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## EdLoop EAPCET

PHYSICS · EAPCET (EAMCET)

# Work, Energy & Power

## Previous Year Questions with answers

**307** questions · **144** papers · **2010–2026** · newest paper first

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**What is in this PDF:** every Work, Energy & Power 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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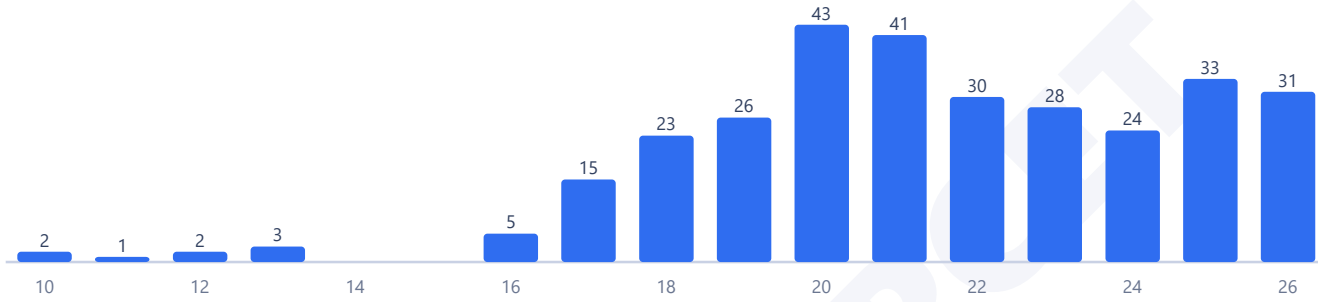
# Chapter at a glance

| 4.7% | 307 | 73 of 77 | 307 / 0 |
|---|---|---|---|
| of Physics questions, 2022–2026 | questions, 2010–2026 | papers asked it, 2022–2026 | MCQ / numerical, 2010–2026 |

**Trend.** Steady: 1.9 questions per paper in 2024–2026 against 1.9 in 2022–2023.

### Questions per year




Counts are the questions we hold: 307 in 144 papers. No question in this chapter was found repeated across papers.

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

| | |
|---|---|
| Energy & Conservation | 113 |
| Collisions | 87 |
| Power | 54 |
| Work | 53 |

## How often it comes up

Work, Energy & Power ranks among the most influential chapters in Class 11 Physics, providing methods that simplify complex dynamical questions. In the papers we hold from 2022 to 2026, it delivered **146 questions in 77 papers**, averaging **1.9 questions per paper**. Across that recent stretch, it featured in 73 of the 77 papers. That strong frequency places it as the **4th largest of 28 Physics chapters** by question share, making up 4.7% of all Physics questions asked in those five years.

Looking over the entire 2010 to 2026 archive, our dataset includes 307 questions from 144 of the 149 papers, averaging 2.1 questions per paper and claiming 5.2% of the subject. In the early period from 2010 to 2021, the chapter had an even higher presence with 161 questions in 72 papers (appearing in 71 papers, 2.2 per paper, 5.6% share). Over the last three exam years from 2024 to 2026, it accounted for 88 questions in 46 papers (appearing in 43 papers, 1.9 per paper, 4.8% share). Comparing the early era to the last three years, the chapter's share of Physics has fallen, whereas comparing the recent five-year baseline to the last three years, it has stayed about the same. Every year since 2022 has produced questions from this unit.

Between 2022 and 2026, the two states recorded steady distributions: AP EAPCET papers carried 100 questions across 48 papers (appearing in 48 papers, 2.1 per paper, 5.2% share), while TS EAPCET papers featured 46 questions across 29 papers (appearing in 25 papers, 1.6 per paper, 4.0% share).

## Most-asked topics

During the 2022 to 2026 cycle, questions distributed across four central topics:

- **Energy & Conservation**: 52 questions. Across the entire 2010 to 2026 archive, this topic leads with 113 questions.
- **Collisions**: 39 questions recently, with 87 questions in the complete collection.

- **Power**: 29 questions in the recent window, totalling 54 questions overall.
- **Work**: 26 questions recently, and 53 questions across all papers.

Every topic appeared in 2026 papers, meaning students should balance their preparation between energy methods, collision mechanics, and pump or engine power calculations.

## What the questions look like

Energy conservation problems frequently track vertical motion under gravity or compressed spring systems. Common scenarios examine a body thrown vertically where potential and kinetic energy ratios are given at one height to find speeds at another altitude. Another common format involves vertical circular loops, requiring students to find the minimum launch speed at the lowest point or calculate string tension at the top and bottom.

Collision problems cover both one-dimensional and two-dimensional interactions. In head-on elastic collisions, questions often involve identical or differing masses where one body comes to rest, asking for the mass ratio or the percentage loss of kinetic energy in inelastic encounters. Problems with spheres of the same density but different radii require relating mass to radius cubed before applying conservation of linear momentum.

Work calculations frequently involve variable forces expressed as functions of position, demanding integration of force over displacement. Questions also examine work done against buoyancy when pulling objects out of water tanks. Power questions center on water pumps lifting water from wells, vehicle engines maintaining velocity against air resistance, and constant power sources accelerating vehicles over time.

## How to practise it

Master the work-energy theorem as your primary tool, recognizing that the net work done by all forces equals the change in kinetic energy. This theorem bypasses intermediate acceleration steps and proves far faster than force balances in non-uniform motion.

For collision problems, set up conservation of linear momentum along each axis first, followed by the coefficient of restitution formula. Memorize the standard velocity formulas for elastic head-on collisions, especially the special cases where one mass is much larger than the other or when colliding masses are equal.

For power questions, distinguish between instantaneous power (force times velocity) and average power (work done divided by total elapsed time). Pay close attention to efficiency percentages in water pump questions, ensuring you correctly distinguish output power delivered to the fluid from electrical input power drawn by the motor.

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**Q1** AP EAPCET 2026 · 18 May · Shift 1 MCQ

A block of mass 2 kg, moving along $X$-axis on a horizontal surface with a speed of $4\ ms^{-1}$ enters a rough surface from $x = 0.5$ m to $x = 1.5$ m. The retarding force on this rough surface is related to distance by $\mathrm{F} = -12x$ N. The speed of the block as it just crosses the rough surface is

(A) Zero
(B) $1.5\ \mathrm{ms}^{-1}$
(C) $2\ \mathrm{ms}^{-1}$
(D) $2.5\ \mathrm{ms}^{-1}$

**Answer: (C)** $2\ \mathrm{ms}^{-1}$ · The council's preliminary key

**Q2** AP EAPCET 2026 · 18 May · Shift 1 MCQ

A Ball 'A' collides with another identical ball 'B' which is at rest. After collision, if the velocity of the ball 'B' becomes two times of final velocity of the ball 'A', then the coefficient of restitution is

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

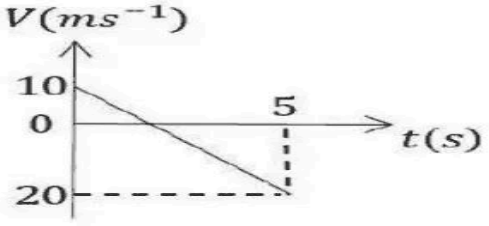
**Answer: (A)** $\frac{1}{3}$ · The council's preliminary key

**Q3** AP EAPCET 2026 · 18 May · Shift 2 MCQ

The velocity–time graph of a body of mass 4 kg moving along a straight line is shown in figure. Work done by all the forces acting on the body from $t = 0$ to $t = 5s$ is

*(see the figure above)*

The velocity—time graph of a body of mass 4 kg moving along a straight line is shown in figure. Work done by all the forces acting on the body from $t = 0$ to $t = 5s$ is




సరళరేఖామార్గంలో ప్రయాణిస్తున్న 4 kg ద్రవ్యరాశి గల వస్తువు వేగం—కాలం వక్రం పటంలో చూపబడింది. $t = 0$ నుంచి $t = 5s$ ల కాలంలో వస్తువుపై పనిచేయు అన్ని బలాల వలన జరిగిన పని

**Options :**

1. $300\ J$
2. $-300\ J$
3. $-600\ J$
4. $600\ J$

(A) $300\ J$
(B) $-300\ J$
(C) $-600\ J$
(D) $600\ J$

**Answer: (D)** $600\ J$ · The council's preliminary key

**Q4** AP EAPCET 2026 · 18 May · Shift 2 MCQ

As shown in figure, a particle slides on a frictionless track which terminates in a straight line horizontal section $B$. If the particle starts slipping from A, then the horizontal distance to be covered by the particle before it hits the ground after crossing B.

*(see the figure above)*

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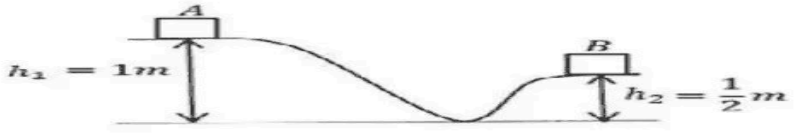



పటంలో చూపిన విధంగా ఒక కణం నిశ్చల స్థితి నుంచి ఒక సునుపైన, ఘర్షణ లేని మార్గంలో A వద్ద వదలబడింది. ఈ మార్గం చివరలో B వద్ద ఒక క్షితిజసమాంతరం భాగం కలిగి ఉంది. మార్గం ముగింపు B నుంచి ఆ కణం భూమిని తాకే వరకు ప్రయాణించే క్షితిజ సమాంతర దూరం

Options :
1. $0.5\ m$
2. $1\ m$
3. $1.5\ m$
4. $2\ m$

(A) $0.5\ m$
(B) $1\ m$
(C) $1.5\ m$
(D) $2\ m$

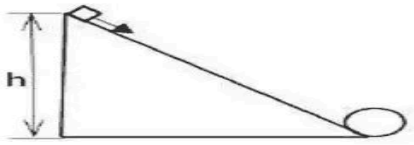
**Answer: (B)** $1\ m$ · The council's preliminary key

**Q5** AP EAPCET 2026 · 15 May · Shift 1 MCQ

An object is sliding (without rolling) from the top of the smooth inclined plane of height h from rest as shown and it just completes a vertical circle of diameter 20 cm. Then the minimum height h of smooth inclined plane is

*(see the figure above)*

An object is sliding (without rolling) from the top of the smooth inclined plane of height h from rest as shown and it just completes a vertical circle of diameter 20 cm. Then the minimum height h of smooth inclined plane is




ఒక వస్తువు h ఎత్తుగల నునుపైన వాలుతలంపై విరామ స్థితి నుండి క్రిందికి జారి (దొర్లకుండా) పటంలో చూపినట్లు 20 cm వ్యాసంగల నిలువు వృత్తాన్ని పూర్తి చేసింది. అయితే, నునుపు వాలుతలం యొక్క కనిష్ఠ ఎత్తు ఎంత?

**Options :**

1. 0.25 m
2. 0.2 m
3. 0.5 m
4. 2.5 m

(A) 0.25 m
(B) 0.2 m
(C) 0.5 m
(D) 2.5 m

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

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## Q6 AP EAPCET 2026 · 15 May · Shift 1 MCQ

A body of mass 2 kg is thrown vertically upwards from the ground level with kinetic energy of 240 J. The kinetic energy of the body will become half at a height of
($g = 10\ ms^{-2}$)

(A) 24 m
(B) 12 m
(C) 6 m
(D) 4 m

**Answer: (C) 6 m** · The council's preliminary key

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## Q7 AP EAPCET 2026 · 15 May · Shift 1 MCQ

A person lifts 60 kg load to a vertical height of 30 m over a duration of 20 seconds. If the power of the man is 1323 W, the mass of the man is

(A) 30 kg
(B) 40 kg
(C) 50 kg
(D) 60 kg

**Answer: (A)** 30 kg · The council's preliminary key

**Q8** AP EAPCET 2026 · 15 May · Shift 2 MCQ

A moving block having mass m, collides with another stationary block of mass 5m. After collision, the block with mass m comes to rest. If the initial velocity of block with mass m is V, then the value of coefficient of restitution is

(A) 0.2
(B) 0.5
(C) 0.7
(D) 0.25

**Answer: (A)** 0.2 · The council's preliminary key

**Q9** AP EAPCET 2026 · 14 May · Shift 1 MCQ

$5\ kg$ block pushed by $100\ N$ over $10\ m$ on a plane. If the coefficient of friction between the block and plane is 0.2. The final kinetic energy of the block is ___ $(g = 10ms^{-2})$

(A) $1000\ J$
(B) $900\ J$
(C) $800\ J$
(D) $700\ J$

**Answer: (B)** $900\ J$ · The council's preliminary key

**Q10** AP EAPCET 2026 · 14 May · Shift 1 MCQ

A force $F = 4x$ is applied to move an object from $x = 0$ to $x = 2m$, the work done is

(A) $8\ J$
(B) $16\ J$
(C) $4\ J$
(D) $32\ J$

**Answer: (A)** $8\ J$ · The council's preliminary key

**Q11** AP EAPCET 2026 · 14 May · Shift 2 MCQ

A $1000\ kg$ car moves at $20\ ms^{-1}$ power required to maintain speed against $500\ N$ resistive force is

(A) $5\ kW$
(B) $10\ kW$
(C) $20\ kW$
(D) $50\ kW$

**Answer: (B)** $10\ kW$ · The council's preliminary key

## Q12 AP EAPCET 2026 · 14 May · Shift 2 MCQ

A massless spring with a spring constant $k$ is fixed at its upper end. A block of mass $M$ is attached to the lower end of the spring and released from rest in its unstretched position. The maximum elongation of the spring is

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

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

## Q13 AP EAPCET 2026 · 13 May · Shift 1 MCQ

A body of mass $5$ kg is projected vertically upwards from a point X from the ground with an initial speed of $20\ \mathrm{ms}^{-1}$. It rises to a point Y where its kinetic energy is reduced to $400$ J. If the body experiences a constant air resistance of $10$ N throughout its motion, then the vertical distance between X and Y is (Acceleration due to gravity $= 10\ ms^{-2}$)

(A) 5m
(B) 10m
(C) 8m
(D) 16m

**Answer: (B)** 10m · The council's preliminary key

## Q14 AP EAPCET 2026 · 13 May · Shift 1 MCQ

Three balls A, B and C of equal mass are moving in the same order along the same straight line on a smooth horizontal surface. Initially, ball A moves towards right with a velocity of $6\ ms^{-1}$, ball B moves towards left with a velocity of $4\ ms^{-1}$ and ball C moves towards right with a velocity of $3\ ms^{-1}$. If the coefficient of restitution between any two balls is 0.8, then the relative velocity of balls B and C after collision is

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(A) $1.6\ ms^{-1}$

(B) $0.8\ ms^{-1}$

(C) $3.2\ ms^{-1}$

(D) $2.4\ ms^{-1}$

**Answer: (A)** $1.6\ ms^{-1}$ · The council's preliminary key

## Q15 AP EAPCET 2026 · 13 May · Shift 2 MCQ

A block of mass 0.18 kg is attached to a spring of constant $2\ \mathrm{Nm}^{-1}$ as shown in the figure. The coefficient of friction between block and horizontal surface is 0.1. Initially block is at rest and spring is unstretched. When an impulse is given to the block, it slides through a distance 0.06m and stops. The velocity of the block just after the impulse is given to it is
(Take $g = 10\ \mathrm{ms}^{-2}$)

*(see the figure above)*

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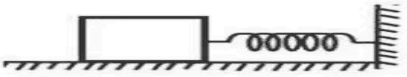

ద్రవ్యరాశి 0.18 kg గల దిమ్మెను స్ప్రింగ్ స్థిరాంకం 2 $Nm^{-1}$ గల ఒక స్ప్రింగ్ కు పటములో చూపినట్లు కలిపారు. దిమ్మె మరియు క్షితిజ సమాంతర తలాల మధ్య ఘర్షణ గుణకం 0.1. తొలుత దిమ్మె విరామ స్థితిలో, స్ప్రింగ్ సాగదీయబడకుండా ఉన్నాయి. ఇప్పుడు దిమ్మెపై ప్రచోదనము కల్పించినప్పుడు అది 0.06 m దూరము ప్రయాణించి విరామానికి వచ్చిన. ప్రచోదించబడిన వెంటనే దిమ్మె వేగం
(g = 10 $ms^{-2}$ గా తీసుకొనుము)

**Options :**

1. 4 $ms^{-1}$
2. 2 $ms^{-1}$
3. 0.4 $ms^{-1}$
4. 0.2 $ms^{-1}$

(A) $4\ \mathrm{ms}^{-1}$

(B) $2\ \mathrm{ms}^{-1}$

(C) $0.4\ \mathrm{ms}^{-1}$

(D) $0.2\ \mathrm{ms}^{-1}$

**Answer: (C)** $0.4\ \mathrm{ms}^{-1}$ · The council's preliminary key

## Q16 AP EAPCET 2026 · 13 May · Shift 2 MCQ

A block of mass 1 kg is dropped on a spring – mass system as shown in the figure. The block travels 100 m in the air before striking the 3 kg mass. Calculate the maximum compression in the spring, if both the blocks move together after the collision
(Spring constant of the spring, k=1.25 x $10^6$ N/m, g=10 $ms^{-2}$)

*(see the figure above)*

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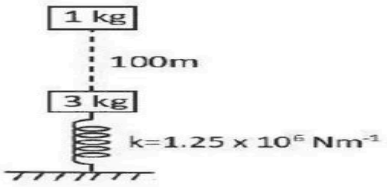


పటంలో చూపిన విధంగా, ద్రవ్యరాశి 1 kg గల దిమ్మెను స్ప్రింగు - ద్రవ్యరాశి వ్యవస్థపై జారవిడిచారు. ఆ దిమ్మె 3 kg ద్రవ్యరాశి గల దిమ్మెతో అభిఘాతం జరిపే లోపు గాలిలో 100 m దూరం ప్రయాణించింది. అభిఘాతం తరువాత రెండు దిమ్మెలు కలిసి చలిస్తుంటే, స్ప్రింగు యొక్క గరిష్ట సంపీడనం ఎంత?
(స్ప్రింగు యొక్క స్థిరాంకం, k=1.25 x $10^6$ N/m, g=10 $ms^{-2}$)

**Options :**

1. Zero
2. 2 cm
3. 0.2 cm
4. 4 cm

(A) Zero
(B) 2 cm
(C) 0.2 cm
(D) 4 cm

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

## Q17 AP EAPCET 2026 · 12 May · Shift 1 MCQ

A motor of efficiency 80% lifts water from a tank and delivers it from the end of a pipe which is 3.2 m vertically above the level from which water is drawn. If the cross-sectional area of the pipe is $12\,cm^2$ and water leaves the end of the pipe at a speed of $6\ m\ s^{-1}$, then the power of the motor is (acceleration due to gravity = $10\ m\ s^{-2}$)

(A) 450 W
(B) 360 W
(C) 900 W
(D) 720 W

**Answer: (A)** 450 W · The council's preliminary key

## Q18 AP EAPCET 2026 · 12 May · Shift 1 MCQ

A ball of mass $M$ moving with a velocity of $4\ m\ s^{-1}$ collides with another ball of mass $2M$ moving in the same direction. If the coefficient of restitution between the two balls is 0.35 and the velocity of the heavier ball after collision is $2.9\ m\ s^{-1}$, then the initial velocity of the heavier ball is

(A) $3\ \mathrm{m\ s^{-1}}$
(B) $4\ \mathrm{m\ s^{-1}}$
(C) $6\ \mathrm{m\ s^{-1}}$
(D) $2\ \mathrm{m\ s^{-1}}$

**Answer: (D)** $2\ \mathrm{m\ s^{-1}}$ · The council's preliminary key

**Q19** AP EAPCET 2026 · 12 May · Shift 2 MCQ

If the ratio of the potential and kinetic energies of a body of mass 3 kg thrown vertically upwards at a height of 40 m is 2:3, then the kinetic energy of the body at a height of 65 m is
(Acceleration due to gravity = 10 $ms^{-2}$)

(A) 3000 J
(B) 1050 J
(C) 1950 J
(D) 1200 J

**Answer: (B)** 1050 J · The council's preliminary key

**Q20** AP EAPCET 2026 · 12 May · Shift 2 MCQ

If the work done in increasing the velocity of a body by 25% is 900 J, then the work done in decreasing the velocity of the same body by 25% is

(A) 700 J
(B) 500 J
(C) 225 J
(D) 450 J

**Answer: (A)** 700 J · The council's preliminary key

**Q21** TS EAPCET 2026 · 11 May · Shift 1 MCQ

If a force of $\left(6\sqrt{3}\,\hat{i} - 4\sqrt{2}\,\hat{j}\right)\ \mathrm{N}$ acts on a body of mass 3.7 kg and displaces the body by $\left(2\sqrt{3}\,\hat{i}\right)\ \mathrm{m}$, then the work done by the force is

(A) 18 J
(B) 40 J
(C) 36 J
(D) 52 J

**Answer: (C)** 36 J · The council's preliminary key

**Q22** TS EAPCET 2026 · 11 May · Shift 1 MCQ

A ball P in motion collides with another ball Q of same mass at rest. If the coefficient of restitution between the two balls is 0.2, then the ratio of the velocities of the two balls P and Q after collision is

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

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

**Q23** TS EAPCET 2026 · 11 May · Shift 2 MCQ

If the work done to double the velocity of a body from $15\ \mathrm{ms}^{-1}$ is K times the work done to double its velocity from $10\ \mathrm{ms}^{-1}$, then the value of K is

(A) 2.75
(B) 2.25
(C) 3.25
(D) 3.75

**Answer: (B)** 2.25 · The council's preliminary key

**Q24** TS EAPCET 2026 · 11 May · Shift 2 MCQ

A steel solid sphere of diameter 2 cm collides head-on elastically with another steel solid sphere of radius 2 cm at rest. The fraction of the initial kinetic energy of the smaller sphere transferred to the larger sphere during collision is

(A) $\frac{16}{27}$
(B) $\frac{16}{9}$
(C) $\frac{8}{9}$
(D) $\frac{32}{81}$

**Answer: (D)** $\frac{32}{81}$ · The council's preliminary key

**Q25** TS EAPCET 2026 · 10 May · Shift 1 MCQ

The force acting on a particle in x-direction is $(3+2x)$ N, where 'x' is displacement of the particle in metre. The work to be done in displacing the particle from $x = 1.5$ m to $x = 3.5$ m is

(A) 24 J
(B) 32 J
(C) 16 J
(D) 8 J

**Answer: (C)** 16 J · The council's preliminary key

**Q26** TS EAPCET 2026 · 10 May · Shift 1 MCQ

A ball of mass $5\ \mathrm{kg}$ moving with a kinetic energy of $90\ \mathrm{J}$ collides head-on with another ball of mass $4\ \mathrm{kg}$ at rest. If the relative velocity of separation between the two balls after collision is $3\ \mathrm{ms}^{-1}$, then

the loss of kinetic energy due to the collision is

(A) $30\ \mathrm{J}$
(B) $60\ \mathrm{J}$
(C) $90\ \mathrm{J}$
(D) $45\ \mathrm{J}$

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

**Q27** TS EAPCET 2026 · 10 May · Shift 2 MCQ

A ball of mass 0.5 kg is dropped freely from a point A which is at a height of 10 m from the ground. Between second and third collisions with the ground, the linear momentum of the ball becomes zero at a point B. If the coefficient of restitution between the ball and the ground is 0.5, then the percentage loss of the potential energy of the ball when it reaches point B is

(A) 23.25
(B) 83.75
(C) 6.25
(D) 93.75

**Answer: (D)** 93.75 · The council's preliminary key

**Q28** TS EAPCET 2026 · 9 May · Shift 1 MCQ

A tank of height 5 m is completely filled with water and a cube of side 1 cm and density $1.5\ \mathrm{g\,cm^{-3}}$ is placed at the bottom of the tank. The work to be done to lift the cube at the bottom to a height of 15 m above the surface of the water is
(Neglect the side of the cube when compared with the height and take acceleration due to gravity $=10\ \mathrm{ms^{-2}}$ )

(A) 25 mJ
(B) 300 mJ
(C) 250 mJ
(D) 225 mJ

**Answer: (C)** 250 mJ · The council's preliminary key

**Q29** TS EAPCET 2026 · 9 May · Shift 1 MCQ

Two brass spheres approaching each other with the same speed collide head-on elastically. After collision, if one of the spheres of radius R comes to rest, then the radius of the other sphere is

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

**Answer: (D)** $\frac{R}{\sqrt[3]{3}}$ · The council's preliminary key

**Q30** TS EAPCET 2026 · 9 May · Shift 2 MCQ

The power P (in watt) acting on a body of mass 2 kg is given by $4.5P = 8t^2 + 14t + 9$, where 't' is time in second. If the body starts from rest at $t = 0$, then the velocity of the body at time $t = 3s$ is

(A) $15\ \mathrm{ms}^{-1}$
(B) $12\ \mathrm{ms}^{-1}$
(C) $6\ \mathrm{ms}^{-1}$
(D) $9\ \mathrm{ms}^{-1}$

**Answer: (C)** $6\ \mathrm{ms}^{-1}$ · The council's preliminary key

**Q31** TS EAPCET 2026 · 9 May · Shift 2 MCQ

A body P of mass 1.5 kg moving with a velocity of $10\ \mathrm{ms}^{-1}$ makes a one-dimensional elastic collision with another body Q at rest. If the ratio of the velocities of the bodies P and Q after collision is 1:3, then the velocity of the centre of mass of the system of the two bodies is

(A) $8.5\ \mathrm{ms}^{-1}$
(B) $6.5\ \mathrm{ms}^{-1}$
(C) $5.5\ \mathrm{ms}^{-1}$
(D) $7.5\ \mathrm{ms}^{-1}$

**Answer: (D)** $7.5\ \mathrm{ms}^{-1}$ · The council's preliminary key

**Q32** AP EAPCET 2025 · 27 May · Shift 1 MCQ

If a force $\left(3\hat{i} + 2\hat{j} + 5\hat{k}\right)$ N acting on a body displaces it through $\left(2\hat{i} + 2\hat{j} + 1\hat{k}\right)$m, then the work done by the force on the body is

(A) 40 J
(B) 20 J
(C) 15 J
(D) 25 J

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

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**Q33** AP EAPCET 2025 · 27 May · Shift 1 MCQ

A body is projected vertically upwards with a velocity of $20\ \mathrm{m\,s^{-1}}$. If the potential energy of the body at a height of $5\ \mathrm{m}$ from the ground is $100\ \mathrm{J}$, then the kinetic energy of the body at a height of $10\ \mathrm{m}$ from the ground is
(Acceleration due to gravity $= 10\ \mathrm{m\,s^{-2}}$)

(A) $200\ \mathrm{J}$
(B) $300\ \mathrm{J}$
(C) $150\ \mathrm{J}$
(D) $250\ \mathrm{J}$

**Answer: (A)** $200\ \mathrm{J}$ · The council's preliminary key

**Q34** AP EAPCET 2025 · 27 May · Shift 1 MCQ

A body falls freely on to a hard horizontal surface. If the coefficient of restitution between the surface and the body is 0.8, then the ratio of the maximum height to which the body rises after second impact and the initial height of the body is

(A) $256 : 625$
(B) $64 : 125$
(C) $16 : 25$
(D) $4 : 5$

**Answer: (A)** $256 : 625$ · The council's preliminary key

**Q35** AP EAPCET 2025 · 26 May · Shift 1 MCQ

If a position dependent force $(3x^2 - 2x + 7)\ \mathrm{N}$ acting on a body of mass $2\ \mathrm{kg}$ displaces it from $x = 0\ \mathrm{m}$ to $x = 5\ \mathrm{m}$, then the work done by the force is

(A) $165\ \mathrm{J}$
(B) $115\ \mathrm{J}$
(C) $150\ \mathrm{J}$
(D) $135\ \mathrm{J}$

**Answer: (D)** $135\ \mathrm{J}$ · The council's preliminary key

**Q36** AP EAPCET 2025 · 26 May · Shift 2 MCQ

A body of mass 'm' moving along a straight line collides with a stationary body of mass '2m'. After collision if the two bodies move together with the same velocity, then the fraction of kinetic energy lost in the process is

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

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

**Q37** AP EAPCET 2025 · 26 May · Shift 2 MCQ

If a constant force of $(2\hat{i}+3\hat{j}+4\hat{k})$ N acting on a body of mass 5 kg displaces it from $(3\hat{i}-4\hat{k})$ m to $(2\hat{i}+2\hat{j}+3\hat{k})$ m, then the work done by the force on the body is

(A) 32 J
(B) 28 J
(C) 36 J
(D) 44 J

**Answer: (A)** 32 J · The council's preliminary key

**Q38** AP EAPCET 2025 · 26 May · Shift 2 MCQ

A motor can pump 7560 kg of water per hour from a well of depth 100 m. If the efficiency of the pump is 70%, then power of the pump is
(Acceleration due to gravity = $10\ \mathrm{m\ s^{-2}}$)

(A) 4 kW
(B) 6 kW
(C) 3 kW
(D) 7 kW

**Answer: (C)** 3 kW · The council's preliminary key

**Q39** AP EAPCET 2025 · 26 May · Shift 2 MCQ

If the potential energy of a particle of mass 0.1 kg moving along x-axis is $5x(x-4)$ J, then the speed of the particle is maximum at a position of

(A) $x = 2$ m
(B) $x = 3$ m
(C) $x = 0.5$ m
(D) $x = 5$ m

**Answer: (A)** $x = 2$ m · The council's preliminary key

**Q40** AP EAPCET 2025 · 24 May · Shift 1 MCQ

Two bodies A and B of masses 1.5 kg and 3 kg are moving with velocities $20\ \mathrm{m\ s^{-1}}$ and $15\ \mathrm{m\ s^{-1}}$ respectively. If the same retarding force is applied on the two bodies, then the ratio of the distances

travelled by the bodies A and B before they come to rest is

(A) $1:1$
(B) $8:9$
(C) $2:3$
(D) $3:8$

**Answer: (B)** $8:9$ · The council's preliminary key

**Q41** AP EAPCET 2025 · 24 May · Shift 1 MCQ

If a force $\vec{F} = (3\hat{i} - 2\hat{j})$ N acting on a body displaces it from point (1 m, 2 m) to point (2 m, 0 m), then work done by the force is

(A) 5 J
(B) 6 J
(C) 4 J
(D) 7 J

**Answer: (D)** 7 J · The council's preliminary key

**Q42** AP EAPCET 2025 · 24 May · Shift 1 MCQ

A body moving along a straight line collides another body of same mass moving in the same direction with half of the velocity of the first body. If the coefficient of restitution between the two bodies is 0.5, then the ratio of the velocities of the two bodies after collision is
(treat the collision as one dimensional)

(A) $2:5$
(B) $2:3$
(C) $5:7$
(D) $3:7$

**Answer: (C)** $5:7$ · The council's preliminary key

**Q43** AP EAPCET 2025 · 23 May · Shift 1 MCQ

A car of mass $2000\ \mathrm{kg}$ is accelerating from rest. If its engine is supplying constant power of $10\ \mathrm{kW}$, then the velocity of the car at a time of $10\ \mathrm{s}$ is

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

**Answer: (D)** $10\ \mathrm{m\ s^{-1}}$ · The council's preliminary key

**Q44** AP EAPCET 2025 · 23 May · Shift 1 MCQ

A body of mass 'M' is moving with a uniform speed of 'v' on a frictionless horizontal surface under the influence of two forces $F_1$ and $F_2$ as shown in the figure. The net power of the system is

*(see the figure above)*

Correct Marks : 1 Wrong Marks : 0

A body of mass 'M' is moving with a uniform speed of 'v' on a frictionless horizontal surface under the influence of two forces $F_1$ and $F_2$ as shown in the figure. The net power of the system is

పటంలో చూపిన విధంగా $F_1$ మరియు $F_2$ అనే రెండు బలాలు M ద్రవ్యరాశి గల ఒక వస్తువుపై పనిచేయుట వలన అది 'v' ఏకరీతి వడితో ఒక ఘర్షణ రహిత క్షితిజ సమాంతర తలంపై చలనంలో వున్నది. ఆ వ్యవస్థ యొక్క నికర సామర్థ్యం




Options :

1. $(F_1 - F_2)v$
2. $0.5\,(F_1 + F_2)v$
3. $(F_1 + F_2)v$
4. zero (సున్నా)

(A) $(F_1 - F_2)v$
(B) $0.5\,(F_1 + F_2)v$
(C) $(F_1 + F_2)v$
(D) zero

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

**Q45** AP EAPCET 2025 · 23 May · Shift 2 MCQ

If a force of $(6x^2 - 4x)$ N acts on a body of mass 10 kg, then work to be done by the force in displacing the body from $x = 2$ m to $x = 4$ m is

(A) 22 J
(B) 44 J
(C) 66 J
(D) 88 J

**Answer: (D)** 88 J · The council's preliminary key

**Q46** AP EAPCET 2025 · 23 May · Shift 2 MCQ

A circular well of diameter $2\ \mathrm{m}$ has water upto the ground level. If the bottom of the well is at a depth of $14\ \mathrm{m}$, the time taken in seconds to empty the well using a $1.4\ \mathrm{kW}$ motor is
(Acceleration due to gravity $= 10\ \mathrm{m\,s^{-2}}$)

(A) 1860
(B) 2200
(C) 2660
(D) 3300

**Answer: (B)** 2200 · The council's preliminary key

**Q47** AP EAPCET 2025 · 22 May · Shift 1 MCQ

A train of mass $10^6$ kg is moving at a constant speed of 108 kmph. If the frictional force acting on it is 0.5 N per 100 kg, then the power of the train is

(A) 300 kW
(B) 150 kW
(C) 75 kW
(D) 225 kW

**Answer: (B)** 150 kW · The council's preliminary key

**Q48** AP EAPCET 2025 · 22 May · Shift 1 MCQ

A body is moving along a straight line under the influence of a constant power source. If the relation between the displacement (s) of the body and time (t) is $s \propto t^x$, then $x =$

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

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

**Q49** AP EAPCET 2025 · 22 May · Shift 2 MCQ

Two bodies A and B of masses 20 kg and 5 kg respectively are at rest. Due to the action of a force of 40 N separately, if the two bodies acquire equal kinetic energies in times $t_A$ and $t_B$ respectively, then $t_A : t_B =$

(A) $1 : 2$
(B) $2 : 1$
(C) $2 : 5$
(D) $5 : 6$

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

**Q50** AP EAPCET 2025 · 22 May · Shift 2 MCQ

A crane of efficiency $80\%$ is used to lift 8000 kg of coal from a mine of depth 108 m. If the time taken by the crane to lift the coal is one hour, then the power of the crane (in kW) is

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

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

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

**Q51** AP EAPCET 2025 · 21 May · Shift 1 MCQ

The power required for an engine to maintain a constant speed of $50\ \mathrm{m\,s^{-1}}$ for a train of mass $3 \times 10^6\ \mathrm{kg}$ on rough rails is
(The coefficient of kinetic friction between the rails and wheels of the train is 0.05 and acceleration due to gravity $= 10\ \mathrm{m\,s^{-2}}$)

(A) 75 MW
(B) 40 MW
(C) 75 kW
(D) 65 MW

**Answer: (A) 75 MW** · The council's preliminary key

**Q52** AP EAPCET 2025 · 21 May · Shift 1 MCQ

The linear momentum of a body of mass $8$ kg is $24\ \mathrm{kg\ m\ s^{-1}}$. If a constant force of $24$ N acts on the body in the direction of motion of the body for a time of $3$ s, then the increase in the kinetic energy of the body is

(A) $480$ J
(B) $540$ J
(C) $270$ J
(D) $240$ J

**Answer: (B) $540$ J** · The council's preliminary key

**Q53** AP EAPCET 2025 · 21 May · Shift 1 MCQ

A person holds a ball of mass $0.25$ kg in his hand and throws it, so that it leaves his hand with a speed of $12\ \mathrm{m\,s^{-1}}$. In this process, if his hand moved through a distance of $0.9$ m, then the net force acted on the ball is

(A) $40\ \mathrm{N}$
(B) $20\ \mathrm{N}$
(C) $25\ \mathrm{N}$
(D) $10\ \mathrm{N}$

**Answer: (B)** $20\ \mathrm{N}$ · The council's preliminary key

**Q54** AP EAPCET 2025 · 21 May · Shift 2 MCQ

If a particle of mass 'm' covers half of the horizontal circle with constant speed 'v', then the change in its kinetic energy is

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

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

**Q55** AP EAPCET 2025 · 21 May · Shift 2 MCQ

The bob of a simple pendulum of length 200 cm is released from horizontal position. If 10% of its initial energy is lost due to air resistance, then the speed of bob at the mean position is (Acceleration due to gravity = $10\ \mathrm{m\,s^{-2}}$)

(A) $6\ \mathrm{m\,s^{-1}}$
(B) $3\ \mathrm{m\,s^{-1}}$
(C) $12\ \mathrm{m\,s^{-1}}$
(D) $2\ \mathrm{m\,s^{-1}}$

**Answer: (A)** $6\ \mathrm{m\,s^{-1}}$ · The council's preliminary key

**Q56** AP EAPCET 2025 · 21 May · Shift 2 MCQ

A steel sphere of radius 1.2 cm collides a second steel sphere at rest. If the collision is elastic and after the collision the first sphere continues to move in its initial direction with a velocity of $\frac{7}{9}$ times its initial velocity, then the radius of the second sphere is

(A) 1.8 cm
(B) 2.4 cm
(C) 1.2 cm
(D) 0.6 cm

**Answer: (D)** 0.6 cm · The council's preliminary key

**Q57** AP EAPCET 2025 · 21 May · Shift 2 MCQ

A particle of mass 8 $\mu$g in motion collides with another stationary particle of mass 4 $\mu$g. If the collision is perfectly elastic and one dimensional, the ratio of their de Broglie wavelengths after collision is

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

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

**Q58** TS EAPCET 2025 · 4 May · Shift 1 MCQ

A horizontal force of $10\ \mathrm{N}$ is applied on a block of mass $1.5\ \mathrm{kg}$ which is initially at rest on a rough horizontal surface. The work done by the applied force in a time of $6\ \mathrm{s}$ from the beginning of the motion is

(Acceleration due to gravity $= 10\ \mathrm{ms}^{-2}$; the coefficient of kinetic friction between the block and the surface is $0.2$)

(A) $588\ \mathrm{J}$
(B) $360\ \mathrm{J}$
(C) $840\ \mathrm{J}$
(D) $420\ \mathrm{J}$

**Answer: (C)** $840\ \mathrm{J}$ · The council's preliminary key

**Q59** TS EAPCET 2025 · 4 May · Shift 1 MCQ

A ball is allowed to fall freely from a height of 42 m from the ground. If the coefficient of restitution between the ball and the ground is 0.4, then the total distance travelled by the ball before it comes to rest is

(A) 84 m
(B) 87 m
(C) 72 m
(D) 58 m

**Answer: (D)** 58 m · The council's preliminary key

**Q60** TS EAPCET 2025 · 4 May · Shift 2 MCQ

If the kinetic energy of a body moving with a velocity of $(2\hat{i} + 3\hat{j} - 4\hat{k})\ \mathrm{ms}^{-1}$ is 87 J, then the mass of the body is

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(A) 3 kg
(B) 12 kg
(C) 9 kg
(D) 6 kg

**Answer: (D) 6 kg** · The council's preliminary key

**Q61** TS EAPCET 2025 · 4 May · Shift 2 MCQ

A body of mass $0.5$ kg is supplied with a power 'P' (in watt) which varies with time 't' (in second) as $P = 3t^2 + 3$. If the velocity of the body at time $t = 0$ is zero, then the velocity of the body at time $t = 3\,\mathrm{s}$ is

(A) $12\ \mathrm{ms}^{-1}$
(B) $24\ \mathrm{ms}^{-1}$
(C) $18\ \mathrm{ms}^{-1}$
(D) $36\ \mathrm{ms}^{-1}$

**Answer: (A)** $12\ \mathrm{ms}^{-1}$ · The council's preliminary key

**Q62** TS EAPCET 2025 · 3 May · Shift 1 MCQ

A body of mass 500 g is falling from rest from a height of 3.2 m from the ground. If the body reaches the ground with a velocity of $6\,\mathrm{ms}^{-1}$, then the energy lost by the body due to air resistance is (Acceleration due to gravity = $10\,\mathrm{ms}^{-2}$)

(A) 14 J
(B) 7 J
(C) 21 J
(D) 28 J

**Answer: (B) 7 J** · The council's preliminary key

**Q63** TS EAPCET 2025 · 3 May · Shift 1 MCQ

A body of mass 'm' moving with a velocity of 'v' collides head on with another body of mass '2m' at rest. If the coefficient of restitution between the two bodies is 'e', then the ratio of the velocities of the two bodies after collision is

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

**Answer: (D)** $\frac{1-2e}{1+e}$ · The council's preliminary key

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**Q64** TS EAPCET 2025 · 3 May · Shift 2 MCQ

The work done in displacing a particle from $y = a$ to $y = 2a$ by a force $-\frac{K}{y^2}$ acting along $y$-axis is

(A) $-\frac{5K}{8a}$
(B) $-\frac{14K}{8a^3}$
(C) $-\frac{K}{a^2}$
(D) $-\frac{K}{2a}$

**Answer: (D)** $-\frac{K}{2a}$ · The council's preliminary key

**Q65** AP EAPCET 2024 · 23 May · Shift 1 MCQ

A particle of mass '$m$' at rest on a rough horizontal surface with a coefficient of friction '$\mu$' is given a velocity '$u$'. The average power imparted by friction before it stops

(A) Zero
(B) $\frac{1}{2}\mu mgu$
(C) $\mu mgu$
(D) $2\mu mgu$

**Answer: (B)** $\frac{1}{2}\mu mgu$ · The council's preliminary key

**Q66** AP EAPCET 2024 · 22 May · Shift 1 MCQ

The average power generated by a 90 kg mountain climber who climbs a summit of height 600 m in 90 minutes is (Acceleration due to gravity = $10\ \mathrm{ms}^{-2}$)

(A) 100 W
(B) 25 W
(C) 200 W
(D) 50 W

**Answer: (A)** 100 W · The council's preliminary key

**Q67** AP EAPCET 2024 · 22 May · Shift 2 MCQ

A body of mass 30 kg moving with a velocity $20\ \mathrm{ms}^{-1}$ undergoes one dimensional elastic collision with another ball of same mass moving in the opposite direction with a velocity of $30\ \mathrm{ms}^{-1}$. After collision the velocities of first and second bodies respectively are

(A) $25\ \mathrm{ms}^{-1}, 30\ \mathrm{ms}^{-1}$
(B) $30\ \mathrm{ms}^{-1}, 30\ \mathrm{ms}^{-1}$
(C) $30\ \mathrm{ms}^{-1}, 20\ \mathrm{ms}^{-1}$
(D) $40\ \mathrm{ms}^{-1}, 15\ \mathrm{ms}^{-1}$

**Answer: (C)** $30\ \mathrm{ms}^{-1}, 20\ \mathrm{ms}^{-1}$ · The council's preliminary key

**Q68** AP EAPCET 2024 · 22 May · Shift 2 MCQ

A force of $(4\bar{i} + 2\bar{j} + \bar{k})$ N is acting on a particle of mass 2 kg displaces the particle from a position of $(2\bar{i} + 2\bar{j} + \bar{k})$ m to a position of $(4\bar{i} + 3\bar{j} + 2\bar{k})$ m. The work done by the force on the particle in joules is

(A) 21 J
(B) 11 J
(C) 14 J
(D) 18 J

**Answer: (B) 11 J** · The council's preliminary key

**Q69** AP EAPCET 2024 · 21 May · Shift 1 MCQ

A spring of spring constant $200\ \mathrm{Nm}^{-1}$ is initially stretched by 10 cm from the unstretched position. The work to be done to stretch the spring further by another 10 cm is

(A) 3 J
(B) 6 J
(C) 9 J
(D) 12 J

**Answer: (A) 3 J** · The council's preliminary key

**Q70** AP EAPCET 2024 · 21 May · Shift 1 MCQ

A ball falls freely from rest from a height of $6.25$ m on to a hard horizontal surface. If the ball reaches a height of $81$ cm after second bounce from the surface, the coefficient of restitution is

(A) $0.3$
(B) $0.45$
(C) $0.75$
(D) $0.6$

**Answer: (D)** $0.6$ · The council's preliminary key

**Q71** AP EAPCET 2024 · 21 May · Shift 2 MCQ

A light body of momentum '$P_L$' and a heavy body of momentum '$P_H$', both have the same kinetic energy, then

(A) $P_L > P_H$
(B) $P_H > P_L$
(C) $P_L = P_H$
(D) Always $P_H = 2P_L$

**Answer: (B)** $P_H > P_L$ · The council's preliminary key

**Q72** AP EAPCET 2024 · 21 May · Shift 2 MCQ

A machine with efficiency 2/3 used 12 J of energy in lifting 2 kg block through certain height and it is allowed to fall through the same. The velocity while it reach the ground is

(A) $\sqrt{2}\ \mathrm{ms}^{-1}$
(B) $2\ \mathrm{ms}^{-1}$
(C) $2\sqrt{2}\ \mathrm{ms}^{-1}$
(D) $0.2\ \mathrm{ms}^{-1}$

**Answer: (C)** $2\sqrt{2}\ \mathrm{ms}^{-1}$ · The council's preliminary key

**Q73** AP EAPCET 2024 · 20 May · Shift 1 MCQ

Two bodies A and B of masses $2m$ and $m$ are projected vertically upwards from the ground with velocities $u$ and $2u$ respectively. The ratio of the kinetic energy of body A and the potential energy of body B at a height equal to half of the maximum height reached by body A is

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

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

**Q74** AP EAPCET 2024 · 20 May · Shift 1 MCQ

A body of mass $2\ \mathrm{kg}$ collides head on with another body of mass $4\ \mathrm{kg}$. If the relative velocities of the bodies before and after collision are $10\ \mathrm{ms}^{-1}$ and $4\ \mathrm{ms}^{-1}$ respectively, the loss of kinetic energy of the system due to the collision is

(A) $28\ \mathrm{J}$
(B) $56\ \mathrm{J}$
(C) $84\ \mathrm{J}$
(D) $42\ \mathrm{J}$

**Answer: (B)** $56\ \mathrm{J}$ · The council's preliminary key

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**Q75** AP EAPCET 2024 · 20 May · Shift 2 MCQ

Two objects having masses 1:4 ratio are at rest. When both of them are subjected to same force separately, they achieved same kinetic energy during times $t_1$ and $t_2$ respectively. Then ratio of $\frac{t_2}{t_1}$ is

(A) 4
(B) 2
(C) 2.5
(D) 1

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

**Q76** AP EAPCET 2024 · 20 May · Shift 2 MCQ

An object of mass 'm' is projected with an initial velocity 'u' with an angle of 'θ' with the horizontal. The average power delivered by gravity in reaching the highest point.

(A) $\frac{\mathrm{mgu}\sin^2\theta}{2}$
(B) $\frac{\mathrm{mu}^2\sin^2\theta}{2\mathrm{g}}$
(C) $\frac{\mathrm{mg}\sin\theta}{2\mathrm{u}}$
(D) $\frac{\mathrm{mgu}\sin\theta}{2}$

**Answer: (D)** $\frac{\mathrm{mgu}\sin\theta}{2}$ · The council's preliminary key

**Q77** AP EAPCET 2024 · 19 May · Shift 2 MCQ

A force of $(6x^2 - 4x + 3)$ N acts on a body of mass 0.75 kg and displaces it from $x = 2$ m to $x = 5$ m. The work done by the force is

(A) 201 J
(B) 215 J
(C) 229 J
(D) 307 J

**Answer: (A)** 201 J · The council's preliminary key

**Q78** AP EAPCET 2024 · 19 May · Shift 2 MCQ

A ball falls freely from rest on to a hard horizontal floor and repeatedly bounces. If the velocity of the ball just before the first bounce is 7 $\mathrm{ms}^{-1}$ and the coefficient of restitution is 0.75, the total distance travelled by the ball before it comes to rest is (acceleration due to gravity=10 $\mathrm{ms}^{-2}$)

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(A) $10.75\ \mathrm{m}$
(B) $9.75\ \mathrm{m}$
(C) $8.75\ \mathrm{m}$
(D) $11.75\ \mathrm{m}$

**Answer: (C)** $8.75\ \mathrm{m}$ · The council's preliminary key

**Q79** AP EAPCET 2024 · 18 May · Shift 1 MCQ

In an inelastic collision, after collision the kinetic energy

(A) increases by 2 times
(B) is less than before collision
(C) is more than before collision
(D) remains same

**Answer: (B)** is less than before collision · The council's preliminary key

**Q80** AP EAPCET 2024 · 18 May · Shift 1 MCQ

A spring of $5 \times 10^3\ \mathrm{Nm}^{-1}$ spring constant is stretched initially by 10 cm from unstretched position. The work required to stretch it further by another 10 cm is

(A) 75 N-m
(B) 50 N-m
(C) 76 N-m
(D) 82 N-m

**Answer: (A)** 75 N-m · The council's preliminary key

**Q81** TS EAPCET 2024 · 11 May · Shift 1 MCQ

A constant force of $(8\hat{i} - 2\hat{j} + 6\hat{k})$ N acting on a body of mass 2 kg displaces the body from $(2\hat{i} + 3\hat{j} - 4\hat{k})$ m to $(4\hat{i} - 3\hat{j} + 6\hat{k})$ m. The work done in the process is

(A) 72 J
(B) 88 J
(C) 44 J
(D) 36 J

**Answer: (B)** 88 J · The council's preliminary key

**Q82** TS EAPCET 2024 · 11 May · Shift 1 MCQ

A ball 'A' of mass 1.2 kg moving with a velocity of $8.4\ \mathrm{ms}^{-1}$ makes one dimensional elastic collision with a ball 'B' of mass 3.6 kg at rest. The percentage of kinetic energy transferred by ball 'A' to ball 'B' is

(A) 25%
(B) 50%
(C) 75%
(D) 60%

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

**Q83** TS EAPCET 2024 · 10 May · Shift 1 MCQ

A body thrown vertically upwards from the ground reaches a maximum height 'h'. The ratio of the kinetic and potential energies of the body at a height 40% of h from the ground is

(A) 2:3
(B) 3:2
(C) 1:1
(D) 4:9

**Answer: (B)** 3:2 · The council's preliminary key

**Q84** TS EAPCET 2024 · 10 May · Shift 1 MCQ

A ball of mass 1.2 kg moving with a velocity of $12\ \mathrm{ms}^{-1}$ makes one dimensional collision with another stationary ball of mass 1.2 kg. If the coefficient of restitution is $\frac{1}{\sqrt{2}}$, then the ratio of the total kinetic energy of the balls after collision and the initial kinetic energy is

(A) 3:4
(B) 1:1
(C) 2:3
(D) $3:\sqrt{2}$

**Answer: (A)** 3:4 · The council's preliminary key

**Q85** TS EAPCET 2024 · 10 May · Shift 2 MCQ

The kinetic energy of a body of mass 4 kg moving with a velocity of $(2\hat{i}-4\hat{j}-\hat{k})$ $\mathrm{ms}^{-1}$ is

(A) 84 J
(B) 63 J
(C) 42 J
(D) 21 J

**Answer: (C)** 42 J · The council's preliminary key

**Q86** TS EAPCET 2024 · 10 May · Shift 2 MCQ

A ball P of mass $0.5$ kg moving with a velocity of $10\ \mathrm{ms}^{-1}$ collides with another ball Q of mass $1$ kg at rest. If the coefficient of restitution is $0.4$, the ratio of the velocities of the balls P and Q after the collision is

(A) $1:7$
(B) $2:7$
(C) $2:5$
(D) $5:6$

**Answer: (A)** $1:7$ · The council's preliminary key

**Q87** TS EAPCET 2024 · 9 May · Shift 1 MCQ

A block of mass 0.5 kg is at rest on a horizontal table. The coefficient of kinetic friction between the table and the block is 0.2. If a horizontal force of 5 N is applied on the block, the kinetic energy of the block in a time of 4 s is

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

(A) 64 J
(B) 128 J
(C) 256 J
(D) 512 J

**Answer: (C)** 256 J · The council's preliminary key

**Q88** TS EAPCET 2024 · 9 May · Shift 1 MCQ

The sphere A of mass m moving with a constant velocity hits another sphere B of mass 2m at rest. If the coefficient of restitution is 0.4, the ratio of the velocities of the spheres A and B after collision is

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

**Answer: (C)** 1:7 · The council's preliminary key

**Q89** AP EAPCET 2023 · 19 May · Shift 1 MCQ

A toy of mass 20 g at rest acquires a velocity $(3\hat{i} - 2\hat{j})\ \mathrm{ms}^{-1}$ in 2 seconds. Then the power of the toy is

(A) 0.975 W
(B) 0.325 W
(C) 1.3 W
(D) 0.065 W

**Answer: (D)** 0.065 W · The council's preliminary key

**Q90** AP EAPCET 2023 · 19 May · Shift 1 MCQ

A ball is dropped from some height and after first collision with the ground if it reaches $\frac{3}{4}^{\text{th}}$ of its original height, then the % loss of its energy

(A) 25
(B) 75
(C) 50
(D) 55

**Answer: (A)** 25 · The council's preliminary key

**Q91** AP EAPCET 2023 · 18 May · Shift 1 MCQ

A bullet of mass $20\ \mathrm{g}$ moving with $500\ \mathrm{ms}^{-1}$ is pierced $1\ \mathrm{cm}$ into a wooden block, then the retarding force experienced by the bullet is

(A) $125 \times 10^3\ \mathrm{N}$
(B) $750 \times 10^3\ \mathrm{N}$
(C) $500 \times 10^3\ \mathrm{N}$
(D) $250 \times 10^3\ \mathrm{N}$

**Answer: (D)** $250 \times 10^3\ \mathrm{N}$ · The council's preliminary key

**Q92** AP EAPCET 2023 · 18 May · Shift 1 MCQ

A toy car of mass 100 g is moving with velocity of $\left|\hat{i}+2\hat{j}-3\hat{k}\right|$ m, then the kinetic energy of the car is

(A) 7 J
(B) 70 J
(C) 0.7 J
(D) 0.07 J

**Answer: (C)** 0.7 J · The council's preliminary key

**Q93** AP EAPCET 2023 · 18 May · Shift 2 MCQ

A motor boat is moving in a river with velocity $\vec{v}=7\hat{i}+2\hat{j}-5\hat{k}\,\mathrm{ms}^{-1}$. If the flow of water offers resistive force $\vec{F}=9\hat{i}+3\hat{j}-3\hat{k}$ N, then the power of the boat is

(A) 13 W
(B) 69 W
(C) 12 W
(D) 84 W

**Answer: (D)** 84 W · The council's preliminary key

**Q94** AP EAPCET 2023 · 18 May · Shift 2 MCQ

A spring has a spring constant 200 $\mathrm{Nm}^{-1}$. If it is stretched by 1 cm then the potential energy stored in it is

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(A) 100 J
(B) 0.01 J
(C) 10 J
(D) 1 J

**Answer: (B)** 0.01 J · The council's preliminary key

**Q95** AP EAPCET 2023 · 18 May · Shift 2 MCQ

The work done in moving a body of mass 2 kg to a height of 4 m from the surface of the earth is (Acceleration due to gravity = $10\ \mathrm{ms}^{-2}$)

(A) 10 J
(B) 20 J
(C) 40 J
(D) 80 J

**Answer: (D)** 80 J · The council's preliminary key

**Q96** AP EAPCET 2023 · 17 May · Shift 1 MCQ

A ball of mass $10\ \mathrm{g}$ is allowed to fall down from $10\ \mathrm{m}$ height. After collision with the ground if $50\%$ of its energy is lost, then the height reached by the ball is

(A) $4\ \mathrm{m}$
(B) $6\ \mathrm{m}$
(C) $5\ \mathrm{m}$
(D) $7\ \mathrm{m}$

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

**Q97** AP EAPCET 2023 · 17 May · Shift 2 MCQ

If a body has a potential energy of $(4x^2 + 2x)$ J at a height of 2 m, then the force acting on the body is

(A) 9 N
(B) 27 N
(C) 18 N
(D) 0 N

**Answer: (C)** 18 N · The council's preliminary key

**Q98** AP EAPCET 2023 · 17 May · Shift 2 MCQ

A freely falling body has attained a velocity of $2\ \mathrm{ms}^{-1}$. Now, if the weight of the body is opposed by upward air resistance, then the total distance travelled before stopping is

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(A) 4 m
(B) 8 m
(C) 0.2 m
(D) 0.4 m

**Answer: (D) 0.4 m** · The council's preliminary key

**Q99** AP EAPCET 2023 · 16 May · Shift 1 MCQ

A ball of mass $10\ \mathrm{g}$ moving with $4\ \mathrm{ms}^{-1}$ collides with another ball of same mass at rest. If 0.2 is the coefficient of restitution of the collision, then the ratio of the velocity of first ball to that of the second ball is

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

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

**Q100** AP EAPCET 2023 · 16 May · Shift 2 MCQ

The kinetic energy of a car is doubled when its velocity is increased by $1\ \mathrm{ms}^{-1}$. Then the initial velocity of the car is

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

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

**Q101** AP EAPCET 2023 · 16 May · Shift 2 MCQ

A car of mass 1000 kg having a velocity of 10 $\mathrm{ms}^{-1}$ collides a horizontally mounted spring. If the spring constant is 4000 $\mathrm{Nm}^{-1}$, then the maximum compression of the spring is

(A) 25 m
(B) 15 m
(C) 5 m
(D) 10 m

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

**Q102** AP EAPCET 2023 · 15 May · Shift 1 MCQ

A machine gun fires 300 bullets per minute each with a velocity of 500 $\mathrm{ms}^{-1}$. If the mass of each bullet is 4 g, the power of the machine gun is

(A) 3.6 kW
(B) 3 kW
(C) 5.4 kW
(D) 2.5 kW

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

**Q103** AP EAPCET 2023 · 15 May · Shift 1 MCQ

A body falls freely from a height of 100 m on to the ground and rebounds to a maximum height of 36 m after collision. The coefficient of restitution between ground and the body is

(A) 0.4
(B) 0.36
(C) 0.6
(D) 0.5

**Answer: (C)** 0.6 · The council's preliminary key

**Q104** AP EAPCET 2023 · 15 May · Shift 1 MCQ

A block of steel of mass 2 kg slides down a rough inclined plane of inclination of $\sin^{-1}\left(\frac{3}{5}\right)$ at a constant speed. The temperature of the block as it slides through 80 cm, assuming that the mechanical energy lost is used to increase the temperature of the block is nearly

(Specific heat capacity of steel = 420 $\mathrm{Jkg^{-1}K^{-1}}$ and Acceleration due to gravity = 10 $\mathrm{ms^{-2}}$)

(A) 0.0190 °C
(B) 0.0114 °C
(C) 0.0152 °C
(D) 0.0952 °C

**Answer: (B)** 0.0114 °C · The council's preliminary key

**Q105** AP EAPCET 2023 · 15 May · Shift 2 MCQ

A body of mass 2 kg is moving with a constant acceleration of $\left(2\hat{i}+3\hat{j}-\hat{k}\right)\ \mathrm{ms^{-2}}$. If the displacement made by the body is $\left(3\hat{i}-\hat{j}+2\hat{k}\right)$ m then the work done is

(A) 22 J
(B) 2 J
(C) 12 J
(D) 10 J

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

**Q106** AP EAPCET 2023 · 15 May · Shift 2 MCQ

In the case of non-conservative forces, the following statement is correct.

(A) The work done by non-conservative force in a closed path is zero.
(B) The work done by non-conservative forces does not depend on the path.
(C) The work done by non-conservative forces depend on the path.
(D) There is no energy loss in case of non-conservative forces.

**Answer: (C) The work done by non-conservative forces depend on the path.** · The council's preliminary key

**Q107** TS EAMCET 2023 · 14 May · Shift 1 MCQ

An engine is dragging a mass of 5000 kg with a velocity of $5\ \mathrm{ms}^{-1}$ along a smooth inclined plane of inclination 1 in 50. Then the power of the engine is

(A) 5 kW
(B) 2.5 kW
(C) 10 kW
(D) 25 kW

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

**Q108** TS EAMCET 2023 · 14 May · Shift 1 MCQ

A ball falls freely from a height h on a rigid horizontal plane. If the coefficient of restitution is e, then the total distance travelled by the ball before hitting the plane second time is

(A) $he^2$
(B) $h(1+2e^2)$
(C) $h(1-2e^2)$
(D) $h(1+e^2)$

**Answer: (B)** $h(1+2e^2)$ · The council's preliminary key

**Q109** TS EAMCET 2023 · 13 May · Shift 1 MCQ

A block of mass M moving on a frictionless horizontal surface collides with a spring of spring constant K, as shown in the figure. If the spring compresses by a length L, then the maximum momentum of the block after the collision is

*(see the figure above)*

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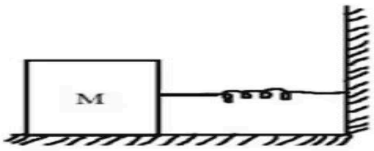
A block of mass M moving on a frictionless horizontal surface collides with a spring of spring constant K, as shown in the figure. If the spring compresses by a length L, then the maximum momentum of the block after the collision is

పటంలో చూపినట్లు ఒక ఘర్షణ రహిత క్షితిజ సమాంతర తలముపై M ద్రవ్యరాశి గల వస్తువు, K స్ప్రింగ్ స్థిరాంకం గల ఒక స్ప్రింగ్‌తో అభిఘాతము చేసినది. దీని వలన ఆ స్ప్రింగ్ L పొడవు సంపీడ్యము చెందినచో అభిఘాతము తర్వాత ఆ వస్తువు గరిష్ఠ ద్రవ్యవేగము




Options :

1. Zero
సున్నా
2. $\frac{ML^2}{K}$
3. $L\sqrt{MK}$
4. $\frac{KL^2}{2M}$

(A) Zero
(B) $\frac{ML^2}{K}$
(C) $L\sqrt{MK}$
(D) $\frac{KL^2}{2M}$

**Answer: (C)** $L\sqrt{MK}$ · The council's preliminary key

## Q110 TS EAMCET 2023 · 13 May · Shift 1 MCQ

A body falls freely from a height 'h' on a fixed horizontal plane and rebounds. If 'e' is the coefficient of restitution, the total distance travelled before it comes to rest is

(A) $h\left[\frac{1+e^2}{1-e^2}\right]$
(B) $h\left[\frac{1-e^2}{1+e^2}\right]$
(C) $\frac{h}{2}\left[\frac{1-e^2}{1+e^2}\right]$
(D) $\frac{h}{2}\left[\frac{1+e^2}{1-e^2}\right]$

**Answer: (A)** $h\left[\frac{1+e^2}{1-e^2}\right]$ · The council's preliminary key

## Q111 TS EAMCET 2023 · 13 May · Shift 2 MCQ

A body is moved along a straight line by an engine which delivers a constant power. The distance moved by the body in time 't' is proportional to

(A) $t^{1/2}$
(B) $t^{3/4}$
(C) $t^{3/2}$
(D) $t^{2}$

**Answer: (C)** $t^{3/2}$ · The council's preliminary key

**Q112** TS EAMCET 2023 · 13 May · Shift 2 MCQ

A body of mass 3 kg is moving under the action of a force which causes a displacement of $\left(\frac{t^3}{3}\right)$ m, where 't' is time in seconds. The work done by the force in first 2 seconds is

(A) 2 J
(B) 3.8 J
(C) 5.2 J
(D) 24 J

**Answer: (D)** 24 J · The council's preliminary key

**Q113** TS EAMCET 2023 · 12 May · Shift 1 MCQ

Two bodies of masses of 1 g and 4 g are moving with equal kinetic energies. The ratio of the magnitudes of their linear momenta is

(A) $4:1$
(B) $\sqrt{2}:1$
(C) $1:2$
(D) $1:16$

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

**Q114** TS EAMCET 2023 · 12 May · Shift 1 MCQ

The displacement 's' of a body of mass 3 kg under the action of a force is given by $s=\frac{t^3}{3}$, where 's' is in metres and 't' is in seconds. The work done by the force in the first two seconds is

(A) 32 J
(B) 3.8 J
(C) 5.2 J
(D) 24 J

**Answer: (D)** 24 J · The council's preliminary key

**Q115** TS EAMCET 2023 · 12 May · Shift 2 MCQ

While a person climbs stairs, the gravitational potential energy of the person increases. The source of this energy is

(A) Work done by normal force from the steps
(B) Work done by frictional force from the steps
(C) Work done by air resistance
(D) Work done by internal forces within the person's body

**Answer: (D) Work done by internal forces within the person's body** · The council's preliminary key

**Q116** TS EAMCET 2023 · 12 May · Shift 2 MCQ

A body of mass 6 kg is moving with a uniform velocity $4\ \mathrm{ms}^{-1}$. Its velocity changes to $6\ \mathrm{ms}^{-1}$ when a force of 12 N acts on it. Then its displacement is

(A) 3 m
(B) 5 m
(C) 8 m
(D) 12 m

**Answer: (B) 5 m** · Checked by our team

**Q117** TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

Statement (I) : The slope of kinetic energy-displacement curve of a body in motion will be directly proportional to its acceleration.
Statement (II) : From a height of 15 m a ball is projected vertically upwards with a velocity of 30 m/s. If the ball rises to the same height after hitting the ground, the loss of its energy on hitting the ground is 30 %.
Statement (III) : The velocity acquired by a body of mass 'm' after travelling a fixed distance from rest under the action of a constant force is directly proportional to mass 'm'.
Which of the following is correct?

(A) Statements I, II, III are true
(B) Statements I, III are true, but statement II is false
(C) Statement I is true, but statements II and III are false
(D) Statements I, II are true, but statement III is false

**Answer: (C) Statement I is true, but statements II and III are false** · The council's preliminary key

**Q118** TS EAMCET 2022 · 20 Jul · Shift 1 MCQ

An object is moving in a straight line under the influence of a source of constant power. If $v$ and $t$ are velocity and time respectively, then

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(A) $v \propto t^2$
(B) $v \propto t^{1/2}$
(C) $v \propto t$
(D) $v \propto t^{3/2}$

**Answer: (B)** $v \propto t^{1/2}$ · The council's preliminary key

**Q119** TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

A boat of mass 1000 kg goes from rest to speed 20.0 m/s in 5.0 s. The water exerts a constant drag force and the acceleration of the boat is constant. If the average power required by the boat is 45000 W, then the magnitude of the drag force is

(A) 500 N
(B) 750 N
(C) 250 N
(D) 1000 N

**Answer: (A)** 500 N · The council's preliminary key

**Q120** TS EAMCET 2022 · 20 Jul · Shift 2 MCQ

A pump on the ground floor of a building can pump up water to fill a tank of volume $36\ \mathrm{m}^3$ in 30 min. If the tank is 50 m above the ground, and the electric power consumed by the pump is 40 kW, the efficiency of the pump is
(Use $g = 10\ \mathrm{m/s^2}$ and density of water = $1000\ \mathrm{Kg/m^3}$)

(A) 30 %
(B) 25 %
(C) 33%
(D) 40 %

**Answer: (B)** 25 % · The council's preliminary key

**Q121** TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

A ball of mass 1 kg moves in a straight line with velocity $v = cx^{\alpha}$, where $c = 1$ (SI unit) and $\alpha$ is a constant. If the work done by the net force during its displacement from $x = 0$ to $x = 4\,m$ is 128 J, then the $\alpha$ is

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

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

**Q122** TS EAMCET 2022 · 19 Jul · Shift 1 MCQ

Assertion(A): In an elastic collision of two billiard balls, both kinetic energy and linear momentum remain conserved.

Reason (R) : During the collision of the balls, as the collision is elastic there is no exchange of energy. Therefore, both energy and momentum are conserved.

The correct option among the following is

(A) (A) is true, (R) is true and (R) is the correct explanation for (A)

(B) (A) is true, (R) is true but (R) is not the correct explanation for (A)

(C) (A) is true but (R) is false

(D) (A) is false but (R) is true

**Answer: (C)** (A) is true but (R) is false · The council's preliminary key

**Q123** TS EAMCET 2022 · 19 Jul · Shift 2 MCQ

Particle A moving with a velocity $v = 10$ m/s experienced a head on collision with a stationary particle B of the same mass. As a result of collision, the kinetic energy of the system decreased by 1%. The speed of particle A after collision is

(A) 10 m/s

(B) 0.05 m/s

(C) 5 m/s

(D) $10\sqrt{2}$ m/s

**Answer: (B)** 0.05 m/s · Checked by our team

**Q124** TS EAMCET 2022 · 18 Jul · Shift 1 MCQ

The potential energy of an object is $U(x) = (5x^2 - 4x^3)$ J, where x is the position in meter. The position at which the force becomes zero is

(A) $\frac{1}{2}$ m

(B) $\frac{5}{6}$ m

(C) $\frac{1}{3}$ m

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

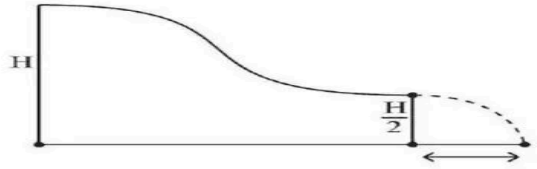
**Answer: (B)** $\frac{5}{6}$ m · The council's preliminary key

**Q125** TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

A small object slides down with initial velocity equal to zero from the top of a smooth hill of height H. The other end of the hill is horizontal and is at height $\frac{H}{2}$ as shown in the figure. The horizontal

distance covered by the object from the end of the hill to the ground is
*(see the figure above)*

A small object slides down with initial velocity equal to zero from the top of a smooth hill of height H. The other end of the hill is horizontal and is at height $\frac{H}{2}$ as shown in the figure. The horizontal distance covered by the object from the end of the hill to the ground is




Options :

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

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

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

## Q126 TS EAMCET 2022 · 18 Jul · Shift 2 MCQ

A moving particle collides with a stationary particle of mass $\frac{1}{n}$ times the mass of moving particle, the fraction of its kinetic energy transferred to the stationary particle is

(A) $\frac{4n^2}{(1+n)^2}$
(B) $\frac{4n}{(1+n)^2}$
(C) $\frac{4n}{1+n^2}$
(D) $4n^2$

**Answer: (B)** $\frac{4n}{(1+n)^2}$ · The council's preliminary key

## Q127 AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

A block of mass 2 kg is pulled at a constant speed with a taut rope along a frictionless plane that is inclined at $30^\circ$. Then the work done by the tension in the rope in pulling it a distance 4 m along the inclined plane in joule is
(acceleration due to gravity $= 10\ \mathrm{m\,s^{-2}}$)

(A) $40$
(B) $20$
(C) $68$
(D) $136$

**Answer: (A)** $40$ · The council's preliminary key

**Q128** AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

A 1 kg box placed at the origin starts sliding along x-axis under the action of a force $\vec{F} = F\hat{i}$. Its acceleration as a function of x is given by $a(x) = \beta.x$ where $\beta = 5\ \mathrm{s}^{-2}$. The work done by $\vec{F}$ in moving the box from $x = 2$ cm to $x = 5$ cm in joule is

(A) $52.5 \times 10^{-4}$
(B) $105.5 \times 10^{-4}$
(C) $17.0 \times 10^{-4}$
(D) $34.0 \times 10^{-4}$

**Answer: (A)** $52.5 \times 10^{-4}$ · The council's preliminary key

**Q129** AP EAPCET 2022 · 8 Jul · Shift 1 MCQ

The work done in stretching a spring of natural length 25 cm and spring constant $50\ \mathrm{Nm}^{-1}$ from 50 cm to 60 cm is

(A) $1.5\ \mathrm{J}$
(B) $2\ \mathrm{J}$
(C) $3.5\ \mathrm{J}$
(D) $5\ \mathrm{J}$

**Answer: (A)** $1.5\ \mathrm{J}$ · The council's preliminary key

**Q130** AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

A system consists of two springs connected is series and each having the spring constant $10\ \mathrm{Nm}^{-1}$. The minimum work required to stretch this system by 1 cm in erg is

(A) $1500$
(B) $2000$
(C) $3000$
(D) $2500$

**Answer: (D)** $2500$ · The council's preliminary key

**Q131** AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

A cannon ball is fired from the top of a 55 m high cliff with an initial speed of $50\ \mathrm{m\,s}^{-1}$. The speed of the cannon ball while hitting the ground in $\mathrm{m\,s}^{-1}$

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

(A) $50$

(B) $60$

(C) $33.2$

(D) $83.2$

**Answer: (B)** $60$ · The council's preliminary key

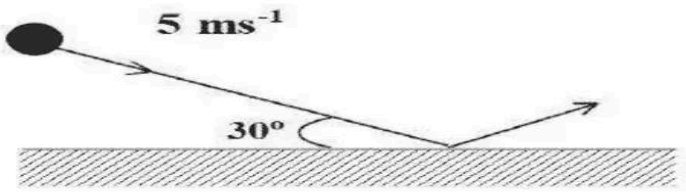
## Q132 AP EAPCET 2022 · 8 Jul · Shift 2 MCQ

A cricket ball hits the ground with a speed of $5\ \mathrm{m\,s}^{-1}$ making an angle $30^\circ$ with the horizontal. If the coefficient of restitution is 0.2, the speed of the reflected ball in $\mathrm{m\,s}^{-1}$ is

*(see the figure above)*

A cricket ball hits the ground with a speed of 5 m $s^{-1}$ making an angle 30° with the horizontal. If the coefficient of restitution is 0.2, the speed of the reflected ball in m $s^{-1}$ is

ఒక క్రికెట్ బంతి 5 m $s^{-1}$ వడి తో క్షితిజంతో 30° చేయునట్లుగా భూమిని తాకింది. ప్రత్యావస్థాన గుణకము 0.2 అయిన, ఆ బంతి తిరిగి పైకి ఎగిరే వడి m $s^{-1}$ లలో




Options :

1. $\sqrt{22}$
2. $\sqrt{15}$
3. $\sqrt{19}$
4. $\sqrt{11}$

(A) $\sqrt{22}$

(B) $\sqrt{15}$

(C) $\sqrt{19}$

(D) $\sqrt{11}$

**Answer: (C)** $\sqrt{19}$ · The council's preliminary key

## Q133 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

A bar of mass m resting on a smooth horizontal plane starts moving due to a constant force F. In the process of its rectilinear motion the angle $\theta$ between the direction of this force and the horizontal varies as $\theta = kx$, where k is a constant and x is the distance traversed by the bar from its initial position. The velocity (v) of the bar as a function of the angle $\theta$ is

(A) $v = \sqrt{\frac{2F\sin\theta}{mk}}$

(B) $v = \sqrt{\frac{2F}{mk\sin\theta}}$

(C) $v = \frac{2F\sin\theta}{mk}$

(D) $v = \frac{2F}{mk\sin\theta}$

**Answer: (A)** $v = \sqrt{\frac{2F\sin\theta}{mk}}$ · The council's preliminary key

## Q134 AP EAPCET 2022 · 7 Jul · Shift 1 MCQ

A lift raises 50 passengers each having average weight 600 N to a height of 100 m at a constant speed in time T. If the average power of 15 kW is required by the lift, then the value of T in seconds is

(A) 150

(B) 100

(C) 300

(D) 200

**Answer: (D)** 200 · The council's preliminary key

## Q135 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

Two wooden blocks of mass $M_1$ and $M_2$ rest on a frictionless table. A bullet of mass m is fired at $M_1$ with speed v which embedded in it and the two together finally collide with $M_2$. Find the velocity of $M_2$ after collision.
[Ignore any energy loss and treat the problem to be one dimensional]

(A) $\frac{2mv}{M_1+M_2+m}$

(B) $\frac{mv}{M_1+M_2+m}$

(C) $\frac{(M_1+M_2+m)v}{M_1+M_2+m}$

(D) $\frac{M_1+M_2}{M_1+M_2+m}v$

**Answer: (A)** $\frac{2mv}{M_1+M_2+m}$ · The council's preliminary key

## Q136 AP EAPCET 2022 · 7 Jul · Shift 2 MCQ

An object of mass 20 kg. is displayed (sic) by $x = 5t^2$ m (here t is time) by the application of a force. Then the ratio of the work done in times 3 s and 5 s is

(A) $\frac{2}{3}$
(B) $\frac{4}{9}$
(C) $\frac{3}{5}$
(D) $\frac{9}{25}$

**Answer: (D)** $\frac{9}{25}$ · The council's preliminary key

**Q137** AP EAPCET 2022 · 6 Jul · Shift 1 MCQ

A force of 10 N acting at an angle on a particle produces a displacement of $(3\hat{i} - 4\hat{j})$ m. Due to this force, if the kinetic energy of the particle is decreased by 25 joule, then the angle between the force and the displacement is

(A) $\cos^{-1}\left(\frac{1}{3}\right)$
(B) $30^\circ$
(C) $120^\circ$
(D) $\cos^{-1}\left(\frac{3}{4}\right)$

**Answer: (C)** $120^\circ$ · The council's preliminary key

**Q138** AP EAPCET 2022 · 6 Jul · Shift 2 MCQ

A force of 5 N acts on a body initially at rest. If the instantaneous power due to the force at the end of the third second (t = 3 s) is 5 W, then the mass of the body is

(A) $25\ \text{kg}$
(B) $12.5\ \text{kg}$
(C) $15\ \text{kg}$
(D) $7.5\ \text{kg}$

**Answer: (C)** $15\ \text{kg}$ · The council's preliminary key

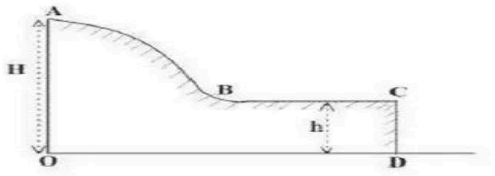
**Q139** AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

A small disc of mass m slides down with initial velocity zero from the top (A) of a smooth hill of height H having a horizontal portion (BC) as shown in the figure. If the height of the horizontal portion of the hill is h, then the maximum horizontal distance covered by the disc from the point D is

*(see the figure above)*

A small disc of mass m slides down with initial velocity zero from the top (A) of a smooth hill of height H having a horizontal portion (BC) as shown in the figure. If the height of the horizontal portion of the hill is h, then the maximum horizontal distance covered by the disc from the point D is

పటంలో చూపిన విధంగా క్షితిజ సమాంతర భాగము (BC) ఉన్న H ఎత్తు గల నున్నని కొండ శిఖరం (A) నుండి m ద్రవ్యరాశి గల బిళ్ళ తొలి వేగం శూన్యము తో జారుతున్నది. క్షితిజ సమాంతర భాగము ఎత్తు h అయిన ఆ బిళ్ళ D బిందువు నుండి ప్రయాణించిన గరిష్ఠ క్షితిజ సమాంతం దూరం




Options :

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

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

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

## Q140 AP EAPCET 2022 · 5 Jul · Shift 1 MCQ

A block of mass 50 kg is pulled at a constant speed of $4\ \mathrm{m\,s^{-1}}$ across a horizontal floor by an applied force of 500 N directed $30^\circ$ above the horizontal. The rate at which the force does work on the block in watt is

(A) $\frac{2000}{\sqrt{3}}$
(B) $500\sqrt{3}$
(C) 1732
(D) 1864

**Answer: (C) 1732** · The council's preliminary key

## Q141 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

A force $\vec{F} = 4\hat{i} - 15\hat{j}$ N, acts on a body resulting in a displacement of $6\hat{i}$. If the body had a kinetic energy of 7 joules at the beginning of the displacement, the kinetic energy at the end of the displacement is

(A) 24 J
(B) 31 J
(C) 30 J
(D) 25 J

**Answer: (B)** 31 J · The council's preliminary key

## Q142 AP EAPCET 2022 · 5 Jul · Shift 2 MCQ

Consider a force $F = Kx^3$, which acts on a particle at rest. The work done by the force for displacement of 2 m is

$(K = 2\ \mathrm{Nm^{-3}})$

(A) 10 J
(B) 4 J
(C) 100 J
(D) 8 J

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

## Q143 AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

A mass of 1 kg falls from a height of 1 m and lands on a mass less platform supported by a spring having spring constant 15 $\mathrm{Nm^{-1}}$ as shown in the figure. The maximum compression of the spring is. (acceleration due to gravity = 10 $\mathrm{ms^{-2}}$)

*(see the figure above)*

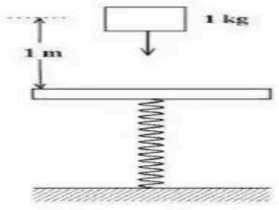
N.A Think Time : N.A Minimum Instruction Time : 0

A mass of 1 kg falls from a height of 1 m and lands on a mass less platform supported by a spring having spring constant 15 $\mathrm{Nm^{-1}}$ as shown in the figure. The maximum compression of the spring is.

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

పటంలో చూపిన విధంగా స్ప్రింగ్ స్థిరాంకం 15 $\mathrm{Nm^{-1}}$ గల స్ప్రింగ్ చే నిలబడిన ద్రవ్యరాశి లేని ప్లాట్ ఫారంపై 1kg ద్రవ్యరాశి 1 m ఎత్తునుండి పడి, నిలబడినది. అయిన ఆ స్ప్రింగ్ గరిష్ఠ సంపీడనము

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




Options :

1. 2 m
2. $\sqrt{2}$ m
3. $\left(\frac{2}{\sqrt{3}}\right)$ m
4. $\sqrt{3}$ m

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

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

**Q144** AP EAPCET 2022 · 4 Jul · Shift 1 MCQ

A bead of mass 400 g is moving along a straight line under a force that delivers a constant power 1.2 W to the bead. If the bead is initially at rest, the speed it attains after 6 sec in $\mathrm{ms}^{-1}$

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

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

**Q145** AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

A ball of mass 300 g is dropped from a height 10 m above a sandy ground. On reaching the ground, it penetrates through a distance 1.5 m in sand and finally stops. The average resistance offered by the sand to oppose the motion is (acceleration due to gravity = $10\ \mathrm{ms}^{-2}$)

(A) 35 N
(B) 23 N
(C) 34 N
(D) 28 N

**Answer: (B)** 23 N · The council's preliminary key

**Q146** AP EAPCET 2022 · 4 Jul · Shift 2 MCQ

Two balls A and B, of masses M and 2M respectively collide each other. If the ball A moves with a speed of $150\ \mathrm{ms}^{-1}$ and collides with ball B, moving with speed v in the opposite direction. After collision if ball A comes to rest and the coefficient of restitution is 1 (one), then the speed of the ball B before it collides with ball A is

(A) $37.5\ \mathrm{ms}^{-1}$
(B) $12.5\ \mathrm{ms}^{-1}$
(C) $75\ \mathrm{ms}^{-1}$
(D) $25\ \mathrm{ms}^{-1}$

**Answer: (A)** $37.5\ \mathrm{ms}^{-1}$ · The council's preliminary key

**Q147** AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

When a light body and a heavy body have equal momenta, the kinetic energy is greater for _____

(A) The lighter body
(B) The heavy body
(C) Both are equal
(D) Can't be determined

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

**Q148** AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

When a force $\vec{F}$ acts on a body and the body moves with a velocity $\vec{v}$, the power is given by ____

(A) $\vec{F} \cdot \vec{v}$
(B) $\frac{\vec{F}}{\vec{v}}$
(C) $\frac{\vec{F}}{v^2}$
(D) $\vec{F} \times v^2$

**Answer: (A)** $\vec{F} \cdot \vec{v}$ · The council's preliminary key

**Q149** AP EAPCET 2021 · 5 Oct · Shift 1 MCQ

A body of mass 2.5 $kg$ is thrown vertically upwards with a kinetic energy of 500 J. The height at which the kinetic energy of the body reduces to 50% of its original value is ____ ($g = 10\ \mathrm{m.s^{-2}}$)

(A) $10\ m$
(B) $12.5\ m$
(C) $25\ m$
(D) $50\ m$

**Answer: (A)** $10\ m$ · The council's preliminary key

**Q150** AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

A body of mass $0.15\ \mathrm{kg}$ moving with a velocity of $15\ \mathrm{m.s^{-1}}$ comes to rest when it hits a spring that is fixed at another end. If the force constant of the spring is $1500\ \mathrm{N.m^{-1}}$, the compression in the spring is _____

(A) $0.15\ \mathrm{m}$
(B) $0.1\ \mathrm{m}$
(C) $0.2\ \mathrm{m}$
(D) $0.5\ \mathrm{m}$

**Answer: (A)** $0.15\ \mathrm{m}$ · The council's preliminary key

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**Q151** AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

What is the nature of the graph between momentum of a body and its kinetic energy?

(A) Straight line
(B) Parabola
(C) Circle
(D) Ellipse

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

**Q152** AP EAPCET 2021 · 25 Aug · Shift 1 MCQ

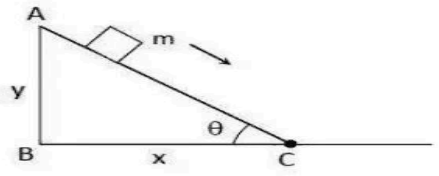
A particle slides down along an inclined plane AC. If the plane is frictionless, kinetic energy of particle at 'C' is

*(see the figure above)*

**Mandatory : No**

A particle slides down along an inclined plane AC. If the plane is frictionless, kinetic energy of particle at 'C' is

ఒక కణము వాలు తలము గుండా క్రిందకు జారుతుంది. తలము ఘర్షణ రహితమయితే 'C' బిందువు వద్ద కణం యొక్క గతిశక్తి ఎంత?




**Options :**

1. $mgy$

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2. $mgx$

3. $mg\left(\frac{y}{\sin\theta}\right)$

4. $mg\left(\frac{y}{\cos\theta}\right)$

(A) $mgy$
(B) $mgx$
(C) $mg\left(\frac{y}{\sin\theta}\right)$
(D) $mg\left(\frac{y}{\cos\theta}\right)$

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

**Q153** AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

Assertion (A): In an elastic collision of two billiard balls, the total K.E. is conserved during the short time of collision of the balls (i.e. when they are in contact).
Reason (R): Energy spent against friction does not follow the law of conservation of energy.

(A) Both A and R are true and R is a correct explanation for A
(B) Both A and R are true but R is not a correct explanation for A
(C) A is true, R is false
(D) A is false, R is false

**Answer: (D) A is false, R is false** · The council's preliminary key

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**Q154** AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

A bullet of mass $30\,\mathrm{g}$ moving with $700\,\mathrm{m.s^{-1}}$ collides with a block of mass $4\,\mathrm{kg}$ hanging by a string of length $0.4\,\mathrm{m}$. After collision, the block rises to a height of $0.2\,\mathrm{m}$. Then find the velocity of the bullet when it comes out of the block _____

(A) $200\,\mathrm{m.s^{-1}}$
(B) $433\,\mathrm{m.s^{-1}}$
(C) $400\,\mathrm{m.s^{-1}}$
(D) $332\,\mathrm{m.s^{-1}}$

**Answer: (B)** $433\,\mathrm{m.s^{-1}}$ · The council's preliminary key

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**Q155** AP EAPCET 2021 · 25 Aug · Shift 2 MCQ

A body of mass $3\,\mathrm{kg}$ is moving with a velocity of $8\,\mathrm{m.s^{-1}}$ collides head on with another body of mass $1\,\mathrm{kg}$, moving in the opposite direction with a velocity of $4\,\mathrm{m.s^{-1}}$. After the collision, if the two bodies stick together and move, they move with a common velocity ____

(A) $5\,\mathrm{m.s^{-1}}$
(B) $7\,\mathrm{m.s^{-1}}$
(C) $10\,\mathrm{m.s^{-1}}$
(D) $14\,\mathrm{m.s^{-1}}$

**Answer: (A)** $5\,\mathrm{m.s^{-1}}$ · The council's preliminary key

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**Q156** AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

A car moving at a speed 'v' is stopped by a retarding force 'F' in a distance 's'. If the retarding force were $3F$, the car will be stopped in a distance _____

(A) $\frac{s}{3}$
(B) $\frac{s}{6}$
(C) $\frac{s}{9}$
(D) $\frac{s}{12}$

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

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**Q157** AP EAPCET 2021 · 24 Aug · Shift 1 MCQ

When the mass and speed of the body are doubled, the kinetic energy of the body:

(A) becomes double
(B) becomes four times
(C) becomes eight time
(D) remains unchanged.

**Answer: (C) becomes eight time** · The council's preliminary key

## Q158 AP EAPCET 2021 · 24 Aug · Shift 2 MCQ

In perfectly inelastic collisions, the relative velocity of the bodies:

(A) before impact is zero
(B) before impact is equal to that after impact
(C) after impact is zero
(D) is characterized by none of the above

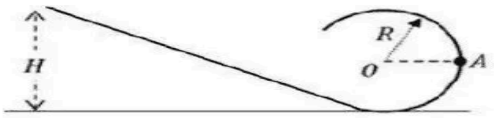
**Answer: (C) after impact is zero** · The council's preliminary key

## Q159 AP EAPCET 2021 · 23 Aug · Shift 1 MCQ

A small body slides down a smooth uneven surface from a height $H$, which eventually emerges into a circular loop of radius $R(< H)$. What should be the value of $H$ so that the force on the body at $A$ is $\sqrt{2}$ times its weight?
*(see the figure above)*

**Mandatory : No**

A small body slides down a smooth uneven surface from a height $H$, which eventually emerges into a circular loop of radius $R(< H)$. What should be the value of $H$ so that the force on the body at $A$ is $\sqrt{2}$ times its weight?




ఒక చిన్న వస్తువు నున్నని అసమాన తలము క్రిందికి $H$ ఎత్తు నుండి జారుతున్నది. చివరిగా పటములో చూపినట్లు $R$ వ్యాసార్ధము ఉన్న వృత్తాకార లూప్ లో వెలువడినది $(R < H)$. $A$ వద్ద వస్తువు మీద బలము దాని భారానికి $\sqrt{2}$ రెట్లు ఉండాలంటే $H$ యొక్క విలువ?

**Options :**

1. $H = \frac{3R}{2}$
2. $H = 5R$
3. $H = \frac{5R}{2}$
4. $H = 3R$

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(A) $H = \frac{3R}{2}$
(B) $H = 5R$
(C) $H = \frac{5R}{2}$
(D) $H = 3R$

**Answer: (A)** $H = \frac{3R}{2}$ · The council's preliminary key

**Q160** AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

The coefficient of restitution for a perfect elastic collision is _____

(A) $1$
(B) $0$
(C) $\infty$
(D) $-1$

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

**Q161** AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

A body of mass $M$ is dropped from a height $h$ on a sand floor. If the body penetrates $x\ cm$ into the sand, the average resistance offered by the sand to the body is _____

(A) $Mg\left(\frac{h}{x}\right)$
(B) $Mg\left(\frac{x+h}{x}\right)$
(C) $Mg(h+x)$
(D) $Mg\left(\frac{x-h}{x}\right)$

**Answer: (B)** $Mg\left(\frac{x+h}{x}\right)$ · The council's preliminary key

**Q162** AP EAPCET 2021 · 23 Aug · Shift 2 MCQ

A bob of a pendulum of length 0.5 $m$ has a speed of 6 $ms^{-1}$ at its lowest point. Find the speed of the bob when the string of the pendulum makes $60^\circ$ with the vertical. (take g = 10 $ms^{-2}$)

(A) $26\ ms^{-1}$
(B) $\sqrt{31}\ ms^{-1}$
(C) $13\ ms^{-1}$
(D) $1.3\ ms^{-1}$

**Answer: (B)** $\sqrt{31}\ ms^{-1}$ · The council's preliminary key

**Q163** AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

When a force $\vec{F} = 17 - 2x + 6x^2$ N acts on a body of mass 2 kg and displaces it from $x = 0$ m to $x = 8$ m, the work done is _____.

(A) $1096\ \text{J}$
(B) $270\ \text{J}$
(C) $35\ \text{J}$
(D) $135\ \text{J}$

**Answer: (A)** $1096\ \text{J}$ · The council's preliminary key

**Q164** AP EAPCET 2021 · 20 Aug · Shift 1 MCQ

A uniform chain has a mass 'm' and length 'l'. It is held on a frictionless table with one-sixth of its length hanging over the edge. The work done in just pulling the hanging part back on the table is:

(A) $\frac{mgl}{72}$
(B) $\frac{mgl}{36}$
(C) $\frac{mgl}{12}$
(D) $\frac{mgl}{6}$

**Answer: (A)** $\frac{mgl}{72}$ · The council's preliminary key

**Q165** AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

An engine develops $20\ kW$ of power. How much time will it take to lift a mass of $200\ kg$ to a height of $40\ m$? $(g = 10\ m.s^{-2})$

(A) $4\ s$
(B) $5\ s$
(C) $8\ s$
(D) $10\ s$

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

**Q166** AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

Two bodies having kinetic energy in the ratio $4:1$, are moving with same linear velocity. The ratio of their masses is _____

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

**Answer: (C)** $4:1$ · The council's preliminary key

**Q167** AP EAPCET 2021 · 20 Aug · Shift 2 MCQ

Water is falling on the blades of a turbine from a height of $25\ m$. $3 \times 10^3\ kg$ of water pours on the blade per minute. If the whole of energy is transferred to the turbine, power delivered is:

(A) $12250\ W$
(B) $16250\ W$
(C) $8250\ W$
(D) $20250\ W$

**Answer: (A)** $12250\ W$ · The council's preliminary key

**Q168** AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

A metal ball of mass $2\ kg$ moving with a velocity of $36\ kmph$ has a head on collision with a stationary ball of mass $3\ kg$. After the collision, if both balls move together, the loss in kinetic energy due to collision is _____

(A) $40$ J
(B) $60$ J
(C) $100$ J
(D) $140$ J

**Answer: (B)** $60$ J · The council's preliminary key

**Q169** AP EAPCET 2021 · 19 Aug · Shift 1 MCQ

A body of mass $8\ kg$, under the action of a force, is displaced according to the equation $s = \frac{t^2}{4}\ m$, where 't' is the time. Find the work done by the force in the first 4 seconds.

(A) $9$ J
(B) $16$ J
(C) $6$ J
(D) $3$ J

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

**Q170** AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

What is the shape of the graph between speed and kinetic energy of a body?

(A) A straight line
(B) A hyperbola
(C) A parabola
(D) Exponential

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

**Q171** AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

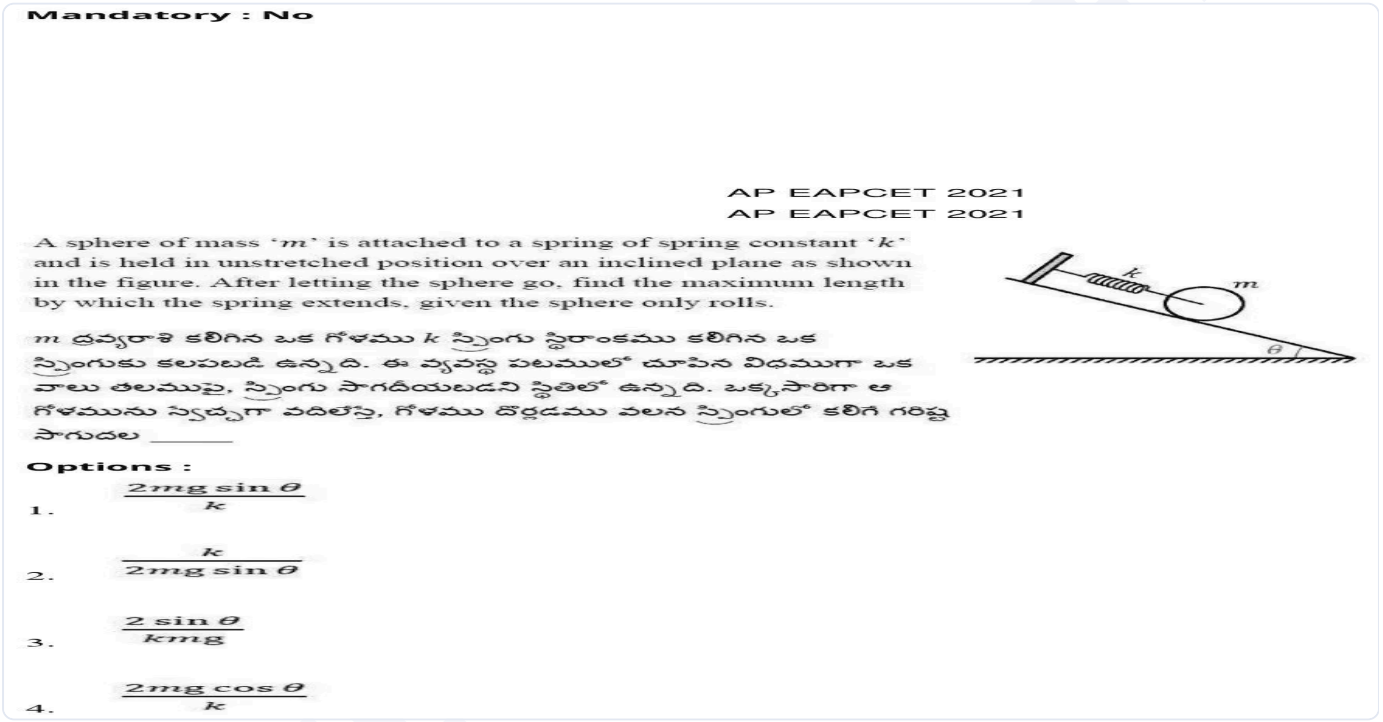
A quarter horse power motor runs at a speed of $600\ \text{rpm}$. Assuming $60\ \%$ efficiency, the work done by the motor in one rotation is _____

(A) 7.46 J
(B) 74.6 J
(C) 111.9 J
(D) 11.19 J

**Answer: (D)** 11.19 J · The council's preliminary key

## Q172 AP EAPCET 2021 · 19 Aug · Shift 2 MCQ

A sphere of mass 'm' is attached to a spring of spring constant 'k' and is held in unstretched position over an inclined plane as shown in the figure. After letting the sphere go, find the maximum length by which the spring extends, given the sphere only rolls.
*(see the figure above)*




(A) $\frac{2mg\sin\theta}{k}$
(B) $\frac{k}{2mg\sin\theta}$
(C) $\frac{2\sin\theta}{kmg}$
(D) $\frac{2mg\cos\theta}{k}$

**Answer: (A)** $\frac{2mg\sin\theta}{k}$ · The council's preliminary key

## Q173 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

A bullet of mass m enters a wooden block of length L at a speed $v_1$ and emerges out of block with a speed $v_2$. If $\overline{F}$ is the average force which impeded its motion through the wooden block then correct statement is (Assume uniform deceleration inside the block)

(A) $\overline{F} = \frac{m}{2L}(v_2^2 - v_1^2)$
(B) $\overline{F} = \frac{m}{4L}(v_2^2 + v_1^2)$
(C) $\overline{F} = 2\frac{m}{L}(v_2 - v_1)^2$
(D) $\overline{F} = \frac{m}{2L}(v_2 + v_1)^2$

**Answer: (A)** $\overline{F} = \frac{m}{2L}(v_2^2 - v_1^2)$ · The council's preliminary key

### Q174 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

If the average terminal velocity of rain drop is 2 $ms^{-1}$, then the energy transferred by rain to each square meter of the surface at a place which receives 100 cm of rain in a year is

(A) $1 \times 10^4$ J
(B) $1 \times 10^3$ J
(C) $2 \times 10^3$ J
(D) $2 \times 10^4$ J

**Answer: (C)** $2 \times 10^3$ J · The council's preliminary key

### Q175 TS EAMCET 2021 · 6 Aug · Shift 1 MCQ

A horizontal force $\vec{F} = (g - x^2)\hat{i}$ N acts on a wooden block resting on a horizontal smooth surface. The work done to move the block from x = 0 to x = 3 m (in Joule) is (use g = 10 $m/s^2$):

(A) 24
(B) 35
(C) 30
(D) 21

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

### Q176 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

A force acts on a body of mass $15\ \text{kg}$, initially at rest. If the instantaneous power due to the force at the end of the third second is $5\ \text{W}$ then the instantaneous power (in W) at the end of the fourth second will be

(A) 6.33
(B) 6.67
(C) 6.29
(D) 6.94

**Answer: (B)** 6.67 · The council's preliminary key

### Q177 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

A ball of mass $2\ \text{kg}$ is moving in $xy$ plane with a potential energy given as $U = (12x + 16y)$ J, $x$ and $y$ being in metre. Assume the initial position of the ball at $t = 0$ is at origin $(0, 0)$ and it is moving with a

velocity of $(15\hat{i} + 20\hat{j})\ \mathrm{m/s}$. Then identify the correct statement.

(A) The path of the ball is parabolic

(B) The direction of motion of the ball initially at $t = 0$ is parallel to the direction of acceleration

(C) The speed of the ball at $t = 2\mathrm{s}$ is $5\ \mathrm{m/s}$

(D) The magnitude of acceleration of the ball is $8\ \mathrm{m/s^2}$

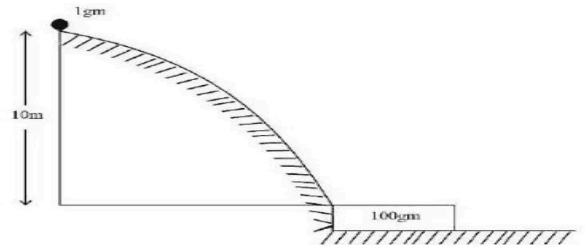
**Answer: (C)** The speed of the ball at $t = 2\mathrm{s}$ is $5\ \mathrm{m/s}$ · The council's preliminary key

## Q178 TS EAMCET 2021 · 6 Aug · Shift 2 MCQ

A small disc of mass $1\ \mathrm{gm}$ slides down a smooth hill of height $10\ \mathrm{m}$ from rest and gets on to a plank of mass $100\ \mathrm{gm}$ as shown in the figure. Due to friction between the disc and the plank, the disc slows down and moves as one piece with the plank. The work done by the frictional force is approximately (Use $g = 10\ \mathrm{m/s^2}$)

*(see the figure above)*

A small disc of mass 1 gm slides down a smooth hill of height 10 m from rest and gets on to a plank of mass 100 gm as shown in the figure. Due to friction between the disc and the plank, the disc slows down and moves as one piece with the plank. The work done by the frictional force is approximately
(Use $g = 10\ \mathrm{m/s^2}$)




Options :

1. 0.01 J
2. 10 J
3. 0.1 J
4. 1 J

(A) $0.01\ \mathrm{J}$

(B) $10\ \mathrm{J}$

(C) $0.1\ \mathrm{J}$

(D) $1\ \mathrm{J}$

**Answer: (C)** $0.1\ \mathrm{J}$ · The council's preliminary key

## Q179 TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

A constant force of 5 N accelerates a stationary particle of mass 500 gm through a displacement of 5 m. The average power delivered is

(A) 6.25 w
(B) 25 w
(C) 62.5 w
(D) 50 w

**Answer: (B)** 25 w · The council's preliminary key

**Q180** TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

Which of the following is not a correct statement?

(A) Work done by conservative force is equal to negative change in potential energy
(B) Total energy of system is always conserved
(C) Work done by non-conservative force in a closed path is equal to zero
(D) In stable equilibrium, the potential energy is minimum

**Answer: (C) Work done by non-conservative force in a closed path is equal to zero** · The council's preliminary key

**Q181** TS EAMCET 2021 · 5 Aug · Shift 1 MCQ

A small block of mass 200 g is placed on a horizontal slab at a height of 2 m above the floor. The block is pressed against a horizontal spring fixed at one end to compress the spring through 10.0 cm. Upon releasing, the block moves horizontally till it leaves the spring. Calculate the horizontal distance covered by the block after leaving the slab and just before hitting the ground. The spring constant is 50 N/m. (Assume $g = 10\ \mathrm{m/s^2}$).

(A) 0.99 m
(B) 0.55 m
(C) 0.44 m
(D) 0.33 m

**Answer: (A)** 0.99 m · The council's preliminary key

**Q182** TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

A water pump rated 600 W, has an efficiency of 95 %. If it is used to raise water through vertical distance of 60 m. The volume of water drawn in 20 minutes, is
[Use density of water = 1000 kg $m^{-3}$, g = 10 $m/s^2$]

(A) 1.14 $m^3$
(B) 2.24 $m^3$
(C) 11.4 $m^3$
(D) 22.4 $m^3$

**Answer: (A)** 1.14 $m^3$ · The council's preliminary key

**Q183** TS EAMCET 2021 · 5 Aug · Shift 2 MCQ

Ball P of mass m moving with velocity 'v' collides with another ball Q of mass 2 m, at rest. If $v_P$ and $v_Q$ are the final velocities of P and Q respectively, after collision, then
(Assume the coefficient of restitution is $\frac{1}{3}$)

(A) $\frac{v_Q}{v_P} = 4$
(B) $\frac{v_P}{v_Q} = 4$
(C) $\frac{v_Q}{v_P} = 2$
(D) $\frac{v_P}{v_Q} = 2$

**Answer: (A)** $\frac{v_Q}{v_P} = 4$ · The council's preliminary key

**Q184** TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

The potential energy of a particle in a central field has the form $U(r) = \frac{1}{r^2} - \frac{1}{r}$, where 'r' is the distance from the centre of the field. The magnitude of the maximum attractive force in Newton is

(A) $\frac{1}{27}$
(B) $\frac{1}{9}$
(C) $\frac{1}{3}$
(D) 1

**Answer: (A)** $\frac{1}{27}$ · The council's preliminary key

**Q185** TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

Consider a rocket is being fired. The kinetic energy of the rocket is increased by 16 times where as its total mass is reduced by half through the burning of fuel. The factor by which its momentum increases is

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

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

**Q186** TS EAMCET 2021 · 4 Aug · Shift 1 MCQ

Water is pumped steadily out of a flooded basement, at the speed of 10 m/s through a hose (tube) of radius 1 cm, passing through a window 3 m above the water level. The power of the pump is
(Assume $g = 10\ \mathrm{m/s^2}$, density of water = $1000\ \mathrm{kg/m^3}$)

(A) $80\pi$ W
(B) $30\pi$ W
(C) $50\pi$ W
(D) $90\pi$ W

**Answer: (A)** $80\pi$ W · The council's preliminary key

**Q187** TS EAMCET 2021 · 4 Aug · Shift 2 MCQ

Consider a small block sliding down an inclined plane of inclination 30° with the horizontal. The coefficient of friction is $\mu = \frac{2}{3}x$, where x is the distance (in meter) through which the mass slides down. The distance covered by the mass before it stops is

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

**Answer: (B)** $\sqrt{3}$ m · The council's preliminary key

**Q188** AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

Two objects of masses $m_1$ and $m_2$ possess equal kinetic energies. If $p_1$ and $p_2$ are their respective momentum, then $p_1 : p_2$ is _____

(A) $m_1 : m_2$
(B) $m_2 : m_1$
(C) $\sqrt{m_1} : \sqrt{m_2}$
(D) $m_1^2 : m_2^2$

**Answer: (C)** $\sqrt{m_1} : \sqrt{m_2}$ · The council's preliminary key

**Q189** AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

Brakes stop a train in a certain distance $x$. If the force of these brakes is reduced to one fourth of its original force, the train needs _____ the original distance $x$ to stop.

(A) Double
(B) Half
(C) Four Times
(D) Same

**Answer: (C) Four Times** · The council's preliminary key

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**Q190** AP EAMCET 2020 · 7 Oct · Shift 1 MCQ

$(60\,\hat{i} + 15\,\hat{j} - 3\,\hat{k})\ N$ force produces a velocity $(2\,\hat{i} - 4\,\hat{j} + 5\,\hat{k})$ in a particle. The value of power at that time will be _____

(A) $45\ W$
(B) $95\ W$
(C) $75\ W$
(D) $100\ W$

**Answer: (A)** $45\ W$ · The council's preliminary key

**Q191** AP EAMCET 2020 · 23 Sep · Shift 1 MCQ

A uniform chain of mass 'M' and length 'L' is lying on a smooth horizontal table, with half of its length hanging down. The work done is pulling the entire chain up the table is

(A) $\frac{MgL}{2}$
(B) $\frac{MgL}{4}$
(C) $\frac{MgL}{8}$
(D) $\frac{MgL}{16}$

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

**Q192** AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

A steel ball of radius $2\ \text{cm}$ is at rest on a frictionless surface. Another steel ball of radius $4\ \text{cm}$ moving with velocity of $81\ \text{cm.s}^{-1}$ collides elastically with the ball which is at rest. After collision the ball with radius of $2\ \text{cm}$ moves with speed of _____

(A) $144\ \text{cm.s}^{-1}$
(B) $72\ \text{cm.s}^{-1}$
(C) $216\ \text{cm.s}^{-1}$
(D) $36\ \text{cm.s}^{-1}$

**Answer: (A)** $144\ \text{cm.s}^{-1}$ · The council's preliminary key

**Q193** AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

A bullet of mass 'm' and velocity 'v' when fired at a sand bag of mass 'M', suspended by a string, gets embedded into the bag. The loss of kinetic energy in this process is

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(A) $\frac{mv^2}{2}$

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

(C) $\frac{Mv^2}{2}$

(D) $\frac{mMv^2}{2(M+m)}$

**Answer: (D)** $\frac{mMv^2}{2(M+m)}$ · The council's preliminary key

**Q194** AP EAMCET 2020 · 22 Sep · Shift 1 MCQ

A bullet of mass $0.01\ \text{kg}$ travelling at a speed of $500\ \text{m.s}^{-1}$ strikes a block of mass $2\ \text{kg}$ which is suspended by a string of length $5\ \text{m}$. The centre of gravity of the block is found to rise a vertical distance of $0.1\ \text{m}$. What is the speed of the bullet after it emerges from the block?

(A) $200\ \text{m.s}^{-1}$

(B) $220\ \text{m.s}^{-1}$

(C) $204\ \text{m.s}^{-1}$

(D) $284\ \text{m.s}^{-1}$

**Answer: (B)** $220\ \text{m.s}^{-1}$ · The council's preliminary key

**Q195** AP EAMCET 2020 · 22 Sep · Shift 2 MCQ

An electric motor exerts a force of 50 N on a cable and pulls it through 60 m in 1 minute. The power supplied by the motor is _____

(A) 50 W

(B) 3000 W

(C) 1 W

(D) 100 W

**Answer: (A)** 50 W · The council's preliminary key

**Q196** AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

Two balls $X$ $(2\ \text{kg})$ and $Y$ $(4\ \text{kg})$ approach each other with equal speeds of $10\ \text{m.s}^{-1}$. If the collision is perfectly elastic, the new velocities of $X$ and $Y$ balls are respectively

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(A) $\frac{50}{3}\ \mathrm{m.s^{-1}}, \frac{-10}{3}\ \mathrm{m.s^{-1}}$

(B) $\frac{-50}{3}\ \mathrm{m.s^{-1}}, \frac{-10}{3}\ \mathrm{m.s^{-1}}$

(C) $\frac{-50}{3}\ \mathrm{m.s^{-1}}, \frac{10}{3}\ \mathrm{m.s^{-1}}$

(D) $\frac{50}{3}\ \mathrm{m.s^{-1}}, \frac{10}{3}\ \mathrm{m.s^{-1}}$

**Answer: (C)** $\frac{-50}{3}\ \mathrm{m.s^{-1}}, \frac{10}{3}\ \mathrm{m.s^{-1}}$ · The council's preliminary key

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**Q197** AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

An automatic gun fires $360$ bullets per minute with a speed of $360\ \mathrm{kmph}$. If each bullet weighs $20\ \mathrm{g}$, the power of the gun is

(A) $75\ \mathrm{W}$

(B) $150\ \mathrm{W}$

(C) $300\ \mathrm{W}$

(D) $600\ \mathrm{W}$

**Answer: (D)** $600\ \mathrm{W}$ · The council's preliminary key

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**Q198** AP EAMCET 2020 · 21 Sep · Shift 1 MCQ

The power utilized when a force of $(2\hat{i}+3\hat{j}+4\hat{k})\ \mathrm{N}$ acts on a body for $4$ seconds, producing a displacement of $(3\hat{i}+4\hat{j}+5\hat{k})\ \mathrm{m}$, is _____

(A) $9.5\ \mathrm{W}$

(B) $7.5\ \mathrm{W}$

(C) $6.5\ \mathrm{W}$

(D) $4.5\ \mathrm{W}$

**Answer: (A)** $9.5\ \mathrm{W}$ · The council's preliminary key

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**Q199** AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

When a moving body collides with a stationary body, of $n$ times its mass, then the amount of kinetic energy transferred to the stationary body is _____

(A) $\frac{4n}{(1+n)^2}$

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

(C) $\frac{n^2}{(1+n)^2}$

(D) $\frac{4n^2}{(1+n)^2}$

**Answer: (A)** $\frac{4n}{(1+n)^2}$ · The council's preliminary key

**Q200** AP EAMCET 2020 · 21 Sep · Shift 2 MCQ

A man pushes a wall and fails to displace it. He does _____

(A) Negative work
(B) Positive but not maximum work
(C) No work at all
(D) Maximum work

**Answer: (C) No work at all** · The council's preliminary key

**Q201** AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

If a force $F$ is applied on a body and it moves with a velocity $v$, the power will be

(A) $F.v$
(B) $F/v$
(C) $F/v^2$
(D) $F.v^2$

**Answer: (A)** $F.v$ · The council's preliminary key

**Q202** AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

A particle is moving an $x$-axis has potential energy $U = 2 - 20x + 5x^2$ J along $x$-axis. The particle is released at $x = -3$. The maximum value of $x$ will be ($x$ is in meters and $U$ is in joules)

(A) $5\,\mathrm{m}$
(B) $3\,\mathrm{m}$
(C) $7\,\mathrm{m}$
(D) $8\,\mathrm{m}$

**Answer: (C)** $7\,\mathrm{m}$ · The council's preliminary key

**Q203** AP EAMCET 2020 · 18 Sep · Shift 1 MCQ

When two bodies collide elastically, then

(A) Kinetic energy of the system alone is conserved
(B) Only momentum is conserved
(C) Both Kinetic energy and momentum is conserved
(D) Neither kinetic energy nor momentum is conserved

**Answer: (C) Both Kinetic energy and momentum is conserved** · The council's preliminary key

**Q204** AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

The kinetic energy of a body is increased by 4 times. Its momentum will _____

(A) increase twice
(B) increase four times
(C) decrease twice
(D) remains constant

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

**Q205** AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

A bullet strikes against a wooden block and is embedded in it, the nature of collision is:

(A) Elastic
(B) Perfectly inelastic
(C) Inelastic
(D) Perfectly elastic

**Answer: (B) Perfectly inelastic** · The council's preliminary key

**Q206** AP EAMCET 2020 · 18 Sep · Shift 2 MCQ

A machine which is 70% efficient raises a $10\ kg$ body through a certain distance and spends $100\ \text{J}$ energy. The body is then released. On reaching the ground, the kinetic energy of the body will be

(A) $0\ \text{J}$
(B) $70\ \text{J}$
(C) $50\ \text{J}$
(D) $35\ \text{J}$

**Answer: (B)** $70\ \text{J}$ · The council's preliminary key

**Q207** AP EAMCET 2020 · 17 Sep · Shift 1 MCQ

Work done _____

(A) Can only be positive
(B) Can only be negative
(C) Can either be positive or negative
(D) Cannot be assigned a sign

**Answer: (C) Can either be positive or negative** · The council's preliminary key

**Q208** AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

When a body moves in a circular path, no work is done by the force, since _____

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(A) There is no net force
(B) There is no displacement
(C) Force is always away from the centre
(D) Force and displacement are perpendicular to each other.

**Answer: (D) Force and displacement are perpendicular to each other.** · The council's preliminary key

## Q209 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

A cyclist comes to a skidding stop in 10 $\mathrm{m}$. During this process, the force on the cycle due to the road is 200 $\mathrm{N}$ and is directly opposite to the motion. How much work does the road do on the cycle?

(A) 2000 J
(B) $-2000$ J
(C) $-1000$ J
(D) 0

**Answer: (B)** $-2000$ J · The council's preliminary key

## Q210 AP EAMCET 2020 · 17 Sep · Shift 2 MCQ

A force $\vec{F} = (5\hat{i} + 4\hat{j})$ N acts on a body and produces a displacement $\vec{S} = (6\hat{i} - 5\hat{j} + 3\hat{k})$ m. The work done by the force is _____

(A) 10 J
(B) 20 J
(C) 30 J
(D) 40 J

**Answer: (A)** 10 J · The council's preliminary key

## Q211 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

A block of mass m placed on a rough horizontal plane is pulled by a constant power P. The coefficient of friction between the block and the surface is $\mu$. The maximum velocity of the block will be

(A) $\frac{\mu P}{mg}$
(B) $\frac{\mu mg}{P}$
(C) $\mu mgP$
(D) $\frac{P}{\mu mg}$

**Answer: (D)** $\frac{P}{\mu mg}$ · Official TGCHE final key

## Q212 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

Two blocks of equal mass are connected with a massless spring of spring constant 2500 N/m$^2$ (sic) and length 10 cm at rest on the frictionless horizontal plane. If a constant horizontal force 10 N is applied as shown in the figure, find the maximum distance between the blocks.

*(see the figure above)*

Question Number : 89 Question Id : 7196501209 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

Two blocks of equal mass are connected with a massless spring of spring constant 2500 N/m$^2$ and length 10 cm at rest on the frictionless horizontal plane. If a constant horizontal force 10 N is applied as shown in the figure, find the maximum distance between the blocks.

ద్రవ్యరాశి గుర్తు స్ప్రింగ్‌కు ఇరువైపులా రెండు సమాన భారం గల దిమ్మెలను తగిలించినారు . స్ప్రింగ్ యొక్క స్థిరాంకం 2500 N/m$^2$ మరియు పొడవు 10 cm. ఆ దిమ్మెలు మర్షణ రహిత క్షితిజసమాంతర తలంపై నిశ్చలంగా ఉన్నాయి. 10 N స్థిర క్షితిజసమాంతర బలం వాటిపై ప్రయోగించబడితే, దిమ్మెల మధ్య గల గరిష్ట దూరం ఎంత?




Options :

1. 10.8 cm
2. 10.4 cm
3. 10.6 cm
4. 10.0 cm

(A) 10.8 cm

(B) 10.4 cm

(C) 10.6 cm

(D) 10.0 cm

**Answer: (B)** 10.4 cm · Official TGCHE final key

## Q213 TS EAMCET 2020 · 14 Sep · Shift 1 MCQ

The graph of potential energy ($U(x)$) versus distance ($x$) is shown in the following figure. The force ($F$) versus distance ($x$) graph will be represented by

(Assume that the force is conservative)

*(see the figure above)*

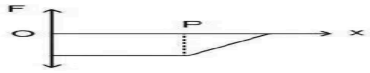
Question Number : 90 Question Id : 7196501210 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical Correct Marks : 1 Wrong Marks : 0

The graph of potential energy (U(x)) versus distance (x) is shown in the following figure. The force (F) versus distance (x) graph will be represented by
(Assume that the force is conservative)

స్థితిజ శక్తి U(x) మరియు దూరాలకు (x) గ్రాఫ్ క్రింద ఇవ్వబడింది. x దూరానికి అనుగుణంగా బలం F యొక్క గ్రాఫ్ ఏది దానిని సూచించును ?
(బలమునకు సంరక్షకత్వము కలదని అనుకోండి)




Options :

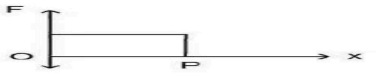
1.



2.



3.



4.



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

**Answer: (C)** · Official TGCHE final key

## Q214 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

A moving body with a mass $m_1$ and velocity u strikes a stationary body of mass $m_2$. The masses $m_1$ and $m_2$ should be in the ratio $\frac{m_1}{m_2}$ so as to decrease the velocity of the first body to $\frac{2u}{3}$ and giving a velocity of $v$ to $m_2$ assuming a perfectly elastic impact. Then the ratio $\frac{m_1}{m_2}$ is

(A) 5
(B) 1/5
(C) 1/25
(D) 25

**Answer: (A) 5** · Official TGCHE final key

## Q215 TS EAMCET 2020 · 14 Sep · Shift 2 MCQ

A force acts on a 30 gm particle in such a way that the position of the particle as a function of time is given by $x = \alpha t^2$, where x is in metre, t is in seconds and $\alpha = 1\ (\mathrm{m/s^2})$. The work done during the first 4 seconds is

(A) $0.96\,\mathrm{J}$
(B) $0.45\,\mathrm{J}$
(C) $0.49\,\mathrm{J}$
(D) $0.53\,\mathrm{J}$

**Answer: (A)** $0.96\,\mathrm{J}$ · Official TGCHE final key

## Q216 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

A force of 4 N acts on a 10 Kg body initially at rest. Let $W_1$ is work done by force during $0 \leq t \leq 1$s. Likewise $W_2$ is the work done by force during $1 \leq t \leq 2$s, where t is time. The ratio $\frac{W_2}{W_1}$ is

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

**Answer: (D)** 3 · Official TGCHE final key

## Q217 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

An elevator of mass 500 kg is ascending upwards with a constant acceleration a = 2 m/s$^2$. What is the work done by the tension in the elevator cable during its climb by 12 m?
(Take g = 10 m/s$^2$)

(A) 36 kJ
(B) 48 kJ
(C) 72 kJ
(D) 100 kJ

**Answer: (C)** 72 kJ · Official TGCHE final key

## Q218 TS EAMCET 2020 · 11 Sep · Shift 1 MCQ

A planet is moving in an elliptical orbit round the sun. The work done on the planet by the gravitational force of the sun:
(a) is zero in no part of the motion
(b) is zero in some parts of the orbit
(c) is zero in one complete revolution
(d) is zero in any small part of the orbit

(A) only (c) is true
(B) only (b), (c), (d) are true
(C) only (b) and (c) are true
(D) only (a) is true

**Answer: (C)** only (b) and (c) are true · Official TGCHE final key

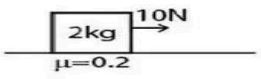
## Q219 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

The block starts from rest as shown in the figure. Find the work done by force of 10 N and friction in the time 0 to 4 sec.
[Take $g = 10\ \mathrm{m/s^2}$]
*(see the figure above)*

Question Number : 89 Question Id : 7196501049 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

The block starts from rest as shown in the figure. Find the work done by force of 10 N and friction in the time 0 to 4 sec.
[Take g = 10 m/s$^2$]

ఒక దిమ్మె విరామస్థితి నుండి పటములో చూపిన విధముగా కదులుతుంది. ఆ దిమ్మెపై 0 నుండి 4 సెకనుల కాలపరిమితిలో 10 N బలము చేసే పని మరియు ఘర్షణ విలువలు
[g = 10 m/s$^2$ గా తీసుకోండి]




Options :
1. 240 J, −96 J
2. 250 J, 96 J
3. 240 J, 96 J
4. 250 J, −96 J

(A) $240\ \mathrm{J},\ -96\ \mathrm{J}$
(B) $250\ \mathrm{J},\ 96\ \mathrm{J}$
(C) $240\ \mathrm{J},\ 96\ \mathrm{J}$
(D) $250\ \mathrm{J},\ -96\ \mathrm{J}$

**Answer: (A)** $240\ \mathrm{J},\ -96\ \mathrm{J}$ · Official TGCHE final key

## Q220 TS EAMCET 2020 · 11 Sep · Shift 2 MCQ

Under action of force, a 2 kg body moves such that its position x as function of time t is given by $x = \alpha t^2/2$ where x is in meters, t is in seconds and $\alpha = 1\ \mathrm{m/s^2}$. The work done by the force in the first two seconds is

(A) $4\ \text{J}$
(B) $16\ \text{J}$
(C) $40\ \text{J}$
(D) $2\ \text{J}$

**Answer: (A)** $4\ \text{J}$ · Official TGCHE final key

**Q221** TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

When a body is acted upon by a resultant force, then the work done by the resultant force is equal to

(A) its initial kinetic energy
(B) its initial potential energy
(C) change in the kinetic energy
(D) change in the potential energy

**Answer: (C) change in the kinetic energy** · Official TGCHE final key

**Q222** TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

A force acts on a body of mass 10 kg, resulting in its displacement given as $x = \left(\frac{t^3}{25}\right)\ m$ where t is the time in seconds. The work done by the force in 5 seconds is

(A) 620 J
(B) 333 J
(C) 524 J
(D) 60 J

**Answer: (D)** 60 J · Official TGCHE final key

**Q223** TS EAMCET 2020 · 10 Sep · Shift 1 MCQ

A bullet of mass 25 g moves horizontally at a speed of 250 m/s is fired into a wooden block of mass 1 kg suspended by a long string. The bullet crosses the block and emerges on the other side. If the centre of the mass of the block rises through a height of 20 cm. The speed of the bullet as it emerges from the block is (Take $g = 10\ \text{m/s}^2$)

(A) 300 m/s
(B) 220 m/s
(C) 150 m/s
(D) 170 m/s

**Answer: (D)** 170 m/s · Official TGCHE final key

**Q224** TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

A force $\vec{F} = (2\hat{i} + 4\hat{j})$ N is applied on an object of mass $M$. What is the work done by this force in moving the object horizontally along the x-axis by 3 m is

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

**Answer: (C) 6 J** · Official TGCHE final key

## Q225 TS EAMCET 2020 · 10 Sep · Shift 2 MCQ

A ball of mass m = 1 Kg is thrown from the top of a building with initial velocity $\vec{v}$ = (20 m/s) $\hat{i}$ + (24 m/s) $\hat{j}$ at time t = 0 s. The change in the potential energy of the ball between t = 0 and t = 6s, if the ball does not hit the ground
(Assume g = 10 m/s$^2$)

(A) $-320$ J
(B) $-360$ J
(C) $-380$ J
(D) $+320$ J

**Answer: (B)** $-360$ J · Official TGCHE final key

## Q226 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

A particle of mass $m_1$ collides with a particle of $m_2$ at rest. After the elastic collision, the two particles moves at an angle of $90^0$ with respect to each other. The ratio $\frac{m_2}{m_1}$ is

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

**Answer: (A) 1.0** · Official TGCHE final key

## Q227 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

A block of mass 100 g moving at a speed of 2 m/s compresses a spring through a distance 2 cm before its speed is halved. Find the spring constant of the spring

(A) $1250\ \mathrm{N/m}$
(B) $750\ \mathrm{N/m}$
(C) $1000\ \mathrm{N/m}$
(D) $1500\ \mathrm{N/m}$

**Answer: (B)** $750\ \mathrm{N/m}$ · Official TGCHE final key

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## Q228 TS EAMCET 2020 · 9 Sep · Shift 1 MCQ

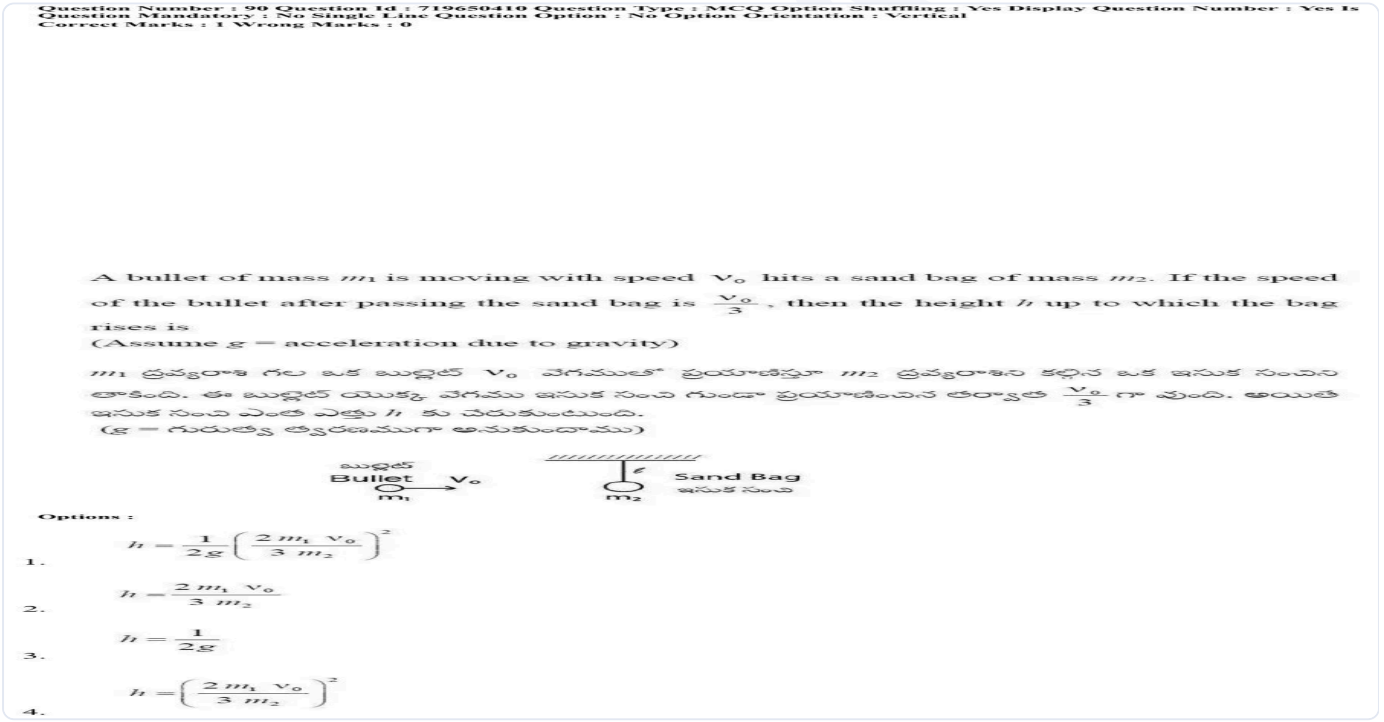
A bullet of mass $m$ moving horizontally with speed $v_0$ hits a wooden block of mass $M$ that is suspended from a massless string. The bullet gets lodged into the block and comes into halt. If the block-bullet combine swings to a maximum height $h$, then how much of the initial kinetic energy of the bullet is lost in the collision?

(A) $\frac{1}{2}mv_0^2\left(\frac{M}{m+M}\right)$
(B) $\frac{1}{2}mv_0^2\left(\frac{M+m}{M}\right)$
(C) $\frac{1}{2}mv_0^2\left(\frac{M^2}{(m+M)^2}\right)$
(D) $\frac{1}{2}mv_0^2\left(\frac{(M+m)^2}{M^2}\right)$

**Answer: (A)** $\frac{1}{2}mv_0^2\left(\frac{M}{m+M}\right)$ · Official TGCHE final key

## Q229 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

A bullet of mass $m_1$ is moving with speed $v_0$ hits a sand bag of mass $m_2$. If the speed of the bullet after passing the sand bag is $\frac{v_0}{3}$, then the height $h$ up to which the bag rises is (Assume g = acceleration due to gravity) *(see the figure above)*


Question Number : 90 Question Id : 7136504410 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 bullet of mass $m_1$ is moving with speed $V_0$ hits a sand bag of mass $m_2$. If the speed of the bullet after passing the sand bag is $\frac{V_0}{3}$, then the height $h$ up to which the bag rises is
(Assume g = acceleration due to gravity)

$m_1$ ద్రవ్యరాశి గల ఒక బుల్లెట్ $V_0$ వేగముతో ప్రయాణిస్తూ $m_2$ ద్రవ్యరాశిని కల్గిన ఒక ఇసుక సంచిని తాకింది. ఈ బుల్లెట్ యొక్క వేగము ఇసుక సంచి గుండా ప్రయాణించిన తర్వాత $\frac{V_0}{3}$ గా మారింది. అయితే ఇసుక సంచి ఎంత ఎత్తు $h$ కు చేరుకుంటుంది.
(g = గురుత్వ త్వరణముగా ఊహించండి)



Options :
1. $h = \frac{1}{2g}\left(\frac{2m_1 V_0}{3 m_2}\right)^2$
2. $h = \frac{2m_1 V_0}{3 m_2}$
3. $h = \frac{1}{2g}$
4. $h = \left(\frac{2m_1 V_0}{3 m_2}\right)^2$

(A) $h = \frac{1}{2g}\left(\frac{2m_1v_0}{3m_2}\right)^2$

(B) $h = \frac{2m_1v_0}{3m_2}$

(C) $h = \frac{1}{2g}$

(D) $h = \left(\frac{2m_1v_0}{3m_2}\right)^2$

**Answer: (A)** $h = \frac{1}{2g}\left(\frac{2m_1v_0}{3m_2}\right)^2$ · Official TGCHE final key

## Q230 TS EAMCET 2020 · 9 Sep · Shift 2 MCQ

A ball of mass 2 g released from the top of an inclined plane describes a circular motion of radius 20 cm in the vertical plane upon reaching the bottom. The minimum height of the inclined plane is:

(A) 20 cm

(B) 10 cm

(C) 50 cm

(D) 60 cm

**Answer: (C)** 50 cm · Official TGCHE final key

## Q231 TS EAMCET 2019 · 6 May · Shift 1 MCQ

A bouncing ball of mass 200 g falls from height of 5 m on to a horizontal ground. After every impact with the ground the velocity of the ball decreases by $\left(\frac{1}{2}\right)$ times. The total momentum, the ball imparts on to the ground after 3 impacts is (Let $g = 10$ m/s$^2$)

(A) $\frac{14}{4}$ kg m/s

(B) $\frac{20}{6}$ kg m/s

(C) $\frac{26}{12}$ kg m/s

(D) $\frac{21}{4}$ kg m/s

**Answer: (D)** $\frac{21}{4}$ kg m/s · Official TGCHE final key

## Q232 TS EAMCET 2019 · 6 May · Shift 1 MCQ

A metal chain of mass 2 kg and length 90 cm over hangs a table with 60 cm on the table. How much work needs to be done to put the hanging part of the chain back on the table.
(Let $g = 10$ m/s$^2$)

(A) 2 J
(B) 10 J
(C) 1 J
(D) 3 J

**Answer: (C) 1 J** · Official TGCHE final key

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**Q233** TS EAMCET 2019 · 4 May · Shift 1 MCQ

Conservative forces are defined as the forces for which,

(A) Work done depends only on the initial and final positions.
(B) Work done depends on the initial and final positions and also on the path taken.
(C) Work done depends only on the path taken.
(D) Work done depends only on the initial position.

**Answer: (A) Work done depends only on the initial and final positions.** · Official TGCHE final key

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**Q234** TS EAMCET 2019 · 4 May · Shift 1 MCQ

Ball A of mass 50 gm and speed 10 m/s collides with ball B of mass 10 gm and speed 15 m/s travelling in opposite direction with each other. Determine the final speed of ball B if the coefficient of restitution is $\frac{2}{5}$.

(A) $\frac{40}{3}\ \mathrm{m/s}$
(B) $\frac{75}{3}\ \mathrm{m/s}$
(C) $\frac{91}{8}\ \mathrm{m/s}$
(D) $\frac{85}{6}\ \mathrm{m/s}$

**Answer: (D)** $\frac{85}{6}\ \mathrm{m/s}$ · Official TGCHE final key

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**Q235** TS EAMCET 2019 · 4 May · Shift 2 MCQ

A block of mass 2 kg is connected to an ideal spring and is placed on a smooth horizontal surface. The spring is pulled to move the block and at an instant, the speed of end A of the spring and speed of the block were measured to be 6 m/s and 3 m/s respectively. At this moment the potential energy stored in the spring is increasing at a rate 15 J/s. Find the acceleration of the block at this instant.
*(see the figure above)*

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Question Number : 89 Question Id : 7512364889 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A block of mass 2 kg is connected to an ideal spring and is placed on a smooth horizontal surface. The spring is pulled to move the block and at an instant, the speed of end A of the spring and speed of the block were measured to be 6 m/s and 3 m/s respectively. At this moment the potential energy stored in the spring is increasing at a rate 15 J/s. Find the acceleration of the block at this instant.

2 kg ద్రవ్యరాశి గల దిమ్మను నునుపైన క్షితిజ తలంపైనుంచిన ఒక ఆదర్శ స్ప్రింగ్‌నకు తగిలించారు. దిమ్మను కదపడానికి స్ప్రింగ్‌ను లాగినపుడు ఒకానొక సమయంలో స్ప్రింగ్ యొక్క ఒక అంచు A వడి మరియు దిమ్మ వడులను వరుసగా 6 m/s మరియు 3 m/s గా కొలిచారు. ఆ క్షణంలో స్ప్రింగ్‌లో నిల్వ ఉన్న స్థితిజశక్తి 15 J/s రేటుతో వృద్ధి చెందుతుంది. ఆ క్షణంలో దిమ్మ యొక్క త్వరణంను కనుగొనండి.




Options :

1. $1.5\ \mathrm{m/s^2}$
2. $3.0\ \mathrm{m/s^2}$
3. $4.5\ \mathrm{m/s^2}$
4. $2.5\ \mathrm{m/s^2}$

TS EAMCET 2019

(A) 1.5 m/s$^2$
(B) 3.0 m/s$^2$
(C) 4.5 m/s$^2$
(D) 2.5 m/s$^2$

**Answer: (D)** 2.5 m/s$^2$ · Official TGCHE final key

## Q236 TS EAMCET 2019 · 3 May · Shift 1 MCQ

A box of mass 3 kg moves on a horizontal frictionless table and collides with another box of mass 3 kg initially at rest on the edge of the table at height 1 m. The speed of the moving box just before the collision is 4 m/s. The two boxes stick together and fall from the table. The kinetic energy just before the boxes strike the floor is (Assume $g = 10\ \mathrm{m/s^2}$)

(A) 40 J
(B) 80 J
(C) 96 J
(D) 72 J

**Answer: (D)** 72 J · Official TGCHE final key

## Q237 TS EAMCET 2019 · 3 May · Shift 1 MCQ

A ball of mass 2 kg is thrown from a tall building with velocity $\vec{v} = (20\ \mathrm{m/s})\hat{i} + (24\ \mathrm{m/s})\hat{j}$ at time $t =$ 0 s. Change in the potential energy of the ball after $t = 8$ s is
(The ball is assumed to be in air during its motion between 0 s and 8 s, $\hat{i}$ is along the horizontal and $\hat{j}$ is along the vertical direction, let $g = 10\ \mathrm{m/s^2}$)

(A) $-2.56\ \text{kJ}$
(B) $0.52\ \text{kJ}$
(C) $1.76\ \text{kJ}$
(D) $-2.44\ \text{kJ}$

**Answer: (A)** $-2.56\ \text{kJ}$ · Official TGCHE final key

## Q238 TS EAMCET 2019 · 3 May · Shift 2 MCQ

A bar of mass $m$ resting on a smooth horizontal plane starts moving due to force $|\vec{F}| = \frac{mg}{9}$. The magnitude of the force remains constant with time. The force vector makes an angle $\theta$ with the horizontal which varies with the distance covered as $\theta = Cx$. If the constant $C = 10\left(\frac{\text{radian}}{\text{meter}}\right)$, then the speed of the bar, when $\theta$ becomes equal to $30^\circ$ for the first time, is (Assume g = 10 m/s$^2$)

(A) 0.33 m/s
(B) 0.50 m/s
(C) 1.0 m/s
(D) 0.8 m/s

**Answer: (A)** 0.33 m/s · Official TGCHE final key

## Q239 TS EAMCET 2019 · 3 May · Shift 2 MCQ

A mass of 2 kg, initially at a height of 1.2 m above an uncompressed spring with spring constant $2 \times 10^4$ N/m, is released from rest to fall on the spring. Taking the acceleration due to gravity as 10 m/s$^2$ and neglecting the air resistance, the compression of the spring in mm is

(A) 20
(B) 40
(C) 50
(D) 60

**Answer: (C)** 50 · Official TGCHE final key

## Q240 TS EAMCET 2019 · 3 May · Shift 2 MCQ

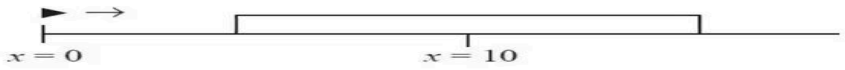
A bullet of mass 1 kg fired with a speed $2\ \text{ms}^{-1}$ from $x = 0$ passes through a block of wood whose centre is kept at a distance of 10 m from the origin as shown in figure. The retarding force ($F_r$) on the bullet within the wooden block is $-0.5/x$. The minimum length of the block (upto one decimal digit) required to completely stop the bullet is (Assume $e^4 = 55$)

*(see the figure above)*

Question Number : 89 Question Id : 7512364409 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A bullet of mass 1 kg fired with a speed 2 $ms^{-1}$ from $x = 0$ passes through a block of wood whose centre is kept at a distance of 10 m from the origin as shown in figure. The retarding force ($F_r$) on the bullet within the wooden block is $-0.5/x$. The minimum length of the block (upto one decimal digit) required to completely stop the bullet is (Assume $e^4 = 55$)

పటంలో చూపిన విధంగా ఒక 1 kg ద్రవ్యరాశి గల గుండును మూలబిందువు $x = 0$ నుండి 2 $ms^{-1}$ వడితో పేల్చినపుడు అది 10 m దూరంలో గల కర్ర దిమ్మె గుండా పోవుచున్నది. కర్ర దిమ్మెలో గుండుపై పనిచేయు మందిత బలం, $F_r = -0.5/x$ అయితే, గుండును పూర్తిగా ఆపటానికి కావలిసిన దిమ్మె కనిష్ఠ పొడవు (ఏక దశాంశ సంఖ్య వరకు) విలువ ($e^4 = 55$ గా అనుకొనుము)




Options :

1. 10.1 m
2. 9.2 m
3. 9.7 m
4. 19.3 m

(A) 10.1 m
(B) 9.2 m
(C) 9.7 m
(D) 19.3 m

**Answer: (D)** 19.3 m · Official TGCHE final key

## Q241 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

A constant power of 7 watt is applied on a toy car of mass 15 kg. The distance travelled by the car when its velocity increases from 3 $ms^{-1}$ to 5 $ms^{-1}$ is

(A) 56 m
(B) 7 m
(C) 61 m
(D) 70 m

**Answer: (D)** 70 m · Official APSCHE final key

## Q242 AP EAMCET 2019 · 23 Apr · Shift 1 MCQ

A body A moving with momentum 'P' collides one dimensionally with another stationary body B of same mass. During impact, A gives impulse 'J' to B. Then which of the following is/are correct?
a) The total momentum of A and B is 'P' before and after impact and (P - J) during the impact.
b) During the impact, B gives impulse of magnitude J to A.
c) The coefficient of restitution is $\left[\frac{2J}{P} - 1\right]$
d) The coefficient of restitution is $\left[\frac{2J}{P} + 1\right]$

(A) only a is correct
(B) a and c are correct
(C) b and c are correct
(D) only c is correct

**Answer: (C) b and c are correct** · Official APSCHE final key

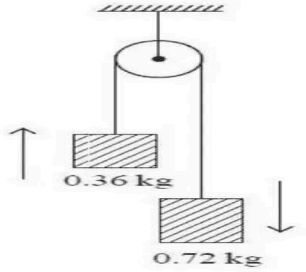
## Q243 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

In the arrangement shown in the figure, work done by the string on the block of mass 0.36 kg during the first second after the blocks are released from state of rest is (Ignore friction and mass of the string) (Acceleration due to gravity $= 10\ \mathrm{ms}^{-2}$)
*(see the figure above)*

Question Number : 87 Question Id : 1874634407 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In the arrangement shown in the figure, work done by the string on the block of mass 0.36 kg during the first second after the blocks are released from state of rest is (Ignore friction and mass of the string)
(Acceleration due to gravity $= 10\ \mathrm{ms}^{-2}$)

పటంలో చూపిన అమరికలో దిమ్మెలను విరామ స్థితి నుండి విడుదల చేసినపుడు, 0.36 kg ద్రవ్యరాశి గల దిమ్మెపై మొదటి సెకనులో దారము చేసిన పని (ఘర్షణను, దారము ద్రవ్యరాశిని విస్మరింపుము.)
(గురుత్వ త్వరణము $= 10\ \mathrm{ms}^{-2}$)




Options :
1. 8 J
2. 4 J
3. 12 J
4. 2 J

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

**Answer: (A) 8 J** · Official APSCHE final key

## Q244 AP EAMCET 2019 · 22 Apr · Shift 1 MCQ

A man who is running has half the kinetic energy of a boy of half his mass. The man speeds up by $1\ \mathrm{ms}^{-1}$ and then has the same kinetic energy as the boy. The initial speed of the boy is

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

**Answer: (B)** $2(\sqrt{2}+1)\ \mathrm{ms}^{-1}$ · Official APSCHE final key

## Q245 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

A ball dropped from a building of height $12\ \mathrm{m}$ falls on a slab of $1\ \mathrm{m}$ height from the ground and makes a perfect elastic collision. Later the ball falls on a wooden table of height $0.5\ \mathrm{m}$, makes inelastic collision and falls on the ground. If the coefficient of restitution between the ball and the table is 0.5, then the velocity of the ball while touching the ground is about (Acceleration due to gravity $= 10\ \mathrm{ms}^{-2}$)

(A) $15.5\ \mathrm{ms}^{-1}$
(B) $14.5\ \mathrm{ms}^{-1}$
(C) $9.2\ \mathrm{ms}^{-1}$
(D) $8.2\ \mathrm{ms}^{-1}$

**Answer: (D)** $8.2\ \mathrm{ms}^{-1}$ · Official APSCHE final key

## Q246 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

A motor pumps a liquid of density $\rho$ through a pipe of cross sectional area A. If the liquid moves with a speed v in this pipe, then the rate of kinetic energy imparted to the liquid is proportional to

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

**Answer: (B)** $v^3$ · Official APSCHE final key

## Q247 AP EAMCET 2019 · 22 Apr · Shift 2 MCQ

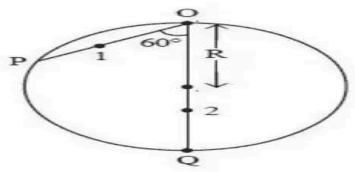
Two particles 1 and 2 are allowed to descend on two frictionless chords OP and OQ as shown in figure. The ratio of the speeds of the particles 1 and 2 respectively when they reach the circumference is

*(see the figure above)*

Question Number : 88 Question Id : 1874634568 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Two particles 1 and 2 are allowed to descend on two frictionless chords OP and OQ as shown in figure. The ratio of the speeds of the particles 1 and 2 respectively when they reach the circumference is

పటంలో చూపినట్లు రెండు కణములు 1 మరియు 2 లను ఘర్షణలేని రెండు జ్యాకర్షణములు OP మరియు OQ ల మీద జారనిచ్చారు. అవి ఆ వృత్త పరిధి మీదకు చేరినప్పుడు కణము 1 మరియు 2 ల వడుల నిష్పత్తి




Options :

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

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

**Answer: (A)** $\frac{1}{2}$ · Official APSCHE final key

## Q248 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

Potential energy of a body of mass 1 kg free to move along X-axis is given by $U(x) = \left(\frac{x^2}{2} - x\right)$ J. If the total mechanical energy of the body is 2 J, then the maximum speed of the body is (Assume only conservative force acts on the body)

(A) $\sqrt{5}\,\mathrm{ms}^{-1}$
(B) $5\,\mathrm{ms}^{-1}$
(C) $3.5\,\mathrm{ms}^{-1}$
(D) $\sqrt{8}\,\mathrm{ms}^{-1}$

**Answer: (A)** $\sqrt{5}\,\mathrm{ms}^{-1}$ · Official APSCHE final key

## Q249 AP EAMCET 2019 · 21 Apr · Shift 1 MCQ

A cylindrical well of radius 2.5 m has water upto a height of 14 m from the bottom. If the water level is at a depth of 6 m from the top of the well, then the time taken in minutes to empty the well using a motor of 10 HP is approximately (Acceleration due to gravity = $10\,\mathrm{ms}^{-2}$)

(A) 30
(B) 80
(C) 98
(D) 90

**Answer: (B)** 80 · Official APSCHE final key

**Q250** AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

A body is released from a height of 30 m vertically downwards. The speed of the body at which potential energy is twice that of kinetic energy is
(Acceleration due to gravity $= 10\ \text{ms}^{-2}$)

(A) $20\sqrt{2}\ \text{ms}^{-1}$
(B) $10\sqrt{2}\ \text{ms}^{-1}$
(C) $10\ \text{ms}^{-1}$
(D) $20\ \text{ms}^{-1}$

**Answer: (B)** $10\sqrt{2}\ \text{ms}^{-1}$ · Official APSCHE final key

**Q251** AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

The work done by a force $\vec{F} = -5x^4\hat{i}\ \text{N}$ in displacing a body from $x = 2\ \text{m}$ to $x = -2\ \text{m}$ is

(A) 6 J
(B) 8 J
(C) 64 J
(D) 0 J

**Answer: (C)** 64 J · Official APSCHE final key

**Q252** AP EAMCET 2019 · 21 Apr · Shift 2 MCQ

Assertion (A): The work done by the electrostatic force is zero when a point charge moves in a circular path around another charge.
Reason (R): The dot product of force and displacement vectors gives work done.

(A) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(B) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
(C) (A) is correct but (R) is not correct
(D) (A) is not correct but (R) is correct

**Answer: (A) Both (A) and (R) are correct and (R) is the correct explanation of (A)** · Official APSCHE final key

**Q253** AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

Two particles P and Q each of mass 3m lie at rest on the X-axis at points $(-a, 0)$ and $(+a, 0)$ respectively. A third particle R of mass 2m initially at the origin moves towards particle Q. If all the

collisions of the system of 3 particles are elastic and head-on, the total number of collisions in the system is

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

**Answer: (A) 2** · Official APSCHE final key

**Q254** AP EAMCET 2019 · 20 Apr · Shift 1 MCQ

A motor engine pumps 1800 litre of water per minute from a well of depth 30 m and allows to pass through a pipe of cross sectional area $30\ \mathrm{cm}^2$. Then the power of the engine is (Acceleration due to gravity $= 10\ \mathrm{ms}^{-2}$)

(A) 20.5 kW
(B) 15.5 kW
(C) 10.5 kW
(D) 9.5 kW

**Answer: (C) 10.5 kW** · Official APSCHE final key

**Q255** AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

A particle moves in the X-Y plane under the action of a force $\vec{F} = K\left[\frac{x}{(x^2+y^2)^{3/2}}\hat{i} + \frac{y}{(x^2+y^2)^{3/2}}\hat{j}\right]$ where K is a constant. Work done by the force when the particle moves from $(0, a)$ to $(a, 0)$ along a circular path of radius 'a' about the origin is

(A) $\frac{2K\pi}{a}$
(B) $\frac{K\pi}{a}$
(C) $\frac{K\pi}{2a}$
(D) $0$

**Answer: (D)** $0$ · Official APSCHE final key

**Q256** AP EAMCET 2019 · 20 Apr · Shift 2 MCQ

A disc of mass 100 gram slides down from rest on an inclined plane of $30^\circ$ and comes to rest after travelling a distance of 1 m along the horizontal plane. If the coefficient of friction is 0.2 for both inclined and horizontal planes, then the work done by the frictional force over the whole journey, approximately, is (Acceleration due to gravity = $10\ \mathrm{ms}^{-2}$)

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(A) $0.106$ J
(B) $0.05$ J
(C) $0.306$ J
(D) $0.2$ J

**Answer: (C)** $0.306$ J · Official APSCHE final key

**Q257** TS EAMCET 2018 · 7 May · Shift 1 MCQ

A small body of mass 500 g moves on a rough horizontal surface before finally stops. The initial velocity of the body is 2 m/sec and coefficient of friction is 0.3. The absolute value of the average power developed by the frictional force during the time of motion will be ( Take $g = 10\ \mathrm{m/sec^2}$ )

(A) 1 W
(B) 1.5 W
(C) 2 W
(D) 2.5 W

**Answer: (B)** 1.5 W · The council's preliminary key

**Q258** TS EAMCET 2018 · 5 May · Shift 1 MCQ

A block of mass '4 m' travelling at a velocity $v_1$ in X-direction on a frictionless horizontal plane makes a head-on collision with another block of mass '2 m' travelling in opposite direction with a velocity $v_2$. After collision both the blocks travel as a single block along X-direction with a final velocity $5\,v_2$. The ratio of velocities $\frac{v_1}{v_2}$ is

(A) 2
(B) 3
(C) 5
(D) 8

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

**Q259** TS EAMCET 2018 · 5 May · Shift 1 MCQ

A particle of mass '$m_1$' moving along the X-axis collides with a stationary particle of mass $m_2$ and deviates by an angle $30^\circ$ to the X-axis as shown in the figure. If the percentage change in kinetic energy of the combined system of these two particles reduces by 50%, the ratio of the masses $\frac{m_2}{m_1}$ is

(A) 8
(B) 6
(C) $\frac{8}{7}$
(D) $\frac{1}{6}$

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

## Q260 TS EAMCET 2018 · 5 May · Shift 1 MCQ

Collision takes place between two solid spheres denoted as 1 and 2. The initial velocities of the spheres are $u_1 = 3\ \mathrm{m/s}$ and $u_2 = 1.5\ \mathrm{m/s}$ and the final velocities are $v_1 = 2.5\ \mathrm{m/s}$ and $v_2 = 3.5\ \mathrm{m/s}$. The coefficient of restitution between the materials of the spheres is nearly

(A) 0.67
(B) 0.78
(C) 0.83
(D) 0.96

**Answer: (A) 0.67** · The council's preliminary key

## Q261 TS EAMCET 2018 · 5 May · Shift 1 MCQ

A spring has a natural length $l$ with one end fixed to the ceiling. The other end is fitted with a smooth ring which can slide on a horizontal rod fixed at distance $l$ below the ceiling. Initially the spring makes an angle of $60^\circ$ with the vertical when system is released from rest. Find the angle of the spring with the vertical when the velocity of the ring reaches half of the maximum velocity which the ring can attain during the motion

(A) $30^\circ$
(B) $\cos^{-1}\left(\frac{2}{2+\sqrt{3}}\right)$
(C) $\cos^{-1}\left(\frac{\sqrt{3}-1}{2}\right)$
(D) $45^\circ$

**Answer: (B)** $\cos^{-1}\left(\frac{2}{2+\sqrt{3}}\right)$ · The council's preliminary key

## Q262 TS EAMCET 2018 · 5 May · Shift 2 MCQ

A mechanical system consists two springs of stiffness coefficients $k_1$ and $k_2$ connected in series. The minimum work to be performed on the system to stretch it by $\Delta l$ is

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(A) $\frac{1}{2}\left(\frac{k_1k_2}{k_1+k_2}\right)\Delta l^2$

(B) $k_1k_2\Delta l^2$

(C) $\left(\frac{k_1k_2}{k_1+k_2}\right)\Delta l^2$

(D) $\left(\frac{k_1k_2}{k_1+k_2}\right)\Delta l$

**Answer: (A)** $\frac{1}{2}\left(\frac{k_1k_2}{k_1+k_2}\right)\Delta l^2$ · The council's preliminary key

## Q263 TS EAMCET 2018 · 5 May · Shift 2 MCQ

A particle of mass '$m$' kg moves along the $X$-axis with its velocity varying with the distance travelled as $v = kx^{\beta}$, where $k$ is positive constant. The total work done by all the forces during displacement of the particle from $x = 0$ to $x = d$ is close to

(A) $\frac{mk^2}{2}$

(B) $\frac{mk^2}{2}d^{2\beta}$

(C) $\frac{mk^2}{2\beta}$

(D) $\frac{mk^2d}{2\beta}$

**Answer: (B)** $\frac{mk^2}{2}d^{2\beta}$ · The council's preliminary key

## Q264 TS EAMCET 2018 · 5 May · Shift 2 MCQ

A block of mass $(10\alpha)$ g, where $\alpha$ is a constant, is moving with velocity $3\ \mathrm{m/sec}$ to the right collides inelastically with the block on the right with mass $10\ g$ and sticks to it. The right block is connected to three springs as shown in the figure. The spring constant of each spring is $2\ \mathrm{N/m}$. If the amplitude of the resulting simple harmonic motion is $\frac{1}{2\sqrt{2}}\ \mathrm{m}$, then the value of $\alpha$ is

*(see the figure above)*

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Question Number : 93 Question Id : 4928632333 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical
Correct : 1 Wrong : 0

A block of mass $(10\ \alpha)$ g, where $\alpha$ is a constant, is moving with velocity 3 m/sec to the right collides inelastically with the block on the right with mass 10 g and sticks to it. The right block is connected to three springs as shown in the figure. The spring constant of each spring is 2 N/m. If the amplitude of the resulting simple harmonic motion is $\frac{1}{2\sqrt{2}}$ m, then the value of $\alpha$ is

ఒక దిమ్మె $(10\ \alpha)$ g ద్రవ్యరాశి (ఇచ్చట $\alpha$ అనేది స్థిరరాశి) కలిగి కుడివైపునకు 3 m/sec వేగంతో ప్రయాణిస్తూ కుడివైపునగల 10 g ద్రవ్యరాశి గల దిమ్మెతో అస్థితిస్థాపక అభిఘాతము చెంది దానికి అతుక్కుపోతుంది. కుడి దిమ్మెను పటంలో చూపిన విధంగా మూడు స్ప్రింగ్‌లకు సంబద్ధము చేసినారు. ప్రతి స్ప్రింగ్ యొక్క స్ప్రింగ్ స్థిరాంకము 2 N/m. అపుడు కలిగే ఫలిత సరళ హరాత్మక గమనపు డోలన పరిమితి $\frac{1}{2\sqrt{2}}$ m అయితే, $\alpha$ విలువ




Options :

1. 5
2. 2.5
3. 7
4. 10

(A) 5
(B) 2.5
(C) 7
(D) 10

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

## Q265 TS EAMCET 2018 · 4 May · Shift 1 MCQ

Assertion (A): When we bounce a ball on the ground, it comes to rest after a few bounces losing all its energy. This is an example of violation of conservation of energy.
Reason (R): Energy can change from one form to another but the total energy is always conserved.
Which of the following is true?

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

**Answer: (D)** (A) is false, but (R) is true · The council's preliminary key

## Q266 TS EAMCET 2018 · 4 May · Shift 1 MCQ

A ball of mass 1 kg moving along $X$-direction collides elastically with a stationary ball of mass '$m$'. The first ball (mass = 1 kg) recoils at right angle to its original direction of motion. If the second ball starts moving at an angle $30^\circ$ with the $X$-axis, the value of '$m$' must be

(A) 0.5 kg
(B) 1.5 kg
(C) 2.5 kg
(D) 2 kg

**Answer: (D)** 2 kg · The council's preliminary key

**Q267** TS EAMCET 2018 · 4 May · Shift 2 MCQ

A small block starts sliding down an inclined plane forming an angle $45^\circ$ with horizontal. The coefficient of friction $\mu$, varies with distance $s$ as $\mu = cs^2$ where 'c' is a constant of appropriate dimensions. Then, distance covered by the block before it stops is

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

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

**Q268** TS EAMCET 2018 · 4 May · Shift 2 MCQ

A car of mass 1200 kg (together with the driver) is moving with a constant acceleration of $2\ \mathrm{m/s^2}$. How much power does the engine generate at the instance when the speed reaches 20 m/s ? (Assume that the coefficient of friction between the car and the road is 0.5).

(A) 48000 W
(B) 120000 W
(C) 168000 W
(D) 288000 W

**Answer: (C)** 168000 W · The council's preliminary key

**Q269** TS EAMCET 2018 · 4 May · Shift 2 MCQ

A ball moving with a velocity v, collides head on with a stationary second ball of same mass. After the collision the velocity of the first ball is reduced to 0.15 v. The kinetic energy of the system is decreased nearly by

(A) 20%
(B) 25%
(C) 30%
(D) 40%

**Answer: (B)** 25% · The council's preliminary key

**Q270** AP EAMCET 2018 · 24 Apr · Shift 1 MCQ

A ball falls freely from a height of 180 m on to a hard horizontal floor and repeatedly bounces. If the coefficient of restitution is 0.5, the average speed and average velocity of the ball before it ceases to rebound are respectively
(Acceleration due to gravity = $10\ \text{ms}^{-2}$)

(A) $10\ \text{ms}^{-1},\ 10\ \text{ms}^{-1}$
(B) $50\ \text{ms}^{-1},\ \frac{50}{3}\ \text{ms}^{-1}$
(C) $\frac{50}{3}\ \text{ms}^{-1},\ 10\ \text{ms}^{-1}$
(D) $\frac{20}{3}\ \text{ms}^{-1},\ \frac{50}{3}\ \text{ms}^{-1}$

**Answer: (C)** $\frac{50}{3}\ \text{ms}^{-1},\ 10\ \text{ms}^{-1}$ · The council's preliminary key

**Q271** AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

A ball moving horizontally with a velocity $2\ \text{ms}^{-1}$ strikes the bob of a seconds pendulum at rest. If the mass of the bob is equal to the mass of the ball and the collision is perfectly elastic, after collision the bob of the pendulum will raise to a height of
($g = 10\ \text{ms}^{-2}$)

(A) $80\ \text{cm}$
(B) $60\ \text{cm}$
(C) $40\ \text{cm}$
(D) $20\ \text{cm}$

**Answer: (D)** $20\ \text{cm}$ · The council's preliminary key

**Q272** AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

A body of mass $2\ \text{kg}$ moving in X-Y plane has a potential energy given by $U = (6x + 8y)\ \text{J}$. The body is at rest at the point $(3, 2)\ \text{m}$. The work to be done by the body to reach another position after $2\ \text{s}$ is

(A) $100\ \text{J}$
(B) $500\ \text{J}$
(C) $750\ \text{J}$
(D) $900\ \text{J}$

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

**Q273** AP EAMCET 2018 · 24 Apr · Shift 2 MCQ

A ball of mass $2\ \text{kg}$ collides with another ball of mass M at rest. If the collision is elastic and after the collision, the first ball moves with $\frac{1}{3}$ of its initial velocity in the same direction, then the mass of second ball is

(A) 2.5 kg
(B) 3.5 kg
(C) 3.0 kg
(D) 1.0 kg

**Answer: (D)** 1.0 kg · The council's preliminary key

## Q274 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

A particle is released from a height H. At a certain height its kinetic energy is half of its potential energy with reference to the surface of the earth. Height and speed of the particle at that instant are respectively

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

**Answer: (D)** $\frac{2H}{3}, \sqrt{\frac{2gH}{3}}$ · The council's preliminary key

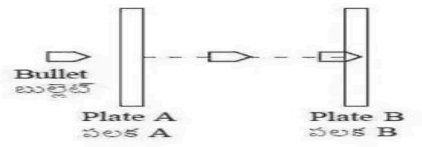
## Q275 AP EAMCET 2018 · 23 Apr · Shift 1 MCQ

A bullet of mass 10 g pierces through a plate A of mass 500 g and then gets embedded into a second plate B of mass 1.49 kg as shown in the figure. Initially the two plates A and B are at rest and move with same velocity after collision. The percentage loss in the initial kinetic energy of the bullet when it is between the plates A and B is _____
(Neglect any loss of material of the plates during the collision)
*(see the figure above)*

Question Number : 88 Question Id : 4557344088 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A bullet of mass 10 g pierces through a plate A of mass 500 g and then gets embedded into a second plate B of mass 1.49 kg as shown in the figure. Initially the two plates A and B are at rest and move with same velocity after collision. The percentage loss in the initial kinetic energy of the bullet when it is between the plates A and B is _____
(Neglect any loss of material of the plates during the collision)

10 g ద్రవ్యరాశిగల ఒక బుల్లెట్ పటంలో చూపిన విధంగా 500 g ద్రవ్యరాశి గల ఒక పలక A గుండా దూసుకెళ్ళి 1.49 kg ద్రవ్యరాశి గల రెండవ పలక B లోకి వెళ్ళి ఇమిడిపోయింది. తొలుత నిశ్చలస్థితిలో ఉన్న రెండు పలకలు A మరియు B అభిఘాతం తర్వాత ఒకే వేగంతో కదిలాయి. బుల్లెట్ A మరియు B పలకల మధ్య ఉన్నప్పుడు దాని తొలి గతిజశక్తిలో కలిగిన నష్టశాతం
(అభిఘాతంలో పలకల పదార్థ నష్టమును పరిగణించవద్దు)




Options :
1. 25
2. 56.25
3. 43.75
4. 75

(A) 25
(B) 56.25
(C) 43.75
(D) 75

**Answer: (C)** 43.75 · The council's preliminary key

## Q276 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

A particle is released freely from a height H. At a certain height, its kinetic energy is two times its potential energy. Then the height and the speed of the particle at that instant are respectively (g = acceleration due to gravity)

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

**Answer: (B)** $\frac{H}{3}, 2\sqrt{\frac{gH}{3}}$ · The council's preliminary key

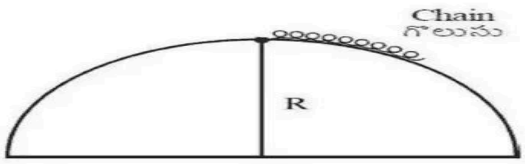
## Q277 AP EAMCET 2018 · 23 Apr · Shift 2 MCQ

A uniform chain of length 'l' and mass 'm' lies on the surface of a smooth hemisphere of radius R (R > l) with one end tied to the top of the hemisphere as shown in the figure. Gravitational potential energy of the chain with respect to the base of the hemisphere is *(see the figure above)*

Question Number : 88 Question Id : 4557344248 Question Type : MCQ Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A uniform chain of length '*l*' and mass 'm' lies on the surface of a smooth hemisphere of radius R (R > *l*) with one end tied to the top of the hemisphere as shown in the figure. Gravitational potential energy of the chain with respect to the base of the hemisphere is

పటంలో చూపబడినట్లు '*l*' పొడవు 'm' ద్రవ్యరాశిగల ఏకరీతి గొలుసు R వ్యాసార్ధము (R > *l*) గల నునుపైన అర్ధగోళము పై, దాని ఒక చివర అర్ధగోళము ఉన్నతమ బిందువునకు కట్టబడి ఉన్నది. అర్ధగోళ పీఠం పరంగా గొలుసు గురుత్వ స్థితిజ శక్తి




Options :
1. $\frac{mgl}{2}$
2. $\frac{mgR^2}{l}\sin\left(\frac{l}{R}\right)$
3. $\frac{mgR^2}{l}\sin\left(\frac{R}{l}\right)$
4. $\frac{mgl^2}{R}\sin\left(\frac{l}{R}\right)$

(A) $\frac{mgl}{2}$
(B) $\frac{mgR^2}{l}\sin\left(\frac{l}{R}\right)$
(C) $\frac{mgR^2}{l}\sin\left(\frac{R}{l}\right)$
(D) $\frac{mgl^2}{R}\sin\left(\frac{l}{R}\right)$

**Answer: (B)** $\frac{mgR^2}{l}\sin\left(\frac{l}{R}\right)$ · The council's preliminary key

## Q278 AP EAMCET 2018 · 22 Apr · Shift 1 MCQ

A body of mass $2\ \text{kg}$ thrown vertically upward from the ground with a velocity of $8\ \text{ms}^{-1}$ reaches a maximum height of $3\ \text{m}$. The work done by the air resistance is _____
(Acceleration due to gravity $= 10\ \text{ms}^{-2}$)

(A) $4\ \text{J}$
(B) $60\ \text{J}$
(C) $64\ \text{J}$
(D) $8\ \text{J}$

**Answer: (A)** $4\ \text{J}$ · The council's preliminary key

## Q279 AP EAMCET 2018 · 22 Apr · Shift 2 MCQ

A uniform chain of mass 'm' and length 'l' is on a smooth horizontal table with $\left(\frac{1}{n}\right)^{\text{th}}$ part of its length is hanging from one end of the table. The velocity of the chain when it completely slips off the table is

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

**Answer: (A)** $\sqrt{gl\left(1-\frac{1}{n^2}\right)}$ · The council's preliminary key

## Q280 TS EAMCET 2017 · 12 May · Offline MCQ

A billiard ball of mass '$M$', moving with velocity '$v_1$' collides with another ball of the same mass but at rest. If the collsion (sic) is elastic the angle of divergence after the collision is

(A) $0^\circ$
(B) $30^\circ$
(C) $90^\circ$
(D) $45^\circ$

**Answer: (C)** $90^\circ$ · The council's preliminary key

## Q281 TS EAMCET 2017 · 12 May · Offline MCQ

Consider a frictionless ramp on which a smooth object is made to slide down from an initial height 'h'. The distance 'd' necessary to stop the object on a flat track (of coefficient of friction '$\mu$'), kept at the ramp end is

(A) $h/\mu$
(B) $\mu h$
(C) $\mu^2 h$
(D) $h^2\mu$

**Answer: (A)** $h/\mu$ · The council's preliminary key

## Q282 TS EAMCET 2017 · 12 May · Offline MCQ

Consider a particle on which constant forces $\vec{F}_1 = \hat{i} + 2\hat{j} + 3\hat{k}$ N and $\vec{F}_2 = 4\hat{i} - 5\hat{j} - 2\hat{k}$ N act together resulting in a displacement from position $\vec{r}_1 = 20\hat{i} + 15\hat{j}$ cm to $\vec{r}_2 = 7\hat{k}$ cm. The total work done on the particle is

(A) $-0.48$ J
(B) $+0.48$ J
(C) $-4.8$ J
(D) $+4.8$ J

**Answer: (A)** $-0.48$ J · The council's preliminary key

## Q283 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

A girl of mass 50 kg is swinging on a cradle. If she moves with a velocity of $2\ \mathrm{ms}^{-1}$ upwards in a direction making an angle $60^\circ$ with the horizontal, then the power generated is ($g = 9.8\ \mathrm{ms}^{-2}$)

(A) $980$ W
(B) $490\sqrt{2}$ W
(C) $490\sqrt{3}$ W
(D) $245$ W

**Answer: (C)** $490\sqrt{3}$ W · The council's preliminary key

## Q284 AP EAMCET 2017 · 26 Apr · Shift 1 MCQ

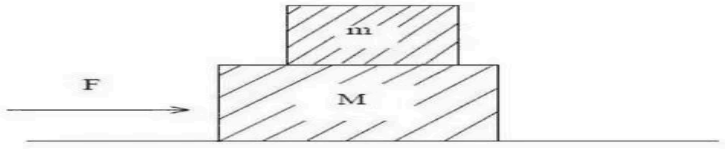
Two blocks of masses 'M' and 'm' are placed on one another on a smooth horizontal surface as shown in the figure. The force 'F' is acting on the mass 'M' horizontally during time interval 't'. Assuming no relative sliding between the blocks, the work done by friction on the blocks is _____

*(see the figure above)*

Question Number : 88 Question Id : 1017174568 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Two blocks of masses 'M' and 'm' are placed on one another on a smooth horizontal surfa as shown in the figure. The force 'F' is acting on the mass 'M' horizontally during tim interval 't'. Assuming no relative sliding between the blocks, the work done by friction the blocks is _____

'M' మరియు 'm' ద్రవ్యరాశులు గల రెండు దిమ్మెలు ఒకదాని పై ఒకటి ఒక నునుపు క్షితిజ సమాంత తలం పై పటంలో చూపినట్లుగా ఉంచారు. 'F' బలం 'M' ద్రవ్యరాశి పై క్షితిజ సమాంతరంగా 't' కాల పాటు పనిచేస్తుంది. ఆ దిమ్మెల మధ్య సాపేక్ష జారుడు లేదనుకుంటే, దిమ్మెల పై ఘర్షణ వలన జరిగి పని _____




Options :

1. $\frac{mF^2t^2}{2(M+m)^2}$
2. $\frac{F^2t^2}{(M+m)}$
3. $\frac{M+m}{mt^2}$
4. $\frac{Ft}{2(M+m)}$

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

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

(C) $\frac{M+m}{mt^2}$

(D) $\frac{Ft}{2(M+m)}$

**Answer: (A)** $\frac{mF^2t^2}{2(M+m)^2}$ · The council's preliminary key

## Q285 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

A car of mass 1000 kg has a motor of efficiency 20%. If burning of one litre of petrol supplies $6 \times 10^7$ J of energy, the amount of petrol used in accelerating the car from rest to $43.2\ \mathrm{km\,h^{-1}}$ is

(A) 6 cc

(B) 12 cc

(C) 18 cc

(D) 24 cc

**Answer: (A) 6 cc** · The council's preliminary key

## Q286 AP EAMCET 2017 · 26 Apr · Shift 2 MCQ

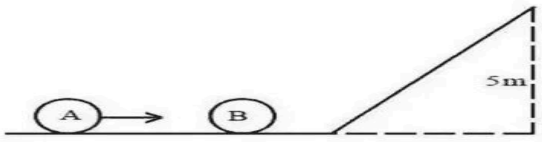
Two identical balls A and B of equal mass are lying on a smooth surface as shown in the figure. If ball 'A' hits ball 'B' at rest with a velocity $16\ \mathrm{ms}^{-1}$, then the co-efficient of restitution between A and B so that B just reaches the highest point of the smooth inclined plane is $(g = 10\ \mathrm{ms}^{-2})$

*(see the figure above)*

Question Number : 88 Question Id : 1017174728 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Two identical balls A and B of equal mass are lying on a smooth surface as shown in th figure. If ball 'A' hits ball 'B' at rest with a velocity 16 $ms^{-1}$, then the co-efficient c restitution between A and B so that B just reaches the highest point of the smooth incline plane is $(g = 10\ ms^{-2})$

సమాన ద్రవ్యరాశులు గల 'A' మరియు 'B' అనే రెండు ఒకే రకమైన బంతులను పటంలో చూపి విధంగా నునుపు తలం పై ఉంచారు. విరామ స్థితిలో ఉన్న 'B' అనే బంతిని 16 $ms^{-1}$ వేగంతో ప్రయోగిస్తు 'A' అనే బంతి ఢీకొన్నది. 'B' అనే బంతి నునుపైన వాలు తలం యొక్క గరిష్ఠ ఎత్తును చేరుకుంటే 'A మరియు 'B' ల మధ్య ప్రత్యావస్థాన గుణకం విలువ $(g = 10\ ms^{-2})$




Options :

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

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

**Answer: (D)** $\frac{1}{4}$ · The council's preliminary key

## Q287 AP EAMCET 2017 · 25 Apr · Shift 1 MCQ

An athlet throws a shotput of mass 25 kg with an initial speed of 4 $\mathrm{ms}^{-1}$ at an angle of $45^\circ$ with the horizontal from a height of 2 m above the ground. Assuming air resistance to be negligible, the kinetic energy of the shotput when it just touches the ground is _____ $(g = 10\ \mathrm{ms}^{-2})$

(A) 600 J
(B) 100 J
(C) 700 J
(D) 800 J

**Answer: (C)** 700 J · The council's preliminary key

## Q288 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

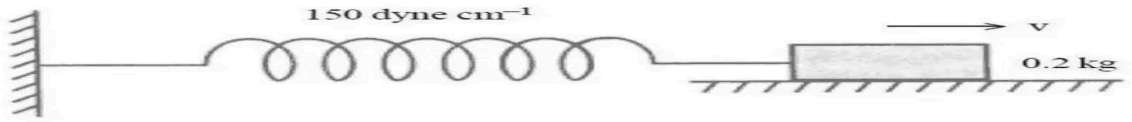
One end of a spring of force constant $150\ \text{dyne cm}^{-1}$ is connected to a block of mass $0.2\ \text{kg}$ kept on a rough horizontal surface of coefficient of friction 0.3. The other end of the spring is connected to a rigid support as shown in the figure and the spring is initially undeformed. The maximum velocity v that can be given to the block so that it travels only in one direction is _____ $\text{ms}^{-1}$. (Acceleration due to gravity $= 10\ \text{ms}^{-2}$)

*(see the figure above)*

Question Number : 87 Question Id : 1017174407 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

One end of a spring of force constant 150 dyne $\text{cm}^{-1}$ is connected to a block of ma 0.2 kg kept on a rough horizontal surface of coefficient of friction 0.3. The other end the spring is connected to a rigid support as shown in the figure and the spring is initial undeformed. The maximum velocity v that can be given to the block so that it travels only one direction is _____ $\text{ms}^{-1}$. (Acceleration due to gravity $= 10\ \text{ms}^{-2}$)

0.3 ఘర్షణ గుణకం గల ఒక గరుకు క్షితిజ సమాంతర తలం పై గల 0.2 kg ద్రవ్యరాశి గల ఒక దిమ్మె 150 dyne $\text{cm}^{-1}$ బల స్థిరాంకం గల ఒక స్ప్రింగ్ యొక్క ఒక చివరను కట్టారు. పటంలో చూపిన విధంగా స్ప్రింగ్ యొక్క రెండవ చివరను ఒక దృఢమైన ఆధారానికి కట్టారు. ప్రారంభంలో స్ప్రింగ్ వికూపణా లోనవలేదు. దిమ్మె ఒకే దిశలో ప్రయాణం చేయవలెనంటె, దిమ్మెకు ఇవ్వదగ్గ గరిష్ఠ వేగం (v) _____ $\text{ms}^{-1}$ (గురుత్వ త్వరణం $= 10\ \text{ms}^{-2}$)




Options :
1. 2
2. 3
3. 6
4. 8

(A) 2

(B) 3

(C) 6

(D) 8

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

## Q289 AP EAMCET 2017 · 25 Apr · Shift 2 MCQ

Two spheres 'A' and 'B' of equal mass lie at rest at the opposite ends of a diameter of a smooth horizontal circular groove of radius 'r'. 'A' moves and collides with 'B' after a time 't'. If 'e' is the coefficient of restitution, next collision between the spheres takes place after a time of _____.

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

**Answer: (A)** $\frac{2t}{e}$ · The council's preliminary key

**Q290** AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

A simple pendulum of length $\frac{10}{3}$ meter with a bob of mass 3 m is hanging freely from a rigid support. A bullet of mass 'm' is fired with a velocity $50\ \mathrm{ms}^{-1}$ from the ground at an angle '$\theta$' with the horizontal. When the bullet is at its highest point of its trajectory, it collides head on with the bob of the pendulum and gets embedded in the bob. After collision, if the pendulum moves through a maximum angle of $120^\circ$, then the value of '$\theta$' is ($g = 10\ \mathrm{ms}^{-2}$)

(A) $\cos^{-1}(0.8)$
(B) $\cos^{-1}(0.6)$
(C) $\cos^{-1}(0.4)$
(D) $\cos^{-1}(0.3)$

**Answer: (A)** $\cos^{-1}(0.8)$ · The council's preliminary key

**Q291** AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

The kinetic energy of a particle moving along a straight line is proportional to the time of its travel. Then its acceleration is proportional to

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

**Answer: (A)** $\frac{1}{\sqrt{t}}$ · The council's preliminary key

**Q292** AP EAMCET 2017 · 24 Apr · Shift 1 MCQ

A ball of mass 2 g moving with a velocity of $2\ \mathrm{ms}^{-1}$ collides with another ball of mass 8 g which is at rest and comes to rest after collission. Then the coefficient of restitution is

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(A) $1$
(B) $0.75$
(C) $0.5$
(D) $0.25$

**Answer: (D)** $0.25$ · The council's preliminary key

## Q293 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

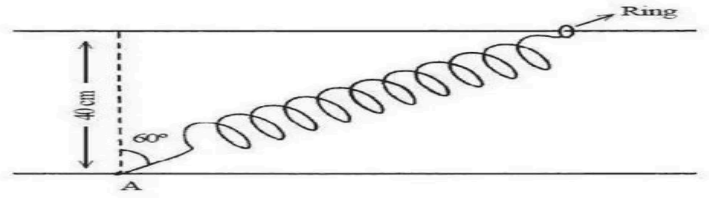
One end of a spring of spring constant $80\ \mathrm{Nm^{-1}}$ and unstretched length of 30 cm is fixed at point A and the other end of the spring is fitted with a smooth ring of mass 300 g as shown in the figure. The ring is allowed to slide on a horizontal rod fixed at a height of 40 cm. Initially the spring makes an angle of $60^\circ$ with the vertical and the system of spring and ring is released from rest. The speed of the ring when the spring becomes vertical is _____ $\mathrm{ms^{-1}}$.

*(see the figure above)*

Question Number : 87 Question Id : 1017173927 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

One end of a spring of spring constant 80 $Nm^{-1}$ and unstretched length of 30 cm is fixed at point A and the other end of the spring is fitted with a smooth ring of mass 300 g as shown in the figure. The ring is allowed to slide on a horizontal rod fixed at a height of 40 cm. Initially the spring makes an angle of 60° with the vertical and the system of spring and ring is released from rest. The speed of the ring when the spring becomes vertical is _____ $ms^{-1}$.

స్ప్రింగ్ స్థిరాంకం 80 $Nm^{-1}$ గావున్న సాగదీయబడని పొడవు 30 cm గల ఒక స్ప్రింగ్ యొక్క, ఒక కొనను A అనే బిందువు వద్ద బిగించి, రెండవ కొనను 300 g ద్రవ్యరాశి గల ఒక నున్నటి కంకణానికి పటంలో చూపిన విధంగా బిగించారు. కంకణం 40 cm ఎత్తులో గల ఒక క్షితిజ సమాంతర కడ్డీపై కదులునట్లుగా అమర్చారు. తొలుత స్ప్రింగ్ క్షితిజ లంబానికి 60° కోణం చేయుచున్నది. స్ప్రింగ్ మరియు కంకణ వ్యవస్థను నిశ్చలస్థితి నుంచి వదిలినట్లైతే, స్ప్రింగ్ క్షితిజ లంబంగా అయ్యేసరికి కంకణం యొక్క వడి _____ $ms^{-1}$




Options :
1. 32
2. 24
3. 16
4. 8

(A) 32
(B) 24
(C) 16
(D) 8

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

## Q294 AP EAMCET 2017 · 24 Apr · Shift 2 MCQ

A pendulum of length 1 m and having a bob of mass 1 g is pulled aside through an angle $60^\circ$ with the vertical and then released. The power delivered by all the forces acting on the bob when the pendulum makes $30^\circ$ with the vertical is _____ $(g = 10\ \mathrm{ms^{-2}})$

(A) 13.5 mW
(B) 7.5 mW
(C) 17.32 mW
(D) 24.5 mW

**Answer: (A)** 13.5 mW · The council's preliminary key

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**Q295** TS EAMCET 2016 · 15 May · Offline MCQ

A particle moves from (1, 0, 3) to the point (-3, 4, 5), when a force $\vec{F} = (\hat{i} + 5\hat{k})$ acts on it. Amount of work done in Joules is

(A) 14
(B) 10
(C) 6
(D) 15

**Answer: (C)** 6 · Official TGCHE final key

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**Q296** TS EAMCET 2016 · 15 May · Offline MCQ

A body of mass 3 kg moving with a velocity $(2\hat{i} + 3\hat{j} + 3\hat{k})$ m/s collides with another body of mass 4 kg moving with a velocity $(3\hat{i} + 2\hat{j} - 3\hat{k})$ m/s. The two bodies stick together after collision. The velocity of the composite body is

(A) $\frac{1}{7}(4\hat{i} + 6\hat{j} - 3\hat{k})$
(B) $\frac{1}{7}(18\hat{i} + 17\hat{j} - 3\hat{k})$
(C) $\frac{1}{7}(6\hat{i} + 4\hat{j} - 6\hat{k})$
(D) $\frac{1}{7}(9\hat{i} + 8\hat{j} - 6\hat{k})$

**Answer: (B)** $\frac{1}{7}(18\hat{i} + 17\hat{j} - 3\hat{k})$ · Official TGCHE final key

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**Q297** TS EAMCET 2016 · 15 May · Offline MCQ

An elastic spring of unstretched length L and force constant K is stretched by a small length x. It is further stretched by another small length y. Work done during the second stretching is

(A) $\frac{ky}{2}(x + 2y)$
(B) $\frac{k}{2}(2x + y)$
(C) $ky(x + 2y)$
(D) $\frac{ky}{2}(2x + y)$

**Answer: (D)** $\frac{ky}{2}(2x + y)$ · Official TGCHE final key

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**Q298** AP EAMCET 2016 · 29 Apr · Offline MCQ

A 1 kg ball moving with a speed of $6\ \mathrm{ms}^{-1}$ collides head-on with a 0.5 kg ball moving in the opposite direction with a speed of $9\ \mathrm{ms}^{-1}$. If the co-efficient of restitution is $\frac{1}{3}$, the energy lost in the collision is

(A) $303.4\ \mathrm{J}$
(B) $66.7\ \mathrm{J}$
(C) $33.3\ \mathrm{J}$
(D) $67.8\ \mathrm{J}$

**Answer: (C)** $33.3\ \mathrm{J}$ · The council's preliminary key

**Q299** AP EAMCET 2016 · 29 Apr · Offline MCQ

A ball is thrown vertically down from a height of 40 m from the ground with an initial velocity 'v'. The ball hits the ground, loses $\frac{1}{3}^{rd}$ of its total mechanical energy and rebounds back to the same height. If the acceleration due to gravity is $10\ \mathrm{ms}^{-2}$, the value of 'v' is

(A) $5\ \mathrm{ms}^{-1}$
(B) $10\ \mathrm{ms}^{-1}$
(C) $15\ \mathrm{ms}^{-1}$
(D) $20\ \mathrm{ms}^{-1}$

**Answer: (D)** $20\ \mathrm{ms}^{-1}$ · The council's preliminary key

**Q300** AP EAMCET 2013 · 10 May · Offline MCQ

The work done in moving an object from origin to a point whose position vector is $\vec{r} = 3\hat{i} + 2\hat{j} - 5\hat{k}$ by a force $\vec{F} = 2\hat{i} - \hat{j} - \hat{k}$ is

(A) 1 unit
(B) 9 units
(C) 13 units
(D) 60 units

**Answer: (B)** 9 units · The council's preliminary key

**Q301** AP EAMCET 2013 · 10 May · Offline MCQ

A ball at rest is dropped from a height of 12 m. It looses 25% of its kinetic energy on striking the ground and bounces back to a height 'h'. Then value of 'h' is

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(A) 3 m
(B) 6 m
(C) 9 m
(D) 12 m

**Answer: (C)** 9 m · The council's preliminary key

**Q302** AP EAMCET 2013 · 10 May · Offline MCQ

A mass of 2.9 kg is suspended from a string of length 50 cm and is at rest. Another body of mass 100 g, which is moving horizontally with a velocity of 150 m/s strikes and sticks to it. Subsequently when the string makes an angle of $60^\circ$ with the vertical, the tension in the string is ($g = 10$ m/s$^2$)

(A) 140 N
(B) 135 N
(C) 125 N
(D) 90 N

**Answer: (B)** 135 N · The council's preliminary key

**Q303** AP EAMCET 2012 · 12 May · Offline MCQ

The velocity 'v' reached by a car of mass 'm' at certain distance from the starting point driven with constant power 'P' is such that

(A) $v \propto \frac{3P}{m}$
(B) $v^2 \propto \frac{3P}{m}$
(C) $v^3 \propto \frac{3P}{m}$
(D) $v \propto \left(\frac{3P}{m}\right)^2$

**Answer: (C)** $v^3 \propto \frac{3P}{m}$ · Official APSCHE final key

**Q304** AP EAMCET 2012 · 12 May · Offline MCQ

A ball 'A' of mass 'm' moving along positive x-direction with kinetic energy 'K' and momentum P undergoes elastic head on collision with a stationary ball B of mass 'M'. After collision the ball A moves along negative X-direction with kinetic energy $\frac{K}{9}$. Final momentum of B is

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

**Answer: (C)** $\frac{4P}{3}$ · Official APSCHE final key

**Q305** AP EAMCET 2011 · 8 May · Offline MCQ

A ball is let fall from a height $h_0$. It makes $n$ collisions with the earth. After '$n$' collisions it rebounds with a velocity '$v_n$' and the ball rises to a height $h_n$, then coefficient of restitution is given by :

(A) $e = \left[\frac{h_n}{h_0}\right]^{1/2n}$

(B) $e = \left[\frac{h_0}{h_n}\right]^{1/2n}$

(C) $e = \frac{1}{n}\sqrt{\frac{h_n}{h_0}}$

(D) $e = \frac{1}{n}\sqrt{\frac{h_0}{h_n}}$

**Answer: (A)** $e = \left[\frac{h_n}{h_0}\right]^{1/2n}$ · The council's preliminary key

**Q306** AP EAMCET 2010 · 30 May · Offline MCQ

A ball is falling freely from a height. When it reaches 10 m height from the ground its velocity is $V_0$. It collides with the ground and loses 50% of its energy and rises back to height of 10 m. Then the velocity $V_0$ is :

(A) $7\ \mathrm{m/s}$

(B) $10\ \mathrm{m/s}$

(C) $14\ \mathrm{m/s}$

(D) $16\ \mathrm{m/s}$

**Answer: (C)** $14\ \mathrm{m/s}$ · Official APSCHE final key

**Q307** AP EAMCET 2010 · 30 May · Offline MCQ

A ball falls from a height $h$ and rebounds after striking the floor. The coefficient of restitution is $e$. The maximum distance covered before it comes to rest is :

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

(B) $\frac{(1+e^2)h}{e^2}$

(C) $\left(\frac{1+e^2}{1-e^2}\right)h$

(D) $\frac{e^2h}{1-e^2}$

**Answer: (C)** $\left(\frac{1+e^2}{1-e^2}\right)h$ · Official APSCHE final key

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