jan 2024 S1, **23 Jan 2025 S2 (printed)**

The length of the chord of the ellipse $\frac{x^2}{4} + \frac{y^2}{2} = 1$, whose mid-point is $(1, \frac{1}{2})$, is:

(A) $\frac{2}{3}\sqrt{15}$

(B) $\frac{1}{3}\sqrt{15}$

(C) $\sqrt{15}$

(D) $\frac{5}{3}\sqrt{15}$

Q290 Physics · Surface Tension

Asked 2×

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/oFV2xyzZQO](#)Asked 2 times: 9 Apr 2024 S2, **3 Apr 2025 S2 (printed)**

The excess pressure inside a soap bubble A in air is half the excess pressure inside another soap bubble B in air. If the volume of the bubble A is n times the volume of the bubble B, then, the value of n is _____.

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Asked 2 times: 6 Apr 2024 S1, 23 Jan 2025 S2 (printed)

Match List - I with List - II

	List - I		List - II
(A)	Permeability of free space	(I)	$[ML^2T^{-2}]$
(B)	Magnetic field	(II)	$[MT^{-2}A^{-1}]$
(C)	Magnetic moment	(III)	$[MLT^{-2}A^{-2}]$
(D)	Torsional constant	(IV)	$[L^2A]$

Choose the correct answer from the options given below:

- (A) (A)-(III), (B)-(II), (C)-(IV), (D)-(I) (B) (A) – (I), (B) – (IV), (C) – (II), (D) – (III)
 (C) (A) – (II), (B) – (I), (C) – (III), (D) – (IV) (D) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

Asked 2 times: 2 Sep 2020 S2, 23 Jan 2025 S2 (printed)

The variance of the numbers 8, 21, 34, 47, ..., 320 is _____.

Asked 2 times: 4 Apr 2024 S1, 28 Jan 2025 S2 (printed)

Bag B_1 contains 6 white and 4 blue balls, Bag B_2 contains 4 white and 6 blue balls, and Bag B_3 contains 5 white and 5 blue balls. One of the bags is selected at random and a ball is drawn from it. If the ball is white, then the probability that the ball is drawn from Bag B_2 is:

- (A) $\frac{2}{5}$ (B) $\frac{4}{15}$ (C) $\frac{1}{3}$ (D) $\frac{2}{3}$

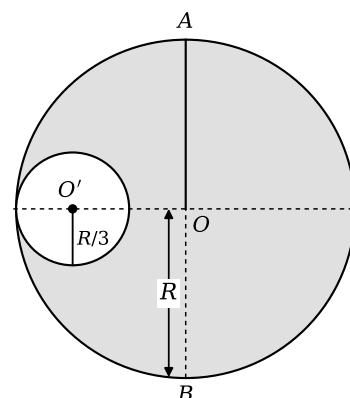
Asked 2 times: 24 Jan 2025 S2, 29 Jan 2025 S2 (printed)

If $\alpha x + \beta y = 109$ is the equation of the chord of the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$, whose mid point is $(\frac{5}{2}, \frac{1}{2})$. then $\alpha + \beta$ is equal to:

- (A) 37 (B) 46 (C) 72 (D) 58

Asked 2 times: 22 Jan 2025 S1, 7 Apr 2025 S2 (printed)

M and R be the mass and radius of a disc. A small disc of radius $R/3$ is removed from the bigger disc as shown in figure. The moment of inertia of remaining part of bigger disc about an axis AB passing through the centre O and perpendicular to the plane of disc is $\frac{4}{x}MR^2$. The value of x is _____.

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Asked 2 times: 29 Jan 2025 S1, 29 Jan 2025 S2 (printed)

Total number of sigma (σ) _____ and pi (π) _____ bonds respectively present in hex-1-en-4-yne are:

- (A) 14 and 3 (B) 11 and 3 (C) 13 and 3 (D) 3 and 13

Asked 2 times: 25 Jan 2023 S1, 4 Apr 2024 S2 (printed)

A light ray is incident on a glass slab of thickness $4\sqrt{3}$ cm and refractive index $\sqrt{2}$. The angle of incidence is equal to the critical angle for the glass slab with air. The lateral displacement of ray after passing through glass slab is _____ cm.

(Given $\sin 15^\circ = 0.25$)

Asked 2 times: 24 Jun 2022 S1, 31 Jan 2024 S2 (printed)

$A_{(g)} \rightleftharpoons B_{(g)} + \frac{C}{2}(g)$ The correct relationship between K_P , α and equilibrium pressure P is

- (A) $K_P = \frac{\alpha^{1/2} P^{3/2}}{(2+\alpha)^{3/2}}$ (B) $K_P = \frac{\alpha^{3/2} P^{1/2}}{(2+\alpha)^{1/2}(1-\alpha)}$ (C) $K_P = \frac{\alpha^{1/2} P^{1/2}}{(2+\alpha)^{3/2}}$ (D) $K_P = \frac{\alpha^{1/2} P^{1/2}}{(2+\alpha)^{1/2}}$

Asked 2 times: 20 Jul 2021 S1, 9 Apr 2024 S2 (printed)

A circular disc reaches from top to bottom of an inclined plane of length l . When it slips down the plane, it takes ts . When it rolls down the plane then it takes $\left(\frac{\alpha}{2}\right)^{1/2} ts$, where α is _____.

Asked 2 times: 8 Apr 2023 S1, 27 Jan 2024 S1 (printed)

In a nuclear fission process, a high mass nuclide ($A \approx 236$) with binding energy 7.6 MeV/ Nucleon dissociated into middle mass nuclides ($A \approx 118$), having binding energy of 8.6 MeV/ Nucleon. The energy released in the process would be _____ MeV.

Asked 2 times: 16 Mar 2021 S2, 4 Apr 2024 S2 (printed)

The maximum number of orbitals which can be identified with $n = 4$ and $m_l = 0$ is _____.

Asked 2 times: 17 Mar 2021 S2, 4 Apr 2024 S1 (printed)

There are 5 points P_1, P_2, P_3, P_4, P_5 on the side AB , excluding A and B , of a triangle ABC . Similarly there are 6 points $P_6, P_7, \dots, P_{11}$ on the side BC and 7 points $P_{12}, P_{13}, \dots, P_{18}$ on the side CA of the triangle. The number of triangles, that can be formed using the points $P_1, P_2, \dots, P_{18}$ as vertices, is:

- (A) 751 (B) 776 (C) 796 (D) 771

Asked 2 times: 10 Apr 2023 S1, 6 Apr 2024 S2 (printed)

Assuming the earth to be a sphere of uniform mass density, a body weighed 300 N on the surface of earth. How much it would weigh at $R/4$ depth under surface of earth?

- (A) 75 N (B) 375 N (C) 300 N (D) 225 N

Asked 2 times: 6 Apr 2023 S2, 9 Apr 2024 S1 (printed)

The standard reduction potentials at 298K for the following half cells are given below:



Consider the given electrochemical reactions,

The number of metal(s) which will be oxidized by $\text{Cr}_2\text{O}_7^{2-}$, in aqueous solution is _____.

Asked 2 times: 29 Jul 2022 S2, 29 Jan 2024 S1 (printed)

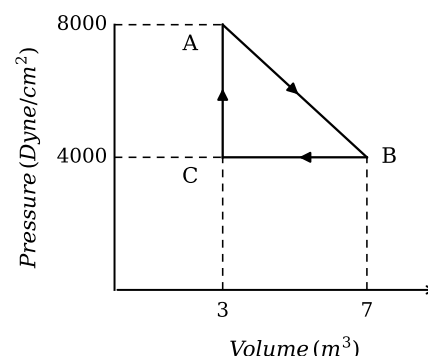
A thermodynamic system is taken from an original state A to an intermediate state B by a linear process as shown in the figure. It's volume is then reduced to the original value from B to C by an isobaric process. The total work done by the gas from A to B and B to C would be:

(A) 800 J

(B) 2200 J

(C) 33800 J

(D) 1200 J



Asked 2 times: 8 Jan 2020 S2, 31 Jan 2024 S1 (printed)

The total number of words (with or without meaning) that can be formed out of the letters of the word 'DISTRIBUTION' taken four at a time, is equal to _____.

Asked 2 times: 24 Feb 2021 S2, 6 Apr 2024 S2 (printed)

Match List I with List II.

	LIST I Alkali Metal		LIST II Emission Wavelength in nm
A.	Li	I.	589.2
B.	Na	II.	455.5
C.	Rb	III.	670.8
D.	Cs	IV.	780.0

Choose the correct answer from the options given below:

(A) (A)-(II), (B)-(IV), (C)-(III), (D)-(I)

(B) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)

(C) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)

(D) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

Asked 2 times: 31 Aug 2021 S1, 8 Apr 2024 S2 (printed)

A proton and an electron have the same de Broglie wavelength. If K_p and K_e be the kinetic energies of proton and electron respectively, then choose the correct relation:

(A) $K_p > K_e$ (B) $K_p = K_e$ (C) $K_p < K_e$ (D) $K_p = K_e^2$

Q309 Physics · Atomic Physics **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/Os0Z8Nh0o1](https://www.prepwiser.in/questions/Os0Z8Nh0o1)

Asked 2 times: 10 Apr 2023 S2, **6 Apr 2024 S1 (printed)**

The ratio of the shortest wavelength of Balmer series to the shortest wavelength of Lyman series for hydrogen atom is:

- (A) 1 : 2 (B) 1 : 4 (C) 2 : 1 (D) 4 : 1

Q310 Physics · Mechanical Waves **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/2rXn9z1PYL](https://www.prepwiser.in/questions/2rXn9z1PYL)

Asked 2 times: 25 Jun 2022 S1, **31 Jan 2024 S1 (printed)**

The fundamental frequency of a closed organ pipe is equal to the first overtone frequency of an open organ pipe. If length of the open pipe is 60cm, the length of the closed pipe will be:

- (A) 15 cm (B) 60 cm (C) 45 cm (D) 30 cm

Q311 Physics · Work, Energy & Power **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/39AcjXWcAE](https://www.prepwiser.in/questions/39AcjXWcAE)

Asked 2 times: 27 Jul 2022 S2, **27 Jan 2024 S2 (printed)**

A bullet is fired into a fixed target loses one third of its velocity after travelling 4cm. It penetrates further $D \times 10^{-3}\text{m}$ before coming to rest. The value of D is:

- (A) 23 (B) 32 (C) 42 (D) 52

Q312 Chemistry · Periodic Table & Periodicity **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/RI2shRyy3E](https://www.prepwiser.in/questions/RI2shRyy3E)

Asked 2 times: 11 Apr 2023 S1, **4 Apr 2024 S1 (printed)**

The correct order of first ionization enthalpy values of the following elements is:

- (A) O
(B) N
(C) Be
(D) F
(E) B

Choose the correct answer from the options given below:

- (A) $A < B < D < C < E$ (B) $C < E < A < B < D$
(C) $E < C < A < B < D$ (D) $B < D < C < E < A$

Q313 Chemistry · Mole Concept & Stoichiometry **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) › [prepwiser.in/questions/5gBjleXk0R](https://www.prepwiser.in/questions/5gBjleXk0R)

Asked 2 times: 17 Mar 2021 S1, **8 Apr 2024 S2 (printed)**

Molality of an aqueous solution of urea is 4.44m. Mole fraction of urea in solution is $x \times 10^{-3}$, Value of x is _____. (Integer answer)

Q314 Physics · Atomic Physics **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) › [prepwiser.in/questions/E87IEcPQDn](https://www.prepwiser.in/questions/E87IEcPQDn)

Asked 2 times: 26 Feb 2021 S2, **29 Jan 2024 S1 (printed)**

When a hydrogen atom going from $n = 2$ to $n = 1$ emits a photon, its recoil speed is $\frac{x}{5}\text{m/s}$. Where $x =$ _____. (Use, mass of hydrogen atom = $1.6 \times 10^{-27}\text{kg}$)

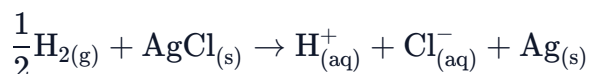
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Q315 Chemistry · Electrochemistry **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/LY8KkNa5w4

Asked 2 times: 8 Apr 2023 S1, **8 Apr 2024 S2 (printed)**

The reaction;



occurs in which of the following galvanic cell:



Q316 Physics · Atomic Physics **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/A0NqM_VO8U

Asked 2 times: 26 Aug 2021 S1, **1 Feb 2024 S2 (printed)**

A particular hydrogen-like ion emits the radiation of frequency $3 \times 10^{15} \text{ Hz}$ when it makes transition from $n = 2$ to $n = 1$. The frequency of radiation emitted in transition from $n = 3$ to $n = 1$ is $\frac{x}{9} \times 10^{15} \text{ Hz}$, when $x = \underline{\hspace{2cm}}$.

Q317 Physics · Centre of Mass & Linear Momentum **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/W_FLeE53Fm

Asked 2 times: 25 Feb 2021 S2, **27 Jan 2024 S1 (printed)**

Two bodies of mass 4g and 25g are moving with equal kinetic energies. The ratio of magnitude of their linear momentum is:

(A) 3 : 5

(B) 5 : 4

(C) 2 : 5

(D) 4 : 5

Q318 Physics · Dual Nature of Radiation & Matter **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/uxIbdb04aR

Asked 2 times: 3 Sep 2020 S2, **29 Jan 2024 S2 (printed)**

Two sources of light emit with a power of 200W. The ratio of number of photons of visible light emitted by each source having wavelengths 300nm and 500nm respectively, will be:

(A) 5 : 3

(B) 3 : 5

(C) 1 : 5

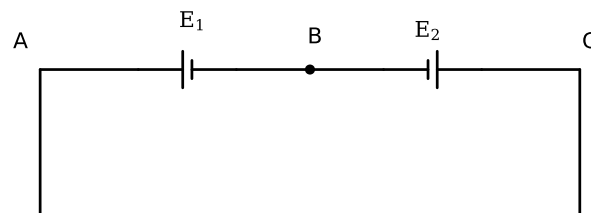
(D) 1 : 3

Q319 Physics · Current Electricity **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/zbCZLSXrXx

Asked 2 times: 24 Feb 2021 S1, **30 Jan 2024 S1 (printed)**

Two cells are connected in opposition as shown. Cell E_1 is of 8V emf and 2Ω internal resistance; the cell E_2 is of 2V emf and 4Ω internal resistance. The terminal potential difference of cell E_2 is $\underline{\hspace{2cm}}$ V.



Q320 Chemistry · Chemical Bonding & Molecular Structure **Asked 2×**

NUMERICAL

[Step-by-step solution](#) > prepwiser.in/questions/q2JCfSi6vG

Asked 2 times: 27 Jul 2021 S1, **27 Jan 2024 S1 (printed)**

Sum of bond order of CO and NO^+ is $\underline{\hspace{2cm}}$.

Q321 Physics · Gravitation **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/gfPpRskWQO

Asked 2 times: 2 Sep 2020 S2, **29 Jan 2024 S1 (printed)**

At what distance above and below the surface of the earth a body will have same weight. (take radius of earth as R .)

(A) $\frac{\sqrt{3}R - R}{2}$

(B) $\frac{R}{2}$

(C) $\frac{\sqrt{5}R - R}{2}$

(D) $\sqrt{5}R - R$

Q322 Mathematics · Sets **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/wwh01KztllAsked 2 times: 6 Sep 2020 S1, **27 Jan 2024 S2 (printed)**

Let A and B be two finite sets with m and n elements respectively. The total number of subsets of the set A is 56 more than the total number of subsets of B . Then the distance of the point $P(m, n)$ from the point $Q(-2, -3)$ is:

- (A) 8 (B) 10 (C) 4 (D) 6

Q323 Physics · Elasticity **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/-PdH--qNFPAsked 2 times: 31 Aug 2021 S1, **31 Jan 2024 S1 (printed)**

The depth below the surface of sea to which a rubber ball be taken so as to decrease its volume by 0.02% is _____ m.

(Take density of sea water = 10^3 kg m^{-3} , Bulk modulus of rubber = $9 \times 10^8 \text{ N m}^{-2}$, and $g = 10 \text{ m s}^{-2}$)

Q324 Mathematics · Sequences & Series **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/pZCpzyz3GMAsked 2 times: 26 Feb 2021 S1, **8 Apr 2024 S2 (printed)**

In an increasing geometric progression of positive terms, the sum of the second and sixth terms is $\frac{70}{3}$ and the product of the third and fifth terms is 49. Then the sum of the 4th, 6th and 8th terms is equal to:

- (A) 78 (B) 96 (C) 91 (D) 84

Q325 Physics · Circular Motion **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/uYs3aYiSoyAsked 2 times: 25 Jun 2022 S2, **31 Jan 2024 S1 (printed)**

A coin is placed on a disc. The coefficient of friction between the coin and the disc is μ . If the distance of the coin from the center of the disc is r , the maximum angular velocity which can be given to the disc, so that the coin does not slip away, is:

- (A) $\sqrt{\frac{r}{\mu g}}$ (B) $\sqrt{\frac{\mu g}{r}}$ (C) $\frac{\mu g}{r}$ (D) $\frac{\mu}{\sqrt{r g}}$

Q326 Physics · Rotational Motion **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/Opo9UgyKosAsked 2 times: 27 Aug 2021 S2, **30 Jan 2024 S2 (printed)**

Two discs of moment of inertia $I_1 = 4 \text{ kg m}^2$ and $I_2 = 2 \text{ kg m}^2$, about their central axes & normal to their planes, rotating with angular speeds 10 rad/s & 4 rad/s respectively are brought into contact face to face with their axes of rotation coincident. The loss in kinetic energy of the system in the process is _____ J.

Q327 Mathematics · Area Under Curves **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › prepwiser.in/questions/g99-jnvZvjAsked 2 times: 3 Sep 2020 S1, **29 Jan 2024 S2 (printed)**

Let the area of the region $\{(x, y) : 0 \leq x \leq 3, 0 \leq y \leq \min\{x^2 + 2, 2x + 2\}\}$ be A . Then $12A$ is equal to _____.

Q328 Mathematics · Sequences & Series **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/O6ZDP-jLgrAsked 2 times: 9 Jan 2020 S2, **27 Jan 2024 S1 (printed)**

The number of common terms in the progressions
4, 9, 14, 19, ..., up to 25th term and
3, 6, 9, 12, ..., up to 37th term is:

- (A) 9 (B) 8 (C) 5 (D) 7

Asked 2 times: 25 Jul 2022 S2, 1 Feb 2024 S1 (printed)

Three identical spheres each of mass $2M$ are placed at the corners of a right angled triangle with mutually perpendicular sides equal to $4m$ each. Taking point of intersection of these two sides as origin, the magnitude of position vector of the centre of mass of the system is $\frac{4\sqrt{2}}{x}$, where the value of x is _____.

Asked 2 times: 27 Jun 2022 S2, 4 Apr 2024 S2 (printed)

The displacement of a particle executing SHM is given by $x = 10 \sin \left(\omega t + \frac{\pi}{3} \right) m$. The time period of motion is 3.14s. The velocity of the particle at $t = 0$ is _____ m/s.

Asked 2 times: 24 Feb 2021 S1, 4 Apr 2024 S1 (printed)

The Molarity (M) of an aqueous solution containing 5.85g of NaCl in 500mL water is : (Given : Molar Mass Na : 23 and Cl : 35.5gmol⁻¹)

- (A) 20 (B) 4 (C) 2 (D) 0.2

Asked 2 times: 20 Jul 2021 S1, 6 Apr 2024 S2 (printed)

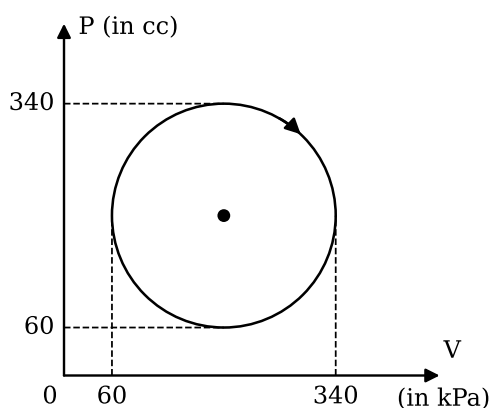
Let $\vec{a} = 6\hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = \hat{i} + \hat{j}$. If $\vec{c}$ is a vector such that $|\vec{c}| \geq 6, \vec{a} \cdot \vec{c} = 6|\vec{c}|, |\vec{c} - \vec{a}| = 2\sqrt{2}$

and the angle between $\vec{a} \times \vec{b}$ and $\vec{c}$ is 60° , then $|(\vec{a} \times \vec{b}) \times \vec{c}|$ is equal to:

- (A) $\frac{3}{2}\sqrt{6}$ (B) $\frac{9}{2}(6 - \sqrt{6})$ (C) $\frac{9}{2}(6 + \sqrt{6})$ (D) $\frac{3}{2}\sqrt{3}$

Asked 2 times: 20 Jul 2021 S1, 5 Apr 2024 S1 (printed)

The heat absorbed by a system in going through the given cyclic process is:



- (A) 61.6 J (B) 431.2 J (C) 19.6 J (D) 616 J

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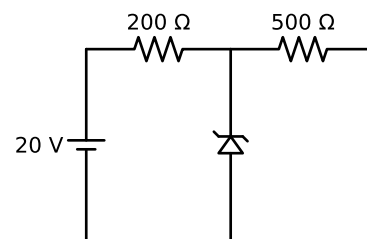
Q334 Physics · Semiconductors & Electronic Devices **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/sP_uqdm01](https://www.prepwiser.in/questions/sP_uqdm01)

Asked 2 times: 20 Jul 2021 S1, **30 Jan 2024 S1 (printed)**

A Zener diode of breakdown voltage 10V is used as a voltage regulator as shown in the figure. The current through the Zener diode is:

- (A) 0 (B) 30 mA (C) 20 mA (D) 50 mA



Q335 Physics · Projectile Motion & Relative Motion **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/-kCQnXDlpZ](https://www.prepwiser.in/questions/-kCQnXDlpZ)

Asked 2 times: 25 Jul 2022 S2, **8 Apr 2024 S2 (printed)**

The angle of projection for a projectile to have same horizontal range and maximum height is:

- (A) $\tan^{-1}\left(\frac{1}{2}\right)$ (B) $\tan^{-1}(2)$ (C) $\tan^{-1}\left(\frac{1}{4}\right)$ (D) $\tan^{-1}(4)$

Q336 Physics · Friction **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/KQ0zXR3UkV](https://www.prepwiser.in/questions/KQ0zXR3UkV)

Asked 2 times: 24 Feb 2021 S1, **30 Jan 2024 S2 (printed)**

A block of mass m is placed on a surface having vertical cross-section 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

Q337 Chemistry · Atomic Structure **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) › [prepwiser.in/questions/9ckCZ4wdII](https://www.prepwiser.in/questions/9ckCZ4wdII)

Asked 2 times: 25 Feb 2021 S2, **31 Jan 2024 S1 (printed)**

The ionization energy of sodium in kJ mol^{-1} , if electromagnetic radiation of wavelength 242nm is just sufficient to ionize sodium atom is _____.

Q338 Physics · Wave Optics **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/cZ4tFENiZh](https://www.prepwiser.in/questions/cZ4tFENiZh)

Asked 2 times: 29 Jul 2022 S2, **30 Jan 2024 S2 (printed)**

A beam of unpolarised light of intensity I_0 is passed through a polaroid A and then through another polaroid B which is oriented so that its principal plane makes an angle of 45° relative to that of A . The intensity of emergent light is:

- (A) $I_0/2$ (B) $I_0/8$ (C) $I_0/4$ (D) I_0

Q339 Physics · Dual Nature of Radiation & Matter **Asked 2×**

[Step-by-step solution](#) › [prepwiser.in/questions/IcnCUZcQ3W](https://www.prepwiser.in/questions/IcnCUZcQ3W)

Asked 2 times: 1 Feb 2023 S1, **8 Apr 2024 S1 (printed)**

A proton and an electron are associated with same de-Broglie wavelength. The ratio of their kinetic energies is:

(Assume $h = 6.63$

$$\times 10^{-34} \text{ Js, } m_e = 9.0 \times 10^{-31} \text{ kg}$$

and $m_p = 1836$ times m_e)

- (A) $1 : \frac{1}{1836}$ (B) $1 : \sqrt{1836}$ (C) $1 : 1836$ (D) $1 : \frac{1}{\sqrt{1836}}$

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Asked 2 times: 24 Jun 2022 S2, 4 Apr 2024 S2 (printed)

The area (in sq. units) of the region described by $\{(x, y) : y^2 \leq 2x, \text{ and } y \geq 4x - 1\}$ is

- (A) $\frac{9}{32}$ (B) $\frac{11}{12}$ (C) $\frac{8}{9}$ (D) $\frac{11}{32}$

Asked 2 times: 25 Jul 2021 S1, 9 Apr 2024 S1 (printed)

A proton, an electron and an alpha particle have the same energies. Their de-Broglie wavelengths will be compared as:

- (A) $\lambda_p > \lambda_e > \lambda_\alpha$ (B) $\lambda_\alpha < \lambda_p < \lambda_e$ (C) $\lambda_e > \lambda_\alpha > \lambda_p$ (D) $\lambda_p < \lambda_e < \lambda_\alpha$

Asked 2 times: 29 Jun 2022 S2, 1 Feb 2024 S1 (printed)

Let 3, 7, 11, 15, ..., 403 and 2, 5, 8, 11, ..., 404 be two arithmetic progressions. Then the sum, of the common terms in them, is equal to _____.

Asked 2 times: 29 Jun 2022 S2, 9 Apr 2024 S2 (printed)

A spherical ball of radius $1 \times 10^{-4}\text{m}$ and density 10^5kg/m^3 falls freely under gravity through a distance h before entering a tank of water, If after entering in water the velocity of the ball does not change, then the value of h is approximately:(The coefficient of viscosity of water is $9.8 \times 10^{-6}\text{Ns/m}^2$)

- (A) 2518 m (B) 2396 m (C) 2249 m (D) 2296 m

Asked 2 times: 31 Jan 2023 S2, 27 Jan 2024 S1 (printed)

The radius of third stationary orbit of electron for Bohr's atom is R . The radius of fourth stationary orbit will be:

- (A) $\frac{4}{3}R$ (B) $\frac{16}{9}R$ (C) $\frac{3}{4}R$ (D) $\frac{9}{16}R$

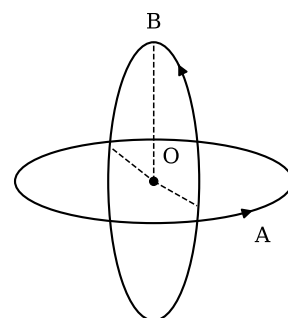
Asked 2 times: 26 Feb 2021 S2, 27 Jan 2024 S1 (printed)

A particle executes simple harmonic motion with an amplitude of 4cm. At the mean position, velocity of the particle is 10cm/s. The distance of the particle from the mean position when its speed becomes 5cm/s is $\sqrt{\alpha}\text{cm}$, where $\alpha =$ _____.

Asked 2 times: 6 Apr 2023 S1, 30 Jan 2024 S1 (printed)

Two insulated circular loop A and B of radius ' a ' carrying a current of ' I ' in the anti clockwise direction as shown in the figure. The magnitude of the magnetic induction at the centre will be:

- (A) $\frac{\sqrt{2}\mu_0 I}{a}$ (B) $\frac{\mu_0 I}{\sqrt{2}a}$ (C) $\frac{\mu_0 I}{2a}$ (D) $\frac{2\mu_0 I}{a}$



Q347 Mathematics · Functions (Advanced) **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/VBuKSEvePkAsked 2 times: 25 Jun 2022 S1, **4 Apr 2024 S1 (printed)**

Let $f(x) = x^5 + 2e^{x/4}$ for all $x \in \mathbf{R}$. Consider a function $g(x)$ such that $(g \circ f)(x) = x$ for all $x \in \mathbf{R}$. Then the value of $8g'(2)$ is:

- (A) 4 (B) 2 (C) 16 (D) 8

Q348 Physics · Semiconductors & Electronic Devices **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/ZcCBB2MrVkAsked 2 times: 26 Feb 2021 S1, **9 Apr 2024 S1 (printed)**

A light emitting diode (LED) is fabricated using GaAs semiconducting material whose band gap is 1.42 eV. The wavelength of light emitted from the LED is:

- (A) 1243 nm (B) 875 nm (C) 650 nm (D) 1400 nm

Q349 Physics · Electromagnetic Waves **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/Uv3ZSfKFPzAsked 2 times: 25 Jun 2022 S2, **6 Apr 2024 S1 (printed)**

Electromagnetic waves travel in a medium with speed of $1.5 \times 10^8 \text{ ms}^{-1}$. The relative permeability of the medium is 2.0. The relative permittivity will be:

- (A) 4 (B) 1 (C) 2 (D) 5

Q350 Mathematics · Binomial Theorem **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/VVWH0-oOhYAsked 2 times: 1 Feb 2023 S2, **8 Apr 2024 S2 (printed)**

If the term independent of x in the expansion of $(\sqrt{ax^2} + \frac{1}{2x^3})^{10}$ is 105, then a^2 is equal to:

- (A) 6 (B) 4 (C) 2 (D) 9

Q351 Mathematics · Differential Equations **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/2aTu29pPx_Asked 2 times: 29 Jan 2023 S2, **6 Apr 2024 S1 (printed)**

Let $y = y(x)$ be the solution of the differential equation $(2x \log_e x) \frac{dy}{dx} + 2y = \frac{3}{x} \log_e x$, $x > 0$ and $y(e^{-1}) = 0$. Then, $y(e)$ is equal to

- (A) $-\frac{3}{e}$ (B) $-\frac{3}{2e}$ (C) $-\frac{2}{3e}$ (D) $-\frac{2}{e}$

Q352 Physics · Kinetic Theory of Gases **Asked 2×**[Step-by-step solution](#) > prepwiser.in/questions/28hqaS2whCAsked 2 times: 29 Jul 2022 S1, **1 Feb 2024 S1 (printed)**

Two moles a monoatomic gas is mixed with six moles of a diatomic gas. The molar specific heat of the mixture at constant volume is:

- (A) $\frac{3}{2}R$ (B) $\frac{7}{4}R$ (C) $\frac{5}{2}R$ (D) $\frac{9}{4}R$

Q353 Mathematics · Three Dimensional Geometry **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > prepwiser.in/questions/0KPK1j0aB9Asked 2 times: 3 Sep 2020 S1, **6 Apr 2024 S1 (printed)**

Let P be the point $(10, -2, -1)$ and Q be the foot of the perpendicular drawn from the point $R(1, 7, 6)$ on the line passing through the points $(2, -5, 11)$ and $(-6, 7, -5)$. Then the length of the line segment PQ is equal to _____.

Q354 Physics · Alternating Current **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > prepwiser.in/questions/7BZhkbqpeJAsked 2 times: 6 Apr 2023 S2, **8 Apr 2024 S2 (printed)**

An alternating emf $E = 110\sqrt{2} \sin 100t$ volt is applied to a capacitor of $2\mu\text{F}$, the rms value of current in the circuit is _____ mA.

Q355 Physics · Units, Dimensions & Errors **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/YPGMTsdJPd](https://www.prepwiser.in/questions/YPGMTsdJPd)Asked 2 times: 16 Mar 2021 S1, **29 Jan 2024 S1 (printed)**

The resistance $R = \frac{V}{I}$ where $V = (200 \pm 5)V$ and $I = (20 \pm 0.2)A$, the percentage error in the measurement of R is:

- (A) 5.5% (B) 3% (C) 7% (D) 3.5%

Q356 Mathematics · Limits **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/zUJKQ8gMnP](https://www.prepwiser.in/questions/zUJKQ8gMnP)Asked 2 times: 29 Jan 2024 S1, **9 Apr 2024 S2 (printed)**

$$\lim_{x \rightarrow \frac{\pi}{2}} \left(\frac{\int_{x^3}^{(\pi/2)^3} (\sin(2t^{1/3}) + \cos(t^{1/3})) dt}{(x - \frac{\pi}{2})^2} \right)$$

is equal to

- (A) $\frac{3\pi^2}{2}$ (B) $\frac{9\pi^2}{8}$ (C) $\frac{5\pi^2}{9}$ (D) $\frac{11\pi^2}{10}$

Q357 Mathematics · Vectors **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/yIShmepwq_](https://www.prepwiser.in/questions/yIShmepwq_)Asked 2 times: 30 Jan 2024 S1, **31 Jan 2024 S1 (printed)**

Let $\vec{a}$ and $\vec{b}$ be two vectors such that $|\vec{a}| = 1$, $|\vec{b}| = 4$, and $\vec{a} \cdot \vec{b} = 2$. If $\vec{c} = (2\vec{a} \times \vec{b}) - 3\vec{b}$ and the angle between $\vec{b}$ and $\vec{c}$ is α , then $192 \sin^2 \alpha$ is equal to _____.

Q358 Physics · Thermodynamics **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/vYe_6zNjT8](https://www.prepwiser.in/questions/vYe_6zNjT8)Asked 2 times: 27 Jan 2024 S2, **5 Apr 2024 S2 (printed)**

During an adiabatic process, if the pressure of a gas is found to be proportional to the cube of its absolute temperature, then the ratio of $\frac{C_p}{C_v}$ for the gas is:

- (A) $\frac{5}{3}$ (B) $\frac{3}{2}$ (C) $\frac{7}{5}$ (D) $\frac{9}{7}$

Q359 Chemistry · General Organic Chemistry (GOC) **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/KFrXaN2pEn](https://www.prepwiser.in/questions/KFrXaN2pEn)Asked 2 times: 29 Jan 2024 S2, **4 Apr 2024 S2 (printed)**

The total number of 'sigma' and 'pi' bonds in 2-oxohex-4-ynoic acid is _____.

Q360 Physics · Rectilinear Motion **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/4LTSMBJvJ](https://www.prepwiser.in/questions/4LTSMBJvJ)Asked 2 times: 29 Jan 2024 S2, **1 Feb 2024 S1 (printed)**

A particle is moving in one dimension (along x axis) under the action of a variable force. Its initial position was 16m right of origin. The variation of its position (x) with time (t) is given as $x = -3t^3 + 18t^2 + 16t$, where x is in m and t is in s.

The velocity of the particle when its acceleration becomes zero is _____ m/s.

Q361 Mathematics · Straight Lines **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/ZQShejNARx](https://www.prepwiser.in/questions/ZQShejNARx)Asked 2 times: 31 Jan 2024 S2, **6 Apr 2024 S1 (printed)**

Let a variable line of slope $m > 0$ passing through the point $(4, -9)$ intersect the coordinate axes at the points A and B . The minimum value of the sum of the distances of A and B from the origin is

- (A) 30 (B) 15 (C) 10 (D) 25

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Q362 Mathematics · Vectors **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/tdtSV-1Nhl](https://www.prepwiser.in/questions/tdtSV-1Nhl)Asked 2 times: 5 Apr 2024 S1, **6 Apr 2024 S1 (printed)**

If $A(3, 1, -1)$, $B\left(\frac{5}{3}, \frac{7}{3}, \frac{1}{3}\right)$, $C(2, 2, 1)$ and $D\left(\frac{10}{3}, \frac{2}{3}, \frac{-1}{3}\right)$ are the vertices of a quadrilateral $ABCD$, then its area is

- (A) $\frac{4\sqrt{2}}{3}$ (B) $\frac{2\sqrt{2}}{3}$ (C) $\frac{5\sqrt{2}}{3}$ (D) $2\sqrt{2}$

Q363 Physics · Electrostatics I: Charges, Field & Gauss's Law **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/PKRug7ygYe](https://www.prepwiser.in/questions/PKRug7ygYe)Asked 2 times: 29 Jan 2024 S2, **8 Apr 2024 S1 (printed)**

An electric field, $\vec{E} = \frac{2\hat{i} + 6\hat{j} + 8\hat{k}}{\sqrt{6}}$ passes through the surface of 4m^2 area having unit vector $\hat{n} = \left(\frac{2\hat{i} + \hat{j} + \hat{k}}{\sqrt{6}}\right)$. The electric flux for that surface is _____ Vm.

Q364 Physics · Rotational Motion **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/JMQ-o445o_](https://www.prepwiser.in/questions/JMQ-o445o_)Asked 2 times: 30 Jan 2024 S1, **31 Jan 2024 S2 (printed)**

A body of mass ' m ' is projected with a speed ' u ' making an angle of 45° with the ground. The angular momentum of the body about the point of projection, at the highest point is expressed as $\frac{\sqrt{2}mu^3}{Xg}$. The value of ' X ' is _____.

Q365 Chemistry · Chemical Thermodynamics **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/s6alCoSa_P](https://www.prepwiser.in/questions/s6alCoSa_P)Asked 2 times: 27 Jan 2024 S1, **4 Apr 2024 S2 (printed)**

Three moles of an ideal gas are compressed isothermally from 60L to 20L using constant pressure of 5atm. Heat exchange Q for the compression is - _____ Lit. atm.

Q366 Physics · Rotational Motion **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/CQymSN3e4e](https://www.prepwiser.in/questions/CQymSN3e4e)Asked 2 times: 27 Jan 2024 S2, **9 Apr 2024 S1 (printed)**

A heavy iron bar, of weight W is having its one end on the ground and the other on the shoulder of a person. The bar makes an angle θ with the horizontal. The weight experienced by the person is:

- (A) $W \sin \theta$ (B) W (C) $\frac{W}{2}$ (D) $W \cos \theta$

Q367 Physics · Moving Charges & Magnetism **Asked 2×** **NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/HiejMfHPPm](https://www.prepwiser.in/questions/HiejMfHPPm)Asked 2 times: 4 Apr 2024 S1, **9 Apr 2024 S1 (printed)**

A square loop of edge length 2m carrying current of 2A is placed with its edges parallel to the x - y axis. A magnetic field is passing through the x - y plane and expressed as $\vec{B} = B_0(1 + 4x)\hat{k}$, where $B_0 = 5T$. The net magnetic force experienced by the loop is _____ N.

Q368 Mathematics · Three Dimensional Geometry **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/hM2yGzZ5zI](https://www.prepwiser.in/questions/hM2yGzZ5zI)Asked 2 times: 27 Jan 2024 S2, **4 Apr 2024 S2 (printed)**

Let P be the point of intersection of the lines $\frac{x-2}{1} = \frac{y-4}{5} = \frac{z-2}{1}$ and $\frac{x-3}{2} = \frac{y-2}{3} = \frac{z-3}{2}$. Then, the shortest distance of P from the line $4x = 2y = z$ is

- (A) $\frac{3\sqrt{14}}{7}$ (B) $\frac{5\sqrt{14}}{7}$ (C) $\frac{\sqrt{14}}{7}$ (D) $\frac{6\sqrt{14}}{7}$

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Asked 2 times: 30 Jan 2024 S2, 1 Feb 2024 S1 (printed)

Two identical charged spheres are suspended by strings of equal lengths. The strings make an angle θ with each other. When suspended in water the angle remains the same. If density of the material of the sphere is 1.5g/cc , the dielectric constant of water will be _____.
(Take density of water = 1g/cc)

Asked 2 times: 31 Jan 2024 S2, 1 Feb 2024 S2 (printed)

Total number of isomeric compounds (including stereoisomers) formed by monochlorination of 2-methylbutane is _____.

Asked 2 times: 1 Feb 2024 S2, 8 Apr 2024 S1 (printed)

A player caught a cricket ball of mass 150g moving at a speed of 20m/s . If the catching process is completed in 0.1s , the magnitude of force exerted by the ball on the hand of the player is:

- (A) 150 N (B) 3 N (C) 30 N (D) 300 N

Asked 2 times: 29 Jan 2024 S2, 9 Apr 2024 S1 (printed)

Let $\vec{OA} = 2\vec{a}$, $\vec{OB} = 6\vec{a} + 5\vec{b}$ and $\vec{OC} = 3\vec{b}$, where O is the origin. If the area of the parallelogram with adjacent sides $\vec{OA}$ and $\vec{OC}$ is 15 sq. units , then the area (in sq. units) of the quadrilateral $OABC$ is equal to:

- (A) 32 (B) 38 (C) 35 (D) 40

Asked 2 times: 27 Jul 2021 S2, 30 Jan 2023 S1 (printed)

In the extraction of copper, its sulphide ore is heated in a reverberatory furnace after mixing with silica to:

- (A) remove FeO as FeSiO_3
(B) remove calcium as CaSiO_3
(C) decrease the temperature needed for roasting of Cu_2S
(D) separate CuO as CuSiO_3

Asked 2 times: 31 Aug 2021 S1, 11 Apr 2023 S1 (printed)

The electric field in an electromagnetic wave is given as

$$\vec{E} = 20 \sin \omega \left(t - \frac{x}{c} \right) \vec{j} \text{ NC}^{-1}$$

where ω and c are angular frequency and velocity of electromagnetic wave respectively. The energy contained in a volume of $5 \times 10^{-4} \text{m}^3$ will be

(Given $\epsilon_0 = 8.85 \times 10^{-12} \text{C}^2/\text{Nm}^2$)

- (A) $17 \cdot 7 \times 10^{-13} \text{J}$ (B) $28 \cdot 5 \times 10^{-13} \text{J}$ (C) $8 \cdot 85 \times 10^{-13} \text{J}$ (D) $88 \cdot 5 \times 10^{-13} \text{J}$

Q375 Physics · Nuclear Physics **Asked 2×**

[Step-by-step solution](#) › [prepwisar.in/questions/7MljmzMlpb](https://www.prepwisar.in/questions/7MljmzMlpb)

Asked 2 times: 26 Jul 2022 S2, **25 Jan 2023 S1 (printed)**

The ratio of the density of oxygen nucleus (${}^{16}_8\text{O}$) and helium nucleus (${}^4_2\text{He}$) is

- (A) 4 : 1 (B) 1 : 1 (C) 2 : 1 (D) 8 : 1

Q376 Physics · Circular Motion **Asked 2×**

[Step-by-step solution](#) › [prepwisar.in/questions/Z5zxK9wScm](https://www.prepwisar.in/questions/Z5zxK9wScm)

Asked 2 times: 27 Jun 2022 S2, **24 Jan 2023 S2 (printed)**

A body of mass 200g is tied to a spring of spring constant 12.5 N/m, while the other end of spring is fixed at point O. If the body moves about O in a circular path on a smooth horizontal surface with constant angular speed 5 rad/s. Then the ratio of extension in the spring to its natural length will be:

- (A) 1 : 2 (B) 2 : 3 (C) 2 : 5 (D) 1 : 1

Q377 Mathematics · Probability: Advanced **Asked 2×**

[Step-by-step solution](#) › [prepwisar.in/questions/7OFb2Vm_hQ](https://www.prepwisar.in/questions/7OFb2Vm_hQ)

Asked 2 times: 29 Jul 2022 S2, **1 Feb 2023 S1 (printed)**

In a binomial distribution $B(n, p)$, the sum and the product of the mean and the variance are 5 and 6 respectively, then $6(n + p - q)$ is equal to:

- (A) 52 (B) 50 (C) 51 (D) 53

Q378 Mathematics · Differential Equations **Asked 2×**

[Step-by-step solution](#) › [prepwisar.in/questions/DgvSkfK_jl](https://www.prepwisar.in/questions/DgvSkfK_jl)

Asked 2 times: 1 Sep 2021 S2, **24 Jan 2023 S1 (printed)**

Let $y = y(x)$ be the solution of the differential equation $x^3 dy + (xy - 1)dx = 0, x > 0, y\left(\frac{1}{2}\right) = 3 - e$. Then $y(1)$ is equal to

- (A) $2 - e$ (B) 3 (C) 1 (D) e

Q379 Mathematics · Vectors **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) › [prepwisar.in/questions/xycc5HbiYw](https://www.prepwisar.in/questions/xycc5HbiYw)

Asked 2 times: 25 Jul 2021 S2, **31 Jan 2023 S1 (printed)**

Let $\vec{a}$ and $\vec{b}$ be two vectors such that $|\vec{a}| = \sqrt{14}, |\vec{b}| = \sqrt{6}$ and $|\vec{a} \times \vec{b}| = \sqrt{48}$. Then $(\vec{a} \cdot \vec{b})^2$ is equal to _____.

Q380 Mathematics · Relations & Functions (Basic) **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) › [prepwisar.in/questions/t3JHpEo2R8](https://www.prepwisar.in/questions/t3JHpEo2R8)

Asked 2 times: 25 Jul 2022 S1, **11 Apr 2023 S2 (printed)**

Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 2, 3, 4, 5, 6\}$. Then the number of functions $f : A \rightarrow B$ satisfying $f(1) + f(2) = f(4) - 1$ is equal to _____.

Q381 Chemistry · Solutions & Colligative Properties **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) › [prepwisar.in/questions/ve3SJvDWcW](https://www.prepwisar.in/questions/ve3SJvDWcW)

Asked 2 times: 27 Jul 2021 S1, **31 Jan 2023 S1 (printed)**

At 27°C , a solution containing 2.5g of solute in 250.0mL of solution exerts an osmotic pressure of 400Pa. The molar mass of the solute is _____ gmol^{-1} (Nearest integer)
(Given: $R = 0.083\text{LbarK}^{-1}\text{mol}^{-1}$)

Q382 Mathematics · Three Dimensional Geometry **Asked 2×**

[Step-by-step solution](#) › [prepwisar.in/questions/PQ1ePJ5PsE](https://www.prepwisar.in/questions/PQ1ePJ5PsE)

Asked 2 times: 25 Jul 2022 S2, **25 Jan 2023 S2 (printed)**

The shortest distance between the lines $x + 1 = 2y = -12z$ and $x = y + 2 = 6z - 6$ is:

- (A) 3 (B) $\frac{5}{2}$ (C) $\frac{3}{2}$ (D) 2

Asked 2 times: 31 Aug 2021 S1, **29 Jan 2023 S1 (printed)**

A point charge $q_1 = 4q_0$ is placed at origin. Another point charge $q_2 = -q_0$ is placed at $x = 12$ cm. Charge of proton is q_0 . The proton is placed on x axis so that the electrostatic force on the proton is zero. In this situation, the position of the proton from the origin is _____ cm.

Asked 2 times: 20 Jul 2021 S2, **1 Feb 2023 S2 (printed)**

If the velocity of light c , universal gravitational constant G and Planck's constant h are chosen as fundamental quantities. The dimensions of mass in the new system is:

- (A) $[h^1 c^1 G^{-1}]$ (B) $[h^{-1/2} c^{1/2} G^{1/2}]$ (C) $[h^{1/2} c^{1/2} G^{-1/2}]$ (D) $[h^{1/2} c^{-1/2} G^1]$

Asked 2 times: 1 Sep 2021 S2, **8 Apr 2023 S2 (printed)**

A steel rod of length 1m and cross sectional area 10^{-4}m^2 is heated from 0°C to 200°C without being allowed to extend or bend. The compressive tension produced in the rod is _____ $\times 10^4 \text{N}$. (Given Young's modulus of steel = $2 \times 10^{11} \text{Nm}^{-2}$, coefficient of linear expansion = 10^{-5}K^{-1})

Asked 2 times: 1 Sep 2021 S2, **6 Apr 2023 S1 (printed)**

Two resistances are given as $R_1 = (10 \pm 0.5)\Omega$ and $R_2 = (15 \pm 0.5)\Omega$. The percentage error in the measurement of equivalent resistance when they are connected in parallel is -

- (A) 2.33 (B) 5.33 (C) 4.33 (D) 6.33

Asked 2 times: 4 Sep 2020 S2, **8 Apr 2023 S1 (printed)**

If the coefficients of three consecutive terms in the expansion of $(1+x)^n$ are in the ratio 1 : 5 : 20, then the coefficient of the fourth term is

- (A) 3654 (B) 1827 (C) 5481 (D) 2436

Asked 2 times: 25 Jul 2021 S2, **1 Feb 2023 S1 (printed)**

The mass of proton, neutron and helium nucleus are respectively $1.0073u$, $1.0087u$ and $4.0015u$. The binding energy of helium nucleus is:

- (A) 28.4MeV (B) 56.8MeV (C) 7.1MeV (D) 14.2MeV

Asked 2 times: 5 Sep 2020 S2, **30 Jan 2023 S2 (printed)**

A body of mass 2kg is initially at rest. It starts moving unidirectionally under the influence of a source of constant power P . Its displacement in 4s is $\frac{1}{3}\alpha^2\sqrt{P}m$. The value of α will be _____.

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Q390

Mathematics · Binomial Theorem

Asked 2×

NUMERICAL

[Step-by-step solution](https://www.prepwisar.in/questions/UV8r9YJcom) > prepwisar.in/questions/UV8r9YJcomAsked 2 times: 26 Aug 2021 S1, **24 Jan 2023 S1 (printed)**

Suppose

$$\sum_{r=0}^{2023} r^{2023} C_r = 2023 \times \alpha \times 2^{2022}$$

. Then the value of α is _____**Q391**

Mathematics · Complex Numbers

Asked 2×[Step-by-step solution](https://www.prepwisar.in/questions/qk4WMCh0IU) > prepwisar.in/questions/qk4WMCh0IUAsked 2 times: 2 Sep 2020 S1, **24 Jan 2023 S2 (printed)**

The value of

$$\left(\frac{1 + \sin \frac{2\pi}{9} + i \cos \frac{2\pi}{9}}{1 + \sin \frac{2\pi}{9} - i \cos \frac{2\pi}{9}} \right)^3$$

is

- (A) $-\frac{1}{2} (1 - i\sqrt{3})$ (B) $-\frac{1}{2} (\sqrt{3} - i)$ (C) $\frac{1}{2} (1 - i\sqrt{3})$ (D) $\frac{1}{2} (\sqrt{3} + i)$

Q392

Mathematics · Vectors

Asked 2×[Step-by-step solution](https://www.prepwisar.in/questions/cKiKOVUxnH) > prepwisar.in/questions/cKiKOVUxnHAsked 2 times: 26 Jul 2022 S2, **11 Apr 2023 S1 (printed)**

Let $\vec{a}$ be a non-zero vector parallel to the line of intersection of the two planes described by $\hat{i} + \hat{j}, \hat{i} + \hat{k}$ and $\hat{i} - \hat{j}, \hat{j} - \hat{k}$. If θ is the angle between the vector $\vec{a}$ and the vector $\vec{b} = 2\hat{i} - 2\hat{j} + \hat{k}$ and $\vec{a} \cdot \vec{b} = 6$, then the ordered pair $(\theta, |\vec{a} \times \vec{b}|)$ is equal to:

- (A) $(\frac{\pi}{3}, 3\sqrt{6})$ (B) $(\frac{\pi}{3}, 6)$ (C) $(\frac{\pi}{4}, 3\sqrt{6})$ (D) $(\frac{\pi}{4}, 6)$

Q393

Physics · Projectile Motion & Relative Motion

Asked 2×[Step-by-step solution](https://www.prepwisar.in/questions/WyMLQrj5i8) > prepwisar.in/questions/WyMLQrj5i8Asked 2 times: 29 Jun 2022 S2, **24 Jan 2023 S1 (printed)**

The maximum vertical height to which a man can throw a ball is 136 m. The maximum horizontal distance upto which he can throw the same ball is:

- (A) 136 m (B) 272 m (C) 68 m (D) 192 m

Q394

Mathematics · Definite Integration

Asked 2×

NUMERICAL

[Step-by-step solution](https://www.prepwisar.in/questions/oKfwKKEUht) > prepwisar.in/questions/oKfwKKEUhtAsked 2 times: 25 Feb 2021 S2, **24 Jan 2023 S1 (printed)**

The value of $12 \int_0^3 |x^2 - 3x + 2| dx$ is _____

Q395

Mathematics · Functions (Advanced)

Asked 2×[Step-by-step solution](https://www.prepwisar.in/questions/PDJ9_LCD_x) > prepwisar.in/questions/PDJ9_LCD_xAsked 2 times: 6 Sep 2020 S2, **24 Jan 2023 S2 (printed)**

Let $f(x)$ be a function such that $f(x+y) = f(x) \cdot f(y)$ for all $x, y \in \mathbb{N}$. If $f(1) = 3$ and

$$\sum_{k=1}^n f(k) = 3279, \text{ then the value of } n \text{ is}$$

- (A) 9 (B) 7 (C) 6 (D) 8

Q396

Mathematics · Three Dimensional Geometry

Asked 2×[Step-by-step solution](https://www.prepwisar.in/questions/HkKsf_K-il) > prepwisar.in/questions/HkKsf_K-ilAsked 2 times: 27 Jun 2022 S2, **13 Apr 2023 S2 (printed)**

Let N be the foot of perpendicular from the point $P(1, -2, 3)$ on the line passing through the points $(4, 5, 8)$ and $(1, -7, 5)$. Then the distance of N from the plane $2x - 2y + z + 5 = 0$ is:

- (A) 7 (B) 6 (C) 9 (D) 8

Asked 2 times: 24 Jun 2022 S1, 1 Feb 2023 S2 (printed)

The threshold frequency of a metal is f_0 . When the light of frequency $2f_0$ is incident on the metal plate, the maximum velocity of photoelectrons is v_1 . When the frequency of incident radiation is increased to $5f_0$, the maximum velocity of photoelectrons emitted is v_2 . The ratio of v_1 to v_2 is:

(A) $\frac{v_1}{v_2} = \frac{1}{2}$

(B) $\frac{v_1}{v_2} = \frac{1}{16}$

(C) $\frac{v_1}{v_2} = \frac{1}{4}$

(D) $\frac{v_1}{v_2} = \frac{1}{8}$

Asked 2 times: 26 Jun 2022 S1, 13 Apr 2023 S2 (printed)

20 mL of 0.1M NaOH is added to 50 mL of 0.1M acetic acid solution. The pH of the resulting solution is _____ $\times 10^{-2}$ (Nearest integer)

Given: $pK_a(\text{CH}_3\text{COOH}) = 4.76$

$$\log 2 = 0.30$$

$$\log 3 = 0.48$$

Asked 2 times: 26 Aug 2021 S1, 1 Feb 2023 S1 (printed)

A series LCR circuit is connected to an ac source of 220V, 50Hz. The circuit contains a resistance $R = 100\Omega$ and an inductor of inductive reactance $X_L = 79.6\Omega$. The capacitance of the capacitor needed to maximize the average rate at which energy is supplied will be _____ μF .

Asked 2 times: 3 Sep 2020 S2, 24 Jan 2023 S1 (printed)

Assume that protons and neutrons have equal masses. Mass of a nucleon is $1.6 \times 10^{-27} \text{ kg}$ and radius of nucleus is $1.5 \times 10^{-15} A^{1/3} \text{ m}$. The approximate ratio of the nuclear density and water density is $n \times 10^{13}$. The value of n is _____.

Asked 2 times: 28 Jun 2022 S2, 11 Apr 2023 S1 (printed)

In an electrochemical reaction of lead, at standard temperature, if $E^0(\text{Pb}^{2+}/\text{Pb}) = m \text{ Volt}$ and $E^0(\text{Pb}^{4+}/\text{Pb}) = n \text{ Volt}$, then the value of $E^0(\text{Pb}^{2+}/\text{Pb}^{4+})$ is given by $m - xn$. The value of x is _____. (Nearest integer)

Asked 2 times: 26 Jun 2022 S2, 12 Apr 2023 S1 (printed)

Let the plane $P: 4x - y + z = 10$ be rotated by an angle $\frac{\pi}{2}$ about its line of intersection with the plane $x + y - z = 4$. If α is the distance of the point $(2, 3, -4)$ from the new position of the plane P , then 35α is equal to:

(A) 126

(B) 105

(C) 85

(D) 90

Asked 2 times: 26 Jun 2022 S1, 1 Feb 2023 S2 (printed)

The sum of the absolute maximum and minimum values of the function $f(x) = |x^2 - 5x + 6| - 3x + 2$ in the interval $[-1, 3]$ is equal to:

(A) 13

(B) 24

(C) 10

(D) 12

Q404 Mathematics · Relations & Functions (Basic)

Asked 2×

[Step-by-step solution](#) › prepwiser.in/questions/0DK8EMVTKX

Asked 2 times: 6 Sep 2020 S1, 13 Apr 2023 S1 (printed)

Fractional part of the number $\frac{4^{2022}}{15}$ is equal to

(A) $\frac{8}{15}$

(B) $\frac{4}{15}$

(C) $\frac{1}{15}$

(D) $\frac{14}{15}$

Q405 Mathematics · Matrices

Asked 2×

[Step-by-step solution](#) › prepwiser.in/questions/JQIZX3IWA1

Asked 2 times: 26 Aug 2021 S1, 25 Jan 2023 S2 (printed)

Let

$$A = \begin{bmatrix} \frac{1}{\sqrt{10}} & \frac{3}{\sqrt{10}} \\ \frac{-3}{\sqrt{10}} & \frac{1}{\sqrt{10}} \end{bmatrix}$$

and $B = \begin{bmatrix} 1 & -i \\ 0 & 1 \end{bmatrix}$, where $i = \sqrt{-1}$. If $M = A^T B A$, then the inverse of the matrix $A M^{2023} A^T$ is

(A) $\begin{bmatrix} 1 & -2023i \\ 0 & 1 \end{bmatrix}$

(B) $\begin{bmatrix} 1 & 0 \\ 2023i & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 1 & 2023i \\ 0 & 1 \end{bmatrix}$

(D) $\begin{bmatrix} 1 & 0 \\ -2023i & 1 \end{bmatrix}$

Q406 Physics · Electrostatics I: Charges, Field & Gauss's Law

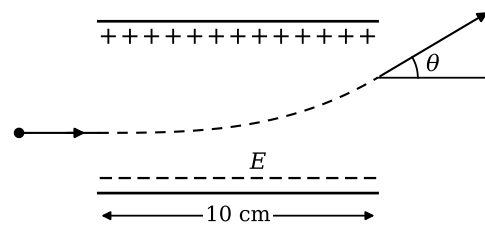
Asked 2×

NUMERICAL

[Step-by-step solution](#) › prepwiser.in/questions/fmVa_ectO1

Asked 2 times: 28 Jul 2022 S2, 25 Jan 2023 S1 (printed)

A uniform electric field of 10 N/C is created between two parallel charged plates (as shown in figure). An electron enters the field symmetrically between the plates with a kinetic energy 0.5 eV. The length of each plate is 10 cm. The angle (θ) of deviation of the path of electron as it comes out of the field is _____ (in degree).

**Q407** Chemistry · Solutions & Colligative Properties

Asked 2×

NUMERICAL

[Step-by-step solution](#) › prepwiser.in/questions/-nIAqofUwA

Asked 2 times: 27 Jun 2022 S2, 30 Jan 2023 S1 (printed)

A solution containing 2g of a non-volatile solute in 20g of water boils at 373.52K. The molecular mass of the solute is _____ gmol^{-1} . (Nearest integer)

Given, water boils at 373K, K_b for water = 0.52Kkgmol^{-1}

Q408 Physics · Atomic Physics

Asked 2×

[Step-by-step solution](#) › prepwiser.in/questions/dxI5dM4qIC

Asked 2 times: 25 Feb 2021 S2, 24 Jan 2023 S2 (printed)

A photon is emitted in transition from $n = 4$ to $n = 1$ level in hydrogen atom. The corresponding wavelength for this transition is (given, $h = 4 \times 10^{-15}$ eVs):

(A) 99.3 nm

(B) 94.1 nm

(C) 974 nm

(D) 941 nm

Q409 Physics · Moving Charges & Magnetism

Asked 2×

[Step-by-step solution](#) › prepwiser.in/questions/kKmbV9O45W

Asked 2 times: 25 Jul 2022 S2, 29 Jan 2023 S2 (printed)

The electric current in a circular coil of four turns produces a magnetic induction 32 T at its centre. The coil is unwound and is rewound into a circular coil of single turn, the magnetic induction at the centre of the coil by the same current will be:

(A) 2 T

(B) 4 T

(C) 8 T

(D) 16 T

Q410 Physics · Nuclear Physics **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/PLI-2HzLEQAsked 2 times: 28 Jul 2022 S1, **10 Apr 2023 S2 (printed)**

The half life of a radioactive substance is T . The time taken, for disintegrating $\frac{7}{8}$ th part of its original mass will be:

- (A) $8T$ (B) $3T$ (C) T (D) $2T$

Q411 Physics · Work, Energy & Power **Asked 2×**

NUMERICAL

[Step-by-step solution](#) › prepwiser.in/questions/wYs7t01kHpAsked 2 times: 29 Jul 2022 S2, **8 Apr 2023 S1 (printed)**

The momentum of a body is increased by 50%. The percentage increase in the kinetic energy of the body is _____ %.

Q412 Physics · Ray Optics **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/dOZHXF2dLcAsked 2 times: 9 Jan 2020 S1, **13 Apr 2023 S1 (printed)**

A vessel of depth ' d ' is half filled with oil of refractive index n_1 and the other half is filled with water of refractive index n_2 . The apparent depth of this vessel when viewed from above will be-

- (A) $\frac{2d(n_1 + n_2)}{n_1 n_2}$ (B) $\frac{d(n_1 + n_2)}{2n_1 n_2}$ (C) $\frac{dn_1 n_2}{2(n_1 + n_2)}$ (D) $\frac{dn_1 n_2}{(n_1 + n_2)}$

Q413 Chemistry · Coordination Compounds **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/_nRbIJNwk4Asked 2 times: 26 Feb 2021 S2, **13 Apr 2023 S2 (printed)**

The total number of stereoisomers for the complex $[\text{Cr}(\text{ox})_2\text{ClBr}]^{3-}$ (where ox = oxalate) is:

- (A) 1 (B) 3 (C) 2 (D) 4

Q414 Chemistry · Ionic Equilibrium **Asked 2×**

NUMERICAL

[Step-by-step solution](#) › prepwiser.in/questions/owwhGYffNmAsked 2 times: 29 Jul 2022 S2, **30 Jan 2023 S1 (printed)**

600mL of 0.01M HCl is mixed with 400mL of 0.01M H_2SO_4 . The pH of the mixture is _____ $\times 10^{-2}$. (Nearest integer)

[Given $\log 2 = 0.30$

$\log 3 = 0.48$

$\log 5 = 0.69$

$\log 7 = 0.84$

$\log 11 = 1.04]$

Q415 Mathematics · Permutations & Combinations **Asked 2×**

NUMERICAL

[Step-by-step solution](#) › prepwiser.in/questions/BX2ET1hqm6Asked 2 times: 18 Mar 2021 S1, **10 Apr 2023 S2 (printed)**

The sum of all the four-digit numbers that can be formed using all the digits 2, 1, 2, 3 is equal to _____.

Q416 Physics · Simple Harmonic Motion **Asked 2×**[Step-by-step solution](#) › prepwiser.in/questions/LLdz2HXnqrAsked 2 times: 17 Mar 2021 S1, **13 Apr 2023 S2 (printed)**

A particle executes SHM of amplitude A . The distance from the mean position when its kinetic energy becomes equal to its potential energy is:

- (A) $\frac{1}{\sqrt{2}}A$ (B) $\frac{1}{2}A$ (C) $2A$ (D) $\sqrt{2}A$

Q417 Chemistry · Polymers **Asked 2×**
Asked 2 times: 20 Jul 2021 S1, **6 Apr 2023 S1 (printed)**

[Step-by-step solution](#) > [prepwisar.in/questions/aBHCcZiWFr](https://www.prepwisar.in/questions/aBHCcZiWFr)

Polymer used in orlon is:

- (A) Polyethene (B) Polyacrylonitrile (C) Polycarbonate (D) Polyamide

Q418 Mathematics · Circles **Asked 2×** **NUMERICAL**
Asked 2 times: 29 Jul 2022 S1, **8 Apr 2023 S1 (printed)**

[Step-by-step solution](#) > [prepwisar.in/questions/Egq-E4-ua5](https://www.prepwisar.in/questions/Egq-E4-ua5)

Consider a circle $C_1 : x^2 + y^2 - 4x - 2y = \alpha - 5$. Let its mirror image in the line $y = 2x + 1$ be another circle $C_2 : 5x^2 + 5y^2 - 10fx - 10gy + 36 = 0$. Let r be the radius of C_2 . Then $\alpha + r$ is equal to _____.

Q419 Mathematics · Three Dimensional Geometry **Asked 2×**
Asked 2 times: 27 Aug 2021 S2, **6 Apr 2023 S1 (printed)**

[Step-by-step solution](#) > [prepwisar.in/questions/tH751Cj6xo](https://www.prepwisar.in/questions/tH751Cj6xo)

If the equation of the plane passing through the line of intersection of the planes $2x - y + z = 3$, $4x - 3y + 5z + 9 = 0$ and parallel to the line $\frac{x+1}{-2} = \frac{y+3}{4} = \frac{z-2}{5}$ is $ax + by + cz + 6 = 0$, then $a + b + c$ is equal to:

- (A) 13 (B) 15 (C) 14 (D) 12

Q420 Physics · Mechanical Waves **Asked 2×** **NUMERICAL**
Asked 2 times: 2 Sep 2020 S2, **11 Apr 2023 S2 (printed)**

[Step-by-step solution](#) > [prepwisar.in/questions/Ji6D15W8vG](https://www.prepwisar.in/questions/Ji6D15W8vG)

A wire of density $8 \times 10^3 \text{ kg/m}^3$ is stretched between two clamps 0.5m apart. The extension developed in the wire is $3.2 \times 10^{-4} \text{ m}$. If $Y = 8 \times 10^{10} \text{ N/m}^2$, the fundamental frequency of vibration in the wire will be _____ Hz.

Q421 Chemistry · Solid State **Asked 2×** **NUMERICAL**
Asked 2 times: 16 Mar 2021 S2, **29 Jan 2023 S2 (printed)**

[Step-by-step solution](#) > [prepwisar.in/questions/GGAIPuP1Kx](https://www.prepwisar.in/questions/GGAIPuP1Kx)

A metal M forms hexagonal close-packed structure. The total number of voids in 0.02 mol of it is _____ $\times 10^{21}$ (Nearest integer).
(Given $N_A = 6.02 \times 10^{23}$)

Q422 Mathematics · Three Dimensional Geometry **Asked 2×**
Asked 2 times: 2 Sep 2020 S1, **13 Apr 2023 S2 (printed)**

[Step-by-step solution](#) > [prepwisar.in/questions/6BxeCiLPBs](https://www.prepwisar.in/questions/6BxeCiLPBs)

The plane, passing through the points $(0, -1, 2)$ and $(-1, 2, 1)$ and parallel to the line passing through $(5, 1, -7)$ and $(1, -1, -1)$, also passes through the point:

- (A) $(0, 5, -2)$ (B) $(2, 0, 1)$ (C) $(1, -2, 1)$ (D) $(-2, 5, 0)$

Q423 Physics · Moving Charges & Magnetism **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > [prepwisar.in/questions/QdxPf1ppjI](https://www.prepwisar.in/questions/QdxPf1ppjI)

Asked 2 times: 2 Sep 2020 S1, **6 Apr 2023 S2 (printed)**

A proton with a kinetic energy of 2.0 eV moves into a region of uniform magnetic field of magnitude $\frac{\pi}{2} \times 10^{-3} \text{ T}$. The angle between the direction of magnetic field and velocity of proton is 60° . The pitch of the helical path taken by the proton is _____ cm. (Take, mass of proton $= 1.6 \times 10^{-27} \text{ kg}$ and Charge on proton $= 1.6 \times 10^{-19} \text{ C}$).

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Q424 Chemistry · Hydrogen & s-Block Elements **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/QE_M7SqIDj](https://www.prepwisar.in/questions/QE_M7SqIDj)

Asked 2 times: 29 Jul 2022 S2, **6 Apr 2023 S1 (printed)**

The setting time of Cement is increased by adding:

- (A) Gypsum (B) Limestone (C) Clay (D) Silica

Q425 Physics · Simple Harmonic Motion **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/tNs2usVw4I](https://www.prepwisar.in/questions/tNs2usVw4I)

Asked 2 times: 27 Jun 2022 S1, **25 Jan 2023 S2 (printed)**

A particle executes simple harmonic motion between $x = -A$ and $x = +A$. If time taken by particle to go from $x = 0$ to $\frac{A}{2}$ is 2 s; then time taken by particle in going from $x = \frac{A}{2}$ to A is

- (A) 4 s (B) 1.5 s (C) 3 s (D) 2 s

Q426 Physics · Alternating Current **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/6HVuMij2vY](https://www.prepwisar.in/questions/6HVuMij2vY)

Asked 2 times: 26 Jul 2022 S1, **30 Jan 2023 S1 (printed)**

In a series LR circuit with $X_L = R$, power factor P_1 . If a capacitor of capacitance C with $X_C = X_L$ is added to the circuit the power factor becomes P_2 . The ratio of P_1 to P_2 will be:

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

Q427 Physics · Gravitation **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/ckxKiKk3UY](https://www.prepwisar.in/questions/ckxKiKk3UY)

Asked 2 times: 25 Jul 2021 S2, **6 Apr 2023 S1 (printed)**

A planet has double the mass of the earth. Its average density is equal to that of the earth. An object weighing W on earth will weigh on that planet:

- (A) $2^{2/3}W$ (B) W (C) 2W (D) $2^{1/3}W$

Q428 Physics · Kinetic Theory of Gases **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/txOuRXm2r3](https://www.prepwisar.in/questions/txOuRXm2r3)

Asked 2 times: 29 Jul 2022 S2, **11 Apr 2023 S2 (printed)**

The root mean square speed of molecules of nitrogen gas at 27°C is approximately : (Given mass of a nitrogen molecule = $4.6 \times 10^{-26}\text{kg}$ and take Boltzmann constant $k_B = 1.4 \times 10^{-23}\text{JK}^{-1}$)

- (A) 91 m/s (B) 1260 m/s (C) 27.4 m/s (D) 523 m/s

Q429 Mathematics · Vectors **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/NVzdFFH7TO](https://www.prepwisar.in/questions/NVzdFFH7TO)

Asked 2 times: 25 Jan 2023 S2, **6 Apr 2023 S2 (printed)**

The sum of all values of α , for which the points whose position vectors are

$$\hat{i} - 2\hat{j} + 3\hat{k}, 2\hat{i} - 3\hat{j} + 4\hat{k}, (\alpha + 1)\hat{i} + 2\hat{k}$$

and $9\hat{i} + (\alpha - 8)\hat{j} + 6\hat{k}$ are coplanar, is equal to:

- (A) 6 (B) 4 (C) -2 (D) 2

Q430 Physics · Rotational Motion **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > [prepwisar.in/questions/1-Rb9uWghS](https://www.prepwisar.in/questions/1-Rb9uWghS)

Asked 2 times: 29 Jan 2023 S1, **31 Jan 2023 S1 (printed)**

A solid sphere of mass 1kg rolls without slipping on a plane surface. Its kinetic energy is $7 \times 10^{-3}\text{J}$. The speed of the centre of mass of the sphere is _____ cm s^{-1}

Q431 Mathematics · Ellipse **Asked 2×**

[Step-by-step solution](#) > [prepwisar.in/questions/DYGI4aDTxv](https://www.prepwisar.in/questions/DYGI4aDTxv)

Asked 2 times: 24 Jan 2023 S1, **11 Apr 2023 S2 (printed)**

If the radius of the largest circle with centre (2,0) inscribed in the ellipse $x^2 + 4y^2 = 36$ is r, then $12r^2$ is equal to:

- (A) 72 (B) 92 (C) 115 (D) 69

Asked 2 times: 1 Feb 2023 S2, 6 Apr 2023 S2 (printed)

Element not present in Nessler's reagent is:

- (A) I (B) N (C) K (D) Hg

Asked 2 times: 29 Jan 2023 S2, 31 Jan 2023 S2 (printed)

When a hydrocarbon A undergoes complete combustion it requires 11 equivalents of oxygen and produces 4 equivalents of water. What is the molecular formula of A?

- (A) C_9H_8 (B) C_5H_8 (C) $C_{11}H_4$ (D) $C_{11}H_8$

Asked 2 times: 29 Jan 2023 S1, 12 Apr 2023 S1 (printed)

A conducting circular loop is placed in a uniform magnetic field of 0.4T with its plane perpendicular to the field. Somehow, the radius of the loop starts expanding at a constant rate of 1mm/s. The magnitude of induced emf in the loop at an instant when the radius of the loop is 2cm will be _____ μV .

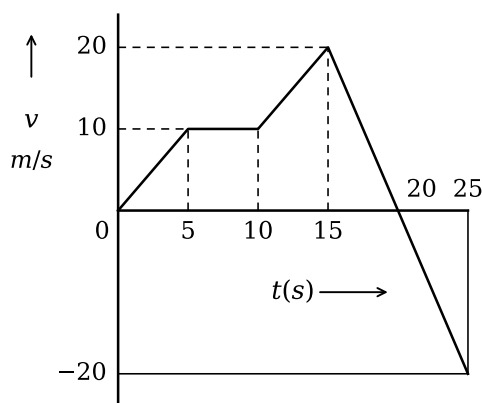
Asked 2 times: 25 Jan 2023 S2, 15 Apr 2023 S1 (printed)

The position of a particle related to time is given by $x = (5t^2 - 4t + 5)$ m. The magnitude of velocity of the particle at $t = 2s$ will be:

- (A) $14ms^{-1}$ (B) $16ms^{-1}$ (C) $10ms^{-1}$ (D) $06ms^{-1}$

Asked 2 times: 24 Jan 2023 S2, 11 Apr 2023 S1 (printed)

From the $v - t$ graph shown, the ratio of distance to displacement in 25s of motion is:



- (A) 1 (B) $\frac{3}{5}$ (C) $\frac{1}{2}$ (D) $\frac{5}{3}$

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Q437 Mathematics · Determinants **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/a49XREILvT](https://www.prepwise.in/questions/a49XREILvT)Asked 2 times: 10 Apr 2023 S1, **13 Apr 2023 S1 (printed)**

For the system of linear equations

$$2x + 4y + 2az = b$$

$$x + 2y + 3z = 4$$

$$2x - 5y + 2z = 8$$

which of the following is NOT correct?

- (A) It has infinitely many solutions if $a = 3, b = 8$ (B) It has infinitely many solutions if $a = 3, b = 6$
(C) It has unique solution if $a = b = 8$ (D) It has unique solution if $a = b = 6$

Q438 Physics · Rectilinear Motion **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/8JcFr78CHf](https://www.prepwise.in/questions/8JcFr78CHf)Asked 2 times: 25 Jan 2023 S1, **10 Apr 2023 S2 (printed)**

A person travels x distance with velocity v_1 and then x distance with velocity v_2 in the same direction. The average velocity of the person is v , then the relation between v, v_1 and v_2 will be.

- (A) $V = V_1 + V_2$ (B) $V = \frac{v_1 + v_2}{2}$ (C) $\frac{1}{v} = \frac{1}{v_1} + \frac{1}{v_2}$ (D) $\frac{2}{V} = \frac{1}{v_1} + \frac{1}{v_2}$

Q439 Physics · Elasticity **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › [prepwise.in/questions/XcK29Uewxp](https://www.prepwise.in/questions/XcK29Uewxp)Asked 2 times: 31 Aug 2021 S1, **26 Jul 2022 S2 (printed)**

A uniform heavy rod of mass 20kg, cross sectional area 0.4m^2 and length 20m is hanging from a fixed support. Neglecting the lateral contraction, the elongation in the rod due to its own weight is $x \times 10^{-9}\text{m}$. The value of x is _____.

(Given, young modulus $Y = 2 \times 10^{11} \text{ Nm}^{-2}$ and $g = 10 \text{ ms}^{-2}$)**Q440** Mathematics · Differential Equations **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/Dzj23uaxxb](https://www.prepwise.in/questions/Dzj23uaxxb)Asked 2 times: 16 Mar 2021 S1, **26 Jul 2022 S1 (printed)**If $\frac{dy}{dx} + 2y \tan x = \sin x$, $0 < x < \frac{\pi}{2}$ and $y\left(\frac{\pi}{3}\right) = 0$, then the maximum value of $y(x)$ is:

- (A) $\frac{1}{8}$ (B) $\frac{3}{4}$ (C) $\frac{1}{4}$ (D) $\frac{3}{8}$

Q441 Physics · Nuclear Physics **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/oVuUlemPWg](https://www.prepwise.in/questions/oVuUlemPWg)Asked 2 times: 25 Jul 2021 S2, **27 Jul 2022 S1 (printed)**What is the half-life period of a radioactive material if its activity drops to $1/16^{\text{th}}$ of its initial value in 30 years?

- (A) 9.5 years (B) 8.5 years (C) 7.5 years (D) 10.5 years

Q442 Physics · Units, Dimensions & Errors **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/sEx-MPLnzp](https://www.prepwise.in/questions/sEx-MPLnzp)Asked 2 times: 7 Jan 2020 S2, **28 Jul 2022 S1 (printed)**The dimensions of $\left(\frac{B^2}{\mu_0}\right)$ will be:(if μ_0 : permeability of free space and B : magnetic field)

- (A) $[M L^2 T^{-2}]$ (B) $[M L T^{-2}]$ (C) $[M L^{-1} T^{-2}]$ (D) $[M L^2 T^{-2} A^{-1}]$

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Q443 Physics · Wave Optics **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/Xcbgj7ffRH](https://www.prepwiser.in/questions/Xcbgj7ffRH)Asked 2 times: 20 Jul 2021 S2, **26 Jun 2022 S2 (printed)**

For a specific wavelength 670 nm of light coming from a galaxy moving with velocity v , the observed wavelength is 670.7 nm. The value of v is:

- (A) $3 \times 10^8 \text{ ms}^{-1}$ (B) $3 \times 10^{10} \text{ ms}^{-1}$ (C) $3.13 \times 10^5 \text{ ms}^{-1}$ (D) $4.48 \times 10^5 \text{ ms}^{-1}$

Q444 Chemistry · Redox Reactions **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/XCO8CErYPY](https://www.prepwiser.in/questions/XCO8CErYPY)Asked 2 times: 26 Feb 2021 S2, **27 Jul 2022 S2 (printed)**

In neutral or alkaline solution, MnO_4^- oxidises thiosulphate to:

- (A) $\text{S}_2\text{O}_7^{2-}$ (B) $\text{S}_2\text{O}_8^{2-}$ (C) SO_3^{2-} (D) SO_4^{2-}

Q445 Physics · Semiconductors & Electronic Devices **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/smMoMVyTIY](https://www.prepwiser.in/questions/smMoMVyTIY)Asked 2 times: 27 Aug 2021 S1, **27 Jun 2022 S2 (printed)**

For a transistor to act as a switch, it must be operated in

- (A) Active region. (B) Saturation state only.
(C) Cut-off state only. (D) Saturation and cut-off state.

Q446 Physics · Electrostatics II: Potential & Capacitance **Asked 2×****NUMERICAL**[Step-by-step solution](#) > [prepwiser.in/questions/RBUFEHUog2](https://www.prepwiser.in/questions/RBUFEHUog2)Asked 2 times: 26 Feb 2021 S2, **30 Jun 2022 S1 (printed)**

Eight similar drops of mercury are maintained at 12 V each. All these spherical drops combine into a single big drop. The potential energy of bigger drop will be _____ E. Where E is the potential energy of a single smaller drop.

Q447 Mathematics · Inverse Trigonometric Functions **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/PcYduYJzvA](https://www.prepwiser.in/questions/PcYduYJzvA)Asked 2 times: 5 Sep 2020 S1, **27 Jun 2022 S2 (printed)**

The value of

$$\cot \left(\sum_{n=1}^{50} \tan^{-1} \left(\frac{1}{1+n+n^2} \right) \right)$$

is:

- (A) $\frac{26}{25}$ (B) $\frac{25}{26}$ (C) $\frac{50}{51}$ (D) $\frac{52}{51}$

Q448 Mathematics · Determinants **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/6tA7-Lnkm4](https://www.prepwiser.in/questions/6tA7-Lnkm4)Asked 2 times: 2 Sep 2020 S1, **24 Jun 2022 S1 (printed)**

The number of values of α for which the system of equations:

$$x + y + z = \alpha$$

$$\alpha x + 2\alpha y + 3z = -1$$

$$x + 3\alpha y + 5z = 4$$

is inconsistent, is

- (A) 0 (B) 1 (C) 2 (D) 3

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Q449 Physics · Work, Energy & Power **Asked 2×**[Step-by-step solution](#) > [prepwisar.in/questions/ZvyraHNMf7](https://www.prepwisar.in/questions/ZvyraHNMf7)Asked 2 times: 25 Feb 2021 S1, **24 Jun 2022 S2 (printed)**

Potential energy as a function of r is given by $U = \frac{A}{r^{10}} - \frac{B}{r^5}$, where r is the interatomic distance, A and B are positive constants. The equilibrium distance between the two atoms will be:

- (A) $\left(\frac{A}{B}\right)^{\frac{1}{5}}$ (B) $\left(\frac{B}{A}\right)^{\frac{1}{5}}$ (C) $\left(\frac{2A}{B}\right)^{\frac{1}{5}}$ (D) $\left(\frac{B}{2A}\right)^{\frac{1}{5}}$

Q450 Mathematics · Limits **Asked 2×**[Step-by-step solution](#) > [prepwisar.in/questions/CqXznONKeB](https://www.prepwisar.in/questions/CqXznONKeB)Asked 2 times: 27 Aug 2021 S2, **25 Jul 2022 S1 (printed)**

If

$$\lim_{n \rightarrow \infty} \left(\sqrt{n^2 - n - 1} + n\alpha + \beta \right) = 0$$

, then $8(\alpha + \beta)$ is equal to:

- (A) 4 (B) -8 (C) -4 (D) 8

Q451 Physics · Rotational Motion **Asked 2×**[Step-by-step solution](#) > [prepwisar.in/questions/cQTDtVnj7D](https://www.prepwisar.in/questions/cQTDtVnj7D)Asked 2 times: 18 Mar 2021 S1, **26 Jun 2022 S1 (printed)**

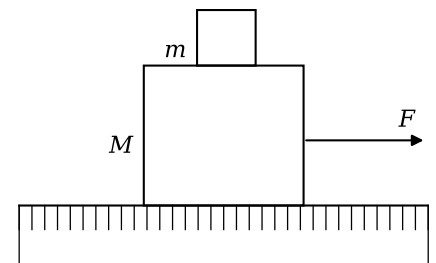
A thin circular ring of mass M and radius R is rotating with a constant angular velocity 2 rad s^{-1} in a horizontal plane about an axis vertical to its plane and passing through the center of the ring. If two objects each of mass m be attached gently to the opposite ends of a diameter of ring, the ring will then rotate with an angular velocity (in rad s^{-1}).

- (A) $\frac{M}{(M+m)}$ (B) $\frac{(M+2m)}{2M}$ (C) $\frac{2M}{(M+2m)}$ (D) $\frac{2(M+2m)}{M}$

Q452 Physics · Friction **Asked 2×**[Step-by-step solution](#) > [prepwisar.in/questions/wD_2k90D3I](https://www.prepwisar.in/questions/wD_2k90D3I)Asked 2 times: 17 Mar 2021 S1, **27 Jun 2022 S1 (printed)**

A system of two blocks of masses $m = 2 \text{ kg}$ and $M = 8 \text{ kg}$ is placed on a smooth table as shown in figure. The coefficient of static friction between two blocks is 0.5. The maximum horizontal force F that can be applied to the block of mass M so that the blocks move together will be:

- (A) 9.8 N (B) 39.2 N (C) 49 N (D) 78.4 N

**Q453** Mathematics · Quadratic Equations & Polynomial Inequalities **Asked 2×**[Step-by-step solution](#) > [prepwisar.in/questions/cFMLkwZ-A2](https://www.prepwisar.in/questions/cFMLkwZ-A2)Asked 2 times: 9 Jan 2020 S2, **25 Jun 2022 S2 (printed)**

Let $a, b \in \mathbb{R}$ be such that the equation $ax^2 - 2bx + 15 = 0$ has a repeated root α . If α and β are the roots of the equation $x^2 - 2bx + 21 = 0$, then $\alpha^2 + \beta^2$ is equal to:

- (A) 37 (B) 58 (C) 68 (D) 92

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Asked 2 times: 25 Feb 2021 S2, 26 Jul 2022 S2 (printed)

Let

$$\beta = \lim_{x \rightarrow 0} \frac{\alpha x - (e^{3x} - 1)}{\alpha x (e^{3x} - 1)}$$

for some $\alpha \in \mathbb{R}$. Then the value of $\alpha + \beta$ is:

(A) $\frac{14}{5}$

(B) $\frac{3}{2}$

(C) $\frac{5}{2}$

(D) $\frac{7}{2}$

Asked 2 times: 27 Aug 2021 S2, 29 Jun 2022 S2 (printed)

Match List I with List II.

	List-I Ore		List-II Composition
(A)	Siderite	(I)	FeCO_3
(B)	Malachite	(II)	$\text{CuCO}_3 \cdot \text{Cu(OH)}_2$
(C)	Sphalerite	(III)	ZnS
(D)	Calamine	(IV)	ZnCO_3

Choose the correct answer from the options given below:

(A) A-I, B-II, C-III, D-IV

(B) A-III, B-IV, C-II, D-I

(C) A-IV, B-III, C-I, D-II

(D) A-I, B-II, C-IV, D-III

Asked 2 times: 20 Jul 2021 S2, 27 Jul 2022 S1 (printed)

A magnet hung at 45° with magnetic meridian makes an angle of 60° with the horizontal. The actual value of the angle of dip is -

(A) $\tan^{-1} \left(\sqrt{\frac{3}{2}} \right)$

(B) $\tan^{-1}(\sqrt{6})$

(C) $\tan^{-1} \left(\sqrt{\frac{2}{3}} \right)$

(D) $\tan^{-1} \left(\sqrt{\frac{1}{2}} \right)$

Asked 2 times: 17 Mar 2021 S1, 26 Jun 2022 S1 (printed)

The remainder when $(2021)^{2023}$ is divided by 7 is:

(A) 1

(B) 2

(C) 5

(D) 6

Asked 2 times: 26 Feb 2021 S1, 30 Jun 2022 S1 (printed)

The number of radial nodes and total number of nodes in 4p orbital respectively are:

(A) 2 and 3

(B) 2 and 2

(C) 3 and 4

(D) 4 and 4

Asked 2 times: 9 Jan 2020 S2, 25 Jun 2022 S2 (printed)

Let $A = \{x \in \mathbb{R} : |x + 1| < 2\}$ and $B = \{x \in \mathbb{R} : |x - 1| \geq 2\}$. Then which one of the following statements is NOT true?

(A) $A - B = (-1, 1)$

(B) $B - A = \mathbb{R} - (-3, 1)$

(C) $A \cap B = (-3, -1]$

(D) $A \cup B = \mathbb{R} - [1, 3)$

Q460 Chemistry · Hydrogen & s-Block Elements **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/HvKihyYgAY

Asked 2 times: 20 Jul 2021 S2, **24 Jun 2022 S1 (printed)**

The highest industrial consumption of molecular hydrogen is to produce compounds of element:

- (A) Carbon (B) Nitrogen (C) Oxygen (D) Chlorine

Q461 Mathematics · Limits **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/SIOwTVuHL5

Asked 2 times: 17 Mar 2021 S1, **26 Jun 2022 S2 (printed)**

$\lim_{x \rightarrow 0} \frac{\cos(\sin x) - \cos x}{x^4}$ is equal to:

- (A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{1}{6}$ (D) $\frac{1}{12}$

Q462 Physics · Electromagnetic Waves **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/_grwaFzRg1

Asked 2 times: 26 Feb 2021 S1, **24 Jun 2022 S2 (printed)**

An electric bulb is rated as 200 W. What will be the peak magnetic field at 4 m distance produced by the radiations coming from this bulb? Consider this bulb as a point source with 3.5% efficiency.

- (A) $1.19 \times 10^{-8} \text{T}$ (B) $1.71 \times 10^{-8} \text{T}$ (C) $0.84 \times 10^{-8} \text{T}$ (D) $3.36 \times 10^{-8} \text{T}$

Q463 Mathematics · Binomial Theorem **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/o-50zzII0a

Asked 2 times: 26 Feb 2021 S1, **25 Jul 2022 S1 (printed)**

If the maximum value of the term independent of t in the expansion of

$$\left(t^2 x^{\frac{1}{5}} + \frac{(1-x)^{\frac{1}{10}}}{t} \right)^{15}, x \geq 0$$

, is K , then $8K$ is equal to _____.

Q464 Chemistry · Hydrogen & s-Block Elements **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/-p_GbRJ6Z-

Asked 2 times: 6 Sep 2020 S2, **25 Jul 2022 S2 (printed)**

High purity (> 99.95%) dihydrogen is obtained by:

- (A) reaction of zinc with aqueous alkali.
(B) electrolysis of acidified water using platinum electrodes.
(C) electrolysis of warm aqueous barium hydroxide solution between nickel electrodes.
(D) reaction of zinc with dilute acid.

Q465 Mathematics · Definite Integration **Asked 2×**

[Step-by-step solution](#) > prepwiser.in/questions/CO4ndtnjie

Asked 2 times: 24 Feb 2021 S2, **28 Jun 2022 S1 (printed)**

Let $[t]$ denote the greatest integer less than or equal to t . Then, the value of the integral

$$\int_0^1 [-8x^2 + 6x - 1] dx \text{ is equal to:}$$

- (A) -1 (B) $-\frac{5}{4}$ (C) $\frac{\sqrt{17}-13}{8}$ (D) $\frac{\sqrt{17}-16}{8}$

Q466 Chemistry · Chemical Kinetics **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > prepwiser.in/questions/lfAxRojd8P

Asked 2 times: 5 Sep 2020 S1, **26 Jun 2022 S1 (printed)**

A flask is filled with equal moles of A and B. The half lives of A and B are 100 s and 50 s respectively and are independent of the initial concentration. The time required for the concentration of A to be four times that of B is _____ s.

(Given : $\ln 2 = 0.693$)

Asked 2 times: 2 Sep 2020 S2, 28 Jun 2022 S2 (printed)

Let $f(x)$ be a quadratic polynomial such that $f(-2) + f(3) = 0$. If one of the roots of $f(x) = 0$ is -1 , then the sum of the roots of $f(x) = 0$ is equal to:

(A) $\frac{11}{3}$

(B) $\frac{7}{3}$

(C) $\frac{13}{3}$

(D) $\frac{14}{3}$

Asked 2 times: 3 Sep 2020 S1, 25 Jul 2022 S1 (printed)

A metal exposed to light of wavelength 800nm and emits photoelectrons with a certain kinetic energy. The maximum kinetic energy of photo-electron doubles when light of wavelength 500nm is used. The workfunction of the metal is : (Take $hc = 1230 \text{ eV} - \text{nm}$).

(A) 1.537 eV

(B) 2.46 eV

(C) 0.615 eV

(D) 1.23 eV

Asked 2 times: 24 Feb 2021 S1, 28 Jun 2022 S1 (printed)

Stability of α -Helix structure of proteins depends upon

(A) dipolar interaction

(B) H-bonding interaction

(C) van der Waals forces

(D) π -stacking interaction

Asked 2 times: 26 Feb 2021 S2, 28 Jul 2022 S2 (printed)

Two streams of photons, possessing energies equal to five and ten times the work function of metal are incident on the metal surface successively. The ratio of maximum velocities of the photoelectron emitted, in the two cases respectively, will be

(A) $1 : 2$

(B) $1 : 3$

(C) $2 : 3$

(D) $3 : 2$

Asked 2 times: 27 Jul 2021 S1, 29 Jul 2022 S1 (printed)

A ball is thrown up vertically with a certain velocity so that, it reaches a maximum height h . Find the ratio of the times in which it is at height $\frac{h}{3}$ while going up and coming down respectively.

(A) $\frac{\sqrt{2}-1}{\sqrt{2}+1}$

(B) $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$

(C) $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

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

Asked 2 times: 31 Aug 2021 S2, 30 Jun 2022 S1 (printed)

A sample of monoatomic gas is taken at initial pressure of 75 kPa . The volume of the gas is then compressed from 1200 cm^3 to 150 cm^3 adiabatically. In this process, the value of workdone on the gas will be:

(A) 79 J

(B) 405 J

(C) 4050 J

(D) 9590 J

Asked 2 times: 20 Jul 2021 S2, 25 Jun 2022 S2 (printed)

The ratio of specific heats $\left(\frac{C_p}{C_v}\right)$ in terms of degree of freedom (f) is given by:

(A) $\left(1 + \frac{f}{3}\right)$

(B) $\left(1 + \frac{2}{f}\right)$

(C) $\left(1 + \frac{f}{2}\right)$

(D) $\left(1 + \frac{1}{f}\right)$

Q474 Mathematics · Vectors **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/R8RR28Ms2e](https://www.prepwiser.in/questions/R8RR28Ms2e)Asked 2 times: 26 Feb 2021 S1, **29 Jul 2022 S2 (printed)**If $(2, 3, 9)$, $(5, 2, 1)$, $(1, \lambda, 8)$ and $(\lambda, 2, 3)$ are coplanar, then the product of all possible values of λ is:

- (A) $\frac{21}{2}$ (B) $\frac{59}{8}$ (C) $\frac{57}{8}$ (D) $\frac{95}{8}$

Q475 Mathematics · Definite Integration **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/2vIbet46yq](https://www.prepwiser.in/questions/2vIbet46yq)Asked 2 times: 26 Feb 2021 S2, **29 Jul 2022 S1 (printed)**

If

$$f(\alpha) = \int_1^{\alpha} \frac{\log_{10} t}{1+t} dt, \alpha > 0$$

, then $f(e^3) + f(e^{-3})$ is equal to:

- (A) 9 (B) $\frac{9}{2}$ (C) $\frac{9}{\log_e(10)}$ (D) $\frac{9}{2\log_e(10)}$

Q476 Physics · Dual Nature of Radiation & Matter **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/_5GTOzUaem](https://www.prepwiser.in/questions/_5GTOzUaem)Asked 2 times: 17 Mar 2021 S1, **28 Jun 2022 S1 (printed)**The de Broglie wavelengths for an electron and a photon are λ_e and λ_p respectively. For the same kinetic energy of electron and photon, which of the following presents the correct relation between the de Broglie wavelengths of two?

- (A) $\lambda_p \propto \lambda_e^2$ (B) $\lambda_p \propto \lambda_e$ (C) $\lambda_p \propto \sqrt{\lambda_e}$ (D) $\lambda_p \propto \sqrt{\frac{1}{\lambda_e}}$

Q477 Mathematics · Definite Integration **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/6LAgAy6hp2](https://www.prepwiser.in/questions/6LAgAy6hp2)Asked 2 times: 16 Mar 2021 S1, **28 Jun 2022 S2 (printed)**Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be a continuous function satisfying $f(x) + f(x+k) = n$, for all $x \in \mathbb{R}$ where $k > 0$ and n is a positive integer. If $I_1 = \int_0^{4nk} f(x) dx$ and $I_2 = \int_{-k}^{3k} f(x) dx$, then:

- (A) $I_1 + 2I_2 = 4nk$ (B) $I_1 + 2I_2 = 2nk$ (C) $I_1 + nI_2 = 4n^2k$ (D) $I_1 + nI_2 = 6n^2k$

Q478 Mathematics · Circles **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/825n8YaqCH](https://www.prepwiser.in/questions/825n8YaqCH)Asked 2 times: 6 Sep 2020 S2, **24 Jun 2022 S1 (printed)**Let $x^2 + y^2 + Ax + By + C = 0$ be a circle passing through $(0, 6)$ and touching the parabola $y = x^2$ at $(2, 4)$. Then $A + C$ is equal to _____.

- (A) 16 (B) $88/5$ (C) 72 (D) -8

Q479 Physics · Simple Harmonic Motion **Asked 2×**[Step-by-step solution](#) › [prepwiser.in/questions/tZBIEUzPAg](https://www.prepwiser.in/questions/tZBIEUzPAg)Asked 2 times: 16 Mar 2021 S1, **26 Jun 2022 S1 (printed)**Time period of a simple pendulum in a stationary lift is 'T'. If the lift accelerates with $\frac{g}{6}$ vertically upwards then the time period will be:(Where g = acceleration due to gravity)

- (A) $\sqrt{\frac{6}{5}}T$ (B) $\sqrt{\frac{5}{6}}T$ (C) $\sqrt{\frac{6}{7}}T$ (D) $\sqrt{\frac{7}{6}}T$

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Q480 Mathematics · Ellipse **Asked 2×**[Step-by-step solution](#) > [prepwiser.in/questions/9pDOQIuAqi](https://www.prepwiser.in/questions/9pDOQIuAqi)Asked 2 times: 26 Feb 2021 S2, **26 Jun 2022 S2 (printed)**

If m is the slope of a common tangent to the curves $\frac{x^2}{16} + \frac{y^2}{9} = 1$ and $x^2 + y^2 = 12$, then $12m^2$ is equal to:

- (A) 6 (B) 9 (C) 10 (D) 12

Q481 Mathematics · Quadratic Equations & Polynomial Inequalities **Asked 2×**

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/VWG5tMiRc9](https://www.prepwiser.in/questions/VWG5tMiRc9)Asked 2 times: 24 Feb 2021 S1, **26 Jun 2022 S2 (printed)**

Let p and q be two real numbers such that $p + q = 3$ and $p^4 + q^4 = 369$. Then $\left(\frac{1}{p} + \frac{1}{q}\right)^{-2}$ is equal to _____.

Q482 Physics · Thermodynamics **Asked 2×**

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/mP3H0VLkwW](https://www.prepwiser.in/questions/mP3H0VLkwW)Asked 2 times: 17 Mar 2021 S1, **27 Jun 2022 S1 (printed)**

In a carnot engine, the temperature of reservoir is 527°C and that of sink is 200 K . If the work done by the engine when it transfers heat from reservoir to sink is 12000 kJ , the quantity of heat absorbed by the engine from reservoir is _____ $\times 10^6\text{ J}$.

Q483 Physics · Surface Tension **Asked 2×**

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/Lu0esAqq3x](https://www.prepwiser.in/questions/Lu0esAqq3x)Asked 2 times: 26 Aug 2021 S1, **27 Jul 2022 S2 (printed)**

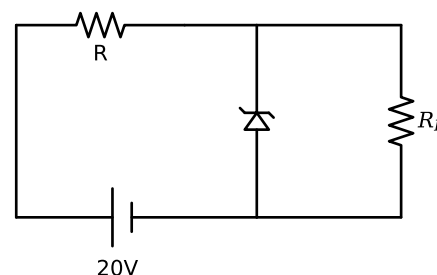
A spherical soap bubble of radius 3 cm is formed inside another spherical soap bubble of radius 6 cm . If the internal pressure of the smaller bubble of radius 3 cm in the above system is equal to the internal pressure of the another single soap bubble of radius $r\text{ cm}$. The value of r is _____.

Q484 Physics · Semiconductors & Electronic Devices **Asked 2×**

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/iez-5LYS_o](https://www.prepwiser.in/questions/iez-5LYS_o)Asked 2 times: 22 Jul 2021 S2, **29 Jul 2022 S2 (printed)**

A 8 V Zener diode along with a series resistance R is connected across a 20 V supply (as shown in the figure). If the maximum Zener current is 25 mA , then the minimum value of R will be _____ Ω .

**Q485** Physics · Magnetism & Matter **Asked 2×**

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/O0tdpRrlt1](https://www.prepwiser.in/questions/O0tdpRrlt1)Asked 2 times: 20 Jul 2021 S2, **27 Jun 2022 S1 (printed)**

The susceptibility of a paramagnetic material is 99 . The permeability of the material in Wb/A-m , is: [Permeability of free space $\mu_0 = 4\pi \times 10^{-7}\text{ Wb/A-m}$]

- (A) $4\pi \times 10^{-7}$ (B) $4\pi \times 10^{-4}$ (C) $4\pi \times 10^{-5}$ (D) $4\pi \times 10^{-6}$

Q486 Physics · Moving Charges & Magnetism **Asked 2×**

NUMERICAL

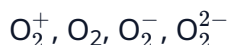
[Step-by-step solution](#) > [prepwiser.in/questions/yghKOaIGq-](https://www.prepwiser.in/questions/yghKOaIGq-)Asked 2 times: 31 Aug 2021 S1, **30 Jun 2022 S1 (printed)**

A coil of n number of turns wound tightly in the form of a spiral with inner and outer radii r_1 and r_2 respectively. When a current of strength I is passed through the coil, the magnetic field at its centre will be:

- (A) $\frac{\mu_0 n I}{2(r_2 - r_1)}$ (B) $\frac{\mu_0 n I}{r_2}$ (C) $\frac{\mu_0 n I}{r_2 - r_1} \log_e \frac{r_1}{r_2}$ (D) $\frac{\mu_0 n I}{2(r_2 - r_1)} \log_e \frac{r_2}{r_1}$

Asked 2 times: 25 Jul 2021 S2, 26 Jun 2022 S1 (printed)

Consider the ions/molecule



For increasing bond order the correct option is:

- (A) $O_2^{2-} < O_2^- < O_2 < O_2^+$ (B) $O_2^- < O_2^{2-} < O_2 < O_2^+$ (C) $O_2^- < O_2^{2-} < O_2^+ < O_2$ (D) $O_2^- < O_2^+ < O_2^{2-} < O_2$

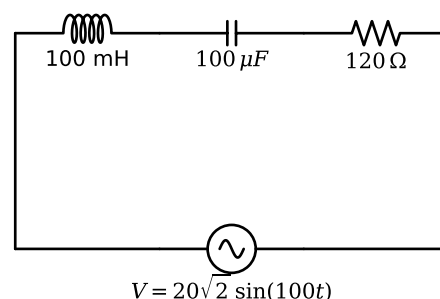
Asked 2 times: 4 Sep 2020 S1, 25 Jul 2022 S2 (printed)

A block of ice of mass 120 g at temperature 0°C is put in 300 g of water at 25°C . The x g of ice melts as the temperature of the water reaches 0°C . The value of x is _____.

[Use specific heat capacity of water = $4200 \text{ J kg}^{-1} \text{ K}^{-1}$, Latent heat of ice = $3.5 \times 10^5 \text{ J kg}^{-1}$]

Asked 2 times: 3 Sep 2020 S1, 28 Jun 2022 S1 (printed)

An AC source is connected to an inductance of 100 mH, a capacitance of $100 \mu\text{F}$ and a resistance of 120Ω as shown in figure. The time in which the resistance having a thermal capacity $2 \text{ J}^\circ\text{C}$ will get heated by 16°C is _____ s.



Asked 2 times: 18 Mar 2021 S2, 27 Jun 2022 S1 (printed)

The area of cross-section of a large tank is 0.5 m^2 . It has a narrow opening near the bottom having area of cross-section 1 cm^2 . A load of 25 kg is applied on the water at the top in the tank. Neglecting the speed of water in the tank, the velocity of the water, coming out of the opening at the time when the height of water level in the tank is 40 cm above the bottom, will be _____ cm s^{-1} . [Take $g = 10 \text{ ms}^{-2}$]

Asked 2 times: 26 Aug 2021 S1, 26 Jun 2022 S2 (printed)

A ball is projected vertically upward with an initial velocity of 50 ms^{-1} at $t = 0 \text{ s}$. At $t = 2 \text{ s}$, another ball is projected vertically upward with same velocity. At $t =$ _____ s, second ball will meet the first ball ($g = 10 \text{ ms}^{-2}$).

Asked 2 times: 22 Jul 2021 S2, 29 Jun 2022 S1 (printed)

The intensity of the light from a bulb incident on a surface is 0.22 W/m^2 . The amplitude of the magnetic field in this light-wave is _____ $\times 10^{-9} \text{ T}$.

(Given : Permittivity of vacuum $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 \text{ N}^{-1} \text{ m}^{-2}$, speed of light in vacuum $c = 3 \times 10^8 \text{ ms}^{-1}$)

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Q493 Chemistry · Qualitative Analysis: Salt Analysis **Asked 2×**

[Step-by-step solution](#) > [prepwise.in/questions/3drfWl6c0s](https://www.prepwise.in/questions/3drfWl6c0s)

Asked 2 times: 27 Aug 2021 S1, **27 Jul 2022 S2 (printed)**

Fe^{3+} cation gives a prussian blue precipitate on addition of potassium ferrocyanide solution due to the formation of:

- (A) $[\text{Fe}(\text{H}_2\text{O})_6]_2 [\text{Fe}(\text{CN})_6]$ (B) $\text{Fe}_2 [\text{Fe}(\text{CN})_6]_2$
(C) $\text{Fe}_3 [\text{Fe}(\text{OH})_2(\text{CN})_4]_2$ (D) $\text{Fe}_4 [\text{Fe}(\text{CN})_6]_3$

Q494 Chemistry · Periodic Table & Periodicity **Asked 2×**

[Step-by-step solution](#) > [prepwise.in/questions/Bt8VL6Y7jx](https://www.prepwise.in/questions/Bt8VL6Y7jx)

Asked 2 times: 4 Sep 2020 S1, **27 Jun 2022 S2 (printed)**

The correct order of increasing ionic radii is

- (A) $\text{Mg}^{2+} < \text{Na}^+ < \text{F}^- < \text{O}^{2-} < \text{N}^{3-}$ (B) $\text{N}^{3-} < \text{O}^{2-} < \text{F}^- < \text{Na}^+ < \text{Mg}^{2+}$
(C) $\text{F}^- < \text{Na}^+ < \text{O}^{2-} < \text{Mg}^{2+} < \text{N}^{3-}$ (D) $\text{Na}^+ < \text{F}^- < \text{Mg}^{2+} < \text{O}^{2-} < \text{N}^{3-}$

Q495 Chemistry · Redox Reactions **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > [prepwise.in/questions/4l0G5BXpzP](https://www.prepwise.in/questions/4l0G5BXpzP)

Asked 2 times: 17 Mar 2021 S1, **27 Jul 2022 S1 (printed)**

20mL of 0.02 M $\text{K}_2\text{Cr}_2\text{O}_7$ solution is used for the titration of 10mL of Fe^{2+} solution in the acidic medium.

The molarity of Fe^{2+} solution is _____ $\times 10^{-2}$ M. (Nearest Integer)

Q496 Mathematics · Applications of Derivatives **Asked 2×**

[Step-by-step solution](#) > [prepwise.in/questions/nyFKIInFHc](https://www.prepwise.in/questions/nyFKIInFHc)

Asked 2 times: 27 Aug 2021 S1, **24 Jun 2022 S2 (printed)**

The number of distinct real roots of the equation

$$x^7 - 7x - 2 = 0 \text{ is}$$

- (A) 5 (B) 7 (C) 1 (D) 3

Q497 Physics · Thermodynamics **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > [prepwise.in/questions/WmapWpEXNx](https://www.prepwise.in/questions/WmapWpEXNx)

Asked 2 times: 26 Feb 2021 S2, **24 Jun 2022 S2 (printed)**

A monoatomic gas performs a work of $\frac{Q}{4}$ where Q is the heat supplied to it. The molar heat capacity of the gas will be _____ R during this transformation. Where R is the gas constant.

Q498 Chemistry · Electrochemistry **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > [prepwise.in/questions/cYUXGoG-C7](https://www.prepwise.in/questions/cYUXGoG-C7)

Asked 2 times: 1 Sep 2021 S2, **24 Jun 2022 S2 (printed)**

The resistance of a conductivity cell containing 0.01 M KCl solution at 298 K is 1750 Ω . If the conductivity of 0.01 M KCl solution at 298 K is $0.152 \times 10^{-3} \text{ S cm}^{-1}$, then the cell constant of the conductivity cell is _____ $\times 10^{-3} \text{ cm}^{-1}$.

Q499 Mathematics · Circles **Asked 2×** **NUMERICAL**

[Step-by-step solution](#) > [prepwise.in/questions/DKCbTQWP5J](https://www.prepwise.in/questions/DKCbTQWP5J)

Asked 2 times: 24 Feb 2021 S1, **28 Jun 2022 S2 (printed)**

If one of the diameters of the circle $x^2 + y^2 - 2\sqrt{2}x - 6\sqrt{2}y + 14 = 0$ is a chord of the circle $(x - 2\sqrt{2})^2 + (y - 2\sqrt{2})^2 = r^2$, then the value of r^2 is equal to _____.

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Q500 Mathematics · Probability: Advanced **Asked 2×**[Step-by-step solution](#) · [prepwiser.in/questions/wk_hv6zmg3](#)Asked 2 times: 27 Aug 2021 S2, **24 Jun 2022 S2 (printed)**A random variable X has the following probability distribution:

X	0	1	2	3	4
$P(X)$	k	$2k$	$4k$	$6k$	$8k$

The value of $P(1 < X < 4 \mid X \leq 2)$ is equal to:

(A) $\frac{4}{7}$

(B) $\frac{2}{3}$

(C) $\frac{3}{7}$

(D) $\frac{4}{5}$

Q501 Physics · Elasticity **Asked 2×** **NUMERICAL**[Step-by-step solution](#) · [prepwiser.in/questions/C1TZ2iHlwU](#)Asked 2 times: 7 Jan 2020 S1, **29 Jul 2022 S2 (printed)**

The speed of a transverse wave passing through a string of length 50cm and mass 10g is 60ms^{-1} . The area of cross-section of the wire is 2.0mm^2 and its Young's modulus is $1.2 \times 10^{11}\text{Nm}^{-2}$. The extension of the wire over its natural length due to its tension will be $x \times 10^{-5}\text{m}$. The value of x is _____.

Q502 Mathematics · Matrices **Asked 2×** **NUMERICAL**[Step-by-step solution](#) · [prepwiser.in/questions/kbH7ZKEKYO](#)Asked 2 times: 8 Jan 2020 S1, **27 Jul 2022 S1 (printed)**

Let S be the set containing all 3×3 matrices with entries from $\{-1, 0, 1\}$. The total number of matrices $A \in S$ such that the sum of all the diagonal elements of $A^T A$ is 6 is _____.

Q503 Mathematics · Inverse Trigonometric Functions **Asked 2×**[Step-by-step solution](#) · [prepwiser.in/questions/UX94D_ej-c](#)Asked 2 times: 24 Feb 2021 S1, **28 Jun 2022 S2 (printed)**

The value of

$$\lim_{n \rightarrow \infty} 6 \tan \left\{ \sum_{r=1}^n \tan^{-1} \left(\frac{1}{r^2 + 3r + 3} \right) \right\}$$

is equal to:

(A) 1

(B) 2

(C) 3

(D) 6

Q504 Physics · Thermodynamics **Asked 2×** **NUMERICAL**[Step-by-step solution](#) · [prepwiser.in/questions/4kjinZj_bFy](#)Asked 2 times: 27 Aug 2021 S2, **26 Jun 2022 S2 (printed)**

A heat engine operates with the cold reservoir at temperature 324 K. The minimum temperature of the hot reservoir, if the heat engine takes 300 J heat from the hot reservoir and delivers 180 J heat to the cold reservoir per cycle, is _____ K.

Q505 Mathematics · Applications of Derivatives **Asked 2×** **NUMERICAL**[Step-by-step solution](#) · [prepwiser.in/questions/kOeNsZXk05](#)Asked 2 times: 25 Jun 2022 S2, **27 Jul 2022 S2 (printed)**

A water tank has the shape of a right circular cone with axis vertical and vertex downwards. Its semi-vertical angle is $\tan^{-1} \frac{3}{4}$. Water is poured in it at a constant rate of 6 cubic meter per hour. The rate (in square meter per hour), at which the wet curved surface area of the tank is increasing, when the depth of water in the tank is 4 meters, is _____.

Q506 Physics · Current Electricity **Asked 2×** **NUMERICAL**[Step-by-step solution](#) · [prepwiser.in/questions/vcBI4e3IIu](#)Asked 2 times: 27 Jun 2022 S1, **27 Jun 2022 S2 (printed)**

The current density in a cylindrical wire of radius $r = 4.0\text{ mm}$ is $1.0 \times 10^6\text{ A/m}^2$. The current through the outer portion of the wire between radial distances $\frac{r}{2}$ and r is $x\pi\text{ A}$; where x is _____.

Q507 Physics · Wave Optics **Asked 2×** NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/xhlvoeSm0n](https://www.prepwiser.in/questions/xhlvoeSm0n)

Asked 2 times: 25 Jun 2022 S1, **27 Jul 2022 S1 (printed)**

Two beams of light having intensities I and $4I$ interfere to produce a fringe pattern on a screen. The phase difference between the two beams are $\pi/2$ and $\pi/3$ at points A and B respectively. The difference between the resultant intensities at the two points is xI . The value of x will be _____.

Q508 Chemistry · Chemical Equilibrium **Asked 2×** NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/Ycj_IJ421M](https://www.prepwiser.in/questions/Ycj_IJ421M)

Asked 2 times: 24 Jun 2022 S1, **25 Jun 2022 S1 (printed)**

The standard free energy change (ΔG°) for 50% dissociation of N_2O_4 into NO_2 at $27^\circ C$ and 1 atm pressure is $-x \text{ J mol}^{-1}$. The value of x is _____. (Nearest Integer)

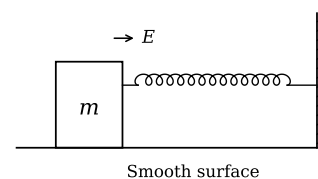
[Given : $R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$, $\log 1.33 = 0.1239$ $\ln 10 = 2.3$]

Q509 Physics · Work, Energy & Power **Asked 2×** NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/kg4kt4_Y0a](https://www.prepwiser.in/questions/kg4kt4_Y0a)

Asked 2 times: 25 Jun 2022 S1, **28 Jul 2022 S1 (printed)**

A block of mass ' m ' (as shown in figure) moving with kinetic energy E compresses a spring through a distance 25cm when, its speed is halved. The value of spring constant of used spring will be $nE \text{ Nm}^{-1}$ for $n =$ _____.



Q510 Mathematics · Area Under Curves **Asked 2×**

[Step-by-step solution](#) > [prepwiser.in/questions/UxxvYtWLjZ](https://www.prepwiser.in/questions/UxxvYtWLjZ)

Asked 2 times: 26 Jun 2022 S1, **26 Jul 2022 S2 (printed)**

The area bounded by the curves $y = |x^2 - 1|$ and $y = 1$ is

- (A) $\frac{2}{3}(\sqrt{2} + 1)$ (B) $\frac{4}{3}(\sqrt{2} - 1)$ (C) $2(\sqrt{2} - 1)$ (D) $\frac{8}{3}(\sqrt{2} - 1)$

Q511 Physics · Work, Energy & Power **Asked 2×**

[Step-by-step solution](#) > [prepwiser.in/questions/_NFgKKd_8I](https://www.prepwiser.in/questions/_NFgKKd_8I)

Asked 2 times: 30 Jun 2022 S1, **26 Jul 2022 S2 (printed)**

A body of mass 8kg and another of mass 2kg are moving with equal kinetic energy. The ratio of their respective momentum will be:

- (A) 1 : 1 (B) 2 : 1 (C) 1 : 4 (D) 4 : 1

Q512 Physics · Mechanical Waves **Asked 2×**

[Step-by-step solution](#) > [prepwiser.in/questions/muFzmEt6yo](https://www.prepwiser.in/questions/muFzmEt6yo)

Asked 2 times: 29 Jun 2022 S1, **26 Jul 2022 S2 (printed)**

A transverse wave is represented by $y = 2 \sin(\omega t - kx) \text{ cm}$. The value of wavelength (in cm) for which the wave velocity becomes equal to the maximum particle velocity, will be:

- (A) 4π (B) 2π (C) π (D) 2

Q513 Physics · Current Electricity **Asked 2×** NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/P_7gsgqnvD](https://www.prepwiser.in/questions/P_7gsgqnvD)

Asked 2 times: 24 Jun 2022 S1, **25 Jul 2022 S2 (printed)**

In a potentiometer arrangement, a cell of emf 1.20 V gives a balance point at 36 cm length of wire. This cell is now replaced by another cell of emf 1.80 V . The difference in balancing length of potentiometer wire in above conditions will be _____ cm .

Practise these online with step-by-step solutions > [prepwiser.in/learn](https://www.prepwiser.in/learn)

Asked 2 times: 29 Jun 2022 S2, 26 Jul 2022 S2 (printed)

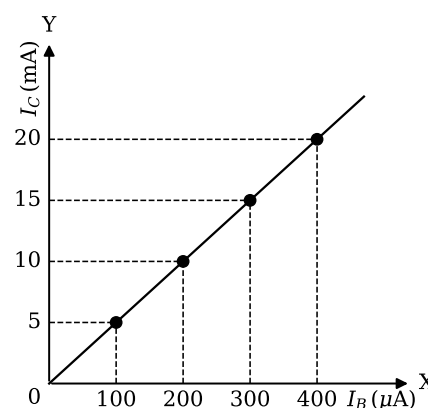
The elevation in boiling point for 1 molal solution of non-volatile solute A is $3K$. The depression in freezing point for 2 molal solution of A in the same solvent is $6K$. The ratio of K_b and K_f i.e., K_b/K_f is $1 : X$. The value of X is [nearest integer]

Asked 2 times: 25 Jun 2022 S2, 25 Jul 2022 S1 (printed)

The half life for the decomposition of gaseous compound A is 240s when the gaseous pressure was 500 Torr initially. When the pressure was 250 Torr, the half life was found to be 4.0 min. The order of the reaction is _____. (Nearest integer)

Asked 2 times: 25 Jun 2022 S2, 26 Jul 2022 S2 (printed)

The typical transfer characteristics of a transistor in CE configuration is shown in figure. A load resistor of $2k\Omega$ is connected in the collector branch of the circuit used. The input resistance of the transistor is $0.50k\Omega$. The voltage gain of the transistor is _____.



Asked 2 times: 24 Jun 2022 S2, 30 Jun 2022 S1 (printed)

100 mL of 0.3 M acetic acid is shaken with 0.8 g of wood charcoal. The final concentration of acetic acid in the solution after adsorption is 0.125 M. The mass of acetic acid adsorbed per gram of carbon is _____ $\times 10^{-4}$ g.

(Given : Molar mass of acetic acid = 60 g mol^{-1})

Asked 2 times: 29 Jun 2022 S1, 27 Jul 2022 S2 (printed)

The activity of a radioactive material is 6.4×10^{-4} curie. Its half life is 5 days. The activity will become 5×10^{-6} curie after:

(A) 7 days

(B) 15 days

(C) 25 days

(D) 35 days

Asked 2 times: 25 Jul 2022 S2, 29 Jul 2022 S1 (printed)

Find the ratio of energies of photons produced due to transition of an electron of hydrogen atom from its (i) second permitted energy level to the first level, and (ii) the highest permitted energy level to the first permitted level.

(A) 3 : 4

(B) 4 : 3

(C) 1 : 4

(D) 4 : 1

Q520 Mathematics · Quadratic Equations & Polynomial Inequalities**Asked 2×****NUMERICAL**[Step-by-step solution](https://www.prepwiser.in/questions/hUU0YJ_OvQ) > prepwiser.in/questions/hUU0YJ_OvQAsked 2 times: 4 Sep 2020 S2, **26 Aug 2021 S2 (printed)**

Let $\lambda \neq 0$ be in $\mathbb{R}$. If α and β are the roots of the equation $x^2 - x + 2\lambda = 0$, and α and γ are the roots of equation $3x^2 - 10x + 27\lambda = 0$, then $\frac{\beta\gamma}{\lambda}$ is equal to _____.

Q521 Mathematics · Applications of Derivatives**Asked 2×****NUMERICAL**[Step-by-step solution](https://www.prepwiser.in/questions/Ncls9izpMJ) > prepwiser.in/questions/Ncls9izpMJAsked 2 times: 8 Jan 2020 S2, **31 Aug 2021 S2 (printed)**

Let $f(x)$ be a cubic polynomial with $f(1) = -10$, $f(-1) = 6$, and has a local minima at $x = 1$, and $f'(x)$ has a local minima at $x = -1$. Then $f(3)$ is equal to _____.

Q522 Physics · Gravitation**Asked 2×**[Step-by-step solution](https://www.prepwiser.in/questions/GspAKADBBP) > prepwiser.in/questions/GspAKADBBPAsked 2 times: 7 Jan 2020 S2, **24 Feb 2021 S2 (printed)**

A body weights 49N on a spring balance at the north pole. What will be its weight recorded on the same weighing machine, if it is shifted to the equator?

[Use $g = \frac{GM}{R^2} = 9.8 \text{ ms}^{-2}$ and radius of earth, $R = 6400 \text{ km}$.]

(A) 49 N**(B)** 49.83 N**(C)** 48.83 N**(D)** 49.17 N**Q523** Mathematics · Sequences & Series**Asked 2×**[Step-by-step solution](https://www.prepwiser.in/questions/NzB9ENVtul) > prepwiser.in/questions/NzB9ENVtulAsked 2 times: 5 Sep 2020 S2, **20 Jul 2021 S2 (printed)**

If sum of the first 21 terms of the series $\log_{9^{1/2}} x + \log_{9^{1/3}} x + \log_{9^{1/4}} x + \dots$, where $x > 0$ is 504, then x is equal to

(A) 243**(B)** 9**(C)** 7**(D)** 81**Q524** Physics · Dual Nature of Radiation & Matter**Asked 2×**[Step-by-step solution](https://www.prepwiser.in/questions/ov8pqD2tMs) > prepwiser.in/questions/ov8pqD2tMsAsked 2 times: 9 Jan 2020 S1, **20 Jul 2021 S1 (printed)**

The radiation corresponding to $3 \rightarrow 2$ transition of a hydrogen atom falls on a gold surface to generate photoelectrons. The electrons are passed through a magnetic field of $5 \times 10^{-4} \text{ T}$. Assume that the radius of the largest circular path followed by these electrons is 7 mm, the work function of the metal is : (Mass of electron = $9.1 \times 10^{-31} \text{ kg}$)

(A) 1.36 eV**(B)** 1.88 eV**(C)** 0.82 eV**(D)** 0.16 eV**Q525** Chemistry · Electrochemistry**Asked 2×****NUMERICAL**[Step-by-step solution](https://www.prepwiser.in/questions/6OZpAy4xaC) > prepwiser.in/questions/6OZpAy4xaCAsked 2 times: 6 Sep 2020 S1, **20 Jul 2021 S2 (printed)**

Potassium chlorate is prepared by electrolysis of KCl in basic solution as shown by following equation.



A current of $x\text{A}$ has to be passed for 10h to produce 10.0g of potassium chlorate. The value of x is _____. (Nearest integer)

(Molar mass of $\text{KClO}_3 = 122.6 \text{ g mol}^{-1}$, $F = 96500 \text{ C}$)

Q526 Mathematics · Complex Numbers**Asked 2×****NUMERICAL**[Step-by-step solution](https://www.prepwiser.in/questions/SkRB1rUryF) > prepwiser.in/questions/SkRB1rUryFAsked 2 times: 3 Sep 2020 S2, **27 Aug 2021 S2 (printed)**

Let z_1 and z_2 be two complex numbers such that $\arg(z_1 - z_2) = \frac{\pi}{4}$ and z_1, z_2 satisfy the equation $|z - 3| = \text{Re}(z)$. Then the imaginary part of $z_1 + z_2$ is equal to _____.

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Q527

Mathematics · Three Dimensional Geometry

Asked 2×

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/st8MkYD4up](https://www.prepwiser.in/questions/st8MkYD4up)

Asked 2 times: 24 Feb 2021 S1, 31 Aug 2021 S1 (printed)

The square of the distance of the point of intersection

of the line $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z+1}{6}$ and the plane $2x - y + z = 6$ from the point $(-1, -1, 2)$ is _____.

Q528

Physics · Semiconductors & Electronic Devices

Asked 2×

[Step-by-step solution](#) > [prepwiser.in/questions/KX-yB_S53](https://www.prepwiser.in/questions/KX-yB_S53)

Asked 2 times: 18 Mar 2021 S2, 27 Aug 2021 S2 (printed)

For a transistor α and β are given as $\alpha = \frac{I_C}{I_E}$ and $\beta = \frac{I_C}{I_B}$. Then the correct relation between α and β will be:

(A) $\alpha = \frac{1-\beta}{\beta}$

(B) $\beta = \frac{\alpha}{1-\alpha}$

(C) $\alpha\beta = 1$

(D) $\alpha = \frac{\beta}{1-\beta}$

Q529

Physics · Circular Motion

Asked 2×

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/KJUEuKn8Tj](https://www.prepwiser.in/questions/KJUEuKn8Tj)

Asked 2 times: 17 Mar 2021 S1, 20 Jul 2021 S2 (printed)

A body rotating with an angular speed of 600 rpm is uniformly accelerated to 1800 rpm in 10 sec. The number of rotations made in the process is _____.

Q530

Mathematics · Vectors

Asked 2×

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/oMWabdGIff](https://www.prepwiser.in/questions/oMWabdGIff)

Asked 2 times: 17 Mar 2021 S2, 1 Sep 2021 S2 (printed)

Let $\vec{a} = 2\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} - \hat{k}$. Let a vector $\vec{v}$ be in the plane containing $\vec{a}$ and $\vec{b}$. If $\vec{v}$ is perpendicular to the vector $3\hat{i} + 2\hat{j} - \hat{k}$ and its projection on $\vec{a}$ is 19 units, then $|2\vec{v}|^2$ is equal to _____.

Q531

Physics · Dual Nature of Radiation & Matter

Asked 2×

[Step-by-step solution](#) > [prepwiser.in/questions/dM3nQEpbFe](https://www.prepwiser.in/questions/dM3nQEpbFe)

Asked 2 times: 16 Mar 2021 S2, 22 Jul 2021 S2 (printed)

An electron of mass m_e and a proton of mass m_p are accelerated through the same potential difference. The ratio of the de-Broglie wavelength associated with the electron to that with the proton is

(A) $\frac{m_e}{m_p}$

(B) 1

(C) $\frac{m_p}{m_e}$

(D) $\sqrt{\frac{m_p}{m_e}}$

Q532

Mathematics · Three Dimensional Geometry

Asked 2×

[Step-by-step solution](#) > [prepwiser.in/questions/z_utbz3HjO](https://www.prepwiser.in/questions/z_utbz3HjO)

Asked 2 times: 26 Feb 2021 S2, 22 Jul 2021 S2 (printed)

Let L be the line of intersection of planes $\vec{r} \cdot (\hat{i} - \hat{j} + 2\hat{k}) = 2$ and $\vec{r} \cdot (2\hat{i} + \hat{j} - \hat{k}) = 2$. If $P(\alpha, \beta, \gamma)$ is the foot of perpendicular on L from the point $(1, 2, 0)$, then the value of $35(\alpha + \beta + \gamma)$ is equal to:

(A) 101

(B) 119

(C) 143

(D) 134

Q533

Physics · Simple Harmonic Motion

Asked 2×

NUMERICAL

[Step-by-step solution](#) > [prepwiser.in/questions/GtGEiQTt6q](https://www.prepwiser.in/questions/GtGEiQTt6q)

Asked 2 times: 26 Aug 2021 S2, 27 Aug 2021 S2 (printed)

Two simple harmonic motion, are represented by the equations $y_1 = 10 \sin(3\pi t + \frac{\pi}{3})$ $y_2 = 5(\sin 3\pi t + \sqrt{3} \cos 3\pi t)$ Ratio of amplitude of y_1 to $y_2 = x : 1$. The value of x is _____.[Practise these online with step-by-step solutions](#) > [prepwiser.in/learn](https://www.prepwiser.in/learn)

Q534 Mathematics · Vectors **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › [prepwise.in/questions/ackzj_aPjr](#)Asked 2 times: 17 Mar 2021 S1, **27 Jul 2021 S2 (printed)**

Let $\vec{a} = \hat{i} - \alpha\hat{j} + \beta\hat{k}$, $\vec{b} = 3\hat{i} + \beta\hat{j} - \alpha\hat{k}$ and $\vec{c} = -\alpha\hat{i} - 2\hat{j} + \hat{k}$, where α and β are integers. If $\vec{a} \cdot \vec{b} = -1$ and $\vec{b} \cdot \vec{c} = 10$, then

$$(\vec{a} \times \vec{b}) \cdot \vec{c}$$

is equal to _____.

Q535 Mathematics · Vectors **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/5ss6Th0djt](#)Asked 2 times: 18 Mar 2021 S2, **20 Jul 2021 S2 (printed)**

In a triangle ABC, if $|\vec{BC}| = 3$, $|\vec{CA}| = 5$ and $|\vec{BA}| = 7$, then the projection of the vector $\vec{BA}$ on $\vec{BC}$ is equal to:

- (A) $\frac{19}{2}$ (B) $\frac{13}{2}$ (C) $\frac{11}{2}$ (D) $\frac{15}{2}$

Q536 Chemistry · Chemical Kinetics **Asked 2×** **NUMERICAL**[Step-by-step solution](#) › [prepwise.in/questions/SUL84WqXOq](#)Asked 2 times: 20 Jul 2021 S2, **22 Jul 2021 S2 (printed)**

In the above first order reaction the initial concentration of N_2O_5 is $2.40 \times 10^{-2} \text{ mol L}^{-1}$ at 318 K. The concentration of N_2O_5 after 1 hour was $1.60 \times 10^{-2} \text{ mol L}^{-1}$. The rate constant of the reaction at 318 K is _____ $\times 10^{-3} \text{ min}^{-1}$. (Nearest integer)

[Given : $\log 3 = 0.477$, $\log 5 = 0.699$]**Q537** Mathematics · Complex Numbers **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/80gQ5tDwCk](#)Asked 2 times: 26 Feb 2021 S2, **27 Jul 2021 S2 (printed)**

Let C be the set of all complex numbers. Let

$$S_1 = \{z \in C : |z - 2| \leq 1\} \text{ and}$$

$$S_2 = \{z \in C : z(1 + i) + \bar{z}(1 - i) \geq 4\}.$$

Then, the maximum value of $|z - \frac{5}{2}|^2$ for $z \in S_1 \cap S_2$ is equal to:

- (A) $\frac{3 + 2\sqrt{2}}{4}$ (B) $\frac{5 + 2\sqrt{2}}{2}$ (C) $\frac{3 + 2\sqrt{2}}{2}$ (D) $\frac{5 + 2\sqrt{2}}{4}$

Q538 Chemistry · Nuclear & Radiochemistry **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/9E-DmN3oqq](#)Asked 2 times: 26 Feb 2021 S2, **22 Jul 2021 S2 (printed)**

Isotope(s) of hydrogen which emits low energy β^- particles with $t_{1/2}$ value > 12 years is/are

- (A) Protium (B) Tritium
(C) Deuterium (D) Deuterium and Tritium

Q539 Physics · Current Electricity **Asked 2×**[Step-by-step solution](#) › [prepwise.in/questions/6DNrQzkIym](#)Asked 2 times: 25 Jul 2021 S1, **26 Aug 2021 S2 (printed)**

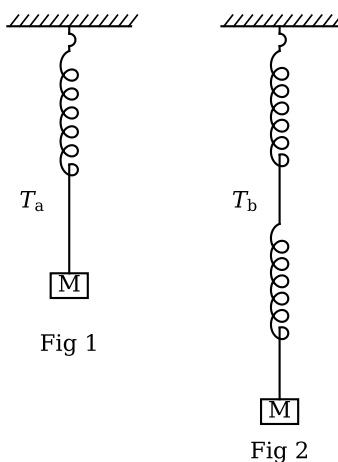
An electric bulb of 500 watt at 100 volt is used in a circuit having a 200 V supply. Calculate the resistance R to be connected in series with the bulb so that the power delivered by the bulb is 500 W.

- (A) 20Ω (B) 30Ω (C) 5Ω (D) 10Ω

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Asked 2 times: 26 Feb 2021 S1, **17 Mar 2021 S1** (printed)

Consider two identical springs each of spring constant k and negligible mass compared to the mass M as shown. Fig. 1 shows one of them and Fig. 2 shows their series combination. The ratios of time period of oscillation of the two SHM is $T_b/T_a = \sqrt{x}$, where value of x is _____. (Round off to the Nearest Integer)



Asked 2 times: 16 Mar 2021 S1, **22 Jul 2021 S2** (printed)

Which one of the following group-15 hydride is the strongest reducing agent?

- (A) AsH_3 (B) BiH_3 (C) PH_3 (D) SbH_3

Asked 2 times: 16 Mar 2021 S1, **20 Jul 2021 S2** (printed)

A series LCR circuit of $R = 5\Omega$, $L = 20 \text{ mH}$ and $C = 0.5 \mu\text{F}$ is connected across an AC supply of 250 V , having variable frequency. The power dissipated at resonance condition is _____ $\times 10^2 \text{ W}$.

Asked 2 times: 16 Mar 2021 S2, **25 Jul 2021 S1** (printed)

The half-life of ^{198}Au is 3 days. If atomic weight of ^{198}Au is 198 g/mol then the activity of 2 mg of ^{198}Au is [in disintegration/second]:

- (A) 2.67×10^{12} (B) 6.06×10^{18} (C) 32.36×10^{12} (D) 16.18×10^{12}

Asked 2 times: 24 Feb 2021 S1, **17 Mar 2021 S1** (printed)

Let there be three independent events E_1 , E_2 and E_3 . The probability that only E_1 occurs is α , only E_2 occurs is β and only E_3 occurs is γ . Let 'p' denote the probability of none of events occurs that satisfies the equations

$(\alpha - 2\beta)p = \alpha\beta$ and $(\beta - 3\gamma)p = 2\beta\gamma$. All the given probabilities are assumed to lie in the interval $(0, 1)$. Then,

$$\frac{\text{Probability of occurrence of } E_1}{\text{Probability of occurrence of } E_3}$$

is equal to _____.

Asked 2 times: 27 Jul 2021 S2, 27 Aug 2021 S1 (printed)

200 mL of 0.2 M HCl is mixed with 300 mL of 0.1 M NaOH. The molar heat of neutralization of this reaction is -57.1 kJ. The increase in temperature in $^{\circ}\text{C}$ of the system on mixing is $x \times 10^{-2}$. The value of x is _____. (Nearest integer)

[Given : Specific heat of water = $4.18 \text{ J g}^{-1} \text{ K}^{-1}$, Density of water = 1.00 g cm^{-3}]

[Assume no volume change on mixing]

Asked 2 times: 31 Aug 2021 S1, 31 Aug 2021 S2 (printed)

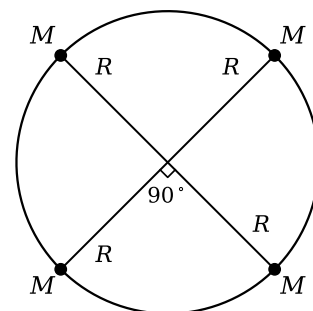
A block moving horizontally on a smooth surface with a speed of 40 m/s splits into two parts with masses in the ratio of $1 : 2$. If the smaller part moves at 60 m/s in the same direction, then the fractional change in kinetic energy is :-

- (A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{1}{8}$ (D) $\frac{1}{4}$

Asked 2 times: 24 Feb 2021 S1, 1 Sep 2021 S2 (printed)

Four particles each of mass M , move along a circle of radius R under the action of their mutual gravitational attraction as shown in figure. The speed of each particle is:

- (A) $\frac{1}{2} \sqrt{\frac{GM}{R(2\sqrt{2} + 1)}}$ (B) $\frac{1}{2} \sqrt{\frac{GM}{R}(2\sqrt{2} + 1)}$
 (C) $\frac{1}{2} \sqrt{\frac{GM}{R}(2\sqrt{2} - 1)}$ (D) $\sqrt{\frac{GM}{R}}$



Asked 2 times: 17 Mar 2021 S2, 27 Aug 2021 S1 (printed)

$\sum_{k=0}^{20} \binom{20}{k}^2$ is equal to:

- (A) ${}^{40}C_{21}$ (B) ${}^{40}C_{19}$ (C) ${}^{40}C_{20}$ (D) ${}^{41}C_{20}$

Asked 2 times: 5 Sep 2020 S1 (printed), 6 Sep 2020 S2

A square loop of side $2a$, and carrying current I , is kept in XZ plane with its centre at origin. A long wire carrying the same current I is placed parallel to the z -axis and passing through the point $(0, b, 0)$, ($b \gg a$). The magnitude of the torque on the loop about z -axis is given by:

- (A) $\frac{2\mu_0 I^2 a^2}{\pi b}$ (B) $\frac{\mu_0 I^2 a^2}{2\pi b}$ (C) $\frac{\mu_0 I^2 a^3}{2\pi b^2}$ (D) $\frac{2\mu_0 I^2 a^3}{\pi b^2}$

Answer key: the 549 most repeated JEE Main questions

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Numbers match the question numbers above. For full working, open the solution link at the top right of each question.

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1. C	2. A	3. C	4. B	5. C	6. B	7. A	8. C
9. A	10. C	11. A	12. A	13. 435	14. B	15. D	16. B
17. D	18. 15	19. B	20. D	21. D	22. D	23. C	24. C
25. 24	26. C	27. B	28. A	29. B	30. A	31. 3	32. D
33. A	34. 200	35. A	36. D	37. D	38. B	39. 350	40. A
41. A	42. 264	43. 125	44. A	45. A	46. C	47. B	48. B
49. 12	50. 1	51. A	52. 2	53. 5	54. 15	55. A	56. 72
57. C	58. 23	59. 2	60. B	61. B	62. 16	63. B	64. A
65. C	66. A	67. B	68. 340	69. 87	70. A	71. A	72. C
73. B	74. 228	75. B	76. D	77. D	78. B	79. C	80. D
81. 160	82. D	83. D	84. B	85. C	86. C	87. B	88. C
89. D	90. B	91. A	92. B	93. B	94. C	95. B	96. B
97. C	98. C	99. C	100. A	101. B	102. D	103. B	104. C
105. A	106. A	107. D	108. D	109. D	110. A	111. B	112. 53
113. C	114. C	115. A	116. A	117. 2	118. B	119. B	120. 7
121. C	122. C	123. B	124. C	125. A	126. B	127. 71	128. C
129. C	130. 1	131. A	132. D	133. D	134. B	135. 300	136. 3000
137. 5	138. D	139. D	140. D	141. C	142. A	143. 32	144. 828
145. D	146. A	147. 10	148. 3	149. 2	150. C	151. D	152. 1
153. B	154. A	155. 100	156. A	157. C	158. 600	159. 12	160. A
161. 1126	162. 64	163. C	164. 312	165. 265	166. B	167. C	168. D
169. B	170. A	171. C	172. D	173. A	174. 232	175. D	176. B
177. B	178. D	179. D	180. 200	181. A	182. D	183. 3730	184. B
185. B	186. 13	187. D	188. B	189. C	190. 50	191. 4	192. C
193. B	194. A	195. A	196. D	197. B	198. B	199. 57	200. D
201. C	202. C	203. C	204. A	205. B	206. 16	207. D	208. 429
209. 6	210. B	211. C	212. A	213. C	214. C	215. D	216. D
217. B	218. 11304	219. A	220. D	221. 19	222. 3	223. B	224. 300
225. 2	226. D	227. B	228. 5	229. 420	230. A	231. 3	232. B
233. 8	234. B	235. C	236. D	237. A	238. C	239. B	240. D
241. C	242. 4	243. B	244. C	245. 2190	246. 12	247. A	248. C
249. 27	250. C	251. B	252. A	253. 9	254. A	255. B	256. C
257. 45	258. 1	259. D	260. B	261. 466	262. D	263. 15	264. A
265. C	266. B	267. C	268. C	269. 7	270. C	271. B	272. D
273. C	274. C	275. B	276. D	277. B	278. A	279. C	280. B
281. D	282. 48	283. 9	284. D	285. D	286. A	287. A	288. 48
289. A	290. 8	291. A	292. 8788	293. B	294. D	295. 9	296. C

297.	2	298.	B	299.	3	300.	236	301.	4	302.	A	303.	D	304.	3
305.	A	306.	3734	307.	B	308.	C	309.	D	310.	A	311.	B	312.	C
313.	74	314.	17	315.	D	316.	32	317.	C	318.	B	319.	6	320.	6
321.	C	322.	B	323.	18	324.	C	325.	B	326.	24	327.	164	328.	D
329.	3	330.	10	331.	D	332.	C	333.	A	334.	B	335.	D	336.	D
337.	494	338.	C	339.	C	340.	A	341.	B	342.	6699	343.	A	344.	B
345.	12	346.	B	347.	C	348.	B	349.	C	350.	B	351.	A	352.	D
353.	13	354.	22	355.	D	356.	B	357.	48	358.	B	359.	18	360.	52
361.	D	362.	A	363.	12	364.	8	365.	200	366.	C	367.	160	368.	A
369.	3	370.	6	371.	C	372.	C	373.	A	374.	C	375.	B	376.	B
377.	A	378.	C	379.	36	380.	360	381.	62250	382.	D	383.	24	384.	C
385.	4	386.	C	387.	A	388.	A	389.	4	390.	1012	391.	B	392.	D
393.	B	394.	22	395.	B	396.	A	397.	A	398.	458	399.	40	400.	11
401.	2	402.	A	403.	C	404.	C	405.	C	406.	45	407.	100	408.	B
409.	A	410.	B	411.	125	412.	B	413.	B	414.	186	415.	26664	416.	A
417.	B	418.	2	419.	C	420.	80	421.	36	422.	D	423.	40	424.	A
425.	A	426.	A	427.	D	428.	D	429.	D	430.	10	431.	B	432.	B
433.	A	434.	50	435.	B	436.	D	437.	B	438.	D	439.	25	440.	A
441.	C	442.	C	443.	C	444.	D	445.	D	446.	32	447.	A	448.	B
449.	C	450.	C	451.	C	452.	C	453.	B	454.	C	455.	A	456.	A
457.	C	458.	A	459.	B	460.	B	461.	C	462.	B	463.	6006	464.	C
465.	C	466.	200	467.	A	468.	C	469.	B	470.	C	471.	B	472.	B
473.	B	474.	D	475.	D	476.	A	477.	C	478.	A	479.	C	480.	B
481.	4	482.	16	483.	2	484.	480	485.	C	486.	D	487.	A	488.	90
489.	15	490.	300	491.	6	492.	43	493.	D	494.	A	495.	24	496.	D
497.	2	498.	266	499.	10	500.	A	501.	15	502.	5376	503.	C	504.	540
505.	5	506.	12	507.	2	508.	710	509.	24	510.	D	511.	B	512.	A
513.	18	514.	1	515.	1	516.	200	517.	13125	518.	D	519.	A	520.	18
521.	22	522.	C	523.	D	524.	C	525.	1	526.	6	527.	61	528.	B
529.	200	530.	1494	531.	D	532.	B	533.	1	534.	9	535.	C	536.	7
537.	D	538.	B	539.	A	540.	2	541.	B	542.	125	543.	D	544.	6
545.	82	546.	C	547.	B	548.	C	549.	A						

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