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EdLoop EAPCET

PHYSICS · EAPCET (EAMCET)

Oscillations (SHM)

Previous Year Questions with answers

208 questions · **141** papers · **2010–2026** · newest paper first

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What is in this PDF: every Oscillations (SHM) question we hold from past AP and TS EAPCET (called EAMCET until 2020 in Andhra Pradesh and 2023 in Telangana) papers, with its options and answer. Where an answer comes from a source other than the official final key, it says so next to the answer.

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

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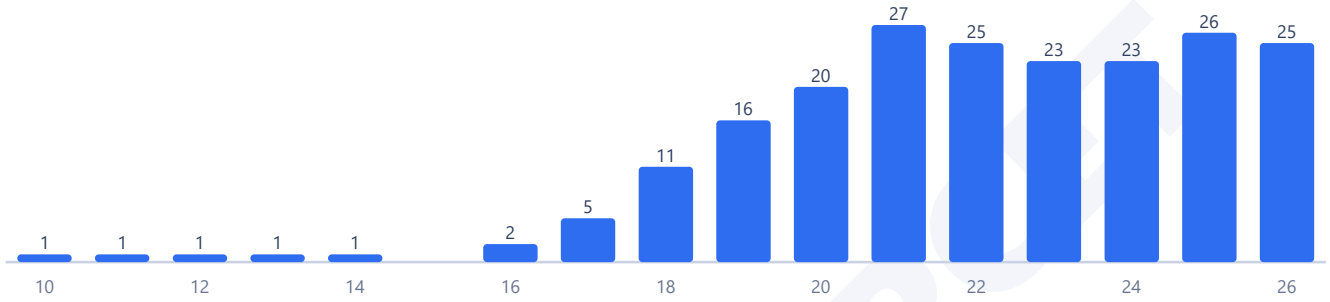
Chapter at a glance

4%	208	77 of 77	208 / 0
of Physics questions, 2022–2026	questions, 2010–2026	papers asked it, 2022–2026	MCQ / numerical, 2010–2026

Trend. Steady: 1.6 questions per paper in 2024–2026 against 1.5 in 2022–2023.

Questions per year



Counts are the questions we hold: 208 in 141 papers. No question in this chapter was found repeated across papers.

Most-asked topics in this chapter (2010–2026)

SHM Basics	70
Oscillating Systems	69
Energy in SHM	46
Damped & Forced Oscillations	23

How often it comes up

Oscillations and simple harmonic motion form a cornerstone of Class 11 mechanics in both Andhra Pradesh and Telangana engineering entrance papers. In the papers we hold for AP and TS EAPCET between 2022 and 2026, the chapter contributed 122 questions across 77 papers. That yields an average of 1.6 questions per paper, representing 4.0% of all physics questions in that recent window. Looking at the complete archive from 2010 to 2026, Oscillations (SHM) generated 208 questions across 149 papers, maintaining an average of 1.4 questions per paper and a 3.5% subject share. Across the earlier testing period from 2010 to 2021, our archive contains 86 questions across 72 papers (3.0% share). In the last three exam years from 2024 to 2026, the chapter delivered 74 questions across 46 papers, registering a 4.0% share. When comparing the last three years to early papers, the chapter's share of the subject is up, whereas compared to the recent five-year window it is about the same.

State-wise breakdowns show that AP sittings test harmonic motion substantially more often than TS sittings. Between 2022 and 2026, AP EAPCET papers in our set contributed 92 questions across 48 papers, averaging 1.9 questions per paper and accounting for 4.8% of the AP physics section. Over the identical timeframe, TS EAPCET provided 30 questions across 29 papers in our set, averaging 1.0 question per paper and taking a 2.6% share. Oscillations (SHM) has appeared every year since 2022 and featured in every paper across both states in the recent five-year window. It ranks 10th of 28 physics chapters by question share between 2022 and 2026. The busiest single sitting in our collection was 2021, which yielded 27 questions across 17 papers.

Most-asked topics

Questions distribute across four distinct syllabus areas:

- **Oscillating Systems**: A leading block of 39 questions appeared between 2022 and 2026, out of 69 questions across all years in our archive. It tests the period of simple pendulums, spring-mass systems in series and parallel,

torsional pendulums, liquid columns in U-tubes, and floating cylinders.

- **SHM Basics**: This section supplied 38 questions in the recent five-year window and 70 questions overall. Key concepts include displacement, velocity, acceleration equations, phase relationships, reference circles, and superposition of collinear oscillations.
- **Energy in SHM**: Recent papers contributed 28 questions, out of 46 questions in the full dataset. Questions focus on kinetic energy, potential energy, total mechanical energy, and their variation with position and time.
- **Damped & Forced Oscillations**: Examiners asked 17 questions recently, bringing the all-time archive count to 23 questions. Topics cover amplitude decay envelopes, damping constants, logarithmic decrement, and resonance conditions.

What the questions look like

Kinematics of simple harmonic motion provides steady questions testing phase leads and coordinate projections. Students are frequently given velocities at two specified displacements and asked to solve for angular frequency ω, amplitude A, or maximum acceleration. Another common format gives the projection of uniform circular motion on a diameter and asks for the analytical displacement equation x(t) with appropriate initial phase.

In oscillating systems, questions frequently modify the physical setup. Typical problems ask what happens to the period of a simple pendulum when suspended in an accelerating lift, immersed in a non-viscous liquid, or placed in a vehicle negotiating a curve. Spring combinations also recur, requiring effective spring constant calculations when springs are cut into unequal lengths or arranged in parallel versus series configurations.

How to practise it

Start by mastering the fundamental differential equation $d^2x/dt^2 + \omega^2 x = zero$. Write the displacement as $x = A \sin(\omega t + \varphi)$. The velocity is $v = \omega \sqrt{(A^2 - x^2)}$, and acceleration is $a = - \omega^2 x$. Remember the critical phase relationships: velocity leads displacement by π/two radians, while acceleration leads displacement by π radians (or opposes it in sign).

Next, work through energy relations. Potential energy is $U = (1/2) k x^2 = (1/2) m \omega^2 x^2$, and kinetic energy is $K = (1/2) m v^2 = (1/2) m \omega^2 (A^2 - x^2)$. Total mechanical energy $E = (1/2) m \omega^2 A^2$ is strictly constant in undamped motion. Note that while displacement oscillates with frequency f, kinetic and potential energies oscillate with twice that frequency, 2f.

Finally, review standard physical systems. For a simple pendulum of length L, the period is $T = 2 \pi \sqrt{(L / g_eff)}$. For a spring of constant k cut into parts with length ratio m : n, the stiffer piece has constant $k(m + n) / m$. For a torsional pendulum with rotational inertia I and torsional stiffness C, the period is $T = 2 \pi \sqrt{(I / C)}$.

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Q1 AP EAPCET 2026 · 18 May · Shift 1 MCQ

A body executes SHM under the influence of one force and has the time period of T_1 seconds. The same body executes SHM with a time period of T_2 seconds when under the influence of another force separately. When both forces act simultaneously and in the same direction, then the time period of the same body is

(A) $(T_1 + T_2)$ sec

(B) $\sqrt{T_1^2 + T_2^2}$ sec

(C) $\sqrt{\dfrac{T_1 + T_2}{T_1 T_2}}$ sec

(D) $\sqrt{\dfrac{T_1^2 T_2^2}{T_1^2 + T_2^2}}$ sec

Answer: (D) $\sqrt{\dfrac{T_1^2 T_2^2}{T_1^2 + T_2^2}}$ sec · The council's preliminary key

Q2 AP EAPCET 2026 · 18 May · Shift 1 MCQ

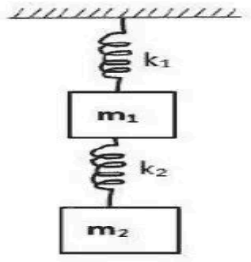
In the arrangement shown, $k_1 = 1500\ \text{Nm}^{-1}$, $k_2 = 500\ \text{Nm}^{-1}$, $m_1 = 2\ \text{kg}$ and $m_2 = 1\ \text{kg}$. The potential energy stored in the system of springs in equilibrium is
[Assume springs mass is negligible and $g = 10\ \text{ms}^{-2}$]

(see the figure above)

Correct Marks : 1 Wrong Marks : 0

In the arrangement shown, $k_1 = 1500\ \text{Nm}^{-1}$, $k_2 = 500\ \text{Nm}^{-1}$, $m_1 = 2$ kg and $m_2 = 1$ kg. The potential energy stored in the system of springs in equilibrium is
[Assume springs mass is negligible and $g = 10\ \text{ms}^{-2}$]

పటంలో చూపిన అమరికలో, $k_1 = 1500\ \text{Nm}^{-1}$, $k_2 = 500\ \text{Nm}^{-1}$, $m_1 = 2$ kg మరియు $m_2 = 1$ kg. సమతాస్థితిలో స్ప్రింగుల వ్యవస్థలో నిల్వవుండే స్థితిజశక్తి
[స్ప్రింగ్‌లు భారరహితమైనవని భావించండి మరియు $g = 10\ \text{ms}^{-2}$



Options :

1. 0.5 J
2. 0.4 J
3. 1.2 J
4. 5.6 J

(A) 0.5 J
(B) 0.4 J
(C) 1.2 J
(D) 5.6 J

Answer: (B) 0.4 J · The council's preliminary key

Q3 AP EAPCET 2026 · 18 May · Shift 2 MCQ

The equation of motion of a particle executing simple harmonic motion is given by $X = \sqrt{2}\,[1.2\sin 2t - 1.6\cos 2t]$, where $'X'$ is displacement in metre and $'t'$ is time in second. The velocity of the particle at a time of 0.125π s is

(A) $5.6\ ms^{-1}$
(B) $5.6\sqrt{2}\ ms^{-1}$
(C) $2.8\ ms^{-1}$
(D) $2.8\sqrt{2}\ ms^{-1}$

Answer: (A) $5.6\ ms^{-1}$ · The council's preliminary key

Q4 AP EAPCET 2026 · 18 May · Shift 2 MCQ

If the minimum time taken by a particle executing simple harmonic motion to move from extreme position to a point at a displacement of 86.6% of the amplitude is T, then the minimum time taken by the particle to move from mean position to a point at a displacement of 86.6% of the amplitude is,

(A) T
(B) 0.5T
(C) 0.25T
(D) 2T

Answer: (D) 2T · The council's preliminary key

Q5 AP EAPCET 2026 · 15 May · Shift 1 MCQ

The maximum kinetic energy of a pendulum executing simple harmonic motion is E. If the length of the pendulum is doubled and the amplitude of motion is halved, then the maximum kinetic energy of the pendulum is

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

Answer: (A) $\frac{E}{8}$ · The council's preliminary key

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Q6 AP EAPCET 2026 · 15 May · Shift 1 MCQ

A particle executes two simple harmonic motions along mutually perpendicular axes, given by $x = A\sin(\omega_1 t),\ y = B\cos(\omega_2 t)$ where $A \neq B$ and $\omega_1 = \omega_2$

Which of the following best describes the resultant motion of the particle?

(A) Straight line
(B) Circular path
(C) Elliptical path
(D) Spiral path

Answer: (C) Elliptical path · The council's preliminary key

Q7 AP EAPCET 2026 · 15 May · Shift 2 MCQ

The springs are connected to the blocks as shown in figures A and B. When the blocks are slightly displaced and released, they oscillate with time period T_A and T_B respectively. Then, the value of $\frac{T_A}{T_B}$ is

(see the figure above)

The springs are connected to the blocks as shown in figures A and B. When the blocks are slightly displaced and released, they oscillate with time period T_A and T_B respectively. Then, the value of $\frac{T_A}{T_B}$ is



పటములు A , B లలో చూపినట్లుగా స్ప్రింగులను దిమ్మెలకు సంధానము చేశారు. దిమ్మెలను కొద్దిగా స్థానభ్రంశము చెందించి వదిలిన, అవి వరుసగా T_A , T_B ఆవర్తన కాలాలతో కంపించినవి. అయిన, $\frac{T_A}{T_B}$ విలువ

Options :

1. $\frac{3}{\sqrt{2}}$
2. $\frac{\sqrt{3}}{\sqrt{2}}$
3. $\frac{\sqrt{2}}{\sqrt{3}}$
4. $\frac{\sqrt{2}}{3}$

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

Answer: (A) $\frac{3}{\sqrt{2}}$ · The council's preliminary key

Q8 AP EAPCET 2026 · 15 May · Shift 2 MCQ

The energy of a particle executing Simple Harmonic Motion (SHM) is given by $E = Ax^2 + BV^2$. Here 'x' is the displacement of the particle from mean position and 'V' is its velocity at 'x' and A and B are constants. The INCORRECT statement is

(A) Amplitude is $\sqrt{\frac{2E}{A}}$

(B) Maximum velocity is $\sqrt{\frac{E}{B}}$

(C) Time period is $2\pi\sqrt{\frac{B}{A}}$

(D) Maximum acceleration is $\frac{\sqrt{EA}}{B}$

Answer: (A) Amplitude is $\sqrt{\frac{2E}{A}}$ · The council's preliminary key

Q9 AP EAPCET 2026 · 14 May · Shift 1 MCQ

A particle is executing simple harmonic motion with time period T and amplitude A. The distance travelled by the particle in $\frac{T}{12}$ time starting from rest is

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

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

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

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

Answer: (B) $\frac{A(2-\sqrt{3})}{2}$ · The council's preliminary key

Q10 AP EAPCET 2026 · 14 May · Shift 1 MCQ

Two blocks each of mass m are connected to a spring of spring constant K. If both are given velocity V in opposite directions as shown in figure, then the maximum elongation of the spring is

(see the figure above)

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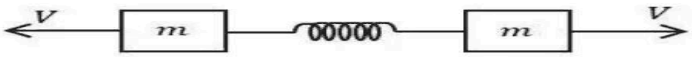

ద్రవ్యరాశి m గల రెండు దిమ్మెలను K స్ప్రింగ్ నకు కలిపినారు. రెండు దిమ్మెలకు V వేగాన్ని వ్యతిరేక దిశలలో పటంలో చూపినట్లు ఇచ్చినచ్చైతే, స్ప్రింగ్ పొందే గరిష్ఠ సాగుదల

Options :

1. $\sqrt{\frac{mV^2}{K}}$
2. $\sqrt{\frac{2mV^2}{K}}$
3. $\sqrt{\frac{mV^2}{2K}}$
4. $2\sqrt{\frac{mV^2}{K}}$

(A) $\sqrt{\frac{mV^2}{K}}$

(B) $\sqrt{\frac{2mV^2}{K}}$

(C) $\sqrt{\frac{mV^2}{2K}}$

(D) $2\sqrt{\frac{mV^2}{K}}$

Answer: (B) $\sqrt{\frac{2mV^2}{K}}$ · The council's preliminary key

Q11 AP EAPCET 2026 · 14 May · Shift 2 MCQ

A particle is executing simple harmonic motion with amplitude A. The position at which kinetic energy and potential energy are equal is given by

(A) $A/2$

(B) $2A$

(C) A

(D) $A/\sqrt{2}$

Answer: (D) $A/\sqrt{2}$ · The council's preliminary key

Q12 AP EAPCET 2026 · 14 May · Shift 2 MCQ

The displacement of particle executing simple harmonic motion is given by $x = 6\sin\left(2\pi t + \frac{\pi}{4}\right) m$. The amplitude and maximum speed are given by

(A) $4m, 2\pi ms^{-1}$
(B) $6m, 4\pi ms^{-1}$
(C) $6m, 12\pi ms^{-1}$
(D) $2m, 12\pi ms^{-1}$

Answer: (C) $6m, 12\pi ms^{-1}$ · The council's preliminary key

Q13 AP EAPCET 2026 · 13 May · Shift 1 MCQ

In simple harmonic motion, at mean position

(A) KE maximum
(B) PE maximum
(C) KE zero
(D) Acceleration maximum

Answer: (A) KE **maximum** · The council's preliminary key

Q14 AP EAPCET 2026 · 13 May · Shift 1 MCQ

A particle starting from the origin executes simple harmonic motion along x-axis. Its velocity at any instant t is given by $v_x = 22\cos\left(\frac{\pi t}{2}\right)\ cm\ s^{-1}$. The total distance covered by the particle in time $t = 4.5\ sec$

(A) $74.5\ cm$
(B) $51.4\ cm$
(C) $65.9\ cm$
(D) $49.8\ cm$

Answer: (C) $65.9\ cm$ · The council's preliminary key

Q15 AP EAPCET 2026 · 13 May · Shift 2 MCQ

Two Simple Harmonic Motions are given by

$y_1 = A\sin\left(\frac{\pi}{2}t + \phi\right)$ and $y_2 = B\sin\left(\frac{2\pi}{3}t + \phi\right)$.

The phase difference between these two after one sec is

(A) π
(B) $\frac{\pi}{2}$
(C) $\frac{\pi}{4}$
(D) $\frac{\pi}{6}$

Answer: (D) $\frac{\pi}{6}$ · The council's preliminary key

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Q16 AP EAPCET 2026 · 12 May · Shift 1 MCQ

A particle is executing simple harmonic motion with an amplitude of 25 cm. If the kinetic energy of the particle at the mean position is 5 J, then the maximum force acting on the particle in its motion is

(A) 20 N
(B) 40 N
(C) 50 N
(D) 100 N

Answer: (B) 40 N · The council's preliminary key

Q17 AP EAPCET 2026 · 12 May · Shift 1 MCQ

The mechanical energy of a damped harmonic oscillator at a time t = 0 is 80 J. If its mechanical energy becomes 40 J after completing 15 oscillations, then the extra oscillations the oscillator has to complete so that its mechanical energy becomes 10 J is

(A) 15
(B) 60
(C) 45
(D) 30

Answer: (D) 30 · The council's preliminary key

Q18 AP EAPCET 2026 · 12 May · Shift 2 MCQ

In SHM, velocity leads displacement by

(A) 0
(B) 90°
(C) 180°
(D) 45°

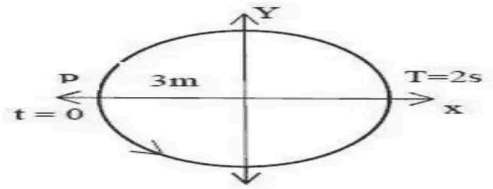
Answer: (B) 90° · The council's preliminary key

Q19 AP EAPCET 2026 · 12 May · Shift 2 MCQ

The figure corresponds to circular motion where the radius of the circle, the period of revolution, the initial position and sense of revolution (ie clockwise or anti-clockwise) are indicated. The corresponding simple harmonic motion of the x-projection of the radius vector of the revolving particle p is

(see the figure above)

The figure corresponds to circular motion where the radius of the circle, the period of revolution, the initial position and sense of revolution (ie clockwise or anti-clockwise) are indicated. The corresponding simple harmonic motion of the x-projection of the radius vector of the revolving particle p is



వృత్త వ్యాసార్ధం, ఆవర్తన కాలం, తొలిస్థానం మరియు భ్రమణదిశ (సవ్యదిశ లేదా అపసవ్య దిశ) లను సూచించే వృత్తాకార గమనం పటంలో చూపబడింది. భ్రమణంలో ఉన్న కణం p యొక్క వ్యాసార్ధ సదిశ x-విక్షేపణముకు సంబంధించిన సరళహరాత్మక చలనం

Options :

1. $x = 3 \sin \pi t$
2. $x = -3 \sin \pi t$
3. $x = -3 \cos \pi t$
4. $x = 2 \sin \left(\frac{2\pi}{3}\right) t$

(A) $x = 3 \sin \pi t$

(B) $x = -3 \sin \pi t$

(C) $x = -3 \cos \pi t$

(D) $x = 2 \sin \left(\frac{2\pi}{3}\right) t$

Answer: (C) $x = -3 \cos \pi t$ · The council's preliminary key

Q20 TS EAPCET 2026 · 11 May · Shift 1 MCQ

A particle executes simple harmonic motion with an amplitude of 40 cm. If the time period of the particle is 6 s, then the minimum time taken by the particle to move from mean position to a point at a distance of 20 cm from the extreme position is

(A) 0.5 s

(B) 1.5 s

(C) 3 s

(D) 2.5 s

Answer: (A) 0.5 s · The council's preliminary key

Q21 TS EAPCET 2026 · 11 May · Shift 2 MCQ

The amplitude of a damped harmonic oscillator becomes $\frac{1}{2\sqrt{2}}$ times its initial amplitude in a time of 6 s. Additional time taken for the amplitude to become $\frac{1}{4\sqrt{2}}$ times its initial amplitude is

(A) 4 s
(B) 6 s
(C) 8 s
(D) 10 s

Answer: (A) 4 s · The council's preliminary key

Q22 TS EAPCET 2026 · 10 May · Shift 1 MCQ

Two particles A and B are executing simple harmonic motion with amplitudes 10 cm and 20 cm respectively. If the time periods of two particles A and B are 8 s and 12 s respectively, then the ratio of the times taken by the particles A and B to complete $\frac{1}{8}^{\text{th}}$ oscillation starting from their extreme positions is

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

Answer: (D) $2:3$ · The council's preliminary key

Q23 TS EAPCET 2026 · 10 May · Shift 2 MCQ

The total energy of a particle executing simple harmonic motion with 2 cm amplitude is 160 mJ. The force acting on the particle at a point where the ratio of the potential and kinetic energies of the particle becomes 1 : 15 is

(A) 16 N
(B) 12 N
(C) 8 N
(D) 4 N

Answer: (D) 4 N · The council's preliminary key

Q24 TS EAPCET 2026 · 9 May · Shift 1 MCQ

A circular disc of radius 15 cm and mass 10 kg is suspended by a wire attached to its centre. When the wire is twisted by rotating the disc and released, the period of torsional oscillations of the disc is 1.5 s. The torsional spring constant of the wire is nearly

(A) $2\ \mathrm{N\,m\,rad^{-1}}$
(B) $3\ \mathrm{N\,m\,rad^{-1}}$
(C) $4\ \mathrm{N\,m\,rad^{-1}}$
(D) $1\ \mathrm{N\,m\,rad^{-1}}$

Answer: (A) $2\ \mathrm{N\,m\,rad^{-1}}$ · The council's preliminary key

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Q25 TS EAPCET 2026 · 9 May · Shift 2 MCQ

For a particle executing simple harmonic motion, if the velocities at distances 6 cm and 8 cm from the mean position are 16π cms^{-1} and 12π cms^{-1} respectively, then the maximum acceleration of the particle (in cms^{-2}) is

(A) $40\pi^2$
(B) $4\pi^2$
(C) $0.4\pi^2$
(D) $400\pi^2$

Answer: (A) $40\pi^2$ · The council's preliminary key

Q26 AP EAPCET 2025 · 27 May · Shift 1 MCQ

If the displacement of a particle executing simple harmonic motion is given by $x = 0.5\cos(125.6\,t)$, then the time period of oscillation of the particle is nearly

(Here x is displacement in metre and t is time in second)

(A) 1 s
(B) 2 s
(C) 0.09 s
(D) 0.05 s

Answer: (D) 0.05 s · The council's preliminary key

Q27 AP EAPCET 2025 · 27 May · Shift 1 MCQ

The amplitude of a damped harmonic oscillator becomes 50% of its initial value in a time of 12 s. If the amplitude of the oscillator at a time of 36 s is x% of its initial amplitude, then the value of x is

(A) 25
(B) 12.5
(C) 37.5
(D) 8

Answer: (B) 12.5 · The council's preliminary key

Q28 AP EAPCET 2025 · 26 May · Shift 1 MCQ

If the function $\sin^2\omega t$ (t is time in second) represents a periodic motion, then the period of the motion is

(A) $\sqrt{\frac{\pi}{\omega}}$ s
(B) $\frac{\pi}{\omega}$ s
(C) $\frac{2\pi}{\omega}$ s
(D) $\sqrt{\frac{2\pi}{\omega}}$ s

Answer: (B) $\frac{\pi}{\omega}$ s · The council's preliminary key

Q29 AP EAPCET 2025 · 26 May · Shift 1 MCQ

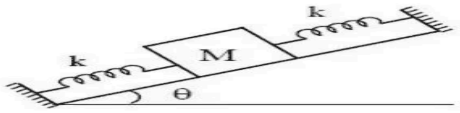
On a smooth inclined plane, a block of mass M is fixed to two rigid supports using two springs, as shown in the figure. If each spring has spring constant k, then the period of oscillation of the block is (Neglect the masses of the springs)

(see the figure above)

Correct Marks : 1 Wrong Marks : 0

On a smooth inclined plane, a block of mass M is fixed to two rigid supports using two springs, as shown in the figure. If each spring has spring constant k, then the period of oscillation of the block is
(Neglect the masses of the springs)

పటంలో చూపిన విధంగా ఒక నున్నటి వాలు తలంపై M ద్రవ్యరాశి గల ఒక దిమ్మె రెండు స్ప్రింగ్‌ల ద్వారా రెండు దృఢ ఆధారాలకు బిగించబడినది. ఒక్కొక్క స్ప్రింగ్ యొక్క స్ప్రింగ్ స్థిరాంకం k అయితే, ఆ దిమ్మె డోలనావర్తన కాలం
(స్ప్రింగ్‌ల ద్రవ్యరాశులను విస్మరింపుము)



Options :

1. $2\pi\left(\frac{M}{2k}\right)^{1/2}$
2. $2\pi\left(\frac{2M}{k}\right)^{1/2}$
3. $2\pi\left(\frac{Mg\sin\theta}{2k}\right)^{1/2}$
4. $2\pi\left(\frac{2Mg}{k}\right)^{1/2}$

(A) $2\pi\left(\frac{M}{2k}\right)^{1/2}$
(B) $2\pi\left(\frac{2M}{k}\right)^{1/2}$
(C) $2\pi\left(\frac{Mg\sin\theta}{2k}\right)^{1/2}$
(D) $2\pi\left(\frac{2Mg}{k}\right)^{1/2}$

Answer: (A) $2\pi\left(\frac{M}{2k}\right)^{1/2}$ · The council's preliminary key

Q30 AP EAPCET 2025 · 26 May · Shift 2 MCQ

A particle is executing simple harmonic motion with amplitude A. The ratio of the kinetic energies of the particle when it is at displacements of $\frac{A}{4}$ and $\frac{A}{2}$ from the mean position is

(A) $4:1$
(B) $2:1$
(C) $5:4$
(D) $9:16$

Answer: (C) $5:4$ · The council's preliminary key

Q31 AP EAPCET 2025 · 24 May · Shift 1 MCQ

The time period of a simple pendulum on the surface of the earth is T. If the pendulum is taken to a height equal to half of the radius of the earth, then its time period is

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

Answer: (B) $\frac{3T}{2}$ · The council's preliminary key

Q32 AP EAPCET 2025 · 24 May · Shift 1 MCQ

A particle is executing simple harmonic motion starting from its mean position. If the time period of the particle is 1.5 s, then the minimum time at which the ratio of the kinetic and total energies of the particle becomes $3:4$ is

(A) $\frac{1}{4}$ s
(B) $\frac{1}{12}$ s
(C) $\frac{1}{8}$ s
(D) $\frac{1}{6}$ s

Answer: (C) $\frac{1}{8}$ s · The council's preliminary key

Q33 AP EAPCET 2025 · 23 May · Shift 1 MCQ

A body of mass 4 kg attached to a spring of force constant $64\ \mathrm{N\,m^{-1}}$ executes simple harmonic motion on a frictionless horizontal surface. The time period of oscillation is

(A) $\frac{\pi}{3}$ s
(B) $\frac{\pi}{2}$ s
(C) π s
(D) $\frac{3\pi}{2}$ s

Answer: (B) $\frac{\pi}{2}$ s · The council's preliminary key

Q34 AP EAPCET 2025 · 23 May · Shift 1 MCQ

A particle is executing simple harmonic motion with amplitude A. At a distance 'x' from the mean position, when the particle is moving towards extreme position it receives a blow in the direction of

motion which instantaneously doubles its velocity. The new amplitude of the particle is (Frequency is constant during the motion)

(A) A
(B) $\sqrt{A^2 - x^2}$
(C) $\sqrt{2A^2 - 3x^2}$
(D) $\sqrt{4A^2 - 3x^2}$

Answer: (D) $\sqrt{4A^2 - 3x^2}$ · The council's preliminary key

Q35 AP EAPCET 2025 · 23 May · Shift 2 MCQ

The equations for the displacements of two particles in simple harmonic motion are $y_1 = 0.1 \sin\left(100\pi t + \frac{\pi}{3}\right)$ and $y_2 = 0.1 \cos \pi t$ respectively. The phase difference between the velocities of the two particles at a time $t = 0$ is

(A) $\frac{\pi}{4}$
(B) $\frac{\pi}{2}$
(C) $\frac{\pi}{6}$
(D) $\frac{\pi}{3}$

Answer: (C) $\frac{\pi}{6}$ · The council's preliminary key

Q36 AP EAPCET 2025 · 23 May · Shift 2 MCQ

A spring is stretched by 0.2 m when a mass of 0.5 kg is suspended to it. The time period of the spring when 0.5 kg mass is replaced with a mass of 0.25 kg is suspended to it is (Acceleration due to gravity $= 10\ \mathrm{m\,s^{-2}}$)

(A) 0.628 s
(B) 6.28 s
(C) 62.8 s
(D) 0.0628 s

Answer: (A) 0.628 s · The council's preliminary key

Q37 AP EAPCET 2025 · 22 May · Shift 1 MCQ

For a particle executing simple harmonic motion, the ratio of kinetic and potential energies at a point where displacement is one half of the amplitude is

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

Answer: (A) $3 : 1$ · The council's preliminary key

Q38 AP EAPCET 2025 · 22 May · Shift 1 MCQ

When the mass attached to a spring is increased from 4 kg to 9 kg, the time period of oscillation increases by 0.2π s. Then the spring constant of the spring is

(A) $80\ \mathrm{N\,m^{-1}}$
(B) $200\ \mathrm{N\,m^{-1}}$
(C) $50\ \mathrm{N\,m^{-1}}$
(D) $100\ \mathrm{N\,m^{-1}}$

Answer: (D) $100\ \mathrm{N\,m^{-1}}$ · The council's preliminary key

Q39 AP EAPCET 2025 · 22 May · Shift 2 MCQ

If the maximum velocity and maximum acceleration of a particle executing simple harmonic motion are respectively $5\ \mathrm{m\ s^{-1}}$ and $10\ \mathrm{m\ s^{-2}}$, then the time period of oscillation of the particle is

(A) π s
(B) 2π s
(C) 2 s
(D) 1 s

Answer: (A) π s · The council's preliminary key

Q40 AP EAPCET 2025 · 22 May · Shift 2 MCQ

A body of mass $1\ \mathrm{kg}$ is suspended from a spring of force constant $600\ \mathrm{N\,m^{-1}}$. Another body of mass $0.5\ \mathrm{kg}$ moving vertically upwards hits the suspended body with a velocity of $3\ \mathrm{m\,s^{-1}}$ and embedded in it. The amplitude of motion is

(A) 5 cm
(B) 15 cm
(C) 10 cm
(D) 8 cm

Answer: (A) 5 cm · The council's preliminary key

Q41 AP EAPCET 2025 · 21 May · Shift 1 MCQ

If the displacement y (in cm) of a particle executing simple harmonic motion is given by the equation $y = 5\sin(3\pi t) + 5\sqrt{3}\cos(3\pi t)$, then the amplitude of the particle is

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(A) 5 cm
(B) $5\sqrt{3}$ cm
(C) $5(1+\sqrt{3})$ cm
(D) 10 cm

Answer: (D) 10 cm · The council's preliminary key

Q42 AP EAPCET 2025 · 21 May · Shift 1 MCQ

The angular frequency of a block of mass 0.1 kg oscillating with the help of a spring of force constant $2.5\ \mathrm{N\,m^{-1}}$ is

(A) $0.2\ \mathrm{rad\,s^{-1}}$
(B) $5\ \mathrm{rad\,s^{-1}}$
(C) $10\ \mathrm{rad\,s^{-1}}$
(D) $2\ \mathrm{rad\,s^{-1}}$

Answer: (B) $5\ \mathrm{rad\,s^{-1}}$ · The council's preliminary key

Q43 AP EAPCET 2025 · 21 May · Shift 2 MCQ

The kinetic energy of a particle executing simple harmonic motion at a displacement of 3 cm from the mean position is 4 mJ. If the amplitude of the particle is 5 cm, then the maximum force acting on the particle is

(A) 0.25 N
(B) 0.50 N
(C) 0.75 N
(D) 1.25 N

Answer: (A) 0.25 N · The council's preliminary key

Q44 AP EAPCET 2025 · 21 May · Shift 2 MCQ

A body of mass 1 kg is attached to the lower end of a vertically suspended spring of force constant 600 N m^{-1}. If another body of mass 0.5 kg moving vertically upward hits the suspended body with a velocity 3 m s^{-1} and embedded in it, then the frequency of the oscillation is

(A) $\frac{5}{\pi}$ Hz
(B) $\frac{10}{\pi}$ Hz
(C) $\frac{\pi}{5}$ Hz
(D) π Hz

Answer: (B) $\frac{10}{\pi}$ Hz · The council's preliminary key

Q45 TS EAPCET 2025 · 4 May · Shift 1 MCQ

If the amplitudes of a damped harmonic oscillator at times $t = 0$, t_1 and t_2 are A_0, A_1 and A_2 respectively, then the amplitude of the oscillator at a time of $(t_1 + t_2)$ is

(A) $\frac{A_0+A_1+A_2}{3}$
(B) $\frac{A_2A_0}{A_1}$
(C) $\frac{A_1A_0}{A_2}$
(D) $\frac{A_1A_2}{A_0}$

Answer: (D) $\frac{A_1A_2}{A_0}$ · The council's preliminary key

Q46 TS EAPCET 2025 · 4 May · Shift 2 MCQ

The force (F in newton) acting on a particle of mass 90 g executing simple harmonic motion is given by $F + 0.04\pi^2 y = 0$, where y is displacement of the particle in meter. If the amplitude of the particle is $\frac{6}{\pi}$ m, then the maximum velocity of the particle is

(A) $6\ \text{ms}^{-1}$
(B) $2\ \text{ms}^{-1}$
(C) $8\ \text{ms}^{-1}$
(D) $4\ \text{ms}^{-1}$

Answer: (D) $4\ \text{ms}^{-1}$ · The council's preliminary key

Q47 TS EAPCET 2025 · 3 May · Shift 1 MCQ

If the amplitude of a damped harmonic oscillator becomes half of its initial amplitude in a time of 10 s, then the time taken for the mechanical energy of the oscillator to become half of its initial mechanical energy is

(A) 2.5 s
(B) 20 s
(C) 10 s
(D) 5 s

Answer: (D) 5 s · The council's preliminary key

Q48 TS EAPCET 2025 · 3 May · Shift 2 MCQ

At a given place, to increase the number of oscillations made by a simple pendulum in one minute from 72 to 90, the length of the pendulum is to be decreased by

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(A) 64%
(B) 36%
(C) 50%
(D) 56%

Answer: (B) 36% · The council's preliminary key

Q49 TS EAPCET 2025 · 2 May · Shift 1 MCQ

The amplitude of a particle executing simple harmonic motion is 6 cm. The distance of the point from the mean position at which the ratio of the potential and kinetic energies of the particle becomes 4:5 is

(A) 6 cm
(B) 4 cm
(C) 3 cm
(D) 2 cm

Answer: (B) 4 cm · The council's preliminary key

Q50 TS EAPCET 2025 · 2 May · Shift 2 MCQ

A particle is executing simple harmonic motion. If the force acting on the particle at a position is 86.6% of the maximum force on it, then the ratio of its velocity at that point and its maximum velocity is

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

Answer: (B) $1 : 2$ · The council's preliminary key

Q51 TS EAPCET 2025 · 2 May · Shift 2 MCQ

The ratio of the time periods of a simple pendulum at heights $2R_E$ and $3R_E$ from the surface of the earth is
(R_E is radius of the earth)

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

Answer: (C) $3 : 4$ · The council's preliminary key

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Q52 AP EAPCET 2024 · 23 May · Shift 1 MCQ

As shown in the figure, two blocks of masses m_1 and m_2 are connected to a spring of force constant k. The blocks are slightly displaced in opposite directions to x_1, x_2 distances and released. If the system executes simple harmonic motion, then the frequency of oscillation of the system (ω) is

(see the figure above)

As shown in the figure, two blocks of masses m_1 and m_2 are connected to a spring of force constant k. The blocks are slightly displaced in opposite directions to x_1, x_2 distances and released. If the system executes simple harmonic motion, then the frequency of oscillation of the system (ω) is
పటములో చూపిన విధముగా m_1 మరియు m_2 ద్రవ్యరాశులు గల రెండు దిమ్మెలు k స్ప్రింగ్ స్థిరాంకము గల స్ప్రింగ్ కు కలుపబడినవి. ఈ రెండు దిమ్మెలు వ్యతిరేకదిశలలో x_1, x_2 దూరములకు స్థానభ్రంశము చెందించి వదిలివేయబడినవి. ఈ వ్యవస్థ సరళ హరాత్మక చలనం చేయుచున్న, వ్యవస్థ కోణీయ పౌనఃపున్యము (ω)



Options :

1. $\left(\frac{1}{m_1}+\frac{1}{m_2}\right)k^2$
2. $\sqrt{\left(\frac{1}{m_1}+\frac{1}{m_2}\right)k^2}$
3. $\sqrt{\left(\frac{1}{m_1}+\frac{1}{m_2}\right)}$
4. $\sqrt{\left(\frac{1}{m_1}+\frac{1}{m_2}\right)k}$

(A) $\left(\frac{1}{m_1}+\frac{1}{m_2}\right)k^2$

(B) $\sqrt{\left(\frac{1}{m_1}+\frac{1}{m_2}\right)k^2}$

(C) $\sqrt{\left(\frac{1}{m_1}+\frac{1}{m_2}\right)}$

(D) $\sqrt{\left(\frac{1}{m_1}+\frac{1}{m_2}\right)k}$

Answer: (D) $\sqrt{\left(\frac{1}{m_1}+\frac{1}{m_2}\right)k}$ · The council's preliminary key

Q53 AP EAPCET 2024 · 23 May · Shift 1 MCQ

A mass M, attached to a horizontal spring executes simple harmonic motion with amplitude A_1. When mass M passes mean position then a smaller mass m is attached to it and both of them together executing simple harmonic motion with amplitude A_2. Then the value of $\frac{A_1}{A_2}$ is

(A) $\sqrt{\frac{m^2+M^2}{M^2}}$

(B) $\sqrt{\frac{m+M}{M^2}}$

(C) $\sqrt{\frac{m+M}{M}}$

(D) $\frac{m+M}{M}$

Answer: (C) $\sqrt{\frac{m+M}{M}}$ · The council's preliminary key

Q54 AP EAPCET 2024 · 22 May · Shift 1 MCQ

Two simple harmonic motions are represented by $y_1 = 5\left[\sin 2\pi t + \sqrt{3}\cos 2\pi t\right]$ and $y_2 = 5\sin\left[2\pi t + \frac{\pi}{4}\right]$. The ratio of their amplitudes is

(A) $1:1$

(B) $2:1$

(C) $1:3$

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

Answer: (B) $2:1$ · The council's preliminary key

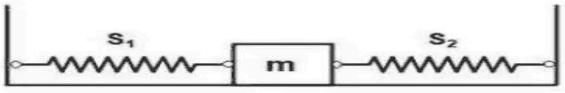
Q55 AP EAPCET 2024 · 22 May · Shift 1 MCQ

When a mass 'm' is connected individually to the springs s_1 and s_2, the oscillation frequencies are v_1 and v_2. If the same mass is attached to the two springs as shown in the figure, the oscillation frequency would be

(see the figure above)

When a mass 'm' is connected individually to the springs s_1 and s_2, the oscillation frequencies are v_1 and v_2. If the same mass is attached to the two springs as shown in the figure, the oscillation frequency would be

'm' ద్రవ్యరాశిని s_1 మరియు s_2 స్ప్రింగ్ లకు వేర్వేరుగా బిగించినపుడు కంపన పౌనఃపున్యాలు వరుసగా v_1 మరియు v_2. అదే ద్రవ్యరాశిని రెండు స్ప్రింగులకు పటంలో చూపినట్లు అనుసంధానం చేస్తే కంపన పౌనఃపున్యం ఎంత?



Options :

1. $v_1 + v_2$
2. $\sqrt{v_1^2 + v_2^2}$
3. $\left(\frac{1}{v_1} + \frac{1}{v_2}\right)^{-1}$
4. $\sqrt{v_1^2 - v_2^2}$

(A) $v_1 + v_2$
(B) $\sqrt{v_1^2 + v_2^2}$
(C) $\left(\frac{1}{v_1} + \frac{1}{v_2}\right)^{-1}$
(D) $\sqrt{v_1^2 - v_2^2}$

Answer: (B) $\sqrt{v_1^2 + v_2^2}$ · The council's preliminary key

Q56 AP EAPCET 2024 · 22 May · Shift 2 MCQ

The displacement of a particle of mass 2 g executing simple harmonic motion is $x = 8\cos\left(50t + \frac{\pi}{12}\right)$ m, where t is time in second. The maximum kinetic energy of the particle is

(A) 160 J
(B) 80 J
(C) 40 J
(D) 20 J

Answer: (A) 160 J · The council's preliminary key

Q57 AP EAPCET 2024 · 22 May · Shift 2 MCQ

The relation between the force (F in newton) acting on a particle executing simple harmonic motion and the displacement of the particle (y in metre) is $500F + \pi^2 y = 0$. If the mass of the particle is 2 g, the time period of oscillation of the particle is

(A) 8 s
(B) 6 s
(C) 2 s
(D) 4 s

Answer: (C) 2 s · The council's preliminary key

Q58 AP EAPCET 2024 · 21 May · Shift 1 MCQ

The mass of a particle is 1 kg and it is moving along x-axis. The period of its oscillation is $\frac{\pi}{2}$. Its potential energy at a displacement of 0.2 m is

(A) 0.24 J
(B) 0.48 J
(C) 0.32 J
(D) 0.16 J

Answer: (C) 0.32 J · The council's preliminary key

Q59 AP EAPCET 2024 · 21 May · Shift 1 MCQ

The potential energy of a particle of mass 10 g as a function of displacement x is $(50\,x^2 + 100)$J.

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The frequency of oscillation is

(A) $\frac{10}{\pi}\,\mathrm{s}^{-1}$
(B) $\frac{5}{\pi}\,\mathrm{s}^{-1}$
(C) $\frac{100}{\pi}\,\mathrm{s}^{-1}$
(D) $\frac{50}{\pi}\,\mathrm{s}^{-1}$

Answer: (D) $\frac{50}{\pi}\,\mathrm{s}^{-1}$ · The council's preliminary key

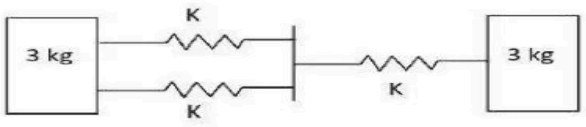
Q60 AP EAPCET 2024 · 21 May · Shift 2 MCQ

In a spring block system as shown in figure, if the spring constant $K = 9\pi^2\,\mathrm{Nm}^{-1}$, then the time period of oscillation is

(see the figure above)

In a spring block system as shown in figure, if the spring constant $K = 9\pi^2 Nm^{-1}$, then the time period of oscillation is

ఒక స్ప్రింగ్-దిమ్మె వ్యవస్థ పటములో చూపబడినది. స్ప్రింగ్ స్థిరాంకం, K విలువ $9\pi^2 Nm^{-1}$ లు అయినచో ఆవర్తన కాలము విలువ



Options :

1. 1 s
2. 3.14 s
3. 1.414 s
4. 0.5 s

(A) 1 s
(B) 3.14 s
(C) 1.414 s
(D) 0.5 s

Answer: (A) 1 s · The council's preliminary key

Q61 AP EAPCET 2024 · 21 May · Shift 2 MCQ

A body is executing simple harmonic motion. At a displacement 'x' its potential energy is E_1 and at a displacement 'y' its potential energy is E_2. The potential energy E at a displacement $(x + y)$ is

(A) $\sqrt{E} = \sqrt{E_1} - \sqrt{E_2}$
(B) $\sqrt{E} = \sqrt{E_1} + \sqrt{E_2}$
(C) $E = E_1 - E_2$
(D) $E = E_1 + E_2$

Answer: (B) $\sqrt{E} = \sqrt{E_1} + \sqrt{E_2}$ · The council's preliminary key

Q62 AP EAPCET 2024 · 20 May · Shift 1 MCQ

In a time of 2 s, the amplitude of a damped oscillator becomes $\frac{1}{e}$ times its initial amplitude A. In the next two seconds, the amplitude of the oscillator is

(A) $\frac{1}{2e}$
(B) $\frac{2}{e}$
(C) $\frac{1}{e^2}$
(D) $\frac{2}{e^2}$

Answer: (C) $\frac{1}{e^2}$ · The council's preliminary key

Q63 AP EAPCET 2024 · 20 May · Shift 1 MCQ

A particle is executing simple harmonic motion with a time period of 3 s. At a position where the displacement of the particle is 60% of its amplitude, the ratio of the kinetic and potential energies of the particle is

(A) $5 : 3$
(B) $16 : 9$
(C) $4 : 3$
(D) $25 : 9$

Answer: (B) $16 : 9$ · The council's preliminary key

Q64 AP EAPCET 2024 · 20 May · Shift 2 MCQ

A horizontal board is performing simple harmonic oscillations horizontally with an amplitude 0.3 m and a period of 4 s. The minimum coefficient of friction between a heavy body placed on the board if the body is not to slip is.

(A) $\mu = 0.05$
(B) $\mu = 0.075$
(C) $\mu = 0.173$
(D) $\mu = 1.14$

Answer: (B) $\mu = 0.075$ · The council's preliminary key

Q65 AP EAPCET 2024 · 20 May · Shift 2 MCQ

A test tube of mass $6\ \mathrm{g}$ and uniform area of cross section $10\ \mathrm{cm}^2$ is floating in water vertically when $10\ \mathrm{g}$ of mercury is in the bottom. The tube is depressed by a small amount and then released. The time period of oscillation is (Accelaration due to gravity = $10\ ms^{-2}$)

(A) $0.75\ \mathrm{s}$
(B) $0.5\ \mathrm{s}$
(C) $0.25\ \mathrm{s}$
(D) $0.85\ \mathrm{s}$

Answer: (C) $0.25\ \mathrm{s}$ · The council's preliminary key

Q66 AP EAPCET 2024 · 19 May · Shift 2 MCQ

The displacement of a particle executing simple harmonic motion is $y = A\sin(2t + \phi)$ m, where t is time in second and ϕ is phase angle. At time $t = 0$, the displacement and velocity of the particle are 2 m and $4\ \mathrm{ms}^{-1}$. The phase angle, $\phi =$

(A) 60°
(B) 30°
(C) 45°
(D) 90°

Answer: (C) 45° · The council's preliminary key

Q67 AP EAPCET 2024 · 19 May · Shift 2 MCQ

The displacement of a damped oscillator is $x(t) = \exp(-0.2t)\cos(3.2t + \emptyset)$ where t is time in second. The time required for the amplitude of the oscillator to become $\frac{1}{e^{1.2}}$ times its initial amplitude is

(A) 3 s
(B) 6 s
(C) 2 s
(D) 8 s

Answer: (B) 6 s · The council's preliminary key

Q68 AP EAPCET 2024 · 18 May · Shift 1 MCQ

Time period of a simple pendulum in Air is T. If the pendulum is in water and executes SHM, its time period is t. The value of $\frac{T}{t}$ is

[density of bob is $\frac{5000}{3}\ \mathrm{kg\,m^{-3}}$]

(A) $\frac{2}{5}$
(B) $\sqrt{\frac{2}{5}}$
(C) $\frac{5}{2}$
(D) $\sqrt{\frac{5}{2}}$

Answer: (B) $\sqrt{\frac{2}{5}}$ · The council's preliminary key

Q69 AP EAPCET 2024 · 18 May · Shift 1 MCQ

For a particle executing simple harmonic motion, match the following statements (conditions) from column I to statements (shapes of graph) in column II

column I	column II
a Velocity-displacement graph ($w = 1$)	i Straight line
b Acceleration-displacement graph	ii Sinusoidal
c Acceleration – time graph	iii Circle
d Acceleration – velocity ($w \neq 1$)	iv Ellipse

(A) a-iv, b-i, c-ii, d-iii
(B) a-iii, b-i, c-ii, d-iv
(C) a-iii, b-ii, c-i, d-iv
(D) a-iv, b-ii, c-i, d-iii

Answer: (B) a-iii, b-i, c-ii, d-iv · The council's preliminary key

Q70 TS EAPCET 2024 · 11 May · Shift 1 MCQ

A massless spring of length 'l' and spring constant 'k' oscillates with a time period 'T' when loaded with a mass 'm'. The spring is now cut into three equal parts and are connected in parallel. The frequency of oscillation of the combination when it is loaded with a mass '4m' is

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

Answer: (D) $\frac{3}{2T}$ · The council's preliminary key

Q71 TS EAPCET 2024 · 10 May · Shift 1 MCQ

If a body dropped freely from a height of 20 m reaches the surface of a planet with a velocity of $31.4\ \mathrm{ms}^{-1}$, then the length of a simple pendulum that ticks seconds on the planet is

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(A) 1 m
(B) 0.625 m
(C) 2.5 m
(D) 2 m

Answer: (C) 2.5 m · The council's preliminary key

Q72 TS EAPCET 2024 · 10 May · Shift 2 MCQ

A block kept on a frictionless horizontal surface is connected to one end of a horizontal spring of constant $100\ \mathrm{Nm}^{-1}$ whose other end is fixed to a rigid vertical wall. Initially the block is at its equilibrium position. The block is pulled to a distance of 8 cm and released. The kinetic energy of the block when it is at a distance of 3 cm from the mean position is

(A) 0.65 J
(B) 0.325 J
(C) 0.275 J
(D) 0.55 J

Answer: (C) 0.275 J · The council's preliminary key

Q73 TS EAPCET 2024 · 9 May · Shift 1 MCQ

In a time 't', the amplitude of vibrations of a damped oscillator becomes half of its initial value, then the mechanical energy of the oscillator decreases by

(A) 40%
(B) 20%
(C) 75%
(D) 50%

Answer: (C) 75% · The council's preliminary key

Q74 TS EAPCET 2024 · 9 May · Shift 2 MCQ

A particle of mass 4 mg is executing simple harmonic motion along x-axis with an angular frequency of 40 rad s^{-1}. If the potential energy of the particle is $V(x) = a + bx^2$, where $V(x)$ is in joule and x is in metre, then the value of b is

(A) $800 \times 10^{-6}\ \mathrm{Jm}^{-2}$
(B) $1600 \times 10^{-6}\ \mathrm{Jm}^{-2}$
(C) $3200 \times 10^{-6}\ \mathrm{Jm}^{-2}$
(D) $6400 \times 10^{-6}\ \mathrm{Jm}^{-2}$

Answer: (C) $3200 \times 10^{-6}\ \mathrm{Jm}^{-2}$ · The council's preliminary key

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Q75 AP EAPCET 2023 · 19 May · Shift 1 MCQ

A pendulum of time period one second is losing its mechanical energy due to damping. Its mechanical energy at time t = 0 is 45 J. After completing 15 oscillations, its mechanical energy is 15 J. The ratio of the damping constant and the mass of the object making damped oscillations is

(A) $\frac{1}{5}\log_e 3\ \mathrm{s}^{-1}$
(B) $\frac{1}{10}\log_e 3\ \mathrm{s}^{-1}$
(C) $\frac{1}{15}\log_e 3\ \mathrm{s}^{-1}$
(D) $\frac{1}{20}\log_e 3\ \mathrm{s}^{-1}$

Answer: (C) $\frac{1}{15}\log_e 3\ \mathrm{s}^{-1}$ · The council's preliminary key

Q76 AP EAPCET 2023 · 19 May · Shift 1 MCQ

Which of the following statements regarding damping force of a damped oscillator is NOT correct?

(A) Damping force depends on the nature of the surrounding medium.
(B) Damping force is generally proportional to the velocity of the body making oscillations.
(C) Damping force acts in the direction of the velocity of the body.
(D) Ratio of the damping force and velocity of the body depends on the size and shape of the body.

Answer: (C) Damping force acts in the direction of the velocity of the body. · The council's preliminary key

Q77 AP EAPCET 2023 · 18 May · Shift 1 MCQ

The equation of motion of a particle executing simple harmonic motion is given by $x = 3\sin\left(6t + \frac{\pi}{6}\right)$, where x is in metres and t is in seconds. The ratio of the potential and kinetic energies of the particle at time $t = 0$ is

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

Answer: (D) $1:3$ · The council's preliminary key

Q78 AP EAPCET 2023 · 18 May · Shift 1 MCQ

Two particles execute simple harmonic motion along the same straight line with same amplitude and same frequency. The two particles pass one another when moving in opposite directions each time at a distance of $\frac{1}{\sqrt{2}}$ times the amplitude from their common mean position. The phase difference between the two particles is

(A) 30^0
(B) 45^0
(C) 60^0
(D) 90^0

Answer: (D) 90^0 · The council's preliminary key

Q79 AP EAPCET 2023 · 18 May · Shift 2 MCQ

The equation of motion of a particle executing simple harmonic motion is $4\frac{d^2y}{dt^2} + \pi^2 y = 0$ where y is in metres and t is in seconds. The time period of oscillation of the particle is

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

Answer: (D) 4 s · The council's preliminary key

Q80 AP EAPCET 2023 · 18 May · Shift 2 MCQ

A block of mass M hangs from a spring and oscillates vertically with an angular frequency ω. If the block is removed from the spring, when it is in equilibrium position, the spring shortens by

(A) $\frac{g}{\omega}$
(B) $\sqrt{\frac{g}{\omega}}$
(C) $\frac{g}{\omega^2}$
(D) $\sqrt{\frac{g}{\omega^2}}$

Answer: (C) $\frac{g}{\omega^2}$ · The council's preliminary key

Q81 AP EAPCET 2023 · 17 May · Shift 1 MCQ

The mechanical energy of a damped oscillator becomes half of its initial energy in 4 seconds. In another t seconds its mechanical energy becomes 12.5% of its initial mechanical energy. Then t =

(A) 4 s
(B) 8 s
(C) 12 s
(D) 16 s

Answer: (B) 8 s · The council's preliminary key

Q82 AP EAPCET 2023 · 17 May · Shift 1 MCQ

When an external force with angular frequency ω_d acts on a system of natural angular frequency ω, the system oscillates with angular frequency ω_d. The condition for the amplitude of oscillations to be maximum is

(A) $\omega_d = 2\omega$
(B) $\omega_d = \omega$
(C) $\omega_d = \frac{\omega}{2}$
(D) $\omega_d = 3\omega$

Answer: (B) $\omega_d = \omega$ · The council's preliminary key

Q83 AP EAPCET 2023 · 17 May · Shift 2 MCQ

A particle initially at the mean position is executing simple harmonic motion with an angular frequency $\frac{\pi}{4}$ rad s^{-1}. The ratio of the distances travelled by the particle in the first second and second second is

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

Answer: (D) $(1 + \sqrt{2}) : 1$ · The council's preliminary key

Q84 AP EAPCET 2023 · 17 May · Shift 2 MCQ

The time period of a simple pendulum on the surface of the earth is T. The height above the surface of the earth at which the time period of the pendulum becomes 2T is

(Radius of the earth = 6400 km)

(A) 3200 km
(B) 6400 km
(C) 1600 km
(D) 800 km

Answer: (B) 6400 km · The council's preliminary key

Q85 AP EAPCET 2023 · 16 May · Shift 1 MCQ

When a body of mass 8 kg is attached to a spring balance, the reading of the balance is 20 cm. Instead of 8 kg, if another body of mass M is suspended from the spring balance and is made to oscillate vertically, the time period of oscillation is $\frac{\pi}{5}$ s, then the value of M is

(Acceleration due to gravity = $10\ \mathrm{ms}^{-2}$)

(A) 4 kg
(B) 6 kg
(C) 8 kg
(D) 9 kg

Answer: (A) 4 kg · The council's preliminary key

Q86 AP EAPCET 2023 · 16 May · Shift 1 MCQ

Under the action of a force $F = -75y$ where F is in Newton and y is in meters, an object of mass 3 kg executes simple harmonic motion. If the velocity of the object at the mean position is $2.5\ \text{ms}^{-1}$, the maximum acceleration of the object is

(A) $5\ \text{ms}^{-2}$
(B) $7.5\ \text{ms}^{-2}$
(C) $10\ \text{ms}^{-2}$
(D) $12.5\ \text{ms}^{-2}$

Answer: (D) $12.5\ \text{ms}^{-2}$ · The council's preliminary key

Q87 AP EAPCET 2023 · 16 May · Shift 2 MCQ

A particle is executing simple harmonic motion. If the minimum time taken by the particle to move from extreme position to half of the amplitude is t_1, and the minimum time taken by the particle to move from mean position to half of the amplitude is t_2, then

(A) $t_1 = t_2$
(B) $t_1 = 0.5\,t_2$
(C) $t_1 = 2\,t_2$
(D) $t_1 = \sqrt{2}\,t_2$

Answer: (C) $t_1 = 2\,t_2$ · The council's preliminary key

Q88 AP EAPCET 2023 · 16 May · Shift 2 MCQ

The time taken for the amplitude of vibrations of a damped oscillator to drop to 25% of its initial value is t. The time taken for its mechanical energy to drop to 50% of its initial mechanical energy is

(A) t
(B) $\frac{t}{2}$
(C) $\frac{t}{4}$
(D) $\frac{t}{8}$

Answer: (C) $\frac{t}{4}$ · The council's preliminary key

Q89 AP EAPCET 2023 · 15 May · Shift 1 MCQ

The amplitudes of a damped harmonic oscillator after 2 and 4 seconds are A_1 and A_2 respectively. If the initial amplitude of the oscillator is A_0, then

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(A) $A_1 = \sqrt{A_0 A_2}$
(B) $A_2 = \sqrt{A_0 A_1}$
(C) $A_0 = \sqrt{A_1 A_2}$
(D) $A_1 = \dfrac{A_0 + A_2}{2}$

Answer: (A) $A_1 = \sqrt{A_0 A_2}$ · The council's preliminary key

Q90 AP EAPCET 2023 · 15 May · Shift 2 MCQ

An object of mass 3 kg is executing simple harmonic motion with an amplitude $\frac{2}{\pi}$ m. If the kinetic energy of the object when it crosses the mean position is 6 J, the time period of oscillation of the object is

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

Answer: (B) 2 s · The council's preliminary key

Q91 AP EAPCET 2023 · 15 May · Shift 2 MCQ

As shown in the figure, a block of weight 20 N is connected to the top of a smooth inclined plane by massless spring of constant $8\pi^2$ $\mathrm{Nm^{-1}}$. If the block is pulled slightly from its mean position and released, the period of oscillations is

(Acceleration due to gravity = $10\ \mathrm{ms^{-2}}$)

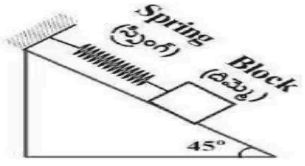
(see the figure above)

As shown in the figure, a block of weight 20 N is connected to the top of a smooth inclined plane by massless spring of constant $8\pi^2$ $\mathrm{Nm^{-1}}$. If the block is pulled slightly from its mean position and released, the period of oscillations is

(Acceleration due to gravity = $10\ \mathrm{ms^{-2}}$)

పటంలో చూపిన విధంగా 20 N భారం గల ఒక దిమ్మె ఒక నునుపైన వాలు తలం పైభాగానికి బిగించబడి $8\pi^2$ $\mathrm{Nm^{-1}}$ స్థిరాంకం గల ఒక స్ప్రింగ్ నకు కలుపబడింది. దిమ్మెను దాని మాధ్యమిక స్థానం నుండి కొద్దిగా లాగి వదిలిన, డోలనావర్తన కాలం

(గురుత్వ త్వరణం = $10\ \mathrm{ms^{-2}}$)



Options :
1. 4 s
2. 3 s
3. 2 s
4. 1 s

(A) $4\ \text{s}$
(B) $3\ \text{s}$
(C) $2\ \text{s}$
(D) $1\ \text{s}$

Answer: (D) $1\ \text{s}$ · The council's preliminary key

Q92 TS EAMCET 2023 · 14 May · Shift 1 MCQ

The displacement of a particle executing simple harmonic motion is given by $x = 2\cos(t)$ where t is the time in seconds then the time period of the particle is

(A) π second
(B) 2π second
(C) 3π second
(D) 0.5π second

Answer: (B) 2π second · The council's preliminary key

Q93 TS EAMCET 2023 · 14 May · Shift 2 MCQ

The displacement of a particle is given by the relation $x = 4(\cos \pi t + \sin \pi t)$. The amplitude of the particle is

(A) -4
(B) 4
(C) $4\sqrt{2}$
(D) 8

Answer: (C) $4\sqrt{2}$ · The council's preliminary key

Q94 TS EAMCET 2023 · 13 May · Shift 1 MCQ

A pendulum has a time period T in air. When it is made to oscillate in water its time period is $\sqrt{2}\,T$. Then the relative density of the material of the bob of the pendulum is (neglect damping)

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

Answer: (B) 2 · The council's preliminary key

Q95 TS EAMCET 2023 · 13 May · Shift 2 MCQ

A force of 6.4 N stretches a vertical spring by 0.1 m. If it were to oscillate with a period of $\frac{\pi}{4}$ then the mass that is to be suspended from the spring is

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(A) $\frac{\pi}{4}$ kg
(B) 1 kg
(C) $\frac{1}{\pi}$ kg
(D) 10 kg

Answer: (B) 1 kg · The council's preliminary key

Q96 TS EAMCET 2023 · 12 May · Shift 1 MCQ

For a particle executing simple harmonic motion, the kinetic energy of the particle at a distance of 4 cm from the mean position is $\frac{1}{3}$rd of the maximum kinetic energy. The amplitude of the motion is

(A) $2\sqrt{6}$ cm
(B) $\frac{2}{\sqrt{6}}$ cm
(C) $\sqrt{2}$ cm
(D) $\frac{6}{\sqrt{2}}$ cm

Answer: (A) $2\sqrt{6}$ cm · The council's preliminary key

Q97 TS EAMCET 2023 · 12 May · Shift 2 MCQ

A clock is designed based on the oscillations of a spring-block system suspended vertically in the absence of air-resistance. Assume it shows the correct time when a spring of stiffness 'k' and block of mass 'm' are used. If the block is replaced by another block of mass 4m, choose the correct option

(A) The clock runs slow by 0.5 s for every one second
(B) The clock runs fast by 0.5 s for every one second
(C) The clock runs fast by 1s for every one second
(D) The clock runs slow by 1s for every one second

Answer: (A) The clock runs slow by 0.5 s for every one second · The council's preliminary key

Q98 TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

A particle performs Simple harmonic motion with a time period of 16s. At a time t = 2s, the particle passes through the origin and at t = 4s its velocity is 4 m/s. The amplitude of the motion is

(A) $\frac{32\pi}{\sqrt{2}}$
(B) $\frac{32\sqrt{2}}{\pi}$
(C) 32π
(D) 32

Answer: (B) $\frac{32\sqrt{2}}{\pi}$ · The council's preliminary key

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Q99 TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

A block is in simple harmonic motion (S.H.M) on the end of the spring with position given by $x = (5)\cos\left(\omega t + \frac{\pi}{4}\right)$ cm. If the total mechanical energy used is 100 J to achieve maximum displacement, then the potential energy at time $t = 0$ is

(A) 20 J
(B) 80 J
(C) 75 J
(D) 50 J

Answer: (D) 50 J · The council's preliminary key

Q100 TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

A simple pendulum of length 1 m and having a bob of mass 100 g is suspended in a car, moving on a circular track of radius 100 m with uniform speed 10 m/s. If the pendulum makes small oscillation in a radial direction about its equilibrium position, then its time period can be given by $T = 2\pi / \alpha^{1/4}$. The value of α is
[Take g = 10 m/s^2]

(A) 11
(B) 110
(C) 101
(D) 1100

Answer: (C) 101 · The council's preliminary key

Q101 TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

The amplitude of a damped oscillator varies with time as $A(t) = A_o \exp(-bt/2m)$ where $b = 70$ g/s and $m = 200$ g. How long does it take for the mechanical energy to drop to one – fourth of its initial value?
[Take $\ln 2 = 0.7$]

(A) 2.0 s
(B) 4.0 s
(C) 2.5 s
(D) 3.5 s

Answer: (B) 4.0 s · The council's preliminary key

Q102 TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

A body starting at t = 0 from origin and oscillates simple harmonically with a period of 4s. After what time will its kinetic energy be 75% of its total energy

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(A) $1/2$ s
(B) $1/3$ s
(C) $1/4$ s
(D) 1 s

Answer: (B) $1/3$ s · The council's preliminary key

Q103 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

A simple pendulum consists of a small sphere of mass 'm' suspended by a thread of length 'l'. The sphere carries a positive charge q. The pendulum is allowed to do small oscillations in a uniform electric field E with direction vertically upwards. The time period of oscillation is

(A) $2\pi\sqrt{\frac{l}{g}}$
(B) $2\pi\sqrt{\frac{ml}{qE}}$
(C) $2\pi\sqrt{\frac{l}{g-\frac{q}{m}E}}$
(D) $2\pi\sqrt{\frac{l}{g+\frac{q}{m}E}}$

Answer: (C) $2\pi\sqrt{\frac{l}{g-\frac{q}{m}E}}$ · The council's preliminary key

Q104 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

A solid sphere of mass M and radius R is attached to a spring of negligible mass kept on a horizontal plane such that it can roll without slipping. The sphere is made to execute SHM by stretching through a distance and released, then the time period of such oscillation is
(K = spring constant)

(A) $2\pi\sqrt{\frac{3M}{2K}}$
(B) $2\pi\sqrt{\frac{5K}{7M}}$
(C) $2\pi\sqrt{\frac{7M}{5K}}$
(D) $2\pi\sqrt{\frac{3K}{2M}}$

Answer: (C) $2\pi\sqrt{\frac{7M}{5K}}$ · The council's preliminary key

Q105 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

Position of a 2 kg mass moving along the x-axis is given by $x = 2\cos\left[(2\ \text{s}^{-1})\,t\right]$ m. Then maximum kinetic energy of the mass in joule is

(A) 4
(B) 8
(C) 12
(D) 16

Answer: (D) 16 · The council's preliminary key

Q106 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

An object mass 2 kg is attached to a spring with spring constant $8\ \mathrm{Nm}^{-1}$. If the object is executing simple harmonic motion then the number of cycles it completes in 66 s is

(A) 21
(B) 16
(C) 28
(D) 12

Answer: (A) 21 · The council's preliminary key

Q107 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

Position of a 3 kg mass moving along the x-axis is given by $x = 0.3\cos(\omega t)$ m. If K (t) denotes the kinetic energy at time t, Then the value of $\frac{K\left(\frac{\pi}{6\omega}\right)}{K\left(\frac{\pi}{3\omega}\right)}$ is

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

Answer: (A) $1/3$ · The council's preliminary key

Q108 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

Assertion (A): In S.H.M kinetic and potential energy become equal when the distance is $\frac{1}{\sqrt{2}}$ times its amplitude
Reason (R): The potential energy of a particle executing S.H.M is periodic with time period being maximum at the extreme displacement.

(A) (A) and (R) are true. R is correct explanation of A
(B) (A) and (R) are true. R is not correct explanation of A
(C) (A) is true, but (R) is false
(D) (A) is false but (R) is true

Answer: (B) (A) and (R) are true. R is not correct explanation of A · The council's preliminary key

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Q109 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

A block of mass 100 g is connected to an elastic spring of spring constant $450\ \mathrm{Nm^{-1}}$ oscillates vertically. The block-spring system is in viscous surrounding medium with a damping constant $69.3\ \mathrm{g\,s^{-1}}$. The time in which the amplitude of oscillations drop to half of its initial value.
[take $\ln 2 = 0.693$]

(A) 6.93 s
(B) 2 s
(C) 20 s
(D) 69.3 s

Answer: (B) 2 s · The council's preliminary key

Q110 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

A point mass of 400 g executes S.H.M. under a force $F = -(10\ \mathrm{Nm^{-1}})\,x$. If it crosses the centre of oscillation with a speed of $10\ \mathrm{ms^{-1}}$, the amplitude of motion is

(A) 2 m
(B) 4 m
(C) 0.4 m
(D) 0.5 m

Answer: (A) 2 m · The council's preliminary key

Q111 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

A particle executes simple harmonic motion with a time period 0.6 s and amplitude 10 cm. Then the mean velocity of the particle over the time interval during which it travels a distance 5 cm starting from the equilibrium position.

(A) $1\ \mathrm{ms^{-1}}$
(B) $50\ \mathrm{cm\,s^{-1}}$
(C) $10\ \mathrm{cm\,s^{-1}}$
(D) $1\ \mathrm{cm\,s^{-1}}$

Answer: (A) $1\ \mathrm{ms^{-1}}$ · The council's preliminary key

Q112 AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

A point mass oscillates along x-axis according to $x = x_o \sin\left(\omega t - \frac{\pi}{6}\right)$. If the acceleration of the point mass is written as $a = A\sin(\omega t + \delta)$ then

(A) $A = x_o,\ \delta = -\frac{\pi}{6}$
(B) $A = x_o\omega^2,\ \delta = -\frac{\pi}{6}$
(C) $A = x_o\omega^2,\ \delta = \frac{\pi}{6}$
(D) $A = x_o\omega^2,\ \delta = \frac{5\pi}{6}$

Answer: (D) $A = x_o\omega^2,\ \delta = \frac{5\pi}{6}$ · The council's preliminary key

Q113 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

A particle undergoing simple harmonic motion has an amplitude of 10 cm. When the particle is at a displacement of 6 cm from the center, then the ratio of its kinetic energy to potential energy is

(A) $3:2$
(B) $9:4$
(C) $16:9$
(D) $4:3$

Answer: (C) $16:9$ · The council's preliminary key

Q114 AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

An object is executing simple harmonic motion with an angular frequency ω. If the maximum velocity is $v_{\max}$ then the maximum acceleration of the object is

(A) $\omega^2 v_{\max}$
(B) $\omega v_{\max}$
(C) $\omega\sqrt{v_{\max}}$
(D) $3\omega v_{\max}$

Answer: (B) $\omega v_{\max}$ · The council's preliminary key

Q115 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

A particle is executing simple harmonic motion with an instantaneous displacement $x = A\sin^2\left(\omega t - \frac{\pi}{4}\right)$. The time period of oscillation of the particle is

(A) $\frac{2\pi}{\omega}$
(B) $\frac{\pi}{\omega}$
(C) $\frac{\pi}{2\omega}$
(D) $\frac{\omega}{2\pi}$

Answer: (B) $\frac{\pi}{\omega}$ · The council's preliminary key

Q116 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

If the amplitude of a lightly damped oscillator decreases by 1.5% then the mechanical energy of the oscillator lost in each cycle is

(A) 1.5%
(B) 0.75%
(C) 6%
(D) 3%

Answer: (D) 3% · The council's preliminary key

Q117 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

A pendulum is oscillating at a frequency of 8 Hz. Suddenly the string of the pendulum is clamped at its midpoint then the new frequency of oscillations is

(A) $16\ \text{Hz}$
(B) $13.8\ \text{Hz}$
(C) $11.28\ \text{Hz}$
(D) $5.7\ \text{Hz}$

Answer: (C) $11.28\ \text{Hz}$ · The council's preliminary key

Q118 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

Time period of a simple pendulum is 4 s at a place on the earth where the acceleration due to gravity is $\pi^2\ \text{ms}^{-2}$. Then the length of the pendulum in meters is

(A) 4
(B) 2
(C) π
(D) $\frac{\pi}{2}$

Answer: (A) 4 · The council's preliminary key

Q119 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

A hydrometer executes simple harmonic motion when it is pushed down vertically in a liquid of density ρ. If the mass of hydrometer is m and the radius of the hydrometer tube is r, then the time period of oscillation is

(A) $T = 2\pi\sqrt{\frac{m}{\pi r^2 \rho g}}$
(B) $T = 2\pi\sqrt{\frac{\pi r^2 \rho g}{m}}$
(C) $T = \frac{1}{2\pi}\sqrt{\frac{m}{\pi r^2 \rho g}}$
(D) $T = \frac{1}{2\pi}\sqrt{\frac{\pi r^2 \rho g}{m}}$

Answer: (A) $T = 2\pi\sqrt{\frac{m}{\pi r^2 \rho g}}$ · The council's preliminary key

Q120 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

An object undergoing simple harmonic motion takes 0.5 s to travel from one point of zero velocity to the next such point. The angular frequency of the motion is

(A) $\pi \text{ rad s}^{-1}$
(B) $2\pi \text{ rad s}^{-1}$
(C) $3\pi \text{ rad s}^{-1}$
(D) $\frac{\pi}{2} \text{ rad s}^{-1}$

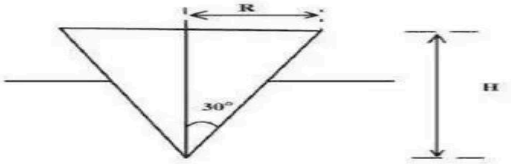
Answer: (B) $2\pi \text{ rad s}^{-1}$ · The council's preliminary key

Q121 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

A cone with half the density of water is floating in water as shown in figure. It is depressed down by a small distance δ ($\ll$ H) and released. The frequency of simple harmonic oscillations of the cone is *(see the figure above)*

A cone with half the density of water is floating in water as shown in figure. It is depressed down by a small distance δ ($\ll$ H) and released. The frequency of simple harmonic oscillations of the cone is

నీటి సాంద్రతలో సగం సాంద్రత గల ఒక శంకాకార వస్తువు పటంలో చూపిన విధంగా నీటిలో తేలుతున్నది. దానిని కొద్ది దూరం δ ($\ll$ H) క్రిందికి నెట్టి వదిలారు. వస్తువు చేసే సరళ హారత్మక పౌనఃపున్యం.



Options :

1. $\frac{1}{2\pi}\sqrt{\frac{6g}{H}\frac{1}{4^{\frac{1}{3}}}}$
2. $\frac{1}{2\pi}\sqrt{\frac{3g}{H}\frac{1}{4^{\frac{1}{3}}}}$
3. $\frac{1}{2\pi}\sqrt{\frac{6g}{2H}}$
4. $\frac{1}{2\pi}\sqrt{\frac{g}{H}}$

(A) $\frac{1}{2\pi}\sqrt{\frac{6g}{H}\frac{1}{4^{1/3}}}$
(B) $\frac{1}{2\pi}\sqrt{\frac{3g}{H}\frac{1}{4^{1/3}}}$
(C) $\frac{1}{2\pi}\sqrt{\frac{6g}{2H}}$
(D) $\frac{1}{2\pi}\sqrt{\frac{g}{H}}$

Answer: (A) $\frac{1}{2\pi}\sqrt{\frac{6g}{H}\frac{1}{4^{1/3}}}$ · The council's preliminary key

Q122 AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

A body is executing S.H.M. At a displacement 'x' its potential energy is 9 J and at a displacement 'y' its potential energy is 16 J. The potential energy at displacement (x+y) is

(A) 25 J
(B) 5 J
(C) 49 J
(D) 7 J

Answer: (C) 49 J · The council's preliminary key

Q123 AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

The time period of a pendulum in a stationary lift is 'T'. If the lift moves upwards with acceleration $\frac{g}{6}$, the time period of the pendulum becomes _____

(A) $\left(\sqrt{\frac{6}{7}}\right)T$
(B) $\left(\frac{\sqrt{5}}{2}\right)T$
(C) $\left(\frac{\sqrt{6}}{7}\right)T$
(D) $\left(\frac{2}{\sqrt{5}}\right)T$

Answer: (A) $\left(\sqrt{\frac{6}{7}}\right)T$ · The council's preliminary key

Q124 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

Match the following entries in column-I and column-II with respect to an oscillating spring-block system:
Column-I
a) Mass of the block is doubled
b) Spring constant is made 4 times
c) Amplitude of oscillations is doubled
d) Angular frequency is doubled
Column-II
i) Energy of oscillation becomes 4 times
ii) Speed of block becomes 2 times
iii) P.E. becomes 4 times
iv) Time period becomes $\sqrt{2}$ times

(A) a-iii, b-ii, c-i, d-iv
(B) a-iv, b-i, c-iii, d-ii
(C) a-ii, b-iii, c-iv, d-i
(D) a-iv, b-iii, c-ii, d-i

Options (2) or (4) were accepted. More than one answer was accepted. · The council's preliminary key

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Q125 AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

A particle of mass $0.4\ \text{kg}$ executes simple harmonic motion of amplitude $0.4\ \text{m}$. When it passes through the mean position, its kinetic energy is $256 \times 10^{-3}\ \text{J}$. If the initial phase of the oscillation is $\frac{\pi}{4}$, then the equation of its motion is _____

(A) $x = 0.4 \sin\left((0.4)t + \frac{\pi}{4}\right)$
(B) $x = 0.2 \sin\left(2\sqrt{2} + \left(\frac{\pi}{4}\right)t\right)$
(C) $x = 0.8 \sin\left((2\sqrt{2})t + \frac{\pi}{2}\right)$
(D) $x = 0.4 \sin\left((2\sqrt{2})\,t + \frac{\pi}{4}\right)$

Answer: (D) $x = 0.4 \sin\left((2\sqrt{2})\,t + \frac{\pi}{4}\right)$ · The council's preliminary key

Q126 AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

The displacement of a simple harmonic motion of amplitude $6\ \text{cm}$ when its kinetic energy is equal to its potential energy is _____

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

Answer: (C) $3\sqrt{2}\ \text{cm}$ · The council's preliminary key

Q127 AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

A particle executing simple harmonic motion has a maximum speed of $40\ \text{m.s}^{-1}$ and maximum acceleration of $60\ \text{m.s}^{-2}$. The period of oscillation is _____

(A) $\frac{4\pi}{3}\ \text{s}$
(B) $\frac{\pi}{2}\ \text{s}$
(C) $2\pi\ \text{s}$
(D) $\frac{1}{\pi}\ \text{s}$

Answer: (A) $\frac{4\pi}{3}\ \text{s}$ · The council's preliminary key

Q128 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

A simple pendulum is vibrating in an evacuated chamber. It will oscillate with _____

(A) Constant amplitude
(B) Decreasing amplitude
(C) Increasing amplitude
(D) Amplitude, the variation of which cannot be predicted

Answer: (A) Constant amplitude · The council's preliminary key

Q129 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

Two particles 'P' and 'Q' describe SHM of same amplitude 'a' and same frequency 'f' along the same straight line. The maximum distance between the two particles is $a\sqrt{2}$. The phase difference between the particle is _____

(A) Zero
(B) $\frac{\pi}{2}$
(C) $\frac{\pi}{6}$
(D) $\frac{\pi}{3}$

Answer: (B) $\frac{\pi}{2}$ · The council's preliminary key

Q130 AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

A simple harmonic oscillation is represented by $x = A\cos\left(\omega t + \frac{\pi}{4}\right)$. Its speed is maximum when 't' equals _____

(A) $\frac{\pi}{2\omega}$
(B) $\frac{\pi}{4\omega}$
(C) $\frac{\pi}{\omega}$
(D) $\frac{2\pi}{\omega}$

Answer: (B) $\frac{\pi}{4\omega}$ · The council's preliminary key

Q131 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

A simple pendulum, suspended from the ceiling of a lift, has a period of oscillation T, when the lift is at rest. If the lift starts moving upwards with an acceleration $a = 3g$, then the new period will be

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

Answer: (D) $\frac{T}{2}$ · The council's preliminary key

Q132 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

A body of mass $4.9\ kg$ hangs from a spring and oscillates with a period $0.5\ s$. On the removal of the body, the spring is shortened by _____ (Take $g = 10\ m.s^{-2}, \pi^2 = 10$)

(A) $6.3\ m$
(B) $0.63\ m$
(C) $6.25\ cm$
(D) $63\ cm$

Answer: (C) $6.25\ cm$ · The council's preliminary key

Q133 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

The amplitude of a damped oscillator is known to decrease to 0.9 times its original magnitude in 5 seconds. Approximately, by how many times its original magnitude will its amplitude decrease after another 20 seconds?

(A) 0.73
(B) 0.9
(C) 0.59
(D) 0.26

Answer: (C) 0.59 · The council's preliminary key

Q134 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

Ratio of maximum acceleration to the maximum velocity of a simple harmonic oscillator is

(A) ω
(B) $\frac{\omega}{2}$
(C) ω^2
(D) 2ω

Answer: (A) ω · The council's preliminary key

Q135 AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

A particle of mass 'm' is under an influence of a force $\vec{F} = -k\vec{x} + \vec{F}_0$. The particle when disturbed will oscillate _____

(A) About $x = 0$ with $\omega = \sqrt{\frac{k}{m}}$
(B) About $x = 0$ with $\omega = \sqrt{\frac{m}{k}}$
(C) About $x = \frac{F_0}{k}$ with $\omega = \sqrt{\frac{k}{m}}$
(D) About $x = \frac{F_0}{k}$ with $\omega \neq \sqrt{\frac{k}{m}}$

Answer: (C) About $x = \frac{F_0}{k}$ with $\omega = \sqrt{\frac{k}{m}}$ · The council's preliminary key

Q136 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

A particle executing simple harmonic motion along a straight line with an amplitude A, attains maximum potential energy when its displacement from mean position equals _____.

(A) 0
(B) $\pm\frac{A}{\sqrt{2}}$
(C) $\pm A$
(D) $\pm\frac{A}{2}$

Answer: (C) $\pm A$ · The council's preliminary key

Q137 AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

The bob of a simple pendulum is a spherical hollow ball filled with water. A plugged hole near the bottom of the oscillating bob gets suddenly unplugged. During observation, till water is coming out, the time period of oscillation would:

(A) remain unchanged
(B) increase towards a saturation value
(C) first increase and then decrease to the original value.
(D) first decrease and then increase to the original value.

Answer: (C) first increase and then decrease to the original value. · The council's preliminary key

Q138 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

In case of a forced vibration, the resonance wave becomes very sharp when the:

(A) quality factor is small
(B) dampening force is small
(C) restoring force is small
(D) applied periodic force is small

Answer: (B) dampening force is small · The council's preliminary key

Q139 AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

Two waves are represented by: $x_1 = A\sin\left(\omega t + \frac{\pi}{6}\right)$ and $x_2 = A\cos\omega t$ Then the phase difference between them is _____

(A) $\frac{\pi}{6}$
(B) $\frac{\pi}{2}$
(C) $\frac{\pi}{3}$
(D) π

Answer: (C) $\frac{\pi}{3}$ · The council's preliminary key

Q140 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

A spring is stretched by $0.40\ m$ when a mass of $0.6\ kg$ is suspended from it. The period of oscillations of the spring loaded by $255\ gm$ and put to oscillations is close to _____ (g = $10\ \mathrm{m.s^{-2}}$)

(A) $11\ s$
(B) $48.6\ s$
(C) $0.82\ s$
(D) $4.86\ s$

Answer: (C) $0.82\ s$ · The council's preliminary key

Q141 AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

A heavy brass sphere is hung from a spring and it executes vertical vibrations with period T. The sphere is now immersed in a non-viscous liquid with a density $(1/10)^{th}$ that of brass. When set into vertical vibrations with the sphere remaining inside liquid all the time, the time period will be

(A) $\left(\sqrt{\frac{9}{10}}\right)T$
(B) $\left(\sqrt{\frac{10}{9}}\right)T$
(C) $\left(\frac{9}{10}\right)T$
(D) Unchanged

Answer: (D) Unchanged · The council's preliminary key

Q142 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

A block of mass $1\ \mathrm{kg}$ is fastened to a spring of spring constant of $100\ \mathrm{N.m^{-1}}$. The block is pulled to a distance $x = 10\ \mathrm{cm}$ from its equilibrium position ($x = 0\ \mathrm{cm}$) on a frictionless surface, from rest at $t = 0$. The kinetic energy and the potential energy of the block when it is $5\ \mathrm{cm}$ away from the mean position is _____

(A) $0.375\ \mathrm{J},\ 0.125\ \mathrm{J}$
(B) $0.125\ \mathrm{J},\ 0.375\ \mathrm{J}$
(C) $0.125\ \mathrm{J},\ 0.125\ \mathrm{J}$
(D) $0.375\ \mathrm{J},\ 0.375\ \mathrm{J}$

Answer: (A) $0.375\ \mathrm{J},\ 0.125\ \mathrm{J}$ · The council's preliminary key

Q143 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

The scale of a spring balance which can measure from 0 to $15\ \mathrm{kg}$ is $0.25\ \mathrm{m}$ long. If a body suspended from this balance oscillates with a time period $\frac{2\pi}{5}$ seconds, neglecting the mass of the spring, find the mass of the body suspended.

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(A) $24\ \text{kg}$
(B) $1\ \text{kg}$
(C) $20\ \text{kg}$
(D) $7\ \text{kg}$

Answer: (A) $24\ \text{kg}$ · The council's preliminary key

Q144 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

A particle executes simple harmonic motion according to the equation $x(t) = A\sin^2(\alpha t)$. If the time period of the S.H.M is 0.2 s, then the value of α (in units of rad/s) is

(A) 2π
(B) 10π
(C) 5π
(D) 2.5π

Answer: (C) 5π · The council's preliminary key

Q145 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

Two particles execute simple harmonic motion (SHM) along close parallel lines. SHM of the both the particles have same frequency and same amplitude. When they pass each other moving in opposite direction each time, their displacement is half their amplitude. Then their phase difference is

(A) 0
(B) $2\pi/3$
(C) $\pi/3$
(D) $\pi/2$

Answer: (B) $2\pi/3$ · The council's preliminary key

Q146 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

The displacement of a particle in simple harmonic motion (SHM) is given by $y = \sqrt{3\pi}\sin\left(\frac{100}{\pi}t + \frac{\pi}{4}\right)$. What will be the displacement of the particle from the mean position when its kinetic energy is eight times that of its potential energy?

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

Answer: (A) $\sqrt{\frac{\pi}{3}}$ · The council's preliminary key

Q147 TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

A simple harmonic oscillator has an amplitude of 0.5 m and a time period of 2 seconds. What is the magnitude of acceleration when it is displaced from the mean position by 0.25 m?

(A) π^2 m/s^2
(B) $\frac{\pi^2}{2}$ m/s^2
(C) $\frac{\pi^2}{4}$ m/s^2
(D) $\frac{\pi^2}{8}$ m/s^2

Answer: (C) $\frac{\pi^2}{4}$ m/s^2 · The council's preliminary key

Q148 TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

A body of mass 1 kg is executing simple harmonic motion (SHM). Its displacement y (in cm) at time t given by $y = \left[6 \sin\left(100t + \frac{\pi}{4}\right)\right]$ cm. Its maximum kinetic energy is

(A) 1.8 J
(B) 18 J
(C) 180 J
(D) 0.18 J

Answer: (B) 18 J · The council's preliminary key

Q149 TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

A particle is executing simple harmonic motion (SHM). Its acceleration at a distance of 1 cm from the mean position is $3\ \mathrm{cm/s^2}$. If its velocity is 6 cm/s when it is at a distance of 2 cm from its mean position, then the amplitude of SHM is

(A) $5\ \mathrm{cm}$
(B) $4\ \mathrm{cm}$
(C) $2\sqrt{3}\ \mathrm{cm}$
(D) $3\sqrt{2}\ \mathrm{cm}$

Answer: (B) $4\ \mathrm{cm}$ · The council's preliminary key

Q150 AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

A particle executes simple harmonic motion between $x = -A$ and $x = +A$. If it takes a time T_1 to go from $x = 0$ to $x = A/2$ and T_2 to go from $x = A/2$ to $x = A$. Then

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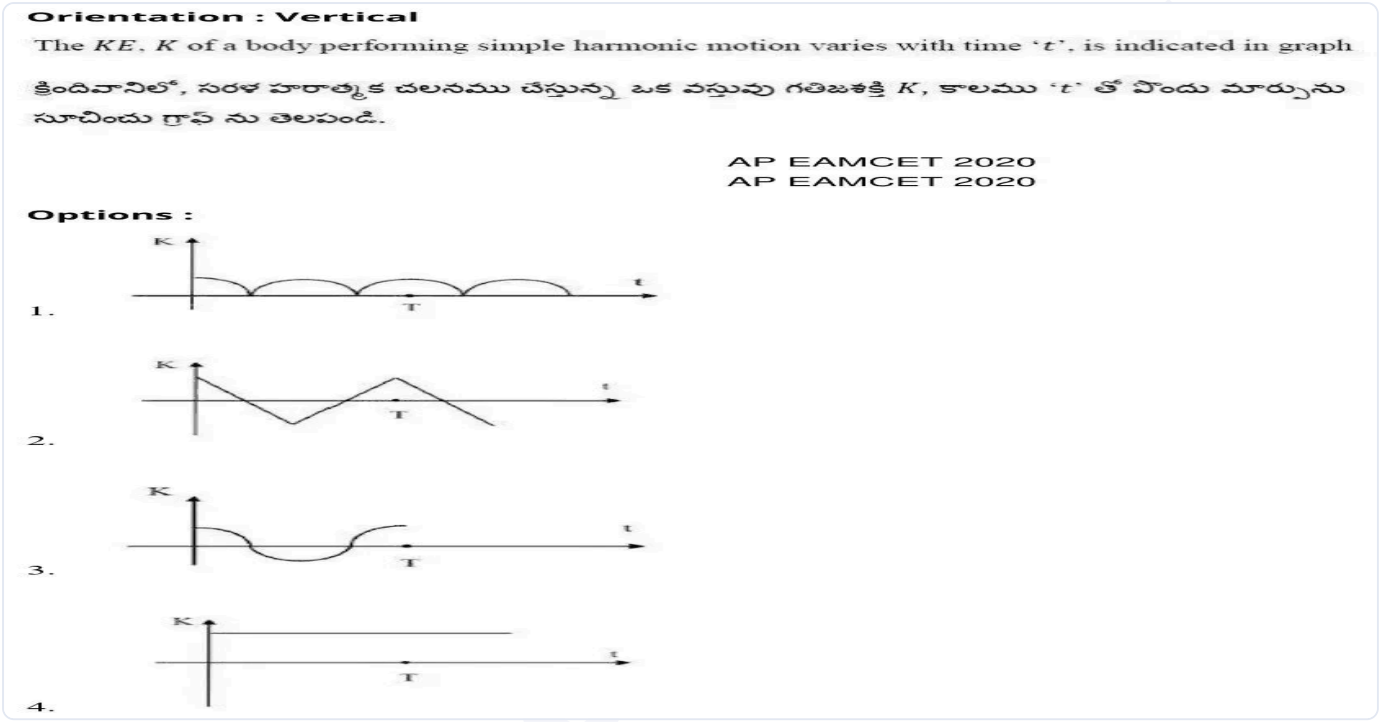
(A) $T_1 < T_2$
(B) $T_1 > T_2$
(C) $T_1 = T_2$
(D) $T_1 = 2T_2$

Answer: (A) $T_1 < T_2$ · The council's preliminary key

Q151 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

The KE, K of a body performing simple harmonic motion varies with time 't', is indicated in graph



(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (A) · The council's preliminary key

Q152 AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

The acceleration of a particle executing S.H.M. is _____

(A) Always zero
(B) Always constant
(C) Maximum at the extreme position
(D) Maximum at the equilibrium position

Answer: (C) Maximum at the extreme position · The council's preliminary key

Q153 AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

The maximum velocity of a particle performing simple harmonic motion is 6.28 $\mathrm{cm.s^{-1}}$. If the length of its path is 8 cm, what is its period?

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

Answer: (B) 4 s · The council's preliminary key

Q154 AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

The maximum force acting on a particle executing simple harmonic motion is $10\ \mathrm{N}$. The force on the particle when it is midway between mean and extreme positions will be

(A) $10\ \mathrm{N}$
(B) $12\ \mathrm{N}$
(C) $5\ \mathrm{N}$
(D) 0

Answer: (C) $5\ \mathrm{N}$ · The council's preliminary key

Q155 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

A body executes simple harmonic motion with an amplitude A. At what displacement, from the mean position, is the potential energy of the body one fourth of its total energy?

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

Answer: (B) $\frac{A}{2}$ · The council's preliminary key

Q156 AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

Four pendulums A, B, C and D are hanged from the same elastic support as shown in figure. A and C are of the same length while B is smaller than A, C while D is longer than A. If A is given displacement, then at steady state

(see the figure above)

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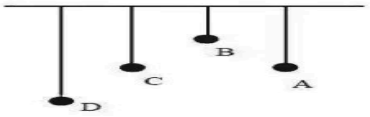
Orientation : Vertical

Four pendulums A, B, C and D are hanged from the same elastic support as shown in figure. A and C are of the same length while B is smaller than A, C while D is longer than A. If A is given displacement, then at steady state

ఈ క్రింది బొమ్మలో చూపినట్లు ఒక స్థిర స్థావర ఆధారము నుండి నాలుగు లోలకాలు A, B, C మరియు D లు వ్రేలాడ దీశారు. A మరియు C ల పొడవులు సమానము, B పొడవు A, C ల కంటే తక్కువ మరియు D పొడవు A కంటే ఎక్కువ. A కి స్థాన భ్రంశాన్ని కలిగించి వదిలినారు. నిలకడ స్థితిలో



Options :

1. D will vibrate with max amplitude
   D గరిష్ఠ కంపన పరిమితి తో కంపించును

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AP EAMCET 2020

2. C will vibrate with max amplitude
   C గరిష్ఠ కంపన పరిమితి తో కంపించును

3. B will vibrate with max amplitude
   B గరిష్ఠ కంపన పరిమితి తో కంపించును

4. All four will osculate with equal amplitude
   నాలుగు ఒకే కంపన పరిమితి తో కంపించాయి

(A) D will vibrate with max amplitude

(B) C will vibrate with max amplitude

(C) B will vibrate with max amplitude

(D) All four will osculate with equal amplitude

Answer: (B) C will vibrate with max amplitude · The council's preliminary key

Q157 AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

Three blocks of masses $700\ \text{g}$, $500\ \text{g}$ and $400\ \text{g}$, suspended at the end of a spring as shown in the figure, are in equilibrium. When the $700\ \text{g}$ block is removed, the system has a period of oscillations of $3\ s$. If both $700\ \text{g}$ and $500\ \text{g}$ blocks are removed, the period of oscillation becomes _____

(see the figure above)

Orientation : Vertical

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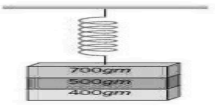
Three blocks of masses 700 g , 500 g and 400 g, suspended at the end of a spring as shown in the figure, are in equilibrium. When the 700 g block is removed, the system has a period of oscillations of 3 s. If both 700 g and 500 g blocks are removed, the period of oscillation becomes _____

700 g , 500 g మరియు 400 g ద్రవ్యరాశులు గల మూడు బ్లాకులు ఒక స్ప్రింగుకి, పై పటంలో చూపిన విధముగా వ్రేలాడ తీయగా, అవి సమతుల్యతలో ఉన్నవి. సమతుల్యతలో ఉన్న వ్యవస్థ నుండి 700 g బరువును తీసివేస్తే 3 సె॥ల ఆవర్తన కాలముతో ఆ వ్యవస్థ డోలనాలు చేసింది. ఒకవేళ 700 g మరియు 500 g బ్లాకులు రెండింటిని తీసివేస్తే ఆ వ్యవస్థ ఆవర్తన కాలము ఎంత?



Options :

1. 1 s
2. 2 s
3. 3 s
4. $\sqrt{\frac{12}{5}}\ s$

(A) $1\ s$

(B) $2\ s$

(C) $3\ s$

(D) $\sqrt{\frac{12}{5}}\ s$

Answer: (B) $2\ s$ · The council's preliminary key

Q158 AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

On a smooth inclined plane, a mass M is attached between two massless springs of force constant k each, as shown in the figure. The other ends of the springs are fixed to firm supports. The period of oscillation of the mass M is

(see the figure above)

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Orientation : Vertical

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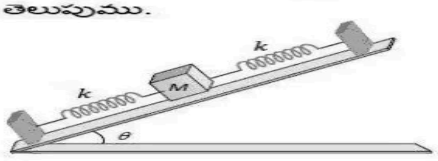
On a smooth inclined plane, a mass M is attached between two massless springs of force constant k each, as shown in the figure. The other ends of the springs are fixed to firm supports. The period of oscillation of the mass M is

ఒక నున్నని వాలు తలముపై M ద్రవ్యరాశి గల వస్తువును రెండు ద్రుడ ఆధారాల మధ్య k బలస్థిరాంకాలు గల స్ప్రింగులతో, పటంలో చూపిన విధముగా కలిపారు. ఆ స్ప్రింగుల ద్రవ్యరాశులు ఉపేక్షించెటట్లు ఉండిన, ఆ వస్తువు యొక్క ఆవర్తన కాలము తెలుపుము.



Options :

1. $2\pi\left(\frac{M}{2k}\right)^{1/2}$
2. $2\pi\left(\frac{2M}{k}\right)^{1/2}$
3. $2\pi\left(\frac{Mg\sin\theta}{2k}\right)$
4. $2\pi\left(\frac{2Mg}{k}\right)^{1/2}$

(A) $2\pi\left(\frac{M}{2k}\right)^{1/2}$

(B) $2\pi\left(\frac{2M}{k}\right)^{1/2}$

(C) $2\pi\left(\frac{Mg\sin\theta}{2k}\right)$

(D) $2\pi\left(\frac{2Mg}{k}\right)^{1/2}$

Answer: (A) $2\pi\left(\frac{M}{2k}\right)^{1/2}$ · The council's preliminary key

Q159 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

The variation of PE of a harmonic oscillator is as shown in the figure. Then find the spring constant

(A) $1\times10^{2}\ \mathrm{N.m^{-1}}$

(B) $150\ \mathrm{N.m^{-1}}$

(C) $0.667\times10^{2}\ \mathrm{N.m^{-1}}$

(D) $3\times10^{2}\ \mathrm{N.m^{-1}}$

Answer: (B) $150\ \mathrm{N.m^{-1}}$ · The council's preliminary key

Q160 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

A particle is exhibiting simple harmonic motion has its displacement (x) and velocity (v) related as $4v^2 = 25 - x^2$. The time period of SHM is

(A) π sec

(B) 2π sec

(C) 3π sec

(D) 4π sec

Answer: (D) 4π sec · Official TGCHE final key

Q161 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

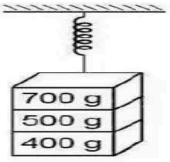
Three masses 700g, 500g and 400g are suspended at the end of a spring shown in figure and are in equilibrium. When the 700g mass is removed, the system oscillates with a time period of 3 seconds. If 500 gm mass is further removed then it will oscillate with a period of

(see the figure above)

Question Number : 101 Question Id : 7196501221 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Correct Marks : 1 Wrong Marks : 0

Three masses 700g, 500g and 400g are suspended at the end of a spring shown in figure and are in equilibrium. When the 700g mass is removed, the system oscillates with a time period of 3 seconds. If 500 gm mass is further removed then it will oscillate with a period of

700g, 500g మరియు 400g ద్రవ్యరాశులు ఒక స్ప్రింగ్ చివరన పటంలో చూపిన విధంగా వేలాడబడి ఉన్నాయి. 700g ద్రవ్యరాశిని తొలగించినప్పుడు, ఆ వ్యవస్థ 3 సెకన్ల ఆవర్తన కాలంతో డోలనం చేస్తుంది. తరువాత దాని నుండి 500g ద్రవ్యరాశిని కూడా తొలగిస్తే, వ్యవస్థ ఆవర్తన కాలం



Options :

1. 1 s
2. 2 s
3. 3 s
4. $\sqrt{\frac{12}{5}}$ s

(A) 1 s

(B) 2 s

(C) 3 s

(D) $\sqrt{\frac{12}{5}}$ s

Answer: (B) 2 s · Official TGCHE final key

Q162 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

A particle is executing simple harmonic motion in one dimension. If the amplitude of oscillations is 0.2 cm and if its velocity at the mean position is $5\,m/s$, then the angular frequency of the oscillation is

(A) $1000\ rad/s$
(B) $1500\ rad/s$
(C) $2000\ rad/s$
(D) $2500\ rad/s$

Answer: (D) $2500\ rad/s$ · Official TGCHE final key

Q163 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

A body is oscillating in simple harmonic motion according to the equation $x = 6\cos\left(2\pi t + \frac{\pi}{3}\right)$ meters. The magnitude of the acceleration (in $\mathrm{m/s^2}$) of the body at $t = 1\mathrm{s}$.

(A) $12\pi^2$
(B) 12π
(C) $4\pi^2$
(D) 4π

Answer: (A) $12\pi^2$ · Official TGCHE final key

Q164 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

Consider a simple harmonic motion (SHM). Let K and U be kinetic energy and potential energy when the displacement in SHM is one -half $\left(\frac{1}{2}\right)$ the amplitude. The correct statement is

(A) $\frac{K}{U} = 1$
(B) $\frac{K}{U} = \frac{1}{2}$
(C) $\frac{K}{U} = \frac{4}{3}$
(D) $\frac{K}{U} = 3$

Answer: (D) $\frac{K}{U} = 3$ · Official TGCHE final key

Q165 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

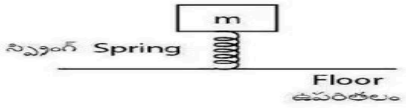
A stiff spring having spring constant K = 400 N/m is attached to the floor vertically. A mass m=10 kg is placed on top of the spring. The block oscillates if it is pressed downward and released. Find the extension in the spring at which the block loses contact with spring.
(Take $g = 10\ \mathrm{m/s^2}$)
(see the figure above)

EdLoop EAPCET

Question Number : 93 Question Id : 7196501053 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

A stiff spring having spring constant K = 400 N/m is attached to the floor vertically. A mass m=10 kg is placed on top of the spring. The block oscillates if it is pressed downward and released. Find the extension in the spring at which the block loses contact with spring.
(Take g= 10 m/s^2)

గట్టిగా వున్న స్ప్రింగ్‌ని ఒక నేల ఉపరితలంపై నుండి నిట్టనిలువుగా అతికించబడినది మరియు ఈ స్ప్రింగ్ యొక్క స్ప్రింగ్ స్థిరాంకము K = 400 N/m. ఈ స్ప్రింగ్ పై భాగములో m=10 kg ద్రవ్యరాశి గల దిమ్మె అమర్చబడివుంది. ఈ స్ప్రింగ్‌ను క్రిందకు గట్టిగా నొక్కి వదిలితే ఆ దిమ్మె డోలనాలు చేస్తుంది. అయితే స్ప్రింగ్‌లో ఎంత సాగుదలకు ఆ దిమ్మె స్ప్రింగ్‌తో బంధాన్ని కోల్పోతుంది
(g= 10 m/s^2 అనుకుందాం)



Options :

1. 25 cm
2. 15 cm
3. 20 cm
4. 22 cm

(A) 25 cm

(B) 15 cm

(C) 20 cm

(D) 22 cm

Answer: (A) 25 cm · Official TGCHE final key

Q166 TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

For a particle executing SHM, determine the ratio of average acceleration of the particle between extreme position and equilibrium position w.r.t the maximum acceleration.

(A) $\frac{4}{\pi}$

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

(C) $\frac{1}{\pi}$

(D) $\frac{1}{2\pi}$

Answer: (B) $\frac{2}{\pi}$ · Official TGCHE final key

Q167 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

A point mass oscillates along the x-axis according to the law $x = x_0 \cos\left(\omega t - \frac{\pi}{4}\right)$. If the acceleration of the particle is written as $a = A\cos(\omega t - \delta)$, then

(A) $A = x_0\omega^2, \delta = \frac{-3\pi}{4}$
(B) $A = x_0, \delta = -\frac{\pi}{4}$
(C) $A = x_0\omega^2, \delta = \frac{\pi}{4}$
(D) $A = x_0\omega^2, \delta = \frac{3\pi}{4}$

Answer: (A) $A = x_0\omega^2, \delta = \frac{-3\pi}{4}$ · Official TGCHE final key

Q168 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

A simple harmonic oscillator of frequency 1 Hz has a phase of 1 radian. By how much should the origin be shifted in time so as to make the phase of the oscillator vanish. (time in seconds (s)).

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

Answer: (B) $-\frac{1}{2\pi}$ s · Official TGCHE final key

Q169 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

A small sphere of radius r is placed as a concave surface of radius of curvature R a little away from the centre. When the sphere is released, it oscillates. Assuming the oscillation to be simple harmonic motion, and r << R then the time period is

(A) $2\pi\sqrt{\frac{R}{g}}$
(B) $2\pi\sqrt{\frac{3R}{2g}}$
(C) $2\pi\sqrt{\frac{2R}{3g}}$
(D) $2\pi\sqrt{\frac{R}{2g}}$

Answer: (A) $2\pi\sqrt{\frac{R}{g}}$ · Official TGCHE final key

Q170 TS EAMCET 2019 · 6 May · Shift 1 MCQ

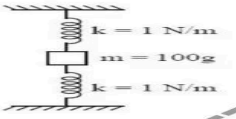
A block of mass 100 g is suspended vertically from a massless spring system of spring-constant $k = 1$ N/m each. The block is hit from above to impart an impulse of 2 Ns. Calculate the maximum displacement from the equilibrium position of the block
(Let $g = 10$ m/s^2)
(see the figure above)

EdLoop EAPCET

Question Number : 88 Question Id : 75123665048 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A block of mass 100 g is suspended vertically from a massless spring system of spring-constant $k = 1$ N/m each. The block is hit from above to impart an impulse of 2 Ns. Calculate the maximum displacement from the equilibrium position of the block (Let g = 10 m/s^2)

100 g ద్రవ్యరాశిగల ఒక దిమ్మను, స్ప్రింగ్ యొక్క స్థిరాంకము $k = 1$ N/m గా కలిగిన ద్రవ్యరాశి లేని స్ప్రింగ్ వ్యవస్థ నుండి నిట్టనిలువుగా క్రిందదీయబడినది. ప్రచోదనము 2 Ns కలుగునట్లు దిమ్మను పైనుండి కొట్టబడినది. సమతాస్థితి స్థానము నుండి దిమ్మ పొందు గరిష్ఠ స్థానభ్రంశాన్ని లెక్కించండి. ($g = 10$ m/s^2 గా తీసుకొనుము)



TS EAMCET 2019

Options :

1. 2 m
2. 4 m
3. 5 m
4. 9 m

(A) 2 m

(B) 4 m

(C) 5 m

(D) 9 m

Answer: (C) 5 m · Official TGCHE final key

Q171 TS EAMCET 2019 · 6 May · Shift 1 MCQ

A uniform rod of length 1.8 m suspended by an end is made to undergo small oscillations. Find the length of the simple pendulum having the mass and time period equal to that of the rod.

(A) 3.6 m

(B) 1.2 m

(C) 2.4 m

(D) 4.2 m

Answer: (B) 1.2 m · Official TGCHE final key

Q172 TS EAMCET 2019 · 4 May · Shift 1 MCQ

A body of mass 0.3 kg hangs by a spring with a force constant of 50 N/m. The amplitude of oscillations is damped and reaches $\frac{1}{e}$ of its original value in about 100 oscillations. If ω and ω' are the angular frequencies of undamped and damped oscillations respectively, then percentage of $\left(\frac{\omega-\omega'}{\omega}\right)$ is

(A) $\left(\frac{1}{800\pi}\right)$
(B) $\left(\frac{\pi^2}{600}\right)$
(C) $\left(\frac{1}{800\pi^2}\right)$
(D) $\left(\frac{\pi}{400}\right)$

Answer: (C) $\left(\frac{1}{800\pi^2}\right)$ · Official TGCHE final key

Q173 TS EAMCET 2019 · 4 May · Shift 2 MCQ

If the displacement of a body is given by $x = 3\cos\left[2\pi t + \frac{\pi}{4}\right]$ m, then the acceleration of the body at $t = 2$ s is

(A) 0
(B) $-6\sqrt{2}\pi^2$ m/s^2
(C) $-10\pi^2$ m/s^2
(D) $-12\sqrt{2}\pi^2$ m/s^2

Answer: (B) $-6\sqrt{2}\pi^2$ m/s^2 · Official TGCHE final key

Q174 TS EAMCET 2019 · 4 May · Shift 2 MCQ

Two particles executing simple harmonic motion as described by $y_1 = 30\sin\left(2\pi t + \frac{\pi}{3}\right)$ and $y_2 = 10(\sin 2\pi t + \sqrt{3}\cos 2\pi t)$ have amplitudes A_1 and A_2 respectively. The ratio $A_1 : A_2$ is

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

Answer: (C) 3:2 · Official TGCHE final key

Q175 TS EAMCET 2019 · 3 May · Shift 1 MCQ

A vertical spring mass system has the same time-period as a simple pendulum undergoing small oscillations. Now both of them are put in an elevator going downwards with an acceleration $5\ \mathrm{m/s^2}$. The ratio of time-period of the spring mass system to the time-period of the pendulum is (Assume $g = 10\ \mathrm{m/s^2}$)

(see the figure above)

EdLoop EAPCET

Question Number : 92 Question Id : 7812364... Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A vertical spring mass system has the same time-period as a simple pendulum undergoing small oscillations. Now both of them are put in an elevator going downwards with an acceleration 5 m/s^2. The ratio of time-period of the spring mass system to the time-period of the pendulum is (Assume $g = 10\ m/s^2$)

ఒక నిలువు స్ప్రింగ్-ద్రవ్యరాశి వ్యవస్థకు, దిగ్ డోలనాలు చేస్తున్న ఒక సాధారణ లోలకం యొక్క డోలనావ్యవధి సమానం. ఈ రెండింటిని, క్రిందకు 5 m/s^2 త్వరణం వెళ్తున్న ఒక లిఫ్ట్‌లో ఉంచినారు. అయితే, స్ప్రింగ్-ద్రవ్యరాశి వ్యవస్థకు గల ఆవర్తన కాలానికి, లోలకపు ఆవర్తన కాలానికి గల నిష్పత్తి ఎంత ($g = 10\ m/s^2$ గా ఉంచుకోండి)



TS EAMCET 2019

Options :

1. $\sqrt{\frac{3}{2}}$
2. $\sqrt{\frac{2}{3}}$
3. $\frac{1}{\sqrt{2}}$
4. $\sqrt{2}$

(A) $\sqrt{\frac{3}{2}}$

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

(C) $\frac{1}{\sqrt{2}}$

(D) $\sqrt{2}$

Answer: (C) $\frac{1}{\sqrt{2}}$ · Official TGCHE final key

Q176 TS EAMCET 2019 · 3 May · Shift 2 MCQ

A particle of mass 0.1 kg is executing simple harmonic motion of amplitude 0.1 m. When the particle passes through the mean position, its kinetic energy is 8×10^{-3} J. If the initial phase is 45°, the equation of its motion is (Assume, $x(t)$ as the position of the particle at time t)

(A) $x(t) = 0.1 \sin\left(4t + \frac{\pi}{4}\right)$

(B) $x(t) = 0.1 \sin\left(16t + \frac{\pi}{4}\right)$

(C) $x(t) = 0.1 \sin\left(2\left(t + \frac{\pi}{4}\right)\right)$

(D) $x(t) = 0.1 \sin\left(2t + \frac{\pi}{4}\right)$

Answer: (A) $x(t) = 0.1 \sin\left(4t + \frac{\pi}{4}\right)$ · Official TGCHE final key

Q177 TS EAMCET 2019 · 3 May · Shift 2 MCQ

Which of the following equation represents a simple harmonic motion? (ω is angular frequency, A is amplitude of oscillation and $i = \sqrt{-1}$)

(A) $\frac{dx}{dt} = i\omega\sqrt{x^2 - A^2}$
(B) $\frac{d^2x}{dt^2} = \omega^2 x$
(C) $\frac{d^2x}{dt^2} = i\omega\sqrt{x^2 - A^2}$
(D) $\frac{d^2x}{dt^2} = \omega x^2$

Answer: (A) $\frac{dx}{dt} = i\omega\sqrt{x^2 - A^2}$ · Official TGCHE final key

Q178 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

A body of mass $1\ \text{kg}$ is suspended from a spring of negligible mass. Another body of mass $500\ \text{g}$ moving vertically upwards hits the suspended body with a velocity of $3\ \text{ms}^{-1}$ and gets embedded in it. If the frequency of oscillation of the system of the two bodies after collision is $\frac{10}{\pi}\ \text{Hz}$, the amplitude of motion and the spring constant are respectively

(A) $5\ \text{cm},\ 300\ \text{Nm}^{-1}$
(B) $10\ \text{cm},\ 300\ \text{Nm}^{-1}$
(C) $10\ \text{cm},\ 600\ \text{Nm}^{-1}$
(D) $5\ \text{cm},\ 600\ \text{Nm}^{-1}$

Answer: (D) $5\ \text{cm},\ 600\ \text{Nm}^{-1}$ · Official APSCHE final key

Q179 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

A particle executing SHM along a straight line has zero velocity at points A and B whose distances from 'O' on the same line OAB are 'a' and 'b' respectively. If the velocity at the mid point between A and B is 'v', then its time period is

(A) $\frac{\pi(b+a)}{\text{v}}$
(B) $\pi\left(\frac{b-a}{\text{v}}\right)$
(C) $\left(\frac{b+a}{2\text{v}}\right)$
(D) $\left(\frac{b-a}{2\text{v}}\right)$

Answer: (B) $\pi\left(\frac{b-a}{\text{v}}\right)$ · Official APSCHE final key

Q180 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

A particle is executing simple harmonic motion along a straight line PQ. At three points A, B and C on the line PQ, lying on one side of the mean position, the velocities of the particle are $8\ \text{ms}^{-1}$, $7\ \text{ms}^{-1}$ and $4\ \text{ms}^{-1}$ respectively. If $AB = BC = 1\ \text{m}$, the velocity of the particle at mean position is

(A) $9\ \mathrm{ms}^{-1}$

(B) $\sqrt{47}\ \mathrm{ms}^{-1}$

(C) $\sqrt{65}\ \mathrm{ms}^{-1}$

(D) $10\ \mathrm{ms}^{-1}$

Answer: (C) $\sqrt{65}\ \mathrm{ms}^{-1}$ · Official APSCHE final key

Q181 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

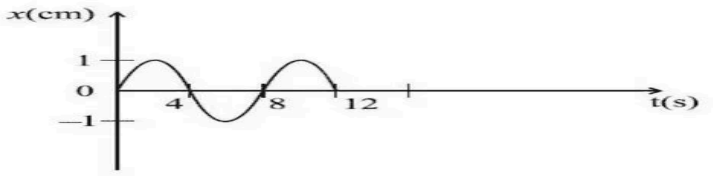
For a particle executing simple harmonic motion, the displacement-time (x - t) graph is as shown in the figure. The acceleration of the particle at $t = \frac{4}{3}$ s is

(see the figure above)

Question Number : 91 Question Id : 1874634091 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a particle executing simple harmonic motion, the displacement-time (x - t) graph is as shown in the figure. The acceleration of the particle at $t = \frac{4}{3}$s is

సరళహరాత్మక చలనం చేస్తున్న ఒక కణం యొక్క స్థానభ్రంశం-కాలం (x - t) గ్రాఫ్ పటంలో చూపినట్లుగా ఉంది. అయితే $t = \frac{4}{3}$s వద్ద ఆ కణం యొక్క త్వరణం



Options :

1. $-\frac{\sqrt{3}}{32}\pi^2\ \mathrm{cm\ s^{-2}}$
2. $-\frac{32}{\sqrt{3}}\pi^2\ \mathrm{cm\ s^{-2}}$
3. $+\frac{\sqrt{3}}{32}\pi\ \mathrm{cm\ s^{-2}}$
4. $+\frac{32}{\sqrt{3}}\pi\ \mathrm{cm\ s^{-2}}$

(A) $-\frac{\sqrt{3}}{32}\pi^2\ \mathrm{cm\,s^{-2}}$

(B) $-\frac{32}{\sqrt{3}}\pi^2\ \mathrm{cm\,s^{-2}}$

(C) $+\frac{\sqrt{3}}{32}\pi\ \mathrm{cm\,s^{-2}}$

(D) $+\frac{32}{\sqrt{3}}\pi\ \mathrm{cm\,s^{-2}}$

Answer: (A) $-\frac{\sqrt{3}}{32}\pi^2\ \mathrm{cm\,s^{-2}}$ · Official APSCHE final key

Q182 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

When a body is in SHM, then match the following.

List - I

A) Velocity is maximum

B) KE is $\left(\frac{3}{4}\right)^{\text{th}}$ of total energy

C) PE is $\left(\frac{3}{4}\right)^{\text{th}}$ of total energy

D) Acceleration is maximum

List - II

I) At extreme position
II) At mean position
III) At half of the amplitude
IV) At $\frac{\sqrt{3}}{2}$ times the amplitude
The correct answer is

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

Answer: (C) A-II, B-III, C-IV, D-I · Official APSCHE final key

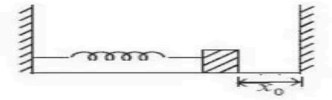
Q183 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

One end of a spring of force constant 'k' is fixed to a vertical wall and the other to a block of mass 'm' resting on a smooth horizontal surface. There is another wall at a distance 'x_0' from the block. The spring is then compressed by $2x_0$ and released. The time taken by the block to strike the other wall is *(see the figure above)*

Question Number : 91 Question Id : 1874634251 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

One end of a spring of force constant 'k' is fixed to a vertical wall and the other to a block of mass 'm' resting on a smooth horizontal surface. There is another wall at a distance 'x_0' from the block. The spring is then compressed by $2x_0$ and released. The time taken by the block to strike the other wall is

'k' స్ప్రింగ్ స్థిరాంకం గల ఒక స్ప్రింగ్ ఒక కొనను ఒక నిలువు గోడకు బిగించి దాని రెండవ కొనను ఘర్షణ రహిత క్షితిజ సమాంతర తలముపై గల 'm' ద్రవ్యరాశి గల దిమ్మెకు బిగించారు. దిమ్మె నుండి 'x_0' దూరంలో మరొక గోడ కలదు. స్ప్రింగ్‌ను $2x_0$ దూరం సంపీడ్యము చేసి వదిలిన అది మరొక గోడను తాకుటకు పట్టుకాలం



Options :
1. $\frac{1}{6}\pi\sqrt{\frac{m}{k}}$
2. $\sqrt{\frac{m}{k}}$
3. $\frac{2\pi}{3}\sqrt{\frac{m}{k}}$
4. $\frac{\pi}{4}\sqrt{\frac{m}{k}}$

(A) $\frac{1}{6}\pi\sqrt{\frac{m}{k}}$
(B) $\sqrt{\frac{m}{k}}$
(C) $\frac{2\pi}{3}\sqrt{\frac{m}{k}}$
(D) $\frac{\pi}{4}\sqrt{\frac{m}{k}}$

Answer: (C) $\frac{2\pi}{3}\sqrt{\frac{m}{k}}$ · Official APSCHE final key

Q184 AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

The amplitude of a damped oscillator becomes half in one minute. The amplitude after 3 minutes will be $\frac{1}{x}$ times the original. Then x is

(A) 4
(B) 8
(C) 6
(D) 12

Answer: (B) 8 · Official APSCHE final key

Q185 AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

A simple pendulum is placed inside a lift, which is moving with a uniform acceleration. If the time periods of the pendulum while the lift is moving upwards and downwards are in the ratio 1:2, then the acceleration of the lift is (Acceleration due to gravity = $10\ \mathrm{ms}^{-2}$)

(A) $6\ \mathrm{ms}^{-2}$
(B) $0\ \mathrm{ms}^{-2}$
(C) $3\ \mathrm{ms}^{-2}$
(D) $2\ \mathrm{ms}^{-2}$

Answer: (A) $6\ \mathrm{ms}^{-2}$ · Official APSCHE final key

Q186 TS EAMCET 2018 · 7 May · Shift 1 MCQ

The position of a particle executing simple harmonic motion is given by $x(t) = 2\cos\left(\frac{\pi}{15}t - \frac{\pi}{2}\right)$ where x is in cm and t is in seconds. The time period of the kinetic energy of the particle in seconds is

(A) π
(B) $\frac{\pi}{15}$
(C) 15
(D) 30

Answer: (C) 15 · The council's preliminary key

Q187 TS EAMCET 2018 · 4 May · Shift 1 MCQ

A particle of mass 'm' is attached to four springs with spring constant k, k, $2k$ and $2k$ as shown in the figure. Four springs are attached to the four corners of a square and a particle is placed at the center. If the particle is pushed slightly towards any side of the square and released, the period of oscillation will be

(see the figure above)

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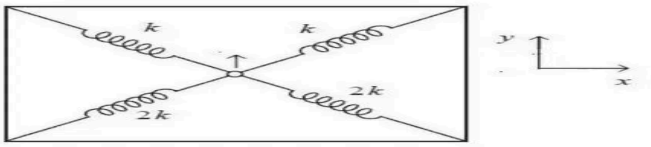
Question Number : 93 Question Id : 4928631693 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct : 1 Wrong : 0

A particle of mass 'm' is attached to four springs with spring constant k, k, $2k$ and $2k$ shown in the figure. Four springs are attached to the four corners of a square and a partic is placed at the center. If the particle is pushed slightly towards any side of the square ar released, the period of oscillation will be

'm' ద్రవ్యరాశి గల కణాన్ని k, k, $2k$ మరియు $2k$ స్ప్రింగ్ స్థిరాంకాలు కలిగిన నాలుగు స్ప్రింగులక పటంలో చూపిన విధంగా తగిలించారు. నాలుగు స్ప్రింగుల మరో చివరలను చతురస్రం మూలలక కణం మధ్యలో ఉండునట్లు తగిలించారు. కణాన్ని చతురస్రపు ఏదేని ఒక భుజంవైపు కొద్దిగా నెట్టి వదిలి దాని డోలనావర్తన కాలం



Options :
1. $2\pi\sqrt{\frac{m}{3k}}$
2. $2\pi\sqrt{\frac{m}{3\sqrt{2}k}}$
3. $2\pi\sqrt{\frac{m}{6k}}$
4. $2\pi\sqrt{\frac{m}{2k}}$

(A) $2\pi\sqrt{\frac{m}{3k}}$
(B) $2\pi\sqrt{\frac{m}{3\sqrt{2}k}}$
(C) $2\pi\sqrt{\frac{m}{6k}}$
(D) $2\pi\sqrt{\frac{m}{2k}}$

Answer: (A) $2\pi\sqrt{\frac{m}{3k}}$ · Checked by our team

Q188 TS EAMCET 2018 · 4 May · Shift 2 MCQ

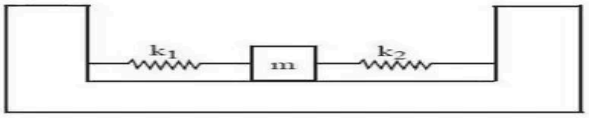
Two springs of spring constant k_1 and k_2 are connected by a mass 'm' as shown in the figure. Under negligible friction, if the mass is displaced by small amount 'x' from its equilibrium position and released, the period of oscillation is
(see the figure above)

EdLoop EAPCET

Question Number : 93 Question Id : 4928631853 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct : 1 Wrong : 0

Two springs of spring constant k_1 and k_2 are connected by a mass 'm' as shown in the figure Under negligible friction, if the mass is displaced by small amount 'x' from its equilibriun position and released, the period of oscillation is

k_1 మరియు k_2 స్ప్రింగ్ స్థిరాంకాలుగల రెండు స్ప్రింగ్‌లను 'm' ద్రవ్యరాశితో పటములో చూపిన విధంగ కలిపినారు. విస్మరించదగిన ఘర్షణ ఉన్నప్పుడు, ద్రవ్యరాశిని దాని సమతాస్థితి నుండి తక్కువ పరిమాణమున్న స్థానభ్రంశము 'x' కలిగించి వదిలిన దాని డోలనాల ఆవర్తనకాలం



Options :
1. $2\pi\sqrt{\frac{m(k_1+k_2)}{k_1k_2}}$
2. $2\pi\sqrt{\frac{m}{k_1+k_2}}$
3. $2\pi\sqrt{\frac{mk_1k_2}{(k_1+k_2)}}$
4. $2\pi\sqrt{\frac{m(k_1-k_2)}{k_1k_2}}$

(A) $2\pi\sqrt{\frac{m(k_1+k_2)}{k_1k_2}}$

(B) $2\pi\sqrt{\frac{m}{k_1+k_2}}$

(C) $2\pi\sqrt{\frac{mk_1k_2}{(k_1+k_2)}}$

(D) $2\pi\sqrt{\frac{m(k_1-k_2)}{k_1k_2}}$

Answer: (B) $2\pi\sqrt{\frac{m}{k_1+k_2}}$ · The council's preliminary key

Q189 AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

At $t = 0$, a particle executing SHM with a time period 3 s is in phase with another particle executing SHM. The time period of the second particle is T (less than 3 s). If they are again in the same phase for the third time after 45 s, then the value of T is _____

(A) 1 s

(B) 1.5 s

(C) 2 s

(D) 2.5 s

Answer: (D) 2.5 s · The council's preliminary key

Q190 AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

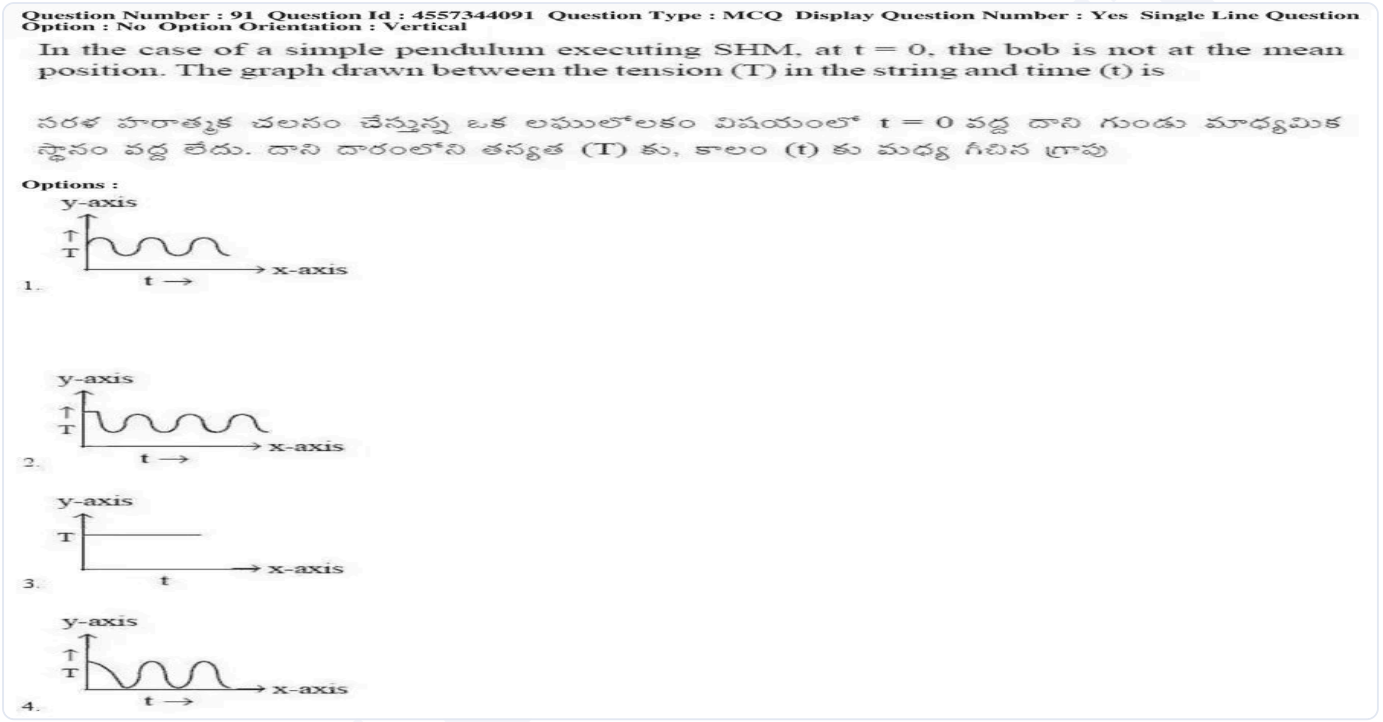
A particle starts executing simple harmonic motion from one extreme position. If a, b and c are the displacements of the particle from the mean position at the ends of three successive seconds, the frequency of simple harmonic motion is _____

(A) $\frac{1}{\pi}\cos^{-1}\left[\frac{a+b}{c}\right]$
(B) $\frac{1}{2\pi}\cos^{-1}\left[\frac{b+c}{2a}\right]$
(C) $\frac{1}{2\pi}\cos^{-1}\left[\frac{a+c}{2b}\right]$
(D) $\frac{1}{2\pi}\cos^{-1}\left[\frac{a+b}{2c}\right]$

Answer: (C) $\frac{1}{2\pi}\cos^{-1}\left[\frac{a+c}{2b}\right]$ · The council's preliminary key

Q191 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

In the case of a simple pendulum executing SHM, at $t = 0$, the bob is not at the mean position. The graph drawn between the tension (T) in the string and time (t) is
(see the figure above)



(A) *see figure*
(B) *see figure*
(C) *see figure*
(D) *see figure*

Answer: (A) · The council's preliminary key

Q192 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

The displacement of a particle of mass 2 g executing SHM is given by $y = 5\sin\left(4t + \frac{\pi}{3}\right)$. Here y is in metres and t is in seconds. The kinetic energy of the particle when $t = \frac{T}{4}$ is

(A) 0.4 J
(B) 0.5 J
(C) 3 J
(D) 0.3 J

Answer: (D) 0.3 J · The council's preliminary key

Q193 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

One end of a long metallic wire of length L, area of cross-section A and Young's modulus Y is tied to the ceiling. The other end is tied to a massless spring of force constant K and a mass 'm' is hung from the free end of the spring. If 'm' is slightly pulled down and released, then its time period of oscillation is

(A) $2\pi\sqrt{\frac{m}{K}}$
(B) $2\pi\sqrt{\frac{mYA}{KL}}$
(C) $2\pi\sqrt{\frac{m(KA+YL)}{KYA}}$
(D) $2\pi\sqrt{\frac{m(KL+YA)}{KYA}}$

Answer: (D) $2\pi\sqrt{\frac{m(KL+YA)}{KYA}}$ · The council's preliminary key

Q194 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

The potential energy of a simple harmonic oscillator of mass $2\ \text{kg}$ at its mean position is $5\ \text{J}$. If its total energy is $9\ \text{J}$ and amplitude is $1\ \text{cm}$, then its time period is

(A) $\frac{\pi}{100}\ \text{s}$
(B) $\frac{\pi}{50}\ \text{s}$
(C) $\frac{\pi}{20}\ \text{s}$
(D) $\frac{\pi}{10}\ \text{s}$

Answer: (A) $\frac{\pi}{100}\ \text{s}$ · The council's preliminary key

Q195 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

A simple pendulum with a bob of mass $40\ \text{g}$ and charge $+2\ \mu\text{C}$ makes 20 oscillations in 44 seconds. A vertical electric field of magnitude $4.2 \times 10^4\ \text{NC}^{-1}$ pointing downward is applied. The time taken by the pendulum to make 15 oscillations in the electric field is
(Acceleration due to gravity $= 10\ \text{ms}^{-2}$)

(A) $30\ \text{s}$
(B) $60\ \text{s}$
(C) $90\ \text{s}$
(D) $15\ \text{s}$

Answer: (A) $30\ \text{s}$ · The council's preliminary key

Q196 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

A particle is executing S.H.M. The time taken for $\left(\frac{3}{8}\right)^{\text{th}}$ of oscillation from extreme position is 'X'. Then the time taken for the particle to complete $\left(\frac{5}{8}\right)^{\text{th}}$ of oscillation from mean position is

(A) $\frac{5X}{4}$
(B) $\frac{7X}{4}$
(C) $\frac{21X}{8}$
(D) $\frac{7X}{12}$

Answer: (B) $\frac{7X}{4}$ · The council's preliminary key

Q197 TS EAMCET 2017 · 12 May · Offline MCQ

A simple pendulum of length 1 m is freely suspended from the ceiling of an elevator. The time period of small oscillations as the elevator moves up with an acceleration of $2\,\text{m/s}^2$ is (use $g = 10\,\text{m/s}^2$)

(A) $\frac{\pi}{\sqrt{5}}\,s$
(B) $\sqrt{\frac{2}{5}}\,\pi\,s$
(C) $\frac{\pi}{\sqrt{2}}\,s$
(D) $\frac{\pi}{\sqrt{3}}\,s$

Answer: (D) $\frac{\pi}{\sqrt{3}}\,s$ · The council's preliminary key

Q198 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

Time period of a simple pendulum of length 'L' is T_1. Time period of a uniform rod of same length 'L' suspended from one end and oscillating in a vertical plane is T_2. Amplitude of oscillation is small in both cases. Then, $\frac{T_1}{T_2}$ is

(A) $\sqrt{\frac{4}{3}}$

(B) 1

(C) $\sqrt{\frac{3}{2}}$

(D) $\sqrt{\frac{2}{3}}$

Answer: (C) $\sqrt{\frac{3}{2}}$ · The council's preliminary key

Q199 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

A particle starting from mean position executes simple harmonic motion with a period 8 s. The minimum time in which its potential energy becomes half of the total energy is _____.

(A) 8 s

(B) 4 s

(C) 1 s

(D) 0.5 s

Answer: (C) 1 s · The council's preliminary key

Q200 AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

Two particles executing SHM along a straight line have same amplitude 'A' and time period 'T'. At $t = 0$, one particle is at a displacement $+A$ and another is at a displacement $-\frac{A}{2}$ and they are approaching towards each other. They cross each other after a time.

(A) $\frac{T}{3}$

(B) $\frac{T}{4}$

(C) $\frac{5T}{6}$

(D) $\frac{T}{6}$

Answer: (D) $\frac{T}{6}$ · The council's preliminary key

Q201 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

The displacement of a particle in an oscillatory motion at a time 't' is given by $x = 8\sin\frac{\pi t}{4}$ cm, then its displacement in the time interval $t = 0$ s to $t = 2$ s is

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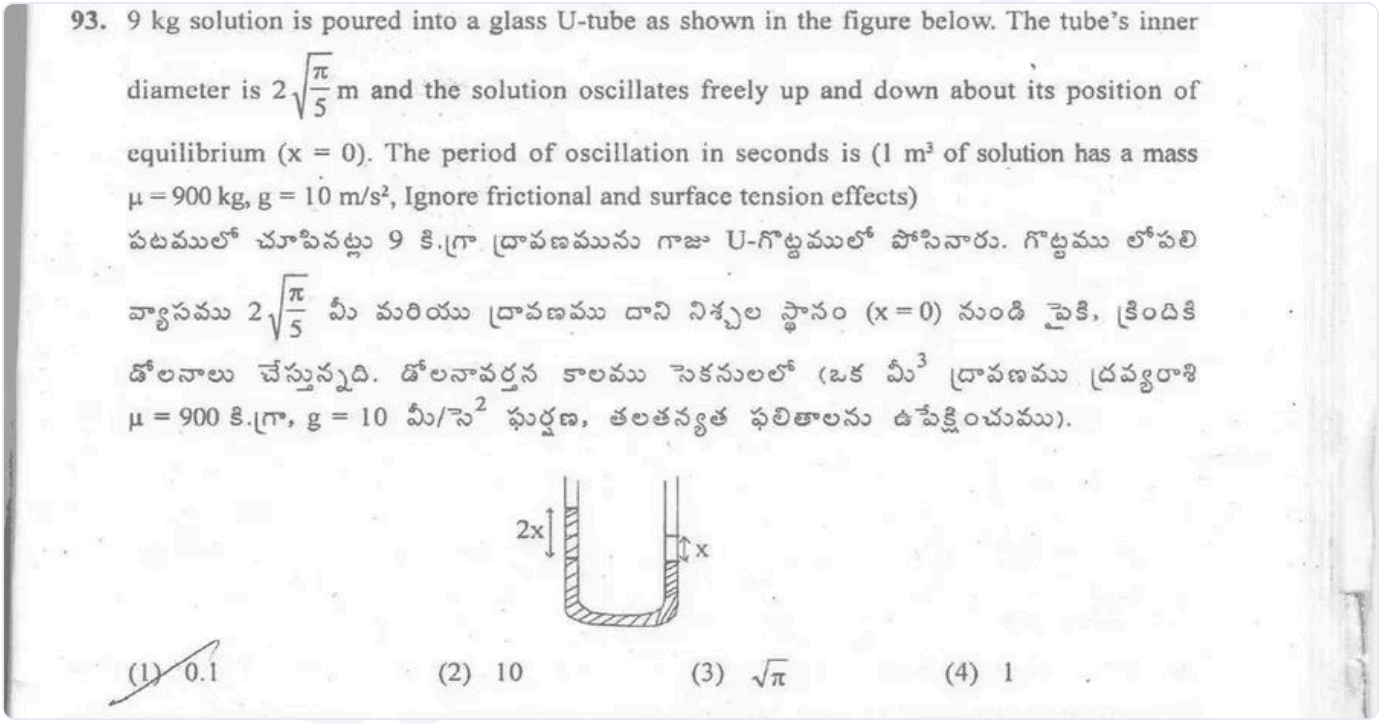
(A) 4 cm
(B) 2 cm
(C) 12 cm
(D) 8 cm

Answer: (D) 8 cm · The council's preliminary key

Q202 TS EAMCET 2016 · 15 May · Offline MCQ

9 kg solution is poured into a glass U-tube as shown in the figure below. The tube's inner diameter is $2\sqrt{\frac{\pi}{5}}$ m and the solution oscillates freely up and down about its position of equilibrium (x = 0). The period of oscillation in seconds is (1 m^3 of solution has a mass $\mu = 900$ kg, $g = 10\ \mathrm{m/s^2}$, Ignore frictional and surface tension effects)
(see the figure above)


93. 9 kg solution is poured into a glass U-tube as shown in the figure below. The tube's inner diameter is $2\sqrt{\frac{\pi}{5}}$ m and the solution oscillates freely up and down about its position of equilibrium (x = 0). The period of oscillation in seconds is (1 m³ of solution has a mass $\mu = 900$ kg, g = 10 m/s², Ignore frictional and surface tension effects)
పటములో చూపినట్లు 9 కి.గ్రా ద్రావణమును గాజు U-గొట్టములో పోసినారు. గొట్టము లోపలి వ్యాసము $2\sqrt{\frac{\pi}{5}}$ మీ మరియు ద్రావణము దాని నిశ్చల స్థానం (x = 0) నుండి పైకి, క్రిందికి డోలనాలు చేస్తున్నది. డోలనావర్తన కాలము సెకనులలో (ఒక మీ³ ద్రావణము ద్రవ్యరాశి $\mu = 900$ కి.గ్రా, g = 10 మీ/సె² ఘర్షణ, తలతన్యత ఫలితాలను ఉపేక్షించుము).
2x
x
(1) 0.1 (2) 10 (3) $\sqrt{\pi}$ (4) 1

(A) 0.1
(B) 10
(C) $\sqrt{\pi}$
(D) 1

Answer: (A) 0.1 · Official TGCHE final key

Q203 AP EAMCET 2016 · 29 Apr · Offline MCQ

A particle is executing simple harmonic motion with an amplitude of 2 m. The difference in the magnitudes of its maximum acceleration and maximum velocity is 4. The time period of its oscillation and its velocity when it is 1 m away from the mean position are respectively.

(A) $2\text{s},\ 2\sqrt{3}\ \text{ms}^{-1}$
(B) $\frac{7}{22}\text{s},\ 4\sqrt{3}\ \text{ms}^{-1}$
(C) $\frac{22}{7}\text{s},\ 2\sqrt{3}\ \text{ms}^{-1}$
(D) $\frac{44}{7}\text{s},\ 4\sqrt{3}\ \text{ms}^{-1}$

Answer: (C) $\frac{22}{7}\text{s},\ 2\sqrt{3}\ \text{ms}^{-1}$ · The council's preliminary key

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Q204 AP EAMCET 2014 · 22 May · Offline MCQ

The ratio between kinetic and potential energies of a body executing simple harmonic motion, when it is at a distance of $\frac{1}{N}$ of its amplitude from the mean position is

(A) N^2+1
(B) $\frac{1}{N^2}$
(C) N^2
(D) N^2-1

Answer: (D) N^2-1 · The council's preliminary key

Q205 AP EAMCET 2013 · 10 May · Offline MCQ

Two particles A and B of masses 'm' and '2m' are suspended from two massless springs of force constants K_1 and K_2. During their oscillation, if their maximum velocities are equal, then ratio of amplitudes of A and B is

(A) $\sqrt{\frac{K_1}{K_2}}$
(B) $\sqrt{\frac{K_2}{2K_1}}$
(C) $\sqrt{\frac{K_2}{K_1}}$
(D) $\sqrt{\frac{2K_1}{K_2}}$

Answer: (B) $\sqrt{\frac{K_2}{2K_1}}$ · The council's preliminary key

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Q206 AP EAMCET 2012 · 12 May · Offline MCQ

The time period of a particle in simple harmonic motion is 8s. At t = 0, it is at the mean position. The ratio of the distances travelled by it in the first and second seconds is

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

Answer: (C) $\frac{1}{\sqrt{2}-1}$ · Official APSCHE final key

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Q207 AP EAMCET 2011 · 8 May · Offline MCQ

A simple harmonic oscillator consists of a particle of mass 'm' and an ideal spring with spring constant 'k'. The particle oscillates with a time period 'T'. The spring is cut into two equal parts. If one part oscillates with the same particle, the time period will be :

(A) $2T$
(B) $\sqrt{2}\,T$
(C) $T/\sqrt{2}$
(D) $\frac{T}{2}$

Answer: (C) $T/\sqrt{2}$ · The council's preliminary key

Q208 AP EAMCET 2010 · 30 May · Offline MCQ

The displacements of two particles of same mass executing SHM are represented by the equations $x_1 = 4\sin\left(10t + \frac{\pi}{6}\right)$ and $x_2 = 5\cos(\omega t)$. The value of 'ω' for which the energy of both the particles remain same is :

(A) 16 units
(B) 6 units
(C) 4 units
(D) 8 units

Answer: (D) 8 units · Official APSCHE final key

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