If $e$ is the electronic charge, $c$ is the speed of light in free space and $h$ is Planck's constant, the quantity $\frac{1}{4\pi\varepsilon_0} \frac{|e|^2}{hc}$ has dimensions of:

**Options:**

70819164381. $[M \: L \: T^0]$

70819164382. $[M \: L \: T^{-1}]$

70819164383. $[M^0 \: L^0 \: T^0]$

70819164384. $[L \: C^{-1}]$
Options:
70819164381. \([M L T^0]\)

70819164382. \([M L T^{-1}]\)

70819164383. \([M^0 L^0 T^0]\)

70819164384. \([L C^{-1}]\)

Question Number : 2 Question Id : 70819119745 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
A stone is dropped from the top of a building. When it crosses a point 5 m below the top, another stone starts to fall from a point 25 m below the top. Both stones reach the bottom of building simultaneously. The height of the building is:

Options:
70819164385. 45 m

70819164386. 25 m

70819164387. 35 m

70819164388. 50 m

Question Number : 2 Question Id : 70819119745 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Question in Telugu:

Question Number : 2 Question Id : 70819119745 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Question in Telugu: 

Question in Telugu:

Question in Telugu:

Question in Telugu:

Question in Telugu:

Question in Telugu:
A sphere of radius 'a' and mass 'm' rolls along a horizontal plane with constant speed $v_0$. It encounters an inclined plane at angle $\theta$ and climbs upward. Assuming that it rolls without slipping, how far up the sphere will travel?

Options:

\[
\frac{v_0^2}{2g \sin \theta}
\]

70819164389.

\[
\frac{2v_0^2}{5g \sin \theta}
\]

70819164390.

\[
\frac{10v_0^2}{7g \sin \theta}
\]

70819164391.
\[ \frac{2}{5} \frac{v_0^2}{g \sin \theta} \]

**Question Number : 3 Question Id : 70819119746 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

\[ 'a' \text{ ప్రమాణం ధరించిన 'm' ప్రాంతం లో గేయుము. నా ప్రమాణం చేసిన ఎందుకు చెప్పించిన కారణం ఎందుకు ఐదు. నంది ప్రమాణం చేసిన ఎందుకు చెప్పించిన కారణం ఎందుకు ఐదు. ప్రమాణం చేసిన ఎందుకు చెప్పించిన కారణం ఎందుకు ఐదు. ప్రమాణం చేసిన ఎందుకు చెప్పించిన కారణం ఎందుకు ఐదు.**

\[ \begin{align*}
\text{Options :} \\
\frac{v_0^2}{2g \sin \theta} \\
\frac{v_0^2}{5g \sin \theta} \\
\frac{10v_0^2}{7g \sin \theta} \\
\frac{2}{5} \frac{v_0^2}{g \sin \theta}
\end{align*} \]

**Question Number : 4 Question Id : 70819119747 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**
The point A moves with a uniform speed along the circumference of a circle of radius 0.36 m and covers 30° in 0.1 s. The perpendicular projection 'P' from 'A' on the diameter MN represents the simple harmonic motion of 'P'. The restoration force per unit mass when P touches M will be:

Options:

70819164393. 100 N
70819164394. 9.87 N
70819164395. 50 N
70819164396. 0.49 N

---

Question Number: 4  Question Id: 70819119747  Question Type: MCQ  Option Shuffling: Yes  Is Question Mandatory: No

Correct Marks: 4  Wrong Marks: 1

0.36 m లో ఆకృతిపోయిని మాత్రమే అందించబడింది. A లోకు దిశ రేఖలో 0.1 s లో 30° వేసేతో పోయాం. P యొక్క వైశాల్యాన్ని (A లకు MN లో దిశ రేఖ ఆస్తీ) నిర్ధారించాలంటె పొందడానికి దేశంపడుండు. P యొక్క M లి తొందరు పెద్దది అంటే శాస్త్రీయ సోంట వివాదం చేసాం:

Options:

70819164393. 100 N
Question Number : 5 Question Id : 70819119748 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Thermodynamic process is shown below on a P-V diagram for one mole of an ideal gas. If \( V_2 = 2V_1 \) then the ratio of temperature \( T_2/T_1 \) is:

[Diagram showing a P-V diagram with points labeled 1 and 2, and the equation \( PV^{1/2} = \text{constant} \).]

Options:

70819164397. \( \frac{1}{\sqrt{2}} \)

70819164398. \( \sqrt{2} \)

70819164399. \( \frac{1}{2} \)

70819164400. \( 2 \)
Question Number : 5 Question Id : 70819119748 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

1. In a diatomic molecule, the rotational energy at a given temperature obeys Maxwell’s distribution.
2. In a diatomic molecule, the rotational energy at a given temperature equals the translational kinetic energy for each molecule.

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

Options :
70819164401. Both Statement I and Statement II are true.

70819164402. Both Statement I and Statement II are false.

70819164403. Statement I is true but Statement II is false.

70819164404. Statement I is false but Statement II is true.

Question Number : 6 Question Id : 70819119749 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:
70819164401.

70819164402.

70819164403.

70819164404.

Question Number : 7 Question Id : 70819119750 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Two identical springs of spring constant ‘2k’ are attached to a block of mass m and to fixed support (see figure). When the mass is displaced from equilibrium position on either side, it executes simple harmonic motion. The time period of oscillations of this system is:

\[ 2\pi \sqrt{\frac{m}{2k}} \]

Options:

- 70819164405.
- 70819164406.
- 70819164407.
- 70819164408.

**Question Number : 7 Question Id : 70819119750 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

Options:

- 70819164405.
\[ 2\pi \sqrt{\frac{m}{k}} \]

\[ \pi \sqrt{\frac{m}{k}} \]

\[ \pi \sqrt{\frac{m}{2k}} \]

Question Number : 8 Question Id : 70819119751 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

\( Y = A \sin(\omega t + \phi_0) \) is the time-displacement equation of a SHM. At \( t = 0 \) the displacement of the particle is \( Y = \frac{A}{2} \) and it is moving along negative \( x \)-direction. Then the initial phase angle \( \phi_0 \) will be:

Options:

\[ \frac{\pi}{3} \]

\[ \frac{5\pi}{6} \]

\[ \frac{\pi}{6} \]

\[ \frac{2\pi}{3} \]
A charge \( q \) is placed at one corner of a cube as shown in figure. The flux of electrostatic field \( \vec{E} \) through the shaded area is:

Options:

\[ \frac{q}{48\varepsilon_0} \]
Question Number : 9 Question Id : 70819119752 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

 Options :

\[ \frac{q}{4\varepsilon_0} \] 70819164414.

\[ \frac{q}{8\varepsilon_0} \] 70819164415.

\[ \frac{q}{24\varepsilon_0} \] 70819164416.
Question Number : 10 Question Id : 70819119753 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
An electron with kinetic energy $K_1$ enters between parallel plates of a capacitor at an angle ‘$\alpha$’ with the plates. It leaves the plates at angle ‘$\beta$’ with kinetic energy $K_2$. Then the ratio of kinetic energies $K_1 : K_2$ will be:

Options:
\[
\frac{\cos \beta}{\cos \alpha}
\]
70819164417.

\[
\frac{\cos \beta}{\sin \alpha}
\]
70819164418.

\[
\frac{\sin^2 \beta}{\cos^2 \alpha}
\]
70819164419.

\[
\frac{\cos^2 \beta}{\cos^2 \alpha}
\]
70819164420.

Question Number : 10 Question Id : 70819119753 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
$\text{If } K_1 \text{ and } K_2 \text{ are the kinetic energies of an electron before and after passing through the electric field, respectively, then } K_1 : K_2 =$

Options:
\[
\frac{\cos \beta}{\cos \alpha}
\]
70819164417.
\[ \frac{\cos \beta}{\sin \alpha} \]

\[ \frac{\sin^2 \beta}{\cos^2 \alpha} \]

\[ \frac{\cos^2 \beta}{\cos^2 \alpha} \]

**Question Number : 11**  
**Question Id : 70819119754**  
**Question Type : MCQ**  
**Option Shuffling : Yes**  
**Is Question Mandatory : No**  
**Correct Marks : 4**  
**Wrong Marks : 1**

In a ferromagnetic material, below the curie temperature, a domain is defined as:

**Options :**

70819164421. a macroscopic region with zero magnetization.

70819164422. a macroscopic region with saturation magnetization.

70819164423. a macroscopic region with randomly oriented magnetic dipoles.

70819164424. a macroscopic region with consecutive magnetic dipoles oriented in opposite direction.

**Question Number : 11**  
**Question Id : 70819119754**  
**Question Type : MCQ**  
**Option Shuffling : Yes**  
**Is Question Mandatory : No**  
**Correct Marks : 4**  
**Wrong Marks : 1**  

అప్పుడు ఒక కార్యక్రమ నిర్మాణంలో, మాత్రమే కచాతమ తమ్ముడు తమ్ముడు తమ్ముడు మాత్రమే కార్యక్రమం అంచిని ఆడాడం:

**Options :**

70819164421. మాత్రమే కచాతమ సైద్ధత ఆడాడం.
Question Number : 12 Question Id : 70819119755 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

An LCR circuit contains resistance of 110 Ω and a supply of 220 V at 300 rad/s angular frequency. If only capacitance is removed from the circuit, current lags behind the voltage by 45°. If on the other hand, only inductor is removed the current leads by 45° with the applied voltage. The rms current flowing in the circuit will be:

Options :
70819164425.  1 A
70819164426.  1.5 A
70819164427.  2 A
70819164428.  2.5 A
The stopping potential for electrons emitted from a photosensitive surface illuminated by light of wavelength 491 nm is 0.710 V. When the incident wavelength is changed to a new value, the stopping potential is 1.43 V. The new wavelength is:

Options:
70819164429. 309 nm
70819164430. 329 nm
70819164431. 382 nm
70819164432. 400 nm
Consider the diffraction pattern obtained from the sunlight incident on a pinhole of diameter 0.1 μm. If the diameter of the pinhole is slightly increased, it will affect the diffraction pattern such that:

**Options:**

70819164433. its size increases, and intensity increases

70819164434. its size increases, but intensity decreases

70819164435. its size decreases, but intensity increases

70819164436. its size decreases, and intensity decreases

---

Consider the diffraction pattern obtained from the sunlight incident on a pinhole of diameter 0.1 μm. If the diameter of the pinhole is slightly increased, it will affect the diffraction pattern such that:

**Options:**

70819164433. its size increases, and intensity increases

70819164434. its size increases, but intensity decreases

70819164435. its size decreases, but intensity increases

70819164436. its size decreases, and intensity decreases
An electron of mass $m_e$ and a proton of mass $m_p = 1836 \ m_e$ are moving with the same speed.

The ratio of their de Broglie wavelength $\frac{\lambda_{\text{electron}}}{\lambda_{\text{proton}}}$ will be:

**Options:**

1. 1
2. 1836
3. $\frac{1}{1836}$
4. 918

Question Number : 15 Question Id : 70819119758 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
The wavelength of the photon emitted by a hydrogen atom when an electron makes a transition from \( n = 2 \) to \( n = 1 \) state is:

\[
\frac{\lambda_{\text{electron}}}{\lambda_{\text{proton}}} = \frac{1}{1836}
\]

Options:

70819164437. 1

70819164438. 1836

70819164439. \( \frac{1}{1836} \)

70819164440. 918

70819164441. 121.8 nm

70819164442. 194.8 nm

70819164443. 490.7 nm

70819164444. 913.3 nm
If a message signal of frequency \( f_m \) is amplitude modulated with a carrier signal of frequency \( f_c \) and radiated through an antenna, the wavelength of the corresponding signal in air is:

\[
\frac{c}{f_c - f_m}
\]

\[
\frac{c}{f_c + f_m}
\]

\[
\frac{c}{f_c}
\]

\[
\frac{c}{f_m}
\]
Is Question Mandatory: No

Correct Marks: 4 Wrong Marks: 1

For extrinsic semiconductors; when doping level is increased;

Options:

Fermi-level of p-type semiconductor will go upward and Fermi-level of n-type semiconductors will go downward.

Fermi-level of p-type semiconductors will go downward and Fermi-level of n-type semiconductor will go upward.

Fermi-level of p and n-type semiconductors will not be affected.

Fermi-level of both p-type and n-type semiconductors will go upward for $T > T_F K$ and downward for $T < T_F K$, where $T_F$ is Fermi temperature.
Question Number : 18 Question Id : 70819119761 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options :
70819164449. p-ఎర్రికాండి, n-ఎర్రికాండి ఏంటిథి, n-ఎర్రికాండి ఏంటిథి మొదలు.

70819164450. p-ఎర్రికాండి, n-ఎర్రికాండి ఏంటిథి, n-ఎర్రికాండి ఏంటిథి మొదలు.

70819164451. p-ఎర్రికాండి, n-ఎర్రికాండి ఏంటిథి అంటారు మొదలు.

T_F ఎర్రికాండి ఎర్రికాండి ఎంటిథి, p-ఎర్రికాండి, n-ఎర్రికాండి ఏంటిథి T > T_F కాను ఎంటిథి, T < T_F కాను ఎంటిథి మొదలు.

Question Number : 19 Question Id : 70819119762 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Match List I with List II.

<table>
<thead>
<tr>
<th>List I</th>
<th>List II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Rectifier</td>
<td>(i) Used either for stepping up or stepping down the a.c. voltage</td>
</tr>
<tr>
<td>(b) Stabilizer</td>
<td>(ii) Used to convert a.c. voltage into d.c. voltage</td>
</tr>
<tr>
<td>(c) Transformer</td>
<td>(iii) Used to remove any ripple in the rectified output voltage</td>
</tr>
<tr>
<td>(d) Filter</td>
<td>(iv) Used for constant output voltage even when the input voltage or load current change</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below :

Options :
70819164453. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

70819164454. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)
70819164455. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819164456. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

**Question Number : 19** Question Id : 70819119762 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

**Correct Marks : 4 Wrong Marks : 1**

List - I  List - II  
(a)  (i)  
(b)  (ii)  
(c)  (iii)  
(d)  (iv)  

Options :
70819164453. (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv)

70819164454. (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)

70819164455. (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)

70819164456. (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

**Question Number : 20** Question Id : 70819119763 Question Type : MCQ Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1
The truth table for the following logic circuit is:

Options:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
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</table>

70819164457.

<table>
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<tr>
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70819164458.

<table>
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70819164459.

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</tbody>
</table>

70819164460.
The given problem is a logic circuit. The circuit comprises two half adders connected in series. The output of the first half adder is fed into the second half adder. The circuit diagram is shown in the image. The inputs are labeled A and B, and the output is labeled Y.

### Options

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
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</tr>
</tbody>
</table>

- Option 1: 70819164457
- Option 2: 70819164458
- Option 3: 70819164459
- Option 4: 70819164460

Correct Marks: 4 Wrong Marks: 1

Is Question Mandatory: No
Two particles having masses 4 g and 16 g respectively are moving with equal kinetic energies. The ratio of the magnitudes of their linear momentum is $n : 2$. The value of $n$ will be \_\_\_\_\_.

**Response Type**: Numeric

**Evaluation Required For SA**: Yes

**Show Word Count**: Yes

**Answers Type**: Range

**Text Areas**: PlainText
Possible Answers:
5 to 5.001

Question Number : 21 Question Id : 70819119764 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
4 g 3060 16 g 3060 16 g 3060 16 g 3060 నాయ్న కానుకు కొనసాగాలు నాయ్న కానుకు కొనసాగాలు. నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు నిల్లు 

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 22 Question Id : 70819119765 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
The initial velocity \( v_i \) required to project a body vertically upward from the surface of the earth to reach a height of 10R, where R is the radius of the earth, may be described in terms of escape velocity \( v_e \) such that \( v_i = \frac{x}{y} v_e \). The value of \( x \) will be __________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001
The percentage increase in the speed of transverse waves produced in a stretched string if the tension is increased by 4\%, will be ________\%.

Possible Answers:
5 to 5.001
If \( \vec{P} \times \vec{Q} = \vec{Q} \times \vec{P} \), the angle between \( \vec{P} \) and \( \vec{Q} \) is \( 0 \) \( ^{\circ} \) \( < 0 < 360\) \( ^{\circ} \). The value of ‘0’ will be \( \underline{\underline{\text{__________}^{\circ}}} \).

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Text Areas: PlainText

Possible Answers:

5 to 5.001
A reversible heat engine converts one-fourth of the heat input into work. When the temperature of the sink is reduced by 52 K, its efficiency is doubled. The temperature in Kelvin of the source will be \[\text{\underline{5}}\text{ to 5.001}\].

**Response Type**: Numeric

**Evaluation Required For SA**: Yes

**Show Word Count**: Yes

**Answers Type**: Range

**Text Areas**: PlainText

**Possible Answers**:

\[5\text{ to 5.001}\]

---

Two small spheres each of mass 10 mg are suspended from a point by threads 0.5 m long. They are equally charged and repel each other to a distance of 0.20 m. The charge on each of the sphere is \[\frac{a}{21} \times 10^{-8} \text{ C}\]. The value of ‘a’ will be \[\text{\underline{5}}\text{ to 5.001}\].

**[Given g = 10 \text{ms}^{-2}]**

**Response Type**: Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 26 Question Id : 70819119769 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

0.5 m दूरी से 2 कोण्डकों से चुकाया जाने 10 mg व्हिल्सट गोल मांगा गर्ने गरिएको छ तर कोण्डको 0.20 m दूरीले चुकाइने गर्नुहोस्।

\[ \frac{n}{2l} \times 10^{-8} \] 

C दरिंदी 'n' निर्णय

[g = 10 ms^{-2} अध्ययन]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 27 Question Id : 70819119770 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Two identical conducting spheres with negligible volume have 2.1 nC and -0.1 nC charges, respectively. They are brought into contact and then separated by a distance of 0.5 m. The electrostatic force acting between the spheres is __________ \times 10^{-9} N.

[Given : 4\pi\varepsilon_0 = \frac{1}{9 \times 10^9} \text{ SI unit}]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Question Number : 27 Question Id : 70819119770 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The peak electric field produced by the radiation coming from the 8 W bulb at a distance of 10 m is $\frac{x}{10} \sqrt{\frac{\mu_0 C}{\pi}} \frac{V}{m}$. The efficiency of the bulb is 10% and it is a point source. The value of $x$ is ________.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Question Number : 28 Question Id : 70819119771 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

5 to 5.001
**Question Number : 28** Question Id : 70819119771 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

8 W तरसून 10 m जोडाक नोंद दिन्नी हो तरसूने हिलाते खिद्ध हुने रुपान्तरित हुनेछ। x गल्यास तर सुभाष

\[ x \text{ होहिल } \frac{x}{10} \sqrt{\frac{\mu_0 c}{\pi}} \text{ m} \]  होको।

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Possible Answers :
5 to 5.001

**Question Number : 29** Question Id : 70819119772 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

A current of 6 A enters one corner P of an equilateral triangle PQR having 3 wires of resistance 2 Ω each and leaves by the corner R. The currents \( i_1 \) in ampere is ________.

\[ \text{Response Type : Numeric} \]
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Question Number : 29 Question Id : 70819119772 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

PQR నిష్పత్తి (చిత్రంలో గుర్తించబడినంటే) 2Ω నగుడంగా ఉంది. 6A ప్రవహపరచడం అయితే P నుండి Q లో ప్రవహించిన i_1 విలుము ఎంతం ఉంటుంది? 

![Diagram of a circuit with currents labeled i_1 and i_2.](image)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 30 Question Id : 70819119773 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The wavelength of an X-ray beam is 10 Å. The mass of a fictitious particle having the same energy as that of the X-ray photons is \( \frac{x}{3} \) kg. The value of x is __________. 

(h = Planck’s constant)

Response Type : Numeric
Evaluation Required For SA : Yes
Question Number: 30 Question Id: 70819119773 Question Type: SA

Correct Marks: 4 Wrong Marks: 0

\( \frac{x}{3} \) h kg.  అయితే \( x \) మిగిలి __________

\( \text{\textit{h}} = \text{మిగిలు అధికంగా} \)  

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Text Areas: PlainText

Possible Answers:

5 to 5.001
Which among the following species has unequal bond lengths?

Options:
1. $\text{XeF}_4$
2. $\text{SiF}_4$
3. $\text{SF}_4$
4. $\text{BF}_4^-$
The solubility of Ca(OH)$_2$ in water is:

[Given: The solubility product of Ca(OH)$_2$ in water $= 5.5 \times 10^{-6}$]

Options:

A. $1.11 \times 10^{-2}$
B. $1.11 \times 10^{-6}$
C. $1.77 \times 10^{-2}$
D. $1.77 \times 10^{-6}$
Question Number : 33 Question Id : 70819119776 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Which one of the following statements is FALSE for hydrophilic sols?

Options :
70819164479. They do not require electrolytes for stability.
70819164480. These sols are reversible in nature.
70819164481. Their viscosity is of the order of that of H₂O.
70819164482. The sols cannot be easily coagulated.

Question Number : 33 Question Id : 70819119776 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Question Number : 34 Question Id : 70819119777 Question Type : MCQ Option Shuffling : Yes
The correct order of bond dissociation enthalpy of halogens is:

Options:
1. $F_2 > Cl_2 > Br_2 > I_2$
2. $I_2 > Br_2 > Cl_2 > F_2$
3. $Cl_2 > Br_2 > F_2 > I_2$
4. $Cl_2 > F_2 > Br_2 > I_2$
The method used for the purification of Indium is:

**Options:**

70819164487. van Arkel method

70819164488. liquation

70819164489. zone refining

70819164490. vapour phase refining

---

**Question Number : 35 Question Id : 70819119778 Question Type : MCQ Option Shuffling : Yes**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

**Options :**

70819164487. 

70819164488. 

70819164489. 

70819164490. 

---

**Question Number : 36 Question Id : 70819119779 Question Type : MCQ Option Shuffling : Yes**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Water does not produce CO on reacting with:

**Options :**
70819164491. CH₄
70819164492. C
70819164493. CO₂
70819164494. C₃H₈

Question Number : 36 Question Id : 70819119779 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Question : 36
Options :
70819164491. CH₄
70819164492. C
70819164493. CO₂
70819164494. C₃H₈

Question Number : 37 Question Id : 70819119780 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Question : 37
Given below are two statements:
Statement I:
a and β forms of sulphur can change reversibly between themselves with slow heating or slow cooling.
Statement II:
At room temperature the stable crystalline form of sulphur is monoclinic sulphur.
In the light of the above statements, choose the correct answer from the options given below:

Options:
70819164495. Both Statement I and Statement II are true.
70819164496. Both Statement I and Statement II are false.
70819164497. Statement I is true but Statement II is false.
70819164498. Statement I is false but Statement II is true.
The major components of German Silver are:

Options:

70819164499. Cu, Zn and Ag

70819164500. Cu, Zn and Ni

70819164501. Ge, Cu and Ag

70819164502. Zn, Ni and Ag

The major components of German Silver are:

Options:

70819164499. Cu, Zn and Ag

70819164500. Cu, Zn and Ni

70819164501. Ge, Cu and Ag

70819164502. Zn, Ni and Ag
Question Number : 39  Question Id : 70819119782  Question Type : MCQ  Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

In which of the following order the given complex ions are arranged correctly with respect to their decreasing spin only magnetic moment?

(i) \([\text{FeF}_6]^{3-}\)  (ii) \([\text{Co(NH}_3)_6]^{3+}\)  (iii) \([\text{NiCl}_4]^{2-}\)  (iv) \([\text{Cu(NH}_3)_4]^{2+}\)

Options:

70819164503. (i) > (iii) > (iv) > (ii)  
70819164504. (ii) > (iii) > (i) > (iv)  
70819164505. (iii) > (iv) > (ii) > (i)  
70819164506. (ii) > (i) > (iii) > (iv)

Question Number : 39  Question Id : 70819119782  Question Type : MCQ  Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

In which of the following order the given complex ions are arranged correctly with respect to their decreasing spin only magnetic moment?

(i) \([\text{FeF}_6]^{3-}\)  (ii) \([\text{Co(NH}_3)_6]^{3+}\)  (iii) \([\text{NiCl}_4]^{2-}\)  (iv) \([\text{Cu(NH}_3)_4]^{2+}\)

Options:

70819164503. (i) > (iii) > (iv) > (ii)  
70819164504. (ii) > (iii) > (i) > (iv)  
70819164505. (iii) > (iv) > (ii) > (i)  
70819164506. (ii) > (i) > (iii) > (iv)
Given below are two statements:

Statement I:
The pH of rain water is normally \( \sim 5.6 \).

Statement II:
If the pH of rain water drops below 5.6, it is called acid rain.

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

Options:

70819164507. Both Statement I and Statement II are true.

70819164508. Both Statement I and Statement II are false.

70819164509. Statement I is true but Statement II is false.

70819164510. Statement I is false but Statement II is true.
Which of the following compound is added to the sodium extract before addition of silver nitrate for testing of halogens?

Options:

70819164511. Hydrochloric acid

70819164512. Sodium hydroxide

70819164513. Nitric acid

70819164514. Ammonia
The major product of the following reaction is:

\[ \text{Cyclohexene} + \text{NO}_2 \xrightarrow{\text{H}_2\text{SO}_4} \]

Options:
1. [Image of option 1]
2. [Image of option 2]
3. [Image of option 3]
4. [Image of option 4]
Question Number : 42  Question Id : 70819119785  Question Type : MCQ  Option Shuffling : Yes  
Is Question Mandatory : No  
Correct Marks : 4  Wrong Marks : 1

Options:

70819164515.

70819164516.

70819164517.

70819164518.

Question Number : 43  Question Id : 70819119786  Question Type : MCQ  Option Shuffling : Yes  
Is Question Mandatory : No  
Correct Marks : 4  Wrong Marks : 1
The major product of the following reaction is:

\[
\text{CH}_3\text{CH}_2\text{CH} \equiv \text{CH}_2 + \text{H}_2/\text{CO} \xrightarrow{\text{Rh catalyst}} \]

**Options:**

70819164519. \(\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}\)

70819164520. \(\text{CH}_3\text{CH}_2\text{CHO}\)

70819164521. \(\text{CH}_3\text{CH}_2\text{CH} \equiv \text{CH} \equiv \text{CHO}\)

70819164522. \(\text{CH}_3\text{CH}_2\text{C} \equiv \text{CH}_2 \quad \text{CHO}\)
The correct sequence of reagents used in the preparation of 4-bromo-2-nitroethyl benzene from benzene is:

**Options:**

70819164523. \( \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Br}_2/\text{AlBr}_3, \text{HNO}_3/\text{H}_2\text{SO}_4, \text{Zn}/\text{HCl} \)

70819164524. \( \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Zn-Hg}/\text{HCl}, \text{Br}_2/\text{AlBr}_3, \text{HNO}_3/\text{H}_2\text{SO}_4 \)

70819164525. \( \text{Br}_2/\text{AlBr}_3, \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{HNO}_3/\text{H}_2\text{SO}_4, \text{Zn}/\text{HCl} \)

70819164526. \( \text{HNO}_3/\text{H}_2\text{SO}_4, \text{Br}_2/\text{AlCl}_3, \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Zn-Hg}/\text{HCl} \)

The correct sequence of reagents used in the preparation of 4-bromo-2-nitroethyl benzene from benzene is:

**Options:**

70819164523. \( \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Br}_2/\text{AlBr}_3, \text{HNO}_3/\text{H}_2\text{SO}_4, \text{Zn}/\text{HCl} \)

70819164524. \( \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Zn-Hg}/\text{HCl}, \text{Br}_2/\text{AlBr}_3, \text{HNO}_3/\text{H}_2\text{SO}_4 \)

70819164525. \( \text{Br}_2/\text{AlBr}_3, \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{HNO}_3/\text{H}_2\text{SO}_4, \text{Zn}/\text{HCl} \)

70819164526. \( \text{HNO}_3/\text{H}_2\text{SO}_4, \text{Br}_2/\text{AlCl}_3, \text{CH}_3\text{COCl}/\text{AlCl}_3, \text{Zn-Hg}/\text{HCl} \)
The correct order of acid character of the following compounds is:

Options:

70819164527. \( I > II > III > IV \)

70819164528. \( III > II > I > IV \)

70819164529. \( II > III > IV > I \)

70819164530. \( IV > III > II > I \)
What is ‘X’ in the given reaction?

$$\text{CH}_2\text{OH} + \text{oxalic acid} \xrightarrow{210^\circ C} \text{CH}_2\text{OH}$$

(major product)

Options:

1. $\text{CHO}$
2. $\text{CHO}$
3. $\text{CH}_2\text{OH}$
4. $\text{CH}_2\text{OH}$
5. $\text{CH} \equiv \text{OH}$
Question Number : 47 Question Id : 70819119790 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Correct statement about the given chemical reaction is:

Options:

70819164535. $\text{NH}_2$ group is ortho and para directive, so product (B) is not possible.
70819164536. Reaction is possible and compound (B) will be the major product.

70819164537. The reaction will form sulphonated product instead of nitration.

70819164538. Reaction is possible and compound (A) will be major product.

Question Number : 47 Question Id : 70819119790 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

![Chemical Reaction Diagram]

Options:

70819164535.  

70819164536.  

70819164537.  

70819164538.  

Question Number : 48 Question Id : 70819119791 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Carbylamine test is used to detect the presence of primary amino group in an organic compound. Which of the following compound is formed when this test is performed with aniline?

**Options:**

![Chemical Structure](image)

70819164539.

![Chemical Structure](image)

70819164540.

![Chemical Structure](image)

70819164541.

![Chemical Structure](image)

70819164542.

*Question Number : 48 Question Id : 70819119791 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1*
Which of the following is correct structure of α-anomer of maltose?

Options:

1. [Diagram]
2. [Diagram]
3. [Diagram]
4. [Diagram]
Question Number : 49 Question Id : 70819119792 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Which of the following is an a-1,4 glycosidic linkage? (Select all that apply)

Options:

7081916453.

7081916454.

7081916455.

7081916456.
Given below are two statements:

Statement I:
The identification of Ni\textsuperscript{2+} is carried out by dimethyl glyoxime in the presence of NH\textsubscript{4}OH.

Statement II:
The dimethyl glyoxime is a bidentate neutral ligand.

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

Options:

70819164547. Both Statement I and Statement II are true.

70819164548. Both Statement I and Statement II are false.

70819164549. Statement I is true but Statement II is false.

70819164550. Statement I is false but Statement II is true.
**Chemistry Section B**

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<th>708191859</th>
</tr>
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<td>4</td>
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</tr>
<tr>
<td><strong>Mandatory or Optional</strong> :</td>
<td>Mandatory</td>
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<td><strong>Number of Questions to be attempted</strong> :</td>
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<td><strong>Section Marks</strong> :</td>
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**Question Number : 51 Question Id : 70819119794 Question Type : SA**

**Correct Marks : 4 Wrong Marks : 0**

Consider titration of NaOH solution versus 1.25 M oxalic acid solution. At the end point following burette readings were obtained.

| (i) | 4.5 mL | (ii) | 4.5 mL | (iii) | 4.4 mL |
| (iv) | 4.4 mL | (v) | 4.4 mL |

If the volume of oxalic acid taken was 10.0 mL then the molarity of the NaOH solution is ________ M. (Rounded-off to the nearest integer)

**Response Type** : Numeric

**Evaluation Required For SA** : Yes
Question Number : 51 Question Id : 70819119794 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

NaOH溶液的浓度是1.25 M。计算100 mL的NaOH溶液中H₃O⁺的浓度。

(i) 4.5 mL (ii) 4.5 mL (iii) 4.4 mL
(iv) 4.4 mL (v) 4.4 mL

-corner1- 10.0 mL溶液中，NaOH溶液的浓度是M的

无法通过给定的信息得到确切的值。

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :

5 to 5.001

Question Number : 52 Question Id : 70819119795 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The unit cell of copper corresponds to a face centered cube of edge length 3.596 Å with one copper atom at each lattice point. The calculated density of copper in kg/m³ is _______.

[Molar mass of Cu : 63.54 g ; Avogadro Number = 6.022 × 10^{23}]  

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers:

5 to 5.001

Question Number: 52 Question Id: 70819119795 Question Type: SA
Correct Marks: 4 Wrong Marks: 0

Electromagnetic radiation of wavelength 663 nm is just sufficient to ionise the atom of metal A. The ionization energy of metal A in kJ mol\(^{-1}\) is \(_______\). (Rounded-off to the nearest integer)
\[h = 6.63 \times 10^{-34} \text{ Js}, \ c = 3.00 \times 10^8 \text{ ms}^{-1}, \ N_A = 6.02 \times 10^{23} \text{ mol}^{-1}\]

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Text Areas: PlainText
Possible Answers:

5 to 5.001

Question Number: 53 Question Id: 70819119796 Question Type: SA
Correct Marks: 4 Wrong Marks: 0

\[\text{Cu} \ \text{density} \ = 8.96 \ \text{g/cm}^3, \ \text{molar mass} \ \text{of} \ \text{Cu} = 63.54 \ \text{g/mol}, \ \text{Avogadro's number} = 6.022 \times 10^{23}\]

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Range
Text Areas: PlainText
Possible Answers:

5 to 5.001
Question Number : 54 Question Id : 70819119797 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Five moles of an ideal gas at 293 K is expanded isothermally from an initial pressure of 2.1 MPa to 1.3 MPa against at constant external pressure 4.3 MPa. The heat transferred in this process is ________ kJ mol$^{-1}$. (Rounded-off to the nearest integer)

[Use $R = 8.314$ J mol$^{-1}$K$^{-1}$]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :

5 to 5.001
293 K నిలిచింది ఎందుకు 0.6 అడుగు బోలివా, ప్రక్రియకి 4.3 MPa తెరచిన పరిస్థితి లోకి సేదినా, నాటికి 2.1 MPa కయపై 1.3 MPa వచ్చిన పరిస్థితి మరియు రెండు నీరుల విస్తరణ వలన ఇది కలుపు కిలోజాన్యులు మోలు విస్తరణ పరిస్థితిలో ఉంటుంది. అప్పుడు యాంత్రిక ఆకమాన నామం కలుపు 5.2001 K mol⁻¹. (చెదు పరిస్థితి)

[R = 8.314 J mol⁻¹K⁻¹, క్యాంప్యూటింగ్ పరిస్థితి]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

---

If a compound AB dissociates to the extent of 75% in an aqueous solution, the molality of the solution which shows a 2.5 K rise in the boiling point of the solution is ________ molal. (Rounded-off to the nearest integer)

\[K_b = 0.52 \text{ K kg mol}^{-1}\]

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

---

And AB సమీకరణలో, 75 ఎక్కడ బోలివా ఒక సాధనాన్ని రాసిన రేటు లో 2.5 K వెయియర్ ఆస్తులు మరియు రెండు రెండు సాధనాల మాటలు ఉంటాయి. (చెదు పరిస్థితి)

\[K_b = 0.52 \text{ K kg mol}^{-1}\]

Response Type : Numeric
Copper reduces $\text{NO}_3^-$ into NO and $\text{NO}_2$ depending upon the concentration of $\text{HNO}_3$ in solution. (Assuming fixed $[\text{Cu}^{2+}]$ and $P_{\text{NO}} = P_{\text{NO}_2}$), the $\text{HNO}_3$ concentration at which the thermodynamic tendency for reduction of $\text{NO}_3^-$ into NO and $\text{NO}_2$ by copper is same is $10^3 \text{ M}$. The value of $2x$ is _________. ( Rounded-off to the nearest integer) 

\[
\text{[Given, } E^{\circ}_\text{Cu}^{2+}/\text{Cu} = 0.34 \text{ V, } E^{\circ}_{\text{NO}_3^-/\text{NO}} = 0.96 \text{ V, } E^{\circ}_{\text{NO}_3^-/\text{NO}_2} = 0.79 \text{ V and at } 298 \text{ K,}}
\]

\[
\frac{RT}{F} (2.303 - 0.059)
\]

**Response Type**: Numeric

**Evaluation Required For SA**: Yes

**Show Word Count**: Yes

**Answers Type**: Range

**Text Areas**: PlainText

**Possible Answers**:

5 to 5.001
The rate constant of a reaction increases by five times on increase in temperature from 27°C to 52°C. The value of activation energy in kJ mol⁻¹ is __________. (Rounded-off to the nearest integer)

\[ R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1} \]

Question Number : 57 Question Id : 70819119800 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001
Question Number : 58 Question Id : 70819119801 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
Among the following, number of metal/s which can be used as electrodes in the photoelectric cell is _______. (Integer answer)
(A) Li  (B) Na  (C) Rb  (D) Cs

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 58 Question Id : 70819119801 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
రోడీ నిత్య మార్కస్ కంటే _______ (ప్రశ్నాంశం) తిరంచాయ యాధులనికి
గిరిశ్తుంది?
(A) Li  (B) Na  (C) Rb  (D) Cs

Response Type : Numeric
Evaluation Required For SA : Yes
The spin only magnetic moment of a divalent ion in aqueous solution (atomic number 29) is \[ \text{_________} \text{BM}. \]

Response Type: Numeric
The number of compound/s given below which contain/s —COOH group is ________.

(A) Sulphanilic acid  (B) Picric acid
(C) Aspirin  (D) Ascorbic acid

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Text Areas: PlainText

Possible Answers:

5 to 5.001
If for the matrix, \( A = \begin{bmatrix} 1 & -\alpha \\ \alpha & \beta \end{bmatrix} \), \( AA^T = I_2 \), then the value of \( \alpha^4 + \beta^4 \) is:

Options:

70819164561. 4

70819164562. 1

70819164563. 2

70819164564. 3
Let $A$ be a $3 \times 3$ matrix with $\det(A) = 4$. Let $R_i$ denote the $i^{th}$ row of $A$. If a matrix $B$ is obtained by performing the operation $R_2 \to 2R_2 + 5R_3$ on $2A$, then $\det(B)$ is equal to:

Options:

$70819164561. \ 4$

$70819164562. \ 1$

$70819164563. \ 2$

$70819164564. \ 3$
The following system of linear equations
\[ 2x + 3y + 2z = 9 \]
\[ 3x + 2y + 2z = 9 \]
\[ x - y + 4z = 8 \]

Options:

70819164569. does not have any solution

70819164570. has a unique solution

70819164571. has infinitely many solutions

70819164572. has a solution \((x, \beta, \gamma)\) satisfying \(x + \beta^2 + \gamma^3 = 12\)
\[2x + 3y + 2z = 9\]
\[3x + 2y + 2z = 9\]
\[x - y + 4z = 8\]

**Options:**

70819164569.  ఒకే సంఖ్యలు

70819164570.  వివిధ సంఖ్యలు

70819164571.  రెండేసిన సంఖ్యలు

70819164572.  \[a + b^2 + \gamma^3 = 12\] కు రింగులు కాని రింగాలు \((a, b, \gamma)\) రేఖలు.

---

**Question Number:** 64  **Question Id:** 70819119807  **Question Type:** MCQ  **Option Shuffling:** Yes  **Is Question Mandatory:** No  **Correct Marks:** 4  **Wrong Marks:** 1

If \(I_n = \int \cot^n x \, dx\), then:

\[\frac{\pi}{4}\]

**Options:**

70819164573.  \(\frac{1}{I_2 + I_4}, \frac{1}{I_3 + I_5}, \frac{1}{I_4 + I_6}\) are in A.P.

70819164574.  \(I_2 + I_4, I_3 + I_5, I_4 + I_6 \) are in A.P.

70819164575.  \(\frac{1}{I_2 + I_4}, \frac{1}{I_3 + I_5}, \frac{1}{I_4 + I_6}\) are in G.P.

70819164576.  \(I_2 + I_4, (I_3 + I_5)^2, I_4 + I_6 \) are in G.P.
Question Number : 64 Question Id : 70819119807 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ I_n = \int_0^{\frac{\pi}{4}} \cot^n x \, dx, \quad \text{then} \quad I_n : \]

\[ \frac{1}{I_2 + I_4}, \quad \frac{1}{I_3 + I_5}, \quad \frac{1}{I_4 + I_6} \quad \text{and} \quad \frac{1}{I_2 + I_4}, \quad \frac{1}{I_3 + I_5}, \quad \frac{1}{I_4 + I_6} \quad \text{also} \]

Options : 
70819164573.

70819164574.

70819164575.

70819164576.

Question Number : 65 Question Id : 70819119808 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

A function \( f(x) \) is given by \( f(x) = \frac{5^x}{5^x + 5} \), then the sum of the series

\[ f \left( \frac{1}{20} \right) + f \left( \frac{2}{20} \right) + f \left( \frac{3}{20} \right) + \ldots \ldots + f \left( \frac{39}{20} \right) \]

is equal to:

Options : 
70819164577.

70819164578.
\[ \frac{49}{2} \]

\[ \frac{39}{2} \]

70819164579.

\[ \frac{19}{2} \]

70819164580.

Question Number : 65 Question Id : 70819119808 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ f(x) = \frac{5^x}{5^x + 1} \]

\[ f\left(\frac{1}{20}\right) + f\left(\frac{2}{20}\right) + f\left(\frac{3}{20}\right) + \ldots + f\left(\frac{39}{20}\right) \]

Options :

\[ \frac{29}{2} \]

70819164577.

\[ \frac{49}{2} \]

70819164578.

\[ \frac{39}{2} \]

70819164579.

\[ \frac{19}{2} \]

70819164580.
Let \( \alpha \) and \( \beta \) be the roots of \( x^2 - 6x - 2 = 0 \). If \( a_n = \alpha^n - \beta^n \) for \( n \geq 1 \), then the value of \( \frac{a_{10} - 2a_8}{3a_9} \) is:

Options:

70819164581. 4

70819164582. 3

70819164583. 2

70819164584. 1
The minimum value of \( f(x) = a^x + a^{1-x} \), where \( a, x \in \mathbb{R} \) and \( a > 0 \), is equal to:

Options:

- \( a + 1 \)
- \( a + \frac{1}{a} \)
- \( 2\sqrt{a} \)
- \( 2a \)
Question Number : 68  Question Id : 70819119811  Question Type : MCQ  Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4  Wrong Marks : 1

The integral \[ \int \frac{e^{3\log_e 2x} + 5e^{2\log_e 2x}}{e^{4\log_e x} + 5e^{3\log_e x} - 7e^{2\log_e x}} \, dx, \, x > 0, \] is equal to:

(where \( c \) is a constant of integration)

Options :

1. \( \log_e |x^2 + 5x - 7| + c \)
2. \( 4\log_e |x^2 + 5x - 7| + c \)
3. \( \frac{1}{4} \log_e |x^2 + 5x - 7| + c \)
4. \( \log_e \sqrt{x^2 + 5x - 7} + c \)

---

Question Number : 68  Question Id : 70819119811  Question Type : MCQ  Option Shuffling : Yes  
Is Question Mandatory : No

Correct Marks : 4  Wrong Marks : 1

The integral \[ \int \frac{e^{3\log_e 2x} + 5e^{2\log_e 2x}}{e^{4\log_e x} + 5e^{3\log_e x} - 7e^{2\log_e x}} \, dx, \, x > 0, \] is equal to:

(where \( c \) is a constant of integration)

Options :

1. \( \log_e |x^2 + 5x - 7| + c \)
\[ 4 \log_e |x^2 + 5x - 7| + c \]

\[ \frac{1}{4} \log_e |x^2 + 5x - 7| + c \]

\[ \log_e \sqrt{x^2 + 5x - 7} + c \]

**Question Number : 69 Question Id : 70819119812 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

If \( \alpha, \beta \in \mathbb{R} \) are such that \( 1 - 2i \) (here \( i^2 = -1 \)) is a root of \( z^2 + \alpha z + \beta = 0 \), then \( (\alpha - \beta) \) is equal to:

**Options :**

70819164593. \( 3 \)

70819164594. \( -3 \)

70819164595. \( 7 \)

70819164596. \( -7 \)

---

**Question Number : 69 Question Id : 70819119812 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

\( z^2 + \alpha z + \beta = 0 \) के \( 1 - 2i \) (हालांकि \( i^2 = -1 \)) जैसे केस्टेन अर्थात \( \alpha, \beta \in \mathbb{R} \) हैं, तब \( (\alpha - \beta) \) :

**Options :**

70819164593. \( 3 \)
If the curve $x^2 + 2y^2 = 2$ intersects the line $x + y = 1$ at two points $P$ and $Q$, then the angle subtended by the line segment $PQ$ at the origin is:

Options:

1. $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{4}\right)$
2. $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{4}\right)$
3. $\frac{\pi}{2} + \tan^{-1}\left(\frac{1}{3}\right)$
4. $\frac{\pi}{2} - \tan^{-1}\left(\frac{1}{3}\right)$
The shortest distance between the line \( x - y = 1 \) and the curve \( x^2 = 2y \) is:

**Options:**

\[
\frac{1}{\sqrt{2}}
\]

70819164601.

\[
\frac{1}{2\sqrt{2}}
\]

70819164602.

\[
0
\]

70819164603.
Question Number : 71 Question Id : 70819119814 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\( \frac{x}{2} - y = 1 \) and \( x^2 = 2y \) and \( \sqrt{2} \) respectively:

Options :
1. \( \frac{1}{\sqrt{2}} \)
2. \( \frac{1}{2\sqrt{2}} \)
3. 0
4. \( \frac{1}{2} \)

Question Number : 72 Question Id : 70819119815 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

A hyperbola passes through the foci of the ellipse \( \frac{x^2}{25} + \frac{y^2}{16} = 1 \) and its transverse and conjugate axes coincide with major and minor axes of the ellipse, respectively. If the product of their eccentricities is one, then the equation of the hyperbola is:

Options :
1. \( \frac{x^2}{9} - \frac{y^2}{16} = 1 \)
\[
\frac{x^2}{9} - \frac{y^2}{4} = 1
\]

70819164606.

\[
\frac{x^2}{9} - \frac{y^2}{25} = 1
\]

70819164607.

\[
x^2 - y^2 = 9
\]

70819164608.

---

Question Number : 72 Question Id : 70819119815 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options :

\[
\frac{x^2}{9} - \frac{y^2}{16} = 1
\]

70819164605.

\[
\frac{x^2}{9} - \frac{y^2}{4} = 1
\]

70819164606.

\[
\frac{x^2}{9} - \frac{y^2}{25} = 1
\]

70819164607.

\[
x^2 - y^2 = 9
\]

70819164608.
A plane passes through the points A(1, 2, 3), B(2, 3, 1) and C(2, 4, 2). If O is the origin and P is (2, −1, 1), then the projection of \( \overrightarrow{OP} \) on this plane is of length:

Options:

\[
\begin{align*}
70819164609. \\
\sqrt{3} \\
70819164610. \\
\sqrt{11} \\
70819164611. \\
\sqrt{7} \\
70819164612. \\
\sqrt{5}
\end{align*}
\]
\[ \lim_{n \to \infty} \left[ \frac{1}{n} + \frac{n}{(n+1)^2} + \frac{n}{(n+2)^2} + \ldots + \frac{n}{(2n-1)^2} \right] \] is equal to:

Options:

\[ \frac{1}{3} \]

\[ \frac{1}{4} \]
In a group of 400 people, 160 are smokers and non-vegetarian, 100 are smokers and vegetarian and the remaining 140 are non-smokers and vegetarian. Their chances of getting a particular chest disorder are 35%, 20% and 10% respectively. A person is chosen from the group at random and is found to be suffering from the chest disorder. The probability that the selected person is a smoker and non-vegetarian is:

Options:

1. \( \frac{7}{45} \)

2. \( \frac{8}{45} \)

3. \( \frac{28}{45} \)

4. \( \frac{14}{45} \)
Question Number : 75 Question Id : 70819119818 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

400 మార్కుల సమాధానం 160 మార్కులు సాధారణగా 100 మార్కులు సాధారణగా మిగిలిన సమాధానం 40; 140 మార్కులు సాధారణగా మిగిలిన సమాధానం 40 మార్కులు. 

85 మార్కులు ఘటకమైన దశాంశం మారినప్పుడు అది మారినప్పుడు 35%, 20% మార్కుల ఉంటే అది మారినప్పుడు 15%. 

ప్రతి సమాధానం 10 మార్కులు సాధారణగా ప్రతి సమాధానం 10 మార్కులు సాధారణగా ప్రతి సమాధానం 10 మార్కులు. 

ప్రతి సమాధానం 70819164617. మార్కులు సాధారణగా ప్రతి సమాధానం 70819164617. మార్కులు సాధారణగా ప్రతి సమాధానం 70819164617. మార్కులు సాధారణగా ప్రతి సమాధానం 70819164617. మార్కులు సాధారణగా ప్రతి సమాధానం 70819164617. మార్కులు సాధారణగా ప్రతి సమాధానం 70819164617. మార్కులు సాధారణగా 

70819164618.

70819164619.

70819164620.

Question Number : 76 Question Id : 70819119819 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Let A be a set of all 4-digit natural numbers whose exactly one digit is 7. Then the probability that a randomly chosen element of A leaves remainder 2 when divided by 5 is:

Options :

1
5
70819164621.

2
9
70819164622.
Question Number : 76
Question Id : 70819119819
Question Type : MCQ
Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4
Wrong Marks : 1
Options :

- 70819164621.
- 70819164622.
- 70819164623.
- 70819164624.

Question Number : 77
Question Id : 70819119820
Question Type : MCQ
Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4
Wrong Marks : 1
Options :

- \( \frac{1}{5} \)
- \( \frac{2}{9} \)
- \( \frac{97}{297} \)
- \( \frac{122}{297} \)
Question Number : 77  Question Id : 70819119820  Question Type : MCQ  Option Shuffling : Yes  
Is Question Mandatory : No  
Correct Marks : 4  Wrong Marks : 1  

\[0 < x, y < \pi \text{ and } \cos x + \cos y = \frac{3}{2}, \text{ find } \sin x + \cos y = :\]

Options :

\[\frac{1}{2}\]

\[\frac{\sqrt{3}}{2}\]

\[\frac{1 - \sqrt{3}}{2}\]

\[\frac{1 + \sqrt{3}}{2}\]
Let \( x \) denote the total number of one-one functions from a set \( A \) with 3 elements to a set \( B \) with 5 elements and \( y \) denote the total number of one-one functions from the set \( A \times B \). Then:

**Options:**

1. \( 2y = 91x \)
2. \( 2y = 273x \)
3. \( y = 91x \)
4. \( y = 273x \)

**Question Number : 78 Question Id : 70819119821 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

**Question Number : 78 Question Id : 70819119821 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**

**Options :**

1. \( 2y = 91x \)
2. \( 2y = 273x \)
3. \( y = 91x \)
4. \( y = 273x \)
Question Number : 79  Question Id : 70819119822  Question Type : MCQ  Option Shuffling : Yes  
Is Question Mandatory : No  
Correct Marks : 4  Wrong Marks : 1  

\[ \csc \left[ 2 \cot^{-1}(5) + \cos^{-1}\left(\frac{4}{5}\right) \right] \] is equal to :  

Options :  

\[ \frac{56}{33} \]  
70819164633.  

\[ \frac{65}{33} \]  
70819164634.  

\[ \frac{65}{36} \]  
70819164635.  

\[ \frac{75}{36} \]  
70819164636.
Question Number : 80 Question Id : 70819119823 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
The contrapositive of the statement “If you will work, you will earn money” is :

Options :
70819164637. To earn money, you need to work

70819164638. You will earn money, if you will not work

70819164639. If you will not earn money, you will not work

70819164640. If you will earn money, you will work

Question Number : 80 Question Id : 70819119823 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
“ఇద్దరు కార్యాలయం, ఇద్దరు మానవ సంస్థలు” అనే సంచాలన సమయంలో నిమిద్దం :

Options :
70819164637. మానవ సంస్థలు కార్యాలయం నిమిద్దం దిద్దాం

70819164638. విశిష్టమైనది, విశిష్టమైనది.
A function \( f \) is defined on \([-3, 3]\) as

\[
    f(x) = \begin{cases} \min(|x|, 2 - x^2), & -2 \leq x \leq 2 \\ |x|, & 2 < |x| \leq 3 \end{cases}
\]

where \([x]\) denotes the greatest integer \( \leq x \). The number of points, where \( f \) is not differentiable in \((-3, 3)\) is \underline{3}.
Question Number : 81 Question Id : 70819119824 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

\[ f(x) = \begin{cases} \lfloor x \rfloor, & 2 - x^2, -2 \leq x \leq 2 \\ |x|, & 2 < |x| \leq 3 \end{cases} \]

\( f \) is continuous in \((-3, 3)\). Show that \( f \) is not differentiable at \( x = 0 \). Hence \( (-3, 3) \notin f \) and \( f \) is not a function. What is the value of \( f(0) \)?

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001

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Question Number : 82 Question Id : 70819119825 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

If the curve, \( y = y(x) \) represented by the solution of the differential equation \((2xy^2 - y)dx + xdy = 0\), passes through the intersection of the lines, \(2x - 3y = 1\) and \(3x + 2y = 8\), then \(|y(1)|\) is equal to ________.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

5 to 5.001
Question Number : 82 Question Id : 70819119825 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
\[(2xy^2 - y)dx + xdy = 0\] is a differential equation. Given \[y = y(x)\] and \[2x - 3y = 1\].
\[3x + 2y = 8\] is another differential equation.
\[|y(1)| = \text{________}.
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 83 Question Id : 70819119826 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
The total number of two digit numbers \(n\), such that \(3^n + 7^n\) is a multiple of 10, is \(\text{________}.
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 83 Question Id : 70819119826 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
\[3^n + 7^n\] is a multiple of 10 for some \(n\). Determine the integer \(n\) such that \[3^n + 7^n\] is a multiple of 10.
\[\text{________}.

If \( \lim_{x \to 0} \frac{ax - (e^{4x} - 1)}{ax(e^{4x} - 1)} \) exists and is equal to \( b \), then the value of \( a - 2b \) is ________.
If the curves $x = y^4$ and $xy = k$ cut at right angles, then $(4k)^6$ is equal to ________.

Response Type: Numeric

Evaluation Required For SA: Yes

Show Word Count: Yes

Answers Type: Range

Text Areas: PlainText

Possible Answers: 
5 to 5.001

---

The value of \[ \int_{-2}^{2} |3x^2 - 3x - 6| \, dx \] is ________.

Response Type: Numeric
Question Number : 86 Question Id : 70819119829 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
\[ \int_{-2}^{2} |3x^2 - 3x - 6| \, dx \] \[ \text{possible answers: } \] 
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 87 Question Id : 70819119830 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
If the remainder when \( x \) is divided by 4 is 3, then the remainder when \((2020 + x)^{2022}\) is divided by 8 is \[ \text{possible answers: } \] 
Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001
Question Number : 87 Question Id : 70819119830 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
\[ x \text{ का 4 वीं घरेलू प्रति रूप शुद्ध सूत्र 3 है, } (2020 + x)^{2022} \text{ का 8 वीं घरेलू प्रति रूप शुद्ध छोटा रूप } \] ________ .

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 88 Question Id : 70819119831 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
A line ‘l’ passing through origin is perpendicular to the lines
\[ \vec{r}_1 = (3 + t)\hat{i} + (-1 + 2t)\hat{j} + (4 + 2t)\hat{k} \]
\[ \vec{r}_2 = (3 + 2s)\hat{i} + (3 + 2s)\hat{j} + (2 + s)\hat{k} \]
If the co-ordinates of the point in the first octant on ‘l’ at a distance of \( \sqrt{17} \) from the point of intersection of ‘l’ and ‘l’ are (a, b, c), then 18(a + b + c) is equal to ________ .

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001

Question Number : 88 Question Id : 70819119831 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
Given the vectors \( \vec{r} \):
\[
\vec{r}_1 = (3 + t) \hat{i} + (-1 + 2t) \hat{j} + (4 + 2t) \hat{k}
\]
\[
\vec{r}_2 = (3 + 2s) \hat{i} + (3 + 2s) \hat{j} + (2 + s) \hat{k}
\]

The vectors \( \vec{r}_1 \) and \( \vec{r}_2 \) are collinear. Thus, \( \vec{r}_2 = \lambda \vec{r}_1 \) for some scalar \( \lambda \). This implies \( \sqrt{17} \) is the magnitude of \( \vec{r}_1 \) or \( \vec{r}_2 \). If \( (a, b, c) \) is such that \( 18(a+b+c) = \) _____.

**Question Number:** 89  **Question Id:** 70819119832  **Question Type:** SA

**Correct Marks:** 4  **Wrong Marks:** 0

A line is a common tangent to the circle \((x - 3)^2 + y^2 = 9\) and the parabola \(y^2 = 4x\). If the two points of contact \((a, b)\) and \((c, d)\) are distinct and lie in the first quadrant, then \(2(a+c) = \) _____.

**Question Number:** 89  **Question Id:** 70819119832  **Question Type:** SA

**Correct Marks:** 4  **Wrong Marks:** 0

Two circles \((x-3)^2 + y^2 = 9\) and \(y^2 = 4x\) touch each other. If the centres \((a,b)\) and \((c,d)\) are such that \(a+c = \) _____.

**Question Number:** 89  **Question Id:** 70819119832  **Question Type:** SA

**Correct Marks:** 4  **Wrong Marks:** 0
Let \( \mathbf{a} = \mathbf{i} + \alpha \mathbf{j} + 3 \mathbf{k} \) and \( \mathbf{b} = 3 \mathbf{i} - \alpha \mathbf{j} + \mathbf{k} \). If the area of the parallelogram whose adjacent sides are represented by the vectors \( \mathbf{a} \) and \( \mathbf{b} \) is \( 8\sqrt{3} \) square units, then \( \mathbf{a} \cdot \mathbf{b} \) is equal to \underline{______}.

Question Number : 90 Question Id : 70819119833 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Range
Text Areas : PlainText
Possible Answers :
5 to 5.001
Text Areas: PlainText

Possible Answers:

5 to 5.001