Question Number : 1 Question Id : 70819122084 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

A radioactive sample is undergoing $\alpha$ decay. At any time $t_1$, its activity is $A$ and another time $t_2$, the activity is $\frac{A}{5}$. What is the average life time for the sample?

Options:

\[ \frac{\ln 5}{t_2 - t_1} \]
70819171401.

\[ \frac{\ln(t_2 + t_1)}{2} \]
70819171402.

\[ \frac{t_2 - t_1}{\ln 5} \]
70819171403.

\[ \frac{t_1 - t_2}{\ln 5} \]
70819171404.
Question Number : 2 Question Id : 70819122085 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Given below are two statements: one is labeled as Assertion A and the other is labeled as Reason R.

Assertion A: For a simple microscope, the angular size of the object equals the angular size of the image.

Reason R: Magnification is achieved as the small object can be kept much closer to the eye than 25 cm and hence it subtends a large angle.

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

Options:

Both A and R are true and R is the correct explanation of A

Both A and R are true but R is NOT the correct explanation of A

A is true but R is false
A is false but R is true

Question Number : 2 Question Id : 70819122085 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:
70819171405. A తొరగిన రెండు ఆధిపత్తుల మధ్య కారణం. రెండు రెండు ఆధిపత్తుల మధ్య దాని కారణం.

70819171406. A తొరగిన రెండు ఆధిపత్తుల మధ్య, R మధ్య అంది కారణం.

70819171407. A రాహిలే, రెండు రెండు ఆధిపత్తుల మధ్య

70819171408. A రాహిలే, రెండు రెండు ఆధిపత్తుల మధ్య

Question Number : 3 Question Id : 70819122086 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:
70819171409. $335 \text{ Hz}$
70819171410. 338 Hz
70819171411. 345 Hz
70819171412. 342 Hz

Question Number : 3 Question Id : 70819122086 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
340 Hz తో కొనికి పోటుతున్న పాడతిస్తుంది ఆ దిశకత్వం శుంకు 5 మిసుకుతున్నది / ఇది విడమిచ్చు. A లో ఉండి ప్రత్యేక పరామరశించు చేయండం కనుక 2 మి సినియా. అందువలన A ప్రత్యేక పరామరశించు చేయండం అనేది కారణం కుదా? 
Options :
70819171409. 335 Hz
70819171410. 338 Hz
70819171411. 345 Hz
70819171412. 342 Hz

Question Number : 4 Question Id : 70819122087 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Draw the output signal $Y$ in the given combination of gates.

**Options:**

1. 70819171413.
2. 70819171414.
3. 70819171415.
4. 70819171416.

**Question Number : 4 Question Id : 70819122087 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1**
Question Number : 5 Question Id : 70819122088 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Given below are two statements:

Statement I : A second’s pendulum has a time period of 1 second.
Statement II : It takes precisely one second to move between the two extreme positions.

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

Options:

- Both Statement I and Statement II are true
  70819171417.

- Both Statement I and Statement II are false
  70819171418.

- Statement I is true but Statement II is false
  70819171419.

- Statement I is false but Statement II is true
  70819171420.

---

Question Number : 5 Question Id : 70819122088 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Options:

- Both Statement I and Statement II are true
  70819171417.

- Both Statement I and Statement II are false
  70819171418.

- Statement I is true but Statement II is false
  70819171419.

- Statement I is false but Statement II is true
  70819171420.
If ‘C’ and ‘V’ represent capacity and voltage respectively then what are the dimensions of λ where C/V = λ?

Options:

70819171421. \([M^{-2} L^{-3} I^2 T^6]\)

70819171422. \([M^{-3} L^{-4} I^3 T^7]\)

70819171423. \([M^{-2} L^{-4} I^3 T^7]\)

70819171424. \([M^{-1} L^{-3} I^{-2} T^{-7}]\)

The question is in both English and Telugu. The English part is the same as above. The Telugu part is the same as above but written in Telugu script.
An aeroplane, with its wings spread 10 m, is flying at a speed of 180 km/h in a horizontal direction. The total intensity of earth's field at that part is $2.5 \times 10^{-4}$ Wb/m² and the angle of dip is 60°. The emf induced between the tips of the plane wings will be ___________.

Options:

70819171425. 108.25 mV

70819171426. 62.50 mV

70819171427. 88.37 mV

70819171428. 54.125 mV
A cord is wound round the circumference of wheel of radius \( r \). The axis of the wheel is horizontal and the moment of inertia about it is \( I \). A weight \( mg \) is attached to the cord at the end. The weight falls from rest. After falling through a distance \( 'h' \), the square of angular velocity of wheel will be:

Options:

1. \( \frac{2gh}{1 + mr^2} \)
2. \( \frac{2gh}{1 + 2mr^2} \)
3. \( \frac{2mgh}{1 + m^2r^2} \)
The trajectory of a projectile in a vertical plane is \( y = \alpha x - \beta x^2 \), where \( \alpha \) and \( \beta \) are constants and \( x \) & \( y \) are respectively the horizontal and vertical distances of the projectile from the point of projection. The angle of projection \( \theta \) and the maximum height attained \( H \) are respectively given by:

\[
\tan^{-1} \beta, \quad \frac{\alpha^2}{2\beta}
\]

\[
\tan^{-1} \left( \frac{\beta}{\alpha} \right), \quad \frac{\alpha^2}{\beta}
\]

\[
\tan^{-1} \alpha, \quad \frac{\alpha^2}{4\beta}
\]

\[
\tan^{-1} \alpha, \quad \frac{4\alpha^2}{\beta}
\]
Two masses $A$ and $B$, each of mass $M$ are fixed together by a massless spring. A force acts on the mass $B$ as shown in figure. If the mass $A$ starts moving away from mass $B$ with acceleration $'a'$, then the acceleration of mass $B$ will be:

\[ F + Ma \]

Options:

\[ \frac{MF}{F + Ma} \]

\[ \frac{F + Ma}{M} \]
Question Number : 10 Question Id : 70819122093 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[
\frac{\dot{M}a - F}{M}
\]

\[
\frac{\dot{F} - Ma}{M}
\]

Question Number : 11 Question Id : 70819122094 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Given below are two statements:

Statement I: An electric dipole is placed at the centre of a hollow sphere. The flux of electric field through the sphere is zero but the electric field is not zero anywhere in the sphere.

Statement II: If R is the radius of a solid metallic sphere and Q be the total charge on it. The electric field at any point on the spherical surface of radius r (< R) is zero but the electric flux passing through this closed spherical surface of radius r is not zero.

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

Options:

70819171441. Both Statement I and Statement II are true

70819171442. Both Statement I and Statement II are false

70819171443. Statement I is true but Statement II is false

70819171444. Statement I is false but Statement II is true
A scooter accelerates from rest for time $t_1$ at constant rate $a_1$ and then retards at constant rate $a_2$ for time $t_2$ and comes to rest. The correct value of $\frac{t_1}{t_2}$ will be:

Options:

\[
\frac{a_1}{a_2}
\]

\[
\frac{a_2}{a_1}
\]

\[
\frac{a_1 + a_2}{a_1}
\]

\[
\frac{a_1 + a_2}{a_2}
\]
The internal energy (U), pressure (P) and volume (V) of an ideal gas are related as \( U = 3PV + 4 \).

The gas is:

**Options:**

- 70819171449. monoatomic only.
- 70819171450. diatomic only.
- 70819171451. polyatomic only.
- 70819171452. either monoatomic or diatomic.
Question Number : 13 Question Id : 70819122096 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The chemical potential of a gas is given by the equation \( U = nRT + PV \), where \( n \) is the number of moles, \( R \) is the ideal gas constant, \( T \) is the temperature, \( P \) is the pressure, and \( V \) is the volume. Which of the following options correctly expresses the chemical potential given the equation above?

Options:

70819171449. \( U = nRT + PV \)

70819171450. \( U = nRT + PV \)

70819171451. \( U = nRT + PV \)

70819171452. \( U = nRT + PV \)

Question Number : 14 Question Id : 70819122097 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The recoil speed of a hydrogen atom after it emits a photon in going from \( n = 5 \) state to \( n = 1 \) state will be:

Options:

70819171453. \( 4.34 \text{ m/s} \)

70819171454. \( 4.17 \text{ m/s} \)

70819171455. \( 3.25 \text{ m/s} \)

70819171456. \( 2.19 \text{ m/s} \)
Question Number : 14 Question Id : 70819122097 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

\[ n = 5 \text{ పైసా లేదా } n = 1 \text{ పైసా వంటి మొత్తం సమాధానం } \text{ పునర్ పరిధి రెండు సమాధానం కూడా కనిపిస్తుంది. } \]

\[ \text{ పునర్ పరిధి నం } \] m/s.

Options :

70819171453. 4.34 m/s

70819171454. 4.17 m/s

70819171455. 3.25 m/s

70819171456. 2.19 m/s

Question Number : 15 Question Id : 70819122098 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

The length of metallic wire is \( l_1 \) when tension in it is \( T_1 \). It is \( l_2 \) when the tension is \( T_2 \). The original length of the wire will be :

Options :

\[ \frac{l_1 + l_2}{2} \]

70819171457.

\[ \frac{T_2 l_1 + T_1 l_2}{T_1 + T_2} \]

70819171458.

\[ \frac{T_1 l_1 - T_2 l_2}{T_2 - T_1} \]

70819171459.
\[
\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}
\]

70819171460.

Question Number : 15 Question Id : 70819122098 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options :

\[
\frac{l_1 + l_2}{2}
\]

70819171457.

\[
\frac{T_2 l_1 + T_1 l_2}{T_1 + T_2}
\]

70819171458.

\[
\frac{T_1 l_1 - T_2 l_2}{T_2 - T_1}
\]

70819171459.

\[
\frac{T_2 l_1 - T_1 l_2}{T_2 - T_1}
\]

70819171460.

Question Number : 16 Question Id : 70819122099 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

A particle executes S.H.M., the graph of velocity as a function of displacement is:

Options :

a circle.
70819171462. a parabola.

70819171463. an ellipse.

70819171464. a helix.

Question Number : 16 Question Id : 70819122099 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options :
70819171461.
70819171462.
70819171463.
70819171464.

Question Number : 17 Question Id : 70819122100 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The incident ray, reflected ray and the outward drawn normal are denoted by the unit vectors \( \vec{a} \), \( \vec{b} \) and \( \vec{c} \) respectively. Then choose the correct relation for these vectors.

Options :
\[ \vec{b} = \vec{a} - \vec{c} \]
\[ \vec{b} = \vec{a} - 2 \left( \vec{a} \cdot \vec{c} \right) \vec{c} \]

70819171466.

\[ \vec{b} = \vec{a} + 2 \vec{c} \]

70819171467.

\[ \vec{b} = 2 \vec{a} + \vec{c} \]

70819171468.

Question Number : 17 Question Id : 70819122100 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options :

\[ \vec{b} = \vec{a} - \vec{c} \]

70819171465.

\[ \vec{b} = \vec{a} - 2 \left( \vec{a} \cdot \vec{c} \right) \vec{c} \]

70819171466.

\[ \vec{b} = \vec{a} + 2 \vec{c} \]

70819171467.

\[ \vec{b} = 2 \vec{a} + \vec{c} \]

70819171468.

Question Number : 18 Question Id : 70819122101 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Find the peak current and resonant frequency of the following circuit (as shown in figure).

V = 30 sin 100t

Options:

70819171469. 2 A and 50 Hz
70819171470. 0.2 A and 50 Hz
70819171471. 2 A and 100 Hz
70819171472. 0.2 A and 100 Hz
Question Number : 19  Question Id : 70819122102  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No  
Correct Marks : 4  Wrong Marks : 1  

An inclined plane making an angle of 30° with the horizontal is placed in a uniform horizontal electric field $E = 200 \text{ N/C}$ as shown in the figure. A body of mass 1 kg and charge 5 mC is allowed to slide down from rest at a height of 1 m. If the coefficient of friction is 0.2, find the time taken by the body to reach the bottom.

\[ g = 9.8 \text{ m/s}^2; \sin 30^\circ = \frac{1}{2}; \cos 30^\circ = \frac{\sqrt{3}}{2} \]

\[ E = 200 \text{ N/C} \]

\[ 1 \text{ kg}, 5 \text{ mC} \]

\[ 1 \text{ m} \]

\[ 30^\circ \]

Options:

70819171473. 2.3 s

70819171474. 1.3 s

70819171475. 0.92 s

70819171476. 0.46 s
Question Number : 19 Question Id : 70819122102 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ g = 9.8 \text{ m/s}^2, \sin 30° = \frac{1}{2}, \cos 30° = \frac{\sqrt{3}}{2} \]

A wire of 1 Ω has a length of 1 m. It is stretched till its length increases by 25%. The percentage change in resistance to the nearest integer is:

Options :
70819171477.
Physics Section B

Section Id: 7081911013
Section Number: 2
Section type: Online
Mandatory or Optional: Mandatory
Number of Questions: 10
Number of Questions to be attempted: 5
The zener diode has a $V_z = 30 \text{ V}$. The current passing through the diode for the following circuit is _______ mA.

$$\begin{align*}
\text{Resistance 1: } & 4 \text{ k} \\
\text{Voltage: } & 90 \text{ V} \\
\text{Resistor 2: } & 5 \text{ k} \\
\text{Diode: } & \\
\end{align*}$$

**Response Type:** Numeric

**Evaluation Required For SA:** Yes

**Show Word Count:** Yes

**Answers Type:** Range

**Possible Answers:**
5 to 5.001
Time period of a simple pendulum is $T$. The time taken to complete $\frac{5}{8}$ oscillations starting from mean position is $\frac{\alpha}{\beta}T$. The value of $\alpha$ is _________.

Question Number : 22 Question Id : 70819122105 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 : 22 Question Id : 70819122105 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

$\frac{5}{8}$ కి సంబంధించిన విధానం లో $T$. సమాధానం కోసం $\frac{5}{8}$ ఫిస్టాసియాలను కావడం లో $\frac{\alpha}{\beta}T$. కంపెంటి $\alpha$ మీరు ఉంటే _________.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
The volume $V$ of a given mass of monoatomic gas changes with temperature $T$ according to the relation $V = kT^\frac{2}{3}$. The work done when temperature changes by 90 K will be $xR$. The value of $x$ is ________.

$[R =$ universal gas constant$]$

Question Number : 23 Question Id : 70819122106 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
Two stream of photons, possessing energies equal to twice and ten times the work function of metal are incident on the metal surface successively. The value of ratio of maximum velocities of the photoelectrons emitted in the two respective cases is $x : y$. The value of $x$ is ______.

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 the highest frequency modulating a carrier is 5 kHz, then the number of AM broadcast stations accommodated in a 90 kHz bandwidth are ________.

**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 the highest frequency modulating a carrier is మైసూరువు గిరిజరి, తీసుకునక దృష్టి మంచు 5 kHz తొలగించింది, 90 kHz వరుస మంచు ప్రాంపత్రిక దృష్టి మంచు కావాలి కారణం కావాలి ________.

**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 the highest frequency modulating a carrier is మైసూరువు గిరిజరి, తీసుకునక దృష్టి మంచు 5 kHz తొలగించింది, 90 kHz వరుస మంచు ప్రాంపత్రిక దృష్టి మంచు కావాలి ________.

**Response Type**: Numeric

**Evaluation Required For SA**: Yes

**Show Word Count**: Yes

**Answers Type**: Range

**Text Areas**: PlainText

**Possible Answers**: 
5 to 5.001
In the reported figure of earth, the value of acceleration due to gravity is same at point A and C but it is smaller than that of its value at point B (surface of the earth). The value of OA : AB will be \( x : y \). The value of \( x \) is \(__\).

**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**: 70819122109  **Question Type**: SA

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

In the reported figure of earth, the value of acceleration due to gravity is same at point A and C but it is smaller than that of its value at point B (surface of the earth). The value of OA : AB will be \( x : y \). The value of \( x \) is \(__\).

**Response Type**: Numeric
0.1 mole of rigid diatomic gas performs a work of \( \frac{Q}{5} \) when heat \( Q \) is supplied to it. The molar heat capacity of the gas during this transformation is \( \frac{xR}{8} \). The value of \( x \) is ________.

\[ R = \text{universal gas constant} \]

**Response Type**: Numeric

**Evaluation Required For SA**: Yes

**Show Word Count**: Yes

**Answers Type**: Range

**Text Areas**: PlainText

**Possible Answers**: 
5 to 5.001

---

1 mole of rigid diatomic gas performs a work of \( \frac{Q}{5} \) when heat \( Q \) is supplied to it. The molar heat capacity of the gas during this transformation is \( \frac{xR}{8} \). The value of \( x \) is ________.

\[ R = \text{universal gas constant} \]

**Response Type**: Numeric

**Evaluation Required For SA**: Yes

**Show Word Count**: Yes

**Answers Type**: Range

**Text Areas**: PlainText

**Possible Answers**: 
5 to 5.001

---

ఒకుని పరిస్థితిలో 1 మొల్ రిజిడ్ డాయమికి గాసు ప్రదానం చేస్తే \( \frac{Q}{5} \) రోజ్ హేట్ \( Q \) సంభాషణ చేయబడింది. మొల్ హేట్ కపాసిటీ ఇది ఉద్యోగానికి అంటే \( \frac{xR}{8} \). \( x \) మొత్తం ________

\[ R = \text{ప్రమాదం గాస్ సంఖ్య} \]

**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 point source of light $S$, placed at a distance 60 cm in front of the centre of a plane mirror of width 50 cm, hangs vertically on a wall. A man walks in front of the mirror along a line parallel to the mirror at a distance 1.2 m from it (see in the figure). The distance between the extreme points where he can see the image of the light source in the mirror is ________ cm.
A particle executes S.H.M. with amplitude ‘a’ and time period ‘T’. The displacement of the particle when its speed is half of maximum speed is \( \frac{\sqrt{\frac{a}{2}}}{2} \). The value of \( x \) is \( \frac{\sqrt{\frac{a}{2}}}{2} \).
Question Number : 30 Question Id : 70819122113 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

27 similar drops of mercury are maintained at 10 V each. All these spherical drops combine into a single big drop. The potential energy of the bigger drop is __________ times that of a smaller drop.

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

**Section Id :** 7081911014  
**Section Number :** 3  
**Section type :** Online  
**Mandatory or Optional :** Mandatory  
**Number of Questions :** 20  
**Number of Questions to be attempted :** 20  
**Section Marks :** 80  
**Mark As Answered Required? :** Yes  
**Sub-Section Number :** 1  
**Sub-Section Id :** 7081911294  
**Question Shuffling Allowed :** Yes

**Question Number :** 31  
**Question Id :** 70819122114  
**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>(Molecule)</td>
<td>(Bond order)</td>
</tr>
<tr>
<td>(a) Ne₂</td>
<td>(i) 1</td>
</tr>
<tr>
<td>(b) N₂</td>
<td>(ii) 2</td>
</tr>
<tr>
<td>(c) F₂</td>
<td>(iii) 0</td>
</tr>
<tr>
<td>(d) O₂</td>
<td>(iv) 3</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:
Options:
70819171491. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)
70819171492. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)
70819171493. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)
70819171494. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 31 Question Id : 70819122114 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

<table>
<thead>
<tr>
<th>ಭವಿಷ್ಯ-I</th>
<th>ಭವಿಷ್ಯ-II</th>
<th>ಮರ್ಚಿಸಬೇಡು :</th>
</tr>
</thead>
<tbody>
<tr>
<td>ಭವಿಷ್ಯ-I</td>
<td>ಭವಿಷ್ಯ-II</td>
<td>(ಮೂಲಸಂಖ್ಯೆ)</td>
</tr>
<tr>
<td>(a) Ne₂</td>
<td>(i) 1</td>
<td></td>
</tr>
<tr>
<td>(b) N₂</td>
<td>(ii) 2</td>
<td></td>
</tr>
<tr>
<td>(c) F₂</td>
<td>(iii) 0</td>
<td></td>
</tr>
<tr>
<td>(d) O₂</td>
<td>(iv) 3</td>
<td></td>
</tr>
</tbody>
</table>

Options:
70819171491. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)
70819171492. (a) → (iv), (b) → (iii), (c) → (ii), (d) → (i)
70819171493. (a) → (ii), (b) → (i), (c) → (iv), (d) → (iii)
70819171494. (a) → (iii), (b) → (iv), (c) → (i), (d) → (ii)

Question Number : 32 Question Id : 70819122115 Question Type : MCQ Option Shuffling : Yes
The nature of charge on resulting colloidal particles when FeCl\(_3\) is added to excess of hot water is:

**Options:**

70819171495. positive

70819171496. negative

70819171497. neutral

70819171498. sometimes positive and sometimes negative

---

**Question Number : 32 Question Id : 70819122115 Question Type : MCQ Option Shuffling : Yes**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

**Question :**

क्या तौल नियम फीस्लोर है एक तौल तापमान केवल एक ही तरल में रहता है?

**Options**:

70819171495. आयतन

70819171496. उपरीयता

70819171497. झामरा

70819171498. कोई नहीं

---

**Question Number : 33 Question Id : 70819122116 Question Type : MCQ Option Shuffling : Yes**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

**Question :**

क्या जलक्षेत्र एक तौल तापमान में रहता है?

**Options**: नहीं
The correct order of electron gain enthalpy is:

Options:
70819171499. O > S > Se > Te
70819171500. Te > Se > S > O
70819171501. S > O > Se > Te
70819171502. S > Se > Te > O

Question Number : 33 Question Id : 70819122116 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Question Number : 34 Question Id : 70819122117 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) Siderite</td>
<td>(i) Cu</td>
</tr>
<tr>
<td>(b) Calamine</td>
<td>(ii) Ca</td>
</tr>
<tr>
<td>(c) Malachite</td>
<td>(iii) Fe</td>
</tr>
<tr>
<td>(d) Cryolite</td>
<td>(iv) Al</td>
</tr>
<tr>
<td></td>
<td>(v) Zn</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

Options:

70819171503.  
(a) → (i), (b) → (ii), (c) → (v), (d) → (iii)

70819171504.  
(a) → (iii), (b) → (v), (c) → (i), (d) → (iv)

70819171505.  
(a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819171506.  
(a) → (iii), (b) → (i), (c) → (v), (d) → (ii)
70819171505. (a) → (i), (b) → (ii), (c) → (iii), (d) → (iv)

70819171506. (a) → (iii), (b) → (i), (c) → (v), (d) → (ii)

Question Number: 35 Question Id: 70819122118 Question Type: MCQ Option Shuffling: Yes
Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1
Which of the following forms of hydrogen emits low energy $\beta^-$ particles?
Options:
70819171507. Proton $H^+$
70819171508. Protium $^1_1H$
70819171509. Deuterium $^2_1H$
70819171510. Tritium $^3_1H$

Question Number: 35 Question Id: 70819122118 Question Type: MCQ Option Shuffling: Yes
Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1
యూడు అర్థం అయితే ప్రమాణం కండా ఒకటి బాస్పెషన్ $\beta^-$ ప్రాంతం చేసినా ప్రమాణం?
Options:
70819171507. ప్రొటన్ $H^+$
70819171508. ప్రోతియం $^1_1H$
70819171509. డ్యూటరియం $^2_1H$
70819171510. ట్రిటియం $^3_1H$
Question Number : 36 Question Id : 70819122119 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>Sodium Carbonate</td>
<td>(i) Deacon</td>
</tr>
<tr>
<td>Titanium</td>
<td>(ii) Castner-Kellner</td>
</tr>
<tr>
<td>Chlorine</td>
<td>(iii) van-Arkel</td>
</tr>
<tr>
<td>Sodium hydroxide</td>
<td>(iv) Solvay</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below:

Options:

70819171511. (a) → (iv), (b) → (iii), (c) → (i), (d) → (ii)

70819171512. (a) → (iv), (b) → (i), (c) → (ii), (d) → (iii)

70819171513. (a) → (i), (b) → (iii), (c) → (iv), (d) → (ii)

70819171514. (a) → (iii), (b) → (ii), (c) → (i), (d) → (iv)
Which pair of oxides is acidic in nature?

Options:

70819171515. $\mathrm{B_2O_3, SiO_2}$

70819171516. $\mathrm{B_2O_3, CaO}$

70819171517. $\mathrm{N_2O, BaO}$

70819171518. $\mathrm{CaO, SiO_2}$
Question Number : 37 Question Id : 70819122120 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Options :
70819171515. $B_2O_3$, $SiO_2$
70819171516. $B_2O_3$, $CaO$
70819171517. $N_2O$, $BaO$
70819171518. $CaO$, $SiO_2$

Question Number : 38 Question Id : 70819122121 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.
Assertion A : In $TlI_3$, isomorphous to $CsI_3$, the metal is present in $+1$ oxidation state.
Reason R : $Tl$ metal has fourteen $f$ electrons in its electronic configuration.
In the light of the above statements, choose the most appropriate answer from the options given below :
Options :
70819171519. Both A and R are correct and R is the correct explanation of A
70819171520. Both A and R are correct but R is NOT the correct explanation of A
70819171521. A is correct but R is not correct
70819171522. A is not correct but R is correct
Question Number : 38 Question Id : 70819122121 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Is \( \text{Cl}_2 \) more stable than \( \text{Br}_2 \)? All of the following steps A are correct.

Options:
1. A \( \text{Cl}_2 \) reacts with \( \text{Br}_2 \) to give \( \text{BrCl}_3 \)
2. A \( \text{Cl}_2 \) reacts with \( \text{Br}_2 \) to give \( \text{ClBr}_3 \)
3. A \( \text{Cl}_2 \) reacts with \( \text{Br}_2 \) to give \( \text{ClBr}_2 \)
4. A \( \text{Cl}_2 \) reacts with \( \text{Br}_2 \) to give \( \text{Cl}_2 \text{Br}_2 \)

Question Number : 39 Question Id : 70819122122 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Calgon is used for water treatment. Which of the following statement is NOT true about Calgon?

Options:
1. Calgon contains the 2nd most abundant element by weight in the Earth’s crust.
2. It is polymeric compound and is water soluble.
3. It is also known as Graham’s salt.
4. It does not remove \( \text{Ca}^{2+} \) ion by precipitation.
Question Number : 39 Question Id : 70819122122 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:

70819171523.  

70819171524.  

70819171525.  

70819171526.  

Question Number : 40 Question Id : 70819122123 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:

70819171527. alcohol, amine  

70819171528. amine, alcohol  

70819171529. alcohol, phenol  

70819171530. amine, phenol
Question Number: 40 Question Id: 70819122123 Question Type: MCQ Option Shuffling: Yes
Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1

Options:

70819171527.  

70819171528.  

70819171529.  

70819171530.  

Question Number: 41 Question Id: 70819122124 Question Type: MCQ Option Shuffling: Yes
Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1

Options:

70819171531.  

70819171532.  

70819171533.  

70819171534.  

In $\text{CH}_2=\text{C}=(\text{CH}_3)^2$ molecule, the hybridization of carbon 1, 2, 3 and 4 respectively, are:

Options:

$sp^2, sp^2, sp^2, sp^3$

$sp^3, sp, sp^3, sp^3$

$sp^2, sp, sp^2, sp^3$

$sp^2, sp^3, sp^2, sp^3$
Question Number : 41 Question Id : 70819122124 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ \text{1. } \text{CH}_2 = \text{C} = \text{C} \text{H} - \text{CH}_3 \text{  } \overset{\text{deg}}{\text{1, 2, 3}} \text{ 4  } \text{रेखीय वेयरियटी लीकेज़}" \\

Options :
70819171531. \( sp^2, sp^2, sp^2, sp^3 \)
70819171532. \( sp^3, sp, sp^3, sp^3 \)
70819171533. \( sp^2, sp, sp^2, sp^3 \)
70819171534. \( sp^2, sp^3, sp^2, sp^3 \)

Question Number : 42 Question Id : 70819122125 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ \begin{array}{c}
\text{CH}_2CH_3 \\
\text{CH}_3CH_2CH_2CH_2CH_2CH_3 \\
\overset{1)}{\text{Zn/HCl}} \\
\overset{2)}{\text{Cr}_2\text{O}_3, 773 \text{ K} \text{ 10}^{-20} \text{ atm}}
\end{array} \]

Considering the above reaction, the major product among the following is :

Options :
70819171535.
70819171536.
Question Number : 42 Question Id : 70819122125 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[
\text{\begin{align*}
\text{CH}_2\text{CH}_2\text{CH}_3 & \\
& \xrightarrow{1) \text{Zn/HCl}} \\
& \quad \xrightarrow{2) \text{Cr}_2\text{O}_3, 773 \text{ K}} \\
& \quad \text{10 - 20 atm}
\end{align*}}
\]

Options :

\[
\text{\begin{align*}
\text{CH}_2\text{CH}_3 & \\
& \xrightarrow{1) \text{Zn/HCl}} \\
& \quad \xrightarrow{2) \text{Cr}_2\text{O}_3, 773 \text{ K}} \\
& \quad \text{10 - 20 atm}
\end{align*}}
\]

70819171535.

70819171536.

70819171537.
Identify A in the given reaction.

\[ \text{OH} \quad \text{SOCl}_2 \rightarrow A \quad \text{(Major Product)} \]

Options:
Question Number: 43  Question Id: 70819122126  Question Type: MCQ  Option Shuffling: Yes  Is Question Mandatory: No  Correct Marks: 4  Wrong Marks: 1

Options:

1. 70819171542.
2. 70819171540.
Identify A in the given chemical reaction.

\[
\begin{align*}
\text{CH}_2\text{CH}_2\text{CHO} & \xrightarrow{\text{NaOH}} A \text{ (Major Product)} \\
\text{CH}_2\text{CH}_2\text{CHO} & \xrightarrow{\text{C}_2\text{H}_5\text{OH}, \text{H}_2\text{O} \Delta} A
\end{align*}
\]

**Options:**

1. ![Option 1](70819171541.png)
2. ![Option 2](70819171542.png)
3. ![Option 3](70819171543.png)
4. ![Option 4](70819171544.png)
5. ![Option 5](70819171545.png)
Question Number : 44 Question Id : 70819122127 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

Options :

70819171543.

70819171544.

70819171545.

70819171546.

Question Number : 45 Question Id : 70819122128 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Identify A in the following chemical reaction.

\[
\begin{align*}
\text{CHO} & \quad \xrightarrow{\text{i) HCHO, NaOH}} \quad \text{A} \\
\text{CH}_3\text{O} & \quad \xrightarrow{\text{ii) CH}_3\text{CH}_2\text{Br}, \text{NaH, DMF}} \\
\quad & \quad \xrightarrow{\text{iii) HI, } \Delta} 
\end{align*}
\]

Options:

1. [Image of option 1]
2. [Image of option 2]
3. [Image of option 3]
4. [Image of option 4]
Question Number : 46 Question Id : 70819122129 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Match List-I with List-II.

List-I

(a) \[ \text{N}_2^+ + \text{Cl}^- \xrightarrow{\text{Cu}_2\text{Cl}_2} \text{Cl}^- + \text{N}_2 \]  

(b) \[ \text{N}_2^+ + \text{Cl}^- \xrightarrow{\text{Cu}, \text{HCl}} \text{Cl}^- + \text{N}_2 \]  

(c) \[ 2\text{CH}_3\text{CH}_2\text{Cl} + 2\text{Na} \xrightarrow{\text{Ether}} \text{C}_2\text{H}_5 - \text{C}_2\text{H}_5 + 2\text{NaCl} \]  

(d) \[ 2\text{C}_6\text{H}_5\text{Cl} + 2\text{Na} \xrightarrow{\text{Ether}} \text{C}_6\text{H}_5 - \text{C}_6\text{H}_5 + 2\text{NaCl} \]  

List-II

(i) Wurtz reaction

(ii) Sandmeyer reaction

(iii) Fittig reaction

(iv) Gatterman reaction

Choose the correct answer from the options given below:

Options:

70819171551. \( (a) \rightarrow (ii), (b) \rightarrow (iv), (c) \rightarrow (i), (d) \rightarrow (iii) \)

70819171552. \( (a) \rightarrow (ii), (b) \rightarrow (i), (c) \rightarrow (iv), (d) \rightarrow (iii) \)

70819171553. \( (a) \rightarrow (iii), (b) \rightarrow (i), (c) \rightarrow (iv), (d) \rightarrow (ii) \)

70819171554. \( (a) \rightarrow (iii), (b) \rightarrow (iv), (c) \rightarrow (i), (d) \rightarrow (ii) \)
Question Number : 47  Question Id : 70819122130  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No

Correct Marks : 4  Wrong Marks : 1

Seliwanoff test and Xanthoproteic test are used for the identification of _________ and _________ respectively.

Options :
70819171555. aldoses, ketoses

70819171556. ketoses, aldoses

70819171557. ketoses, proteins
proteins, ketoses

Question Number : 47 Question Id : 70819122130 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options :
70819171555. రూపకుల,
రూపకుల,
70819171556.
రూపకుల,
రూపకుల,
70819171557.
రూపకుల,
రూపకుల,
70819171558.
రూపకుల,
రూపకుల,

Question Number : 48 Question Id : 70819122131 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) Sucrose</td>
<td>(i) β-D-Galactose and β-D-Glucose</td>
</tr>
<tr>
<td>(b) Lactose</td>
<td>(ii) α-D-Glucose and β-D-Fructose</td>
</tr>
<tr>
<td>(c) Maltose</td>
<td>(iii) α-D-Glucose and α-D-Glucose</td>
</tr>
</tbody>
</table>

Choose the correct answer from the options given below :

Options :
70819171559. (a) → (ii), (b) → (i), (c) → (iii)
Question Number : 48 Question Id : 70819122131 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:
70819171559. (a) → (ii), (b) → (i), (c) → (iii)
70819171560. (a) → (iii), (b) → (i), (c) → (i)
70819171561. (a) → (i), (b) → (iii), (c) → (ii)
70819171562. (a) → (iii), (b) → (i), (c) → (ii)

Question Number : 49 Question Id : 70819122132 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:
2,4-DNP test can be used to identify:
70819171563. halogens

70819171564. aldehyde

70819171565. amine

70819171566. ether

**Question Number : 49 Question Id : 70819122132 Question Type : MCQ Option Shuffling : Yes**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

2, 4-DNP యొక్క సాగితీత్వం మంచింది :

**Options :**

70819171563. మడినీ పడరోతి

70819171564. పెట్టరోతి

70819171565. పడరోతి

70819171566. మడినీ

**Question Number : 50 Question Id : 70819122133 Question Type : MCQ Option Shuffling : Yes**

Is Question Mandatory : No

Correct Marks : 4 Wrong Marks : 1

A. Phenyl methanamine
B. N,N-Dimethylaniline
C. N-Methyl aniline
D. Benzenamine

Choose the correct order of basic nature of the above amines.
Chemistry Section B

Section Id: 7081911015
The NaNO₃ weighed out to make 50 mL of an aqueous solution containing 70.0 mg Na⁺ per mL is _________ g. (Rounded off to the nearest integer)

[Given: Atomic weight in g mol⁻¹ - Na: 23 ; N: 14 ; O: 16]

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 number of octahedral voids per lattice site in a lattice is __________. (Rounded off to the nearest integer)

Response Type: Numeric

Evaluation Required For SA: Yes

---

The number of octahedral voids per lattice site in a lattice is __________. (Rounded off to the nearest integer)

Response Type: Numeric

Evaluation Required For SA: Yes

---

The number of octahedral voids per lattice site in a lattice is __________. (Rounded off to the nearest integer)

Response Type: Numeric

Evaluation Required For SA: Yes

---

Question Number: 53 Question Id: 70819122136 Question Type: SA
A ball weighing 10 g is moving with a velocity of 90 ms\(^{-1}\). If the uncertainty in its velocity is 5%, then the uncertainty in its position is ________ \(\times 10^{-33}\) m. (Rounded off to the nearest integer)

\[ \text{Given: } h = 6.63 \times 10^{-34} \text{ Js} \]

**Response Type**: Numeric

**Evaluation Required For SA**: Yes

**Show Word Count**: Yes

**Answers Type**: Range

**Text Areas**: PlainText

**Possible Answers**: 5 to 5.001

---

10 g वज़न वाला 10 g वज़न वाला 90 ms\(^{-1}\) वेक्टर 90 ms\(^{-1}\) वेक्टर 5%, तो 5% वेक्टर 5% हेनरी स्वार्थ 5% हेनरी स्वार्थ \(\times 10^{-33}\) m. (राउंड हाउफ अड्डा)

\[ \text{Given: } h = 6.63 \times 10^{-34} \text{ Js} \]

**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 average S-F bond energy in kJ mol\(^{-1}\) of SF\(_6\) is ________, (Rounded off to the nearest integer)

\[ \text{Given: The values of standard enthalpy of formation of SF}_6(g), S(g) \text{ and } F(g) \text{ are - 1100, 275 and } 80 \text{ kJ mol}^{-1} \text{ respectively.} \]

**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 : 70819122137 Question Type : SA**

Correct Marks : 4 Wrong Marks : 0

\[
\text{SF}_6 \text{ to } S-F \text{ bond energy is } E \text{ } \text{kJ mol}^{-1} \text{ or } _______. \text{ (చాపలు ఎంపాలు కలిగి)}
\]

\[\text{[ప్రశ్నాంశం]} \text{ లో భాగం రూపాల కలిగి } \text{SF}_6(\text{g}), S(\text{s}) \text{ లోపం } F(\text{g}) \text{ ఏమ్మై ఇంద్రథుతుంది } -1100, 275 \text{ లేదా } 80 \text{ kJ mol}^{-1} \text{ కు చేస్తాయి.} \]

**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 : 55 Question Id : 70819122138 Question Type : SA**

Correct Marks : 4 Wrong Marks : 0

When 12.2 g of benzoic acid is dissolved in 100 g of water, the freezing point of solution was found to be \(-0.93\)°C \((K_f(H_2O) = 1.86 \text{ K kg mol}^{-1})\). The number \(n\) of benzoic acid molecules associated (assuming 100% association) is _______.

**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 : 55 Question Id : 70819122138 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

12.2 g of ice at 0°C is added to 100 g of water at 93°C. By the time the system has reached 0°C, how much water is left (n)? (100% ice at 0°C, 100% water at 93°C)

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 : 56 Question Id : 70819122139 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

The pH of ammonium phosphate solution, if $pK_a$ of phosphoric acid and $pK_b$ of ammonium hydroxide are 5.25 and 4.75 respectively, is ________.

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 : 56 Question Id : 70819122139 Question Type : SA

Correct Marks : 4 Wrong Marks : 0
Estimate the value of $p_{K_a}$ given that the ionic product $K_{sp}$ of a substance is $10^{-5.23}$. Calculate the pH __________.

**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**: 57  
**Question Id**: 70819122140  
**Question Type**: SA

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

Emf of the following cell at 298 K in V is $x \times 10^{-2}$.

$\text{Zn|Zn}^{2+} (0.1 \text{ M}) || \text{Ag}^+ (0.01 \text{ M}) | \text{Ag}$

The value of $x$ is __________. (Rounded off to the nearest integer)

$\left[\text{Given: } E^\theta_{\text{Zn}^{2+}/\text{Zn}} = -0.76 \text{ V }\right. E^\theta_{\text{Ag}^+/\text{Ag}} = +0.80 \text{ V } \frac{2.303RT}{F} = 0.059\left.\right]$  

**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**: 57  
**Question Id**: 70819122140  
**Question Type**: SA

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

$298 \text{ K के वातावरण में बेल्ट्सेट रूप से } \text{emf, } E = x \times 10^{-2}. \text{ है __________. (गणितीय रूप से)}$

$\text{Zn|Zn}^{2+} (0.1 \text{ M}) || \text{Ag}^+ (0.01 \text{ M}) | \text{Ag}$

$\left[\text{Given: } E^\theta_{\text{Zn}^{2+}/\text{Zn}} = -0.76 \text{ V }\right. E^\theta_{\text{Ag}^+/\text{Ag}} = +0.80 \text{ V } \frac{2.303RT}{F} = 0.059\left.\right]$  

**Response Type**: Numeric
If the activation energy of a reaction is 80.9 kJ mol\(^{-1}\), the fraction of molecules at 700 K, having enough energy to react to form products is \(e^{-x}\). The value of \(x\) is ________.

(Rounded off to the nearest integer)

\[\text{[Use } R = 8.31 \text{ J K}^{-1}\text{ mol}^{-1}]\]
In mildly alkaline medium, thiosulphate ion is oxidized by $\text{MnO}_4^-$ to "A". The oxidation state of sulphur in "A" is ________.

**Possible Answers:**
5 to 5.001
The number of stereoisomers possible for \([\text{Co(ox)}_2(\text{Br})(\text{NH}_3)]^{2-}\) is \[\text{________.}\]  
[\text{ox} = \text{oxalate}]

**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**: 60  
**Question Id**: 70819122143  
**Question Type**: SA  
**Correct Marks**: 4  
**Wrong Marks**: 0

\([\text{Co(ox)}_2(\text{Br})(\text{NH}_3)]^{2-}\)  
[\text{ox} = \text{oxalate}]

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

---

**Mathematics Section A**

**Section Id**: 7081911016  
**Section Number**: 5  
**Section type**: Online  
**Mandatory or Optional**: Mandatory  
**Number of Questions**: 20  
**Number of Questions to be attempted**: 20
If the mirror image of the point \((1, 3, 5)\) with respect to the plane \(4x - 5y + 2z = 8\) is \((\alpha, \beta, \gamma)\), then \(5(\alpha + \beta + \gamma)\) equals:

Options:

- 70819171581. 39
- 70819171582. 41
- 70819171583. 43
- 70819171584. 47
Question Number : 62 Question Id : 70819122145 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Let \( A = \{1, 2, 3, \ldots, 10\} \) and \( f : A \to A \) be defined as
\[
    f(k) = \begin{cases} 
        k + 1 & \text{if } k \text{ is odd} \\
        k & \text{if } k \text{ is even}
    \end{cases}
\]

Then the number of possible functions \( g : A \to A \) such that \( g \circ f = f \) is:

Options:

70819171585. \( 5! \)

70819171586. \( \binom{10}{5} \)

70819171587. \( 5^5 \)

70819171588. \( 10^5 \)
Let \( A_1 \) be the area of the region bounded by the curves \( y = \sin x \), \( y = \cos x \) and \( y \)-axis in the first quadrant. Also, let \( A_2 \) be the area of the region bounded by the curves \( y = \sin x \), \( y = \cos x \), \( x = 0 \) and \( x = \frac{\pi}{2} \) in the first quadrant. Then,

\[
\text{Options:}
\begin{align*}
\text{70819171589.} & \quad A_1 : A_2 = 1 : 2 \text{ and } A_1 + A_2 = 1 \\
\text{70819171590.} & \quad A_1 : A_2 = 1 : \sqrt{2} \text{ and } A_1 + A_2 = 1 \\
\text{70819171591.} & \quad A_1 = A_2 \text{ and } A_1 + A_2 = \sqrt{2} \\
\text{70819171592.} & \quad 2A_1 = A_2 \text{ and } A_1 + A_2 = 1 + \sqrt{2}
\end{align*}
\]
If \( 0 < a, b < 1 \), and \( \tan^{-1}a + \tan^{-1} b = \frac{\pi}{4} \), then the value of

\[
(a + b) - \left(\frac{a^2 + b^2}{2}\right) + \left(\frac{a^3 + b^3}{3}\right) - \left(\frac{a^4 + b^4}{4}\right) + \ldots \] is:

Options:

70819171593. \( e \)

70819171594. \( e^2 - 1 \)

70819171595. \( \log_e 2 \)

70819171596. \( \log_e \left(\frac{e}{2}\right) \)
Question Number : 64 Question Id : 70819122147 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ 0 < a, b < 1, \text{ then } \tan^{-1}a + \tan^{-1}b = \frac{\pi}{4} \text{ without loss of generality.} \]

\[(a + b) - \left(\frac{a^2 + b^2}{2}\right) + \left(\frac{a^3 + b^3}{3}\right) - \left(\frac{a^4 + b^4}{4}\right) + \ldots \text{ gives :}
\]

Options :

70819171593. \quad e

70819171594. \quad e^2 - 1

70819171595. \quad \log_e e^2

70819171596. \quad \log_e \left(\frac{e}{2}\right)

Question Number : 65 Question Id : 70819122148 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Let slope of the tangent line to a curve at any point \(P(x, y)\) be given by \(\frac{xy^2 + y}{x}\). If the curve intersects the line \(x + 2y = 4\) at \(x = -2\), then the value of \(y\), for which the point \((3, y)\) lies on the curve, is :

Options :

\[-\frac{4}{3}\]

70819171597.
Question Number : 65 Question Id : 70819122148 Question Type : MCQ Option Shuffling : Yes

Correct Marks : 4 Wrong Marks : 1

Options :
- \( \frac{4}{3} \)
- \( \frac{18}{19} \)
- \( \frac{18}{35} \)
- \( \frac{18}{11} \)

Question Number : 66 Question Id : 70819122149 Question Type : MCQ Option Shuffling : Yes

Is Question Mandatory : No
The sum of the series \( \sum_{n=1}^{\infty} \frac{n^2 + 6n + 10}{(2n + 1)!} \) is equal to:

**Options:**

\[
\begin{align*}
\frac{41}{8} e + \frac{19}{8} e^{-1} - 10 \\
\frac{41}{8} e + \frac{19}{8} e^{-1} + 10 \\
- \frac{41}{8} e + \frac{19}{8} e^{-1} - 10 \\
\frac{41}{8} e - \frac{19}{8} e^{-1} - 10
\end{align*}
\]
\[
\frac{41}{8} e - \frac{19}{8} e^{-1} - 10
\]

**Question Number : 67  Question Id : 70819122150  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No**

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

Let \( f(x) = \int_0^x f(t) \, dt + e^x \) be a differentiable function for all \( x \in \mathbb{R} \). Then \( f(x) \) equals:

**Options :**

70819171605. \( 2e^{(e^x - 1)} - 1 \)

70819171606. \( e^{(e^x - 1)} \)

70819171607. \( e^{ex} - 1 \)

70819171608. \( 2e^{ex} - 1 \)

**Question Number : 67  Question Id : 70819122150  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No**

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

\( \text{任意} \ x \in \mathbb{R} \ \text{使得} \ f(x) = \int_0^x f(t) \, dt + e^x \)\( \text{任意} \ x \in \mathbb{R} \) \( f(x) = \) : 

**Options :**

70819171605. \( 2e^{(e^x - 1)} - 1 \)

70819171606. \( e^{(e^x - 1)} \)
\( e^{ex} - 1 \)

\( 2e^{ax} - 1 \)

**Question Number : 68 Question Id : 70819122151 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

Let \( f(x) \) be a differentiable function at \( x = a \) with \( f'(a) = 2 \) and \( f(a) = 4 \). Then \( \lim_{x \to a} \frac{xf(a) - af(x)}{x - a} \) equals:

**Options :**

70819171609. \( 2a - 4 \)

70819171610. \( 4 - 2a \)

70819171611. \( 2a + 4 \)

70819171612. \( a + 4 \)

**Question Number : 68 Question Id : 70819122151 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

\( x = a \) \( \Rightarrow f(x) \) \( \text{is differentiable at } x = a \) \( f'(a) = 2 \) \( \text{and} \) \( f(a) = 4 \).\( \text{Compute} \) \( \lim_{x \to a} \frac{xf(a) - af(x)}{x - a} = : \)

**Options :**

70819171609. \( 2a - 4 \)
Let \( f(x) = \sin^{-1} x \) and \( g(x) = \frac{x^2 - x - 2}{2x^2 - x - 6} \). If \( g(2) = \lim_{x \to 2} g(x) \), then the domain of the function \( f \circ g \) is:

**Options:**

1. \((-\infty, -2] \cup \left[ -\frac{3}{2}, \infty \right)\)
2. \((-\infty, -2] \cup \left[ -\frac{4}{3}, \infty \right)\)
3. \((-\infty, -1] \cup [2, \infty)\)
4. \((-\infty, -2] \cup [-1, \infty)\)
Let $A(1, 4)$ and $B(1, -5)$ be two points. Let $P$ be a point on the circle $(x-1)^2 + (y-1)^2 = 1$ such that $(PA)^2 + (PB)^2$ have maximum value, then the points, $P$, $A$ and $B$ lie on:

**Options:**

- an ellipse

- a hyperbola

- a parabola

- a straight line
If vectors \( \vec{a}_1 = x \hat{i} - \hat{j} + \hat{k} \) and \( \vec{a}_2 = \hat{i} + y \hat{j} + z \hat{k} \) are collinear, then a possible unit vector parallel to the vector \( x \hat{i} + y \hat{j} + z \hat{k} \) is:

**Options:**

\[
\frac{1}{\sqrt{2}} \begin{pmatrix} -1 & 1 & 1 \end{pmatrix}
\]

70819171621.

\[
\frac{1}{\sqrt{3}} \begin{pmatrix} 1 & 1 & 1 \end{pmatrix}
\]

70819171622.

\[
\frac{1}{\sqrt{3}} \begin{pmatrix} 1 & 1 & 1 \end{pmatrix}
\]

70819171623.

\[
\frac{1}{\sqrt{2}} \begin{pmatrix} 1 & -1 & 1 \end{pmatrix}
\]

70819171624.
Question Number : 71 Question Id : 70819122154 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
\[ \vec{a}_1 = x \hat{i} - j + k \text{ and } \vec{a}_2 = \hat{i} + y \hat{j} + z \hat{k} \text{ are two vectors. Let } x \hat{i} + y \hat{j} + z \hat{k} \text{ be another vector. Which of the following is correct, where } \hat{i}, \hat{j}, \text{ and } \hat{k} \text{ are unit vectors} : \]
Options :
\[ \frac{1}{\sqrt{2}} \left( - \hat{j} + \hat{k} \right) \]
70819171621.
\[ \frac{1}{\sqrt{3}} \left( \hat{i} - \hat{j} + \hat{k} \right) \]
70819171622.
\[ \frac{1}{\sqrt{3}} \left( \hat{i} + \hat{j} - \hat{k} \right) \]
70819171623.
\[ \frac{1}{\sqrt{2}} \left( \hat{i} - \hat{j} \right) \]
70819171624.

Question Number : 72 Question Id : 70819122155 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Let \( F_1(A, B, C) = (A \land \neg B) \lor [\neg C \land (A \lor B)] \lor \neg A \) and \( F_2(A, B) = (A \lor B) \lor (B \rightarrow \neg A) \) be two logical expressions. Then :
Options :
70819171625. \( F_1 \) and \( F_2 \) both are tautologies
70819171626. \( F_1 \) is a tautology but \( F_2 \) is not a tautology
70819171627. \( F_1 \) is not a tautology but \( F_2 \) is a tautology
Both $F_1$ and $F_2$ are not tautologies

Question Number : 72 Question Id : 70819122155 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ F_1(A, B, C) = (A \land \neg B) \lor [\neg C \land (A \lor B)] \lor \neg A \land \neg B \quad F_2(A, B) = (A \lor B) \lor (B \rightarrow \neg A) \]

Options :

70819171625.

70819171626.

70819171627.

70819171628.

Question Number : 73 Question Id : 70819122156 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

A seven digit number is formed using digits 3, 3, 4, 4, 4, 5, 5. The probability, that number so formed is divisible by 2, is :

Options :

\[
\frac{3}{7}
\]

70819171629.

\[
\frac{6}{7}
\]

70819171630.
Question Number : 73 Question Id : 70819122156 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Consider the following system of equations:

\[ x + 2y - 3z = a \]
\[ 2x + 6y - 11z = b \]
\[ x - 2y + 7z = c, \]

where \( a, b \) and \( c \) are real constants. Then the system of equations :
Options:
70819171633. has a unique solution for all a, b and c

70819171634. has a unique solution when $5a = 2b + c$

70819171635. has infinite number of solutions when $5a = 2b + c$

70819171636. has no solution for all a, b and c

Question Number : 74 Question Id : 70819122157 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:

70819171633. has a unique solution for all a, b and c

70819171634. has a unique solution when $5a = 2b + c$

70819171635. has infinite number of solutions when $5a = 2b + c$

70819171636. has no solution for all a, b and c

Question Number : 75 Question Id : 70819122158 Question Type : MCQ Option Shuffling : Yes
Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options:

70819171633. a, b, c ఏ నిర్ధారించింది, అంటే విధంగా లభించండి.

70819171634. $5a = 2b + c$ అయిన విధంగా లభించండి

70819171635. $5a = 2b + c$ అయిన విధంగా లభించండి

70819171636. a, b, c ఏ హిస్సెంటైంది లభించండి.
The triangle of maximum area that can be inscribed in a given circle of radius \( r \) is:

**Options:**

70819171637. An isosceles triangle with base equal to 2r.

70819171638. A right angle triangle having two of its sides of length 2r and r.

70819171639. An equilateral triangle of height \( \frac{2r}{\sqrt{3}} \).

70819171640. An equilateral triangle having each of its sides of length \( \sqrt{3}r \).

---

**Question Number : 75 Question Id : 70819122158 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

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

\( 'r ' \) పైన ఉన్న పింది ప్రత్యేకంగా అనేకం సమాధానాలు ఉండాలి కనుక ప్రశ్న ప్రత్యేకం నిషేధం

**Options :**

70819171637. 2r యొక్క భూమించి మరియు అయితే సమాధానం ఉంటుంది.

70819171638. 2r, r యొక్క భూమించి మరియు అయితే సమాధానం ఉంటుంది.

70819171639. \( \frac{2r}{\sqrt{3}} \) యొక్క భూమించి మరియు అయితే సమాధానం ఉంటుంది.

70819171640. \( \sqrt{3}r \) యొక్క భూమించి మరియు అయితే సమాధానం ఉంటుంది.

---

**Question Number : 76 Question Id : 70819122159 Question Type : MCQ Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4 Wrong Marks : 1**
Let \( L \) be a line obtained from the intersection of two planes \( x + 2y + z = 6 \) and \( y + 2z = 4 \). If point \( P(\alpha, \beta, \gamma) \) is the foot of perpendicular from \((3, 2, 1)\) on \( L \), then the value of \( 2(\alpha + \beta + \gamma) \) equals:

**Options:**

70819171641. 68

70819171642. 102

70819171643. 136

70819171644. 142

---

**Question Number : 77**

**Question Id : 70819122160**

**Question Type : MCQ**

**Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4**

**Wrong Marks : 1**

---

Let \( L \) be a line obtained from the intersection of two planes \( x + 2y + z = 6 \) and \( y + 2z = 4 \). If point \( P(\alpha, \beta, \gamma) \) is the foot of perpendicular from \((3, 2, 1)\) on \( L \), then the value of \( 2(\alpha + \beta + \gamma) \) equals:

**Options:**

70819171641. 68

70819171642. 102

70819171643. 136

70819171644. 142

---

**Question Number : 77**

**Question Id : 70819122160**

**Question Type : MCQ**

**Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4**

**Wrong Marks : 1**
Let $f: \mathbb{R} \to \mathbb{R}$ be defined as

$$f(x) = \begin{cases} 
2 \sin \left( -\frac{\pi x}{2} \right), & \text{if } x < -1 \\
|ax^2 + x + b|, & \text{if } -1 \leq x \leq 1 \\
\sin(\pi x), & \text{if } x > 1
\end{cases}$$

If $f(x)$ is continuous on $\mathbb{R}$, then $a + b$ equals:

**Options:**

70819171645. $-3$

70819171646. $-1$

70819171647. $1$

70819171648. $3$
If the locus of the mid-point of the line segment from the point (3, 2) to a point on the circle, 
\(x^2 + y^2 = 1\) is a circle of radius \(r\), then \(r\) is equal to:

Options:

\[\frac{1}{4}\]
70819171649.

\[\frac{1}{3}\]
70819171650.

\[\frac{1}{2}\]
70819171651.

\[1\]
70819171652.

If the locus of the mid-point of the line segment from the point (3, 2) to a point on the circle, 
\(x^2 + y^2 = 1\) is a circle of radius \(r\), then \(r\) is equal to:

Options:

\[\frac{1}{4}\]
70819171649.

\[\frac{1}{3}\]
70819171650.
A natural number has prime factorization given by \( n = 2^y 3^z 5^x \), where \( y \) and \( z \) are such that 
\[ y + z = 5 \text{ and } y^{-1} + z^{-1} = \frac{5}{6}, \ y > z. \]
Then the number of odd divisors of \( n \), including 1, is:

**Options:**

1. 6
2. 11
3. 12
4. \( 6x \)
Question Number : 80  Question Id : 70819122163  Question Type : MCQ  Option Shuffling : Yes  
Is Question Mandatory : No  
Correct Marks : 4  Wrong Marks : 1  

For \( x > 0 \), if \( f(x) = \int_{1}^{x} \frac{\log_e t}{1 + t} \, dt \), then \( f(e) + f \left( \frac{1}{e} \right) \) is equal to:

Options:

70819171657.  \( 0 \)

70819171658.  \( 1 \)

70819171659.  \( \frac{1}{2} \)

70819171660.  \( -1 \)

---

Question Number : 80  Question Id : 70819122163  Question Type : MCQ  Option Shuffling : Yes  
Is Question Mandatory : No  
Correct Marks : 4  Wrong Marks : 1  

\[ f(x) = \int_{1}^{x} \frac{\log_e t}{1 + t} \, dt, \quad x > 0 \] \( \therefore \) \( f(e) + f \left( \frac{1}{e} \right) = : \)

Options:

70819171657.  \( 0 \)
If \( I_{m,n} = \int_0^1 x^{m-1} (1-x)^{n-1} \, dx \), for \( m, n \geq 1 \), and \( \int_0^1 \frac{x^{m-1} + x^{n-1}}{(1 + x)^{m+n}} \, dx = \alpha I_{m,n} \), \( \alpha \in \mathbb{R} \), then \( \alpha \) equals ________.

Response Type: Numeric

Evaluation Required For SA: Yes
\[ I_{m, n} = \int_{0}^{1} x^{m-1} (1-x)^{n-1} \, dx, \text{ for } m, n > 1, \alpha \in \mathbb{R}, \ \alpha = \ldots. \]

Response Type: Numeric

Evaluation Required For SA: Yes

---

Let \( z \) be those complex numbers which satisfy
\[ |z + 5| \leq 4 \text{ and } z(1 + i) + \overline{z}(1 - i) \geq -10, \ \imath = \sqrt{-1}. \]

If the maximum value of \(|z + 1|^2\) is \( \alpha + \beta \sqrt{2} \), then the value of \((\alpha + \beta)\) is \(\ldots\).

Response Type: Numeric

Evaluation Required For SA: Yes
5 to 5.001

Question Number : 82 Question Id : 70819122165 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
\[|z + 5| \leq 4 \quad \text{and} \quad |z(1 + i) + i(1 - i)| \geq -10, \quad i = \sqrt{-1} \quad \text{where} \quad z = a + bi, \quad a, b \in \mathbb{R}\]
\[|z + 1|^2 \text{ is a real number} \quad \text{where} \quad a + \beta \sqrt{2} \quad \text{and} \quad (a + \beta) \text{ is also} \quad ________.

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 : 70819122166 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
Let the normals at all the points on a given curve pass through a fixed point \((a, b)\). If the curve passes through \((3, -3)\) and \((4, -2\sqrt{2})\), and given that \(a - 2\sqrt{2} b = 3\), then \((a^2 + b^2 + ab)\) 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
Let $a$ be an integer such that all the real roots of the polynomial $2x^5 + 5x^4 + 10x^3 + 10x^2 + 10x + 10$ lie in the interval $(a, a + 1)$. Then, $|a|$ 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 : 85 Question Id : 70819122168 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

Let $X_1, X_2, ..., X_{18}$ be eighteen observations such that $\sum_{i=1}^{18} (X_i - \alpha) = 36$ and $\sum_{i=1}^{18} (X_i - \beta)^2 = 90$,
where $\alpha$ and $\beta$ are distinct real numbers. If the standard deviation of these observations is 1, then the value of $|\alpha - \beta|$ is _________.

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 : 85 Question Id : 70819122168 Question Type : SA

Correct Marks : 4 Wrong Marks : 0

$\alpha, \beta \text{ అంచె విభిన్న రాశులు కొని, } X_1, X_2, ..., X_{18} \text{ యుగుండి రాశులు } \sum_{i=1}^{18} (X_i - \alpha) = 36$

$\sum_{i=1}^{18} (X_i - \beta)^2 = 90 \text{ అంచె విభిన్న రాశులు స్టాండార్డ్ డివేషన్ యుగుండి తోంది. కాని వాడకుడిను ప్రతిచెప్పుకోవం సులభం కాగా, } |\alpha - \beta|$

= _________.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText
If the matrix \( A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 3 & 0 & -1 \end{bmatrix} \) satisfies the equation \( A^{20} + \alpha A^{19} + \beta A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & 1 \end{bmatrix} \) for some real numbers \( \alpha \) and \( \beta \), then \( \beta - \alpha \) is equal to \( \phantom{5 to 5.001} \).
Let $\alpha$ and $\beta$ be two real numbers such that $\alpha + \beta = 1$ and $\alpha \beta = -1$. Let $p_n = (\alpha)^n + (\beta)^n$, 
$p_{n-1} = 11$ and $p_{n+1} = 29$ for some integer $n \geq 1$. Then, the value of $p_n^2$ is ________.

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 : 70819122171 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
18. If the arithmetic mean and geometric mean of the $p^{th}$ and $q^{th}$ terms of the sequence $-16, 8, -4, 2, \ldots$ satisfy the equation $4x^2 - 9x + 5 = 0$, then $p + q$ 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 : 89 Question Id : 70819122172 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
If the arithmetic mean and geometric mean of the $p^{th}$ and $q^{th}$ terms of the sequence $-16, 8, -4, 2, \ldots$ satisfy the equation $4x^2 - 9x + 5 = 0$, then $p + q$ 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 : 89 Question Id : 70819122172 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

\[-16, 8, -4, 2, \ldots \] are the roots of \( p \) in the equation \( q \) and \( \text{other roots}\), then \( 4x^2 - 9x + 5 = 0 \) has \( p + q = \ldots \).

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 : 90 Question Id : 70819122173 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Let \( L \) be a common tangent line to the curves \( 4x^2 + 9y^2 = 36 \) and \( (2x)^2 + (2y)^2 = 31 \). Then the square of the slope of the line \( L \) is \ldots .

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 : 90 Question Id : 70819122173 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

\( 4x^2 + 9y^2 = 36 \) is given \( (2x)^2 + (2y)^2 = 31 \) then \( L \) is \ldots .

Response Type : Numeric
Evaluation Required For SA : Yes
Possible Answers:

5 to 5.001