Question Paper Name: B TECH ETE 16th March 2021 Shift 2
Subject Name: B TECH ETE
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Duration: 180
Number of Questions: 90
Total Marks: 300
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B TECH ETE

Group Number: 1
Group Id: 86435123
Group Maximum Duration: 0
Group Minimum Duration: 180
Show Attended Group?: No
Edit Attended Group?: No
Break time: 0
Group Marks: 300
Is this Group for Examiner?: No

Physics Section A

Section Id: 864351133
Section Number: 1
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: 864351133
Question Shuffling Allowed: Yes

Question Number: 1 Question Id: 8643511981 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1
Two identical antennas mounted on identical towers are separated from each other by a distance of 45 km. What should nearly be the minimum height of receiving antenna to receive the signals in line of sight?
(Assume radius of earth is 6400 km)

Options:
8643515941. 79.1 m
8643515942. 39.55 m
8643515943. 158.2 m
8643515944. 19.77 m

Question Number : 1 Question Id : 8643511981 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The de-Broglie wavelength associated with an electron and a proton were calculated by accelerating them through same potential of 100 V. What should nearly be the ratio of their wavelengths? \( \lambda_p = \frac{1.00727 \text{u}}{0.00055 \text{u}} \)

Options:
Question Number : 2 Question Id : 8643511982 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
100 V ఇన్నిడుతుంది త్రి రెండవ సమాధానం చేయడానికి మొత్తం తాకేస్తే మొత్తం త్రిమందము చిత్రంలో ఉండగాను అంటే ఉండాతా? (m_p = 1.00727u m_e = 0.00055u)
Options :
8643515945. 43 : 1
8643515946. 1860 : 1
8643515947. 41.4 : 1
8643515948. (1860)^2 : 1

Question Number : 3 Question Id : 8643511983 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
The refractive index of a converging lens is 1.4. What will be the focal length of this lens if it is placed in a medium of same refractive index? Assume the radii of curvature of the faces of lens are R_1 and R_2 respectively.
Options :
8643515949. Zero
8643515950. 1
8643515951. Infinite
\[
\frac{R_1 R_2}{R_1 - R_2}
\]

8643515952.

**Question Number : 3**  
**Question Id : 8643511983**  
**Question Type : MCQ**  
**Option Shuffling : Yes**  
**Is Question Mandatory : No**  
**Correct Marks : 4**  
**Wrong Marks : 1**

Options:

8643515949.  
8643515950.  
8643515951.  
8643515952.

8643515953. \[ \frac{R_1 R_2}{R_1 - R_2} \]

**Question Number : 4**  
**Question Id : 8643511984**  
**Question Type : MCQ**  
**Option Shuffling : Yes**  
**Is Question Mandatory : No**  
**Correct Marks : 4**  
**Wrong Marks : 1**

Red light differs from blue light as they have:

Options:

8643515953. Same frequencies and same wavelengths

8643515954. Different frequencies and different wavelengths

8643515955. Same frequencies and different wavelengths

8643515956. Different frequencies and same wavelengths
The magnetic field in a region is given by \( \mathbf{B} = B_o \left( \frac{x}{a} \right) \mathbf{k} \). A square loop of side \( d \) is placed with its edges along the \( x \) and \( y \) axes. The loop is moved with a constant velocity \( \mathbf{v} = v_o \mathbf{i} \).

The emf induced in the loop is:

\[
\frac{B_o v_o d}{2a}
\]

\[
\frac{B_o v_o d^2}{a}
\]
\[
\frac{B_0 v_o^2 d}{2a}
\]

\[
\frac{B_0 v_o d^2}{2a}
\]

Question Number : 5  Question Id : 8643511985  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No  Correct Marks : 4  Wrong Marks : 1

Options :

\[
\frac{B_0 v_o d}{2a}
\]

\[
\frac{B_0 v_o d^2}{2a}
\]

\[
\frac{B_0 v_o^2 d}{2a}
\]

\[
\frac{B_0 v_o d^2}{2a}
\]
Amplitude of a mass-spring system, which is executing simple harmonic motion decreases with time. If mass = 500g, Decay constant = 20 g/s then how much time is required for the amplitude of the system to drop to half of its initial value?

\[(\ln 2 = 0.693)\]

Options:

- 8643515961. 34.65 s
- 8643515962. 15.01 s
- 8643515963. 0.034 s
- 8643515964. 17.32 s

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Question Number : 6 Question Id : 8643511986 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

\[\text{मास-चपूट के - मास से सीधा चपूट नियंत्रण करते हुए, मास का समय कितना बादल से कम है?}\]

\[\text{मास = 500g, ब्यापार कांति = 20 g/s, तो प्रत्येक बादल से कितना समय बादल होता है?}\]

\[(\ln2 = 0.693)\]

Options:

- 8643515961. 34.65 s
- 8643515962. 15.01 s
- 8643515963. 0.034 s
- 8643515964. 17.32 s

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Question Number : 7 Question Id : 8643511987 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1
Calculate the value of mean free path (\( \lambda \)) for oxygen molecules at temperature 27°C and pressure 1.01 \times 10^5 \text{ Pa}. Assume the molecular diameter 0.3 nm and the gas is ideal. (\( k = 1.38 \times 10^{-23} \text{ JK}^{-1} \))

Options:
- 8643515965. 32 nm
- 8643515966. 58 nm
- 8643515967. 86 nm
- 8643515968. 102 nm

Question Number: 7 Question Id: 8643511987 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1

27°C లో ఒగ్గితి 1.01 \times 10^5 \text{ Pa} ఉన్న ప్రభావంతో ఒగ్గితి మూలము ఒత్తిడి ప్రభావంతో ఉన్న మూలము (\( \lambda \)) విని అంటారు. (మణిస్మాగితం మైదానం మూలము ఒత్తిడి ప్రభావంతో 0.3 nm మరియు విని అంటారు. \( k = 1.38 \times 10^{-23} \text{ JK}^{-1} \))

Options:
- 8643515965. 32 nm
- 8643515966. 58 nm
- 8643515967. 86 nm
- 8643515968. 102 nm

Question Number: 8 Question Id: 8643511988 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1

What will be the nature of flow of water from a circular tap, when its flow rate increased from 0.18 L/min to 0.48 L/min? The radius of the tap and viscosity of water are 0.5 cm and 10^{-3} \text{ Pa s}, respectively.

(Density of water: 10^3 \text{ kg/m}^3)
Options:
8643515969. Steady flow to unsteady flow
8643515970. Unsteady to steady flow
8643515971. Remains steady flow
8643515972. Remains turbulent flow

Question Number : 8 Question Id : 8643511988 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Choose the correct answer from the options given below:

Options:
8643515969. 
8643515970. 
8643515971. 
8643515972. 

Question Number : 9 Question Id : 8643511989 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Options:
8643515973. 
8643515974. Zero
Question Number : 9 Question Id : 8643511989 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Options :
1

Question Number : 10 Question Id : 8643511990 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Calculate the time interval between 33% decay and 67% decay if half-life of a substance is 20 minutes.

Options :
20 minutes
40 minutes
60 minutes
13 minutes
Question Number : 10

Correct Marks : 4 Wrong Marks : 1

For the given circuit, comment on the type of transformer used.

Options :

- 8643515977. Step-up transformer
- 8643515978. Step-down transformer
- 8643515979. Auto transformer
- 8643515980. Auxiliary transformer
Question Number : 12 Question Id : 8643511992 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The half-life of $^{198}$Au is 2.7 days. The activity of 1.50 mg of $^{198}$Au if its atomic weight is 198 g mol$^{-1}$ is, ($N_A = 6 \times 10^{23}$/mol).

Options :

8643515985. 240 Ci

8643515986. 357 Ci

8643515987. 252 Ci

8643515988. 535 Ci
Au$^{198}$ टिक्टूर्म रेवण 2.7 गुण दीनाही. धीरे धीरे भरता हर्षवाला 198 g mol$^{-1}$ असलेले 1.50 mg तेजीसूटे Au$^{198}$ टिक्टूर्म (N$_A$ = 6 × 10$^{23}$/mol).

Options:
8643515985. 240 Ci
8643515986. 357 Ci
8643515987. 252 Ci
8643515988. 535 Ci

Question Number : 13 Question Id : 8643511993 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
A bimetallic strip consists of metals A and B. It is mounted rigidly as shown. The metal A has higher coefficient of expansion compared to that of metal B. When the bimetallic strip is placed in a cold bath, it will:

Options:
8643515989. Bend towards the right
8643515990. Bend towards the left
8643515991. Not bend but shrink
8643515992. Neither bend nor shrink

Question Number : 13 Question Id : 8643511993 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
A large block of wood of mass $M = 5.99$ kg is hanging from two long massless cords. A bullet of mass $m = 10$ g is fired into the block and gets embedded in it. The (block + bullet) then swing upwards, their centre of mass rising a vertical distance $h = 9.8$ cm before the (block+bullet) pendulum comes momentarily to rest at the end of its arc. The speed of the bullet just before collision is:

(take $g = 9.8$ ms$^{-2}$)

Options:

8643515993. $811.4$ m/s
Question Number : 14 Question Id : 8643511994 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

\[ M = 5.99 \text{ kg} \]

\[ m = 10 \text{ g} \]

A ball of mass 10 g is initially at rest on a platform. The ball is released from a height of 9.8 cm. The ball hits the ground after travelling a distance of 1 m. What is the velocity of the ball when it hits the ground?

(\( g = 9.8 \text{ ms}^{-2} \))

Options :

8643515993. 811.4 m/s

8643515994. 821.4 m/s

8643515995. 831.4 m/s

8643515996. 841.4 m/s

Question Number : 15 Question Id : 8643511995 Question Type : MCQ Option Shuffling : Yes Is
Question Number : 15 Question Id : 8643511995 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Statement I : A cyclist is moving on an unbanked road with a speed of 7 kmh\(^{-1}\) and takes a sharp circular turn along a path of radius of 2m without reducing the speed. The static friction coefficient is 0.2. The cyclist will not slip and pass the curve. \((g=9.8 \text{ m/s}^2)\)

Statement II : If the road is banked at an angle of 45°, cyclist can cross the curve of 2m radius with the speed of 18.5 kmh\(^{-1}\) without slipping.

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

Options :

8643515997. Both statement I and statement II are true

8643515998. Both statement I and statement II are false

8643515999. Statement I is correct and statement II is incorrect

8643516000. Statement I is incorrect and statement II is correct

Question Number : 15 Question Id : 8643511995 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

మాధ్యమి I : 7 kmh\(^{-1}\) ని వేగంతో దుర్బల కోణానికి రైలు బాగా దృష్టి పొందించడం ద్వారా 2 m వ్యవస్థ కి నిలిస్తుంది. ఈంచి వ్యవస్థ పరిమాణం 0.2. ఈంచి వ్యవస్థకు వహించిన నిలించడం సమయం కావు ఉంది.

మాధ్యమి II : రైలు 45° కొని ద్వారా 18.5 kmh\(^{-1}\) వేగంతో రైలు పరిమితి కి నిలించడం సమయం కావు ఉంది.

మాధ్యమి I మరియు మాధ్యమి II కానిందే

8643515997.

8643515998.
A mosquito is moving with a velocity \( \mathbf{v} = 0.5 t^2 \mathbf{i} + 3t \mathbf{j} + 9 \mathbf{k} \) m/s and accelerating in uniform conditions. What will be the direction of mosquito after 2 s?

Options:

1. \( \tan^{-1} \left( \frac{5}{2} \right) \) from x-axis
2. \( \tan^{-1} \left( \frac{5}{2} \right) \) from y-axis
3. \( \tan^{-1} \left( \frac{2}{3} \right) \) from x-axis
4. \( \tan^{-1} \left( \frac{2}{3} \right) \) from y-axis

Options:

1. \( x \)-coordinate \( \tan^{-1} \left( \frac{5}{2} \right) \)
2. \( y \)-coordinate \( \tan^{-1} \left( \frac{5}{2} \right) \)
Question Number : 17  Question Id : 8643511997  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No  Correct Marks : 4  Wrong Marks : 1
In order to determine the Young’s Modulus of a wire of radius 0.2 cm (measured using a scale of least count = 0.001 cm) and length 1 m (measured using a scale of least count = 1 mm), a weight of mass 1 kg (measured using a scale of least count = 1 g) was hanged to get the elongation of 0.5 cm (measured using a scale of least count 0.001 cm). What will be the fractional error in the value of Young’s Modulus determined by this experiment?

Options :

8643516005.  1.4 %
8643516006.  0.9 %
8643516007.  0.14 %
8643516008.  9 %
A resistor develops 500 J of thermal energy in 20 s when a current of 1.5 A is passed through it. If the current is increased from 1.5 A to 3 A, what will be the energy developed in 20 s.

Options:

- 500 J
- 1000 J
- 1500 J
- 2000 J

1.5 A ఇంతా సమాధానం 20 s ఎందుకు వైవిద్యం గలాం లేదుపోగానే 500 J సమాధానం వైవిద్యం. 
హేముడు 1.5 A కంటే 3 A పైన వైవిద్యం గలాం సమాధానం లేదుపోగానే 20 లేదా.

Options:

- 500 J
- 1000 J
- 1500 J
Find out the surface charge density at the intersection of point $x = 3$ m plane and $x$-axis, in the region of uniform line charge of 8 nC/m lying along the $z$-axis in free space.

Options:

1. 47.88 C/m
2. 0.07 nC m$^{-2}$
3. 0.424 nC m$^{-2}$
4. 4.0 nC m$^{-2}$
The following logic gate is equivalent to:

Options:
8643516017. AND Gate
8643516018. NAND Gate
8643516019. OR Gate
8643516020. NOR Gate

Question Number : 20 Question Id : 8643512000 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

The following logic gate is equivalent to:

Options:
8643516017. AND
8643516018. NAND
8643516019. OR
Physics Section B

Section Id : 864351134
Section Number : 2
Section type : Online
Mandatory or Optional : Mandatory
Number of Questions : 10
Number of Questions to be attempted : 5
Section Marks : 20
Mark As Answered Required? : Yes
Sub-Section Number : 1
Sub-Section Id : 864351134
Question Shuffling Allowed : Yes

Question Number : 21 Question Id : 8643512001 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

If one wants to remove all the mass of the earth to infinity in order to break it up completely.

The amount of energy that needs to be supplied will be $\frac{x}{5} \frac{GM^2}{R}$ where $x$ is ________

(Round off to the Nearest Integer)

(M is the mass of earth, R is the radius of earth, G is the gravitational constant)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : Plaintext
Possible Answers :
100

Question Number : 21 Question Id : 8643512001 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
A swimmer can swim with velocity of 12 km/h in still water. Water flowing in a river has velocity 6 km/h. The direction with respect to the direction of flow of river water he should swim in order to reach the point on the other bank just opposite to his starting point is ________°. (Round off to the Nearest Integer)

(Find the angle in degrees)
A body of mass 2 kg moves under a force of \(2 \hat{i} + 3 \hat{j} + 5 \hat{k}\) N. It starts from rest and was at the origin initially. After 4 s, its new coordinates are (8, b, 20). The value of b is \___________.

(Round off to the Nearest Integer)
A force \( \vec{F} = 4 \hat{i} + 3 \hat{j} + 4 \hat{k} \) is applied on an intersection point of \( x = 2 \) plane and \( x \)-axis. The magnitude of torque of this force about a point \((2, 3, 4)\) is \_____. (Round off to the Nearest Integer)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
100

Question Number : 24 Question Id : 8643512004 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

\( x = 2 \) ద్వారా మాత్రమే \( x \)-ఉండి (intersection) బిందుస్థ్యంలో\( \vec{F} = 4 \hat{i} + 3 \hat{j} + 4 \hat{k} \) అండులే మార్పు పొందాలని లేదు. \((2, 3, 4)\) బిందుస్థ్యం పరిమాణ ను మార్పు పొందాలని లేదు నిఘంధము లేదు.

(అంచు పొడవు సూచించబడింది ప్రాబల్యం).

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
100

Question Number : 25 Question Id : 8643512005 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
A solid disc of radius ‘a’ and mass ‘m’ rolls down without slipping on an inclined plane making an angle θ with the horizontal. The acceleration of the disc will be \( \frac{2}{b} g \sin \theta \) where \( b \) is \( \underline{\text{__________}} \). (Round off to the Nearest Integer)

\( g \) = acceleration due to gravity
\( \theta \) = angle as shown in figure

**Response Type:** Numeric  
**Evaluation Required For SA:** Yes  
**Show Word Count:** Yes  
**Answers Type:** Equal  
**Text Areas:** PlainText  
**Possible Answers:** 100

**Question Number : 25**  
**Question Id : 8643512005**  
**Question Type : SA**  
**Correct Marks : 4**  
**Wrong Marks : 0**
For an ideal heat engine, the temperature of the source is 127°C. In order to have 60% efficiency the temperature of the sink should be \( \underline{\text{_________}}{}^\circ \text{C} \). (Round off to the Nearest Integer)

Question Number : 26 Question Id : 8643512006 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Question Number : 26 Question Id : 8643512006 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Question Number : 27 Question Id : 8643512007 Question Type : SA
Correct Marks : 4 Wrong Marks : 0
In a parallel plate capacitor set up, the plate area of capacitor is 2 m² and the plates are separated by 1 m. If the space between the plates are filled with a dielectric material of thickness 0.5 m and area 2 m² (see fig) the capacitance of the set-up will be \( \text{---} \varepsilon_0 \). (Dielectric constant of the material = 3.2) (Round off to the Nearest Integer)

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Equal
Text Areas: PlainText
Possible Answers:
100
The energy dissipated by a resistor is 10 mJ in 1 s when an electric current of 2 mA flows through it. The resistance is \( \frac{d}{2} \) \( \varepsilon \) (where \( \varepsilon \) is the permittivity of free space = 3.2). (The magnetic field is negligible considering.)

Question Number : 28 Question Id : 8643512008 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

The energy dissipated by a resistor is 10 mJ in 1 s when an electric current of 2 mA flows through it. The resistance is \( \frac{d}{2} \) \( \varepsilon \). (Round off to the Nearest Integer)
Question Number : 28  Question Id : 8643512008  Question Type : SA
Correct Marks : 4  Wrong Marks : 0

1 s = 2 mA 时刻 తో నిష్టగా 25 వసతి మాట్లాడే తూతి వసతి నుండి మారి దానింటాం 10 mJ. వసతి చేరు ఇది ఒంటు బుంబడి వేతిలు ఎరుపు అనుసరించండి (తిన వసతి యౌరవులు నాటికి సాధనా)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
100

Question Number : 29  Question Id : 8643512009  Question Type : SA
Correct Marks : 4  Wrong Marks : 0

A deviation of 2° is produced in the yellow ray when prism of crown and flint glass are achromatically combined. Taking dispersive powers of crown and flint glass as 0.02 and 0.03 respectively and refractive index for yellow light for these glasses are 1.5 and 1.6 respectively. The refracting angles for crown glass prism will be _______° (in degree). (Round off to the Nearest Integer)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
100

Question Number : 29  Question Id : 8643512009  Question Type : SA
Correct Marks : 4  Wrong Marks : 0

ఫ్రాండియా యౌరాం మందితా టుండి యౌరాం అందకర రీతిలో సిద్ధం కారణ తూతి యౌరాం నిడం మాట్లాడే 0.02 మందితా 0.03 మందితా అనే తూతి యౌరాం మాట్లాడే తూతి వసతి సిద్ధం కారణం 1.5 సిద్ధం 1.6. టుండి యౌరాం వసతి సిద్ధం కారణం ఎరుపు అనుసరించండి (తిన వసతి యౌరవులు నాటికి సాధనా)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
A closed organ pipe of length $L$ and an open organ pipe contain gases of densities $\rho_1$ and $\rho_2$ respectively. The compressibility of gases are equal in both the pipes. Both the pipes are vibrating in their first overtone with same frequency. The length of the open pipe is \( \frac{x}{3} L \sqrt{\frac{\rho_1}{\rho_2}} \) where $x$ is __________. (Round off to the Nearest Integer)

Question Number : 30  Question Id : 8643512010  Question Type : SA
Correct Marks : 4  Wrong Marks : 0

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers : 100
The INCORRECT statement regarding the structure of C₆₀ is:

Options:

8643516031. It contains 12 six-membered rings and 24 five-membered rings.

8643516032. The six-membered rings are fused to both six and five-membered rings.

8643516033. The five-membered rings are fused only to six-membered rings.

8643516034. Each carbon atom forms three sigma bonds.

C₆₀ వస్త్రాలు కనుగొనినప్పటి నిర్దేశశాఖలకు ప్రమాదమినది?

Options:

8643516031. దానిని ఎన్ని కంటే కంటే 12 కంటే ఏడు కంటే కంటే కంటే కంటే 24 కంటే కంటే.

8643516032. ఏడు కంటే కంటే, ఏడు కంటే ఏడు కంటే కంటే ఏడు (fused) కంటే.

8643516033. ఏడు కంటే కంటే, ఏడు కంటే కంటే ఏడు కంటే కంటే కంటే.
The INCORRECT statements below regarding colloidal solutions is:

Options:

8643516035. A colloidal solution shows colligative properties.

8643516036. A colloidal solution shows Brownian motion of colloidal particles.

8643516037. The flocculating power of Al$^{3+}$ is more than that of Na$^+$. An ordinary filter paper can stop the flow of colloidal particles.

8643516038.

Question Number : 33 Question Id : 8643512013 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Question Number : 33 Question Id : 8643512013 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1
The characteristics of elements X, Y and Z with atomic numbers, respectively, 33, 53 and 83 are:

Options:
8643516039. X, Y and Z are metals.
8643516040. X and Z are non-metals and Y is a metalloid.
8643516041. X is a metalloid, Y is a non-metal and Z is a metal.
8643516042. X and Y are metalloids and Z is a metal.

Question Number: 34 Question Id: 8643512014 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1
Which of the following reduction reaction CANNOT be carried out with coke?
Options:
8643516043. Fe₂O₃ → Fe
8643516044. ZnO → Zn
8643516045. Cu₂O → Cu
\[ \text{Al}_2\text{O}_3 \rightarrow \text{Al} \]
8643516046.

**Question Number : 34 Question Id : 8643512014 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**
**Correct Marks : 4 Wrong Marks : 1**

మాత్రం తిరిగుతుంది నేతి ప్రయోగాలు పరిస్థితులే రాసినా (రాసినా)?

**Options :**

\[ \text{Fe}_2\text{O}_3 \rightarrow \text{Fe} \]
8643516043.

\[ \text{ZnO} \rightarrow \text{Zn} \]
8643516044.

\[ \text{Cu}_2\text{O} \rightarrow \text{Cu} \]
8643516045.

\[ \text{Al}_2\text{O}_3 \rightarrow \text{Al} \]
8643516046.

**Question Number : 35 Question Id : 8643512015 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No**
**Correct Marks : 4 Wrong Marks : 1**

The correct statements about \( \text{H}_2\text{O}_2 \) are:

(A) used in the treatment of effluents.

(B) used as both oxidising and reducing agents.

(C) the two hydroxyl groups lie in the same plane.

(D) miscible with water.

Choose the correct answer from the options given below:

**Options :**

(A), (B) and (D) only
8643516047.

(B), (C) and (D) only
8643516048.

(A), (C) and (D) only
8643516049.

(A), (B), (C) and (D)
8643516050.
Question Number : 35 Question Id : 8643512015 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\( \text{H}_2\text{O}_2 \) కి నందింది విధానం మిస్టేషన్ చేసినా?

(A) అమ్మినో (efluents) అభిధిని (treatment) తీ ఆమదేవికం.

(B) అమ్మినో కాగడు ఆసిటి రాగి తండ్రీషు ఆమదేవికం.

(C) తొని ప్రవృత్తి నాగార్జున ఉపస్పదల నుండి తమోసం కావచ్చు.

(D) చిత్తు చిత్తుకుందా సిటియల్ (miscible).

హీట్ వాయిసింగ్ స్టాండి నందింది విధానం మిస్టేషన్ చేసినా?

Options :

8643516047. (A), (B) కంమిటి ఆమదేవి

8643516048. (B), (C) కంమిటి ఆమదేవి

8643516049. (A), (C) కంమిటి ఆమదేవి

8643516050. (A), (B), (C) కంమిటి ఆమదేవి

Question Number : 36 Question Id : 8643512016 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Identify the elements X and Y using the ionisation energy values given below:

\[
\text{Ionization energy (kJ/mol)}
\begin{array}{c|c|c}
\text{} & 1^{\text{st}} & 2^{\text{nd}} \\
\hline
\text{X} & 495 & 4563 \\
\text{Y} & 731 & 1450 \\
\end{array}
\]

Options :

8643516051. \( X = \text{Na} \); \( Y = \text{Mg} \)

8643516052. \( X = \text{Mg} \); \( Y = \text{Na} \)
8643516053. \( X = F; \quad Y = Mg \)

8643516054. \( X = Mg; \quad Y = F \)

**Question Number : 36**  
**Question Id : 8643512016**  
**Question Type : MCQ**  
**Option Shuffling : Yes**  
**Is Question Mandatory : No**  
**Correct Marks : 4**  
**Wrong Marks : 1**

<table>
<thead>
<tr>
<th></th>
<th>1st</th>
<th>2nd</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>495</td>
<td>4563</td>
</tr>
<tr>
<td>Y</td>
<td>731</td>
<td>1450</td>
</tr>
</tbody>
</table>

**Options :**

8643516051. \( X = Na; \quad Y = Mg \)

8643516052. \( X = Mg; \quad Y = Na \)

8643516053. \( X = F; \quad Y = Mg \)

8643516054. \( X = Mg; \quad Y = F \)

**Question Number : 37**  
**Question Id : 8643512017**  
**Question Type : MCQ**  
**Option Shuffling : Yes**  
**Is Question Mandatory : No**  
**Correct Marks : 4**  
**Wrong Marks : 1**

The exact volumes of 1 M NaOH solution required to neutralise 50 mL of 1 M \( H_3PO_3 \) solution and 100 mL of 2 M \( H_3PO_2 \) solution, respectively, are:

**Options :**

8643516055. 50 mL and 50 mL

8643516056. 100 mL and 50 mL

8643516057. 100 mL and 200 mL

8643516058. 100 mL and 100 mL
Question Number : 37 Question Id : 8643512017 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No 
Correct Marks : 4 Wrong Marks : 1

50 mL 1 M H₃PO₃ లో ఉండటం మరియు 100 mL 2 M H₃PO₃లో ఉండటం కలంతో కేటాకండి 1 M NaOH లో నీటి ఉండనం కేయలి:

Options :
8643516055. 50 mL లో 100 mL
8643516056. 100 mL లోపై 50 mL
8643516057. 100 mL లోపై 200 mL
8643516058. 100 mL లోపై 100 mL

Question Number : 38 Question Id : 8643512018 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No 
Correct Marks : 4 Wrong Marks : 1

Arrange the following metal complexes in the increasing order of spin only magnetic moment. Presume all the three, high spin system. (Atomic numbers Ce = 58, Gd = 64 and Eu = 63.)
(a) (NH₄)₂[Ce(NO₃)₆]    (b) Gd(NO₃)₃ and      (c) Eu(NO₃)₃

Answer is :

Options :
8643516059. (a) < (b) < (c)
8643516060. (a) < (c) < (b)
8643516061. (b) < (a) < (c)
8643516062. (c) < (a) < (b)
(a) \((\text{NH}_4)\text{[Ce(NO}_3\text{)}_6]\)   (b) \(\text{Gd(NO}_3\text{)}_3\)   (c) \(\text{Eu(NO}_3\text{)}_3\)

Options:

8643516059.  \((a) < (b) < (c)\)

8643516060.  \((a) < (c) < (b)\)

8643516061.  \((b) < (a) < (c)\)

8643516062.  \((c) < (a) < (b)\)

Question Number : 39  Question Id : 8643512019  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No  Correct Marks : 4  Wrong Marks : 1

\(\text{Fex}_2\) and \(\text{Fey}_3\) are known when \(x\) and \(y\) are:

Options:

8643516063.  \(x=\text{F, Cl, Br, I}\) and \(y=\text{F, Cl, Br, I}\)

8643516064.  \(x=\text{F, Cl, Br, I}\) and \(y=\text{F, Cl, Br}\)

8643516065.  \(x=\text{F, Cl, Br and y= F, Cl, Br, I}\)

8643516066.  \(x=\text{Cl, Br, I}\) and \(y=\text{F, Cl, Br, I}\)

Question Number : 39  Question Id : 8643512019  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No  Correct Marks : 4  Wrong Marks : 1

\(x\) మరియు \(y\) లైంగు ప్రాంతంలో నిలువు ఉండే \(\text{Fex}_2\) మరియు \(\text{Fey}_3\) అనే స్పందితాలు (known).

Options:

8643516063.  \(x=\text{F, Cl, Br, I}\) మరియు \(y=\text{F, Cl, Br, I}\)
The green house gas/es is (are):
(A) Carbon dioxide
(B) Oxygen
(C) Water vapour
(D) Methane
Choose the most appropriate answer from the options given below:
Options:
(A) only

(A) and (C) only

(A), (C) and (D) only

(A) and (B) only
Question Number : 41 Question Id : 8643512021 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>Test/Reagents/Observation(s)</td>
<td>Species detected</td>
</tr>
<tr>
<td>(a) Lassaigne’s Test</td>
<td>(i) Carbon</td>
</tr>
<tr>
<td>(b) Cu(II) oxide</td>
<td>(ii) Sulphur</td>
</tr>
<tr>
<td>(c) Silver nitrate</td>
<td>(iii) N, S, P, and halogen</td>
</tr>
<tr>
<td>(d) The sodium fusion extract gives black</td>
<td>(iv) Halogen Specifically</td>
</tr>
<tr>
<td>precipitate with acetic acid and lead</td>
<td></td>
</tr>
<tr>
<td>acetate</td>
<td></td>
</tr>
</tbody>
</table>

The correct match is :

Options :

8643516071. (a)-(i), (b)-(ii), (c)-(iv), (d)-(iii)
8643516072. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

8643516073. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

8643516074. (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)

Question Number : 41 Question Id : 8643512021 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

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

8643516072. (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)

8643516073. (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv)

8643516074. (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)

Question Number : 42 Question Id : 8643512022 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Statement I : Sodium hydride can be used as an oxidising agent.

Statement II : The lone pair of electrons on nitrogen in pyridine makes it basic.

Choose the CORRECT answer from the options given below:

Options :
8643516075. Both statement I and statement II are true

8643516076. Both statement I and statement II are false

8643516077. Statement I is true but statement II is false

8643516078. Statement I is false but statement II is true

---

Question Number : 42 Question Id : 8643512022 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Options :
8643516075. సియముల చేయడానికి సియముల ఆధారం కలిగినవి.

8643516076. సియముల చేయడానికి సియముల ఆధారం కలిగినవి.

8643516077. సియముల చేయడానికి సియముల ఆధారం కలిగినవి.

8643516078. సియముల చేయడానికి సియముల ఆధారం కలిగినవి.

---

Question Number : 43 Question Id : 8643512023 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
An unsaturated hydrocarbon \( X \) on ozonolysis gives \( A \). Compound \( A \) when warmed with ammonical silver nitrate forms a bright silver mirror along the sides of the test tube. The unsaturated hydrocarbon \( X \) is:

**Options:**

- \( \text{CH}_3 - \text{C} = \text{C} - \text{CH}_3 \)
  - 8643516079.

- \( \text{CH}_3 - \text{C} = \text{C} - \text{CH}_3 \) \( \text{CH}_3 \text{CH}_3 \)
  - 8643516080.

- \( \text{HC} \equiv \text{C} - \text{CH}_2 - \text{CH}_3 \)
  - 8643516081.

- \( \text{CH}_3 - \text{C} = \text{C} - \text{CH}_3 \) \( \text{CH}_3 \) \( \text{CH}_3 \) \( \text{CH}_3 \) \( \text{CH}_3 \)
  - 8643516082.

---

**Question Number : 43**  
**Question Id : 8643512023**  
**Question Type : MCQ**  
**Option Shuffling : Yes**  
**Is Question Mandatory : No**

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

A cetone which on ozonolysis gives \( A \) and on warming with ammonical silver nitrate forms a bright silver mirror along the sides of the test tube. Compound \( A \) on warming with ammonical silver nitrate forms a bright silver mirror along the sides of the test tube. The unsaturated hydrocarbon \( X \) is:

**Options:**

- \( \text{CH}_3 - \text{C} = \text{C} - \text{CH}_3 \)
  - 8643516079.

- \( \text{CH}_3 - \text{C} = \text{C} - \text{CH}_3 \) \( \text{CH}_3 \text{CH}_3 \)
  - 8643516080.

- \( \text{HC} \equiv \text{C} - \text{CH}_2 - \text{CH}_3 \)
  - 8643516081.

- \( \text{CH}_3 - \text{C} = \text{C} - \text{CH}_3 \) \( \text{CH}_3 \) \( \text{CH}_3 \) \( \text{CH}_3 \) \( \text{CH}_3 \)
  - 8643516082.
Identify the reagent(s) ‘A’ and condition(s) for the reaction

Options:

8643516083. $A = \text{Cl}_2$; dark, Anhydrous AlCl$_3$

8643516084. $A = \text{HCl}$, ZnCl$_2$

8643516085. $A = \text{Cl}_2$; UV light

8643516086. $A = \text{HCl}$; Anhydrous AlCl$_3$

번역

문제 번호: 44  질문 ID: 8643512024  퀴즈 유형: MCQ  옵션 섞임: Yes  вопрос 필수: No  올바른 점수: 4  틀린 점수: 1

문자 그룹  A  로 변환되는 조건 및 재агент을 식별하십시오.

خيارات:

8643516083. $A = \text{Cl}_2$; 어두운 색상, Anhydrous AlCl$_3$

8643516084. $A = \text{HCl}$, ZnCl$_2$

8643516085. $A = \text{Cl}_2$; UV 밝기

8643516086. $A = \text{HCl}$; Anhydrous AlCl$_3$
\[ A = \text{HCl} ; \text{HCl} \rightarrow \text{AlCl}_3 \]

Question Number : 45  Question Id : 8643512025  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No  Correct Marks : 4  Wrong Marks : 1

In the above reaction, the reagent “A” is:

Options:
- \( \text{LiAlH}_4 \)
- Alkaline \( \text{KMnO}_4 \cdot \text{H}^+ \)
- \( \text{HCl} \), \( \text{Zn} - \text{Hg} \)
- \( \text{NaBH}_4 \cdot \text{H}_3\text{O}^+ \)

---

8643516086.
Question Number : 46  Question Id : 8643512026  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No  Correct Marks : 4  Wrong Marks : 1

The structure of $X$ is:

Options:

1. ![Option 1](image1)
2. ![Option 2](image2)
3. ![Option 3](image3)
Question Number : 46  Question Id : 8643512026  Question Type : MCQ  Option Shuffling : Yes  Is Question Mandatory : No  Correct Marks : 4  Wrong Marks : 1

\[
\begin{align*}
\text{CN} & \quad \text{C}_6\text{H}_5\text{MgBr} & \quad \text{Ether} & \quad \text{dry} & \quad \text{OCH}_3 \\
\text{OCH}_3 & \quad \text{H}_3\text{O}^+ & \quad \text{(1.0 equivalent)} & \quad \text{X} & \quad (\text{意図を達成させる})
\end{align*}
\]

X विश्लेषण :

Options :

- \[8643516091.\]
- \[8643516092.\]
- \[8643516093.\]
Which of the following is least basic?

Options:

8643516095. \((\text{CH}_3\text{CO})_2\text{NH}\)

8643516096. \((\text{C}_2\text{H}_5)_2\text{NH}\)

8643516097. \((\text{CH}_3\text{CO})\text{NH}_2\text{C}_2\text{H}_5\)

8643516098. \((\text{C}_2\text{H}_5)_3\text{N}\)
Ammonolysis of Alkyl halides followed by the treatment with NaOH solution can be used to prepare primary, secondary and tertiary amines. The purpose of NaOH in the reaction is:

**Options:**

8643516099. to remove basic impurities

8643516100. to activate NH₃ used in the reaction

8643516101. to increase the reactivity of alkyl halide

8643516102. to remove acidic impurities

---

8643516103.

---

Question Number : 49 Question Id : 8643512029 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Which of the following polymer is used in the manufacture of wood laminates ?

**Options:**

8643516103. Melamine formaldehyde resin
8643516104. Urea formaldehyde resin

8643516105. cis-poly isoprene

8643516106. Phenol and formaldehyde resin

Question Number : 49 Question Id : 8643512029 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The secondary structure of protein is stabilised by :

Options :

8643516103. van der Waals forces

8643516104. Peptide bond

8643516105. Hydrogen bonding

8643516106. glycosidic bond
When 35 mL of 0.15 M lead nitrate solution is mixed with 20 mL of 0.12 M chromic sulphate solution, \( \ldots \times 10^{-5} \) moles of lead sulphate precipitate out. (Round off to the Nearest Integer).

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Equal
Text Areas: PlainText
Possible Answers: 100
Question Number : 51  Question Id : 8643512031  Question Type : SA  
Correct Marks : 4  Wrong Marks : 0  
35 mL $\times$ 0.15 M 100 $\times$ 20 mL $\times$ 0.12 M \[\text{知らない 希望 素敵な} \text{ ひまわり} \text{ 花びら} \text{ 好きな}\]

\[\_\_\_\_\_\times 10^{-5} \text{ ヘクタール} \times \text{ 希望} \text{ 希望 希望 希望 希望} \text{ 花びら} \text{ 好きな} \text{ ひまわり} \text{ 花びら} \text{ 好きな}\]. ( hormones 使いたい 希望 希望 希望 希望)

Response Type : Numeric  
Evaluation Required For SA : Yes  
Show Word Count : Yes  
Answers Type : Equal  
Text Areas : PlainText  
Possible Answers : 100

Question Number : 52  Question Id : 8643512032  Question Type : SA  
Correct Marks : 4  Wrong Marks : 0  
Ga (atomic mass 70 u) crystallizes in a hexagonal close packed structure. The total number of voids in 0.581 g of Ga is \[\_\_\_\_\_\times 10^{21}\]. (Round off to the Nearest Integer).

\[\text{[Given: } N_A = 6.023 \times 10^{23}\] 

Response Type : Numeric  
Evaluation Required For SA : Yes  
Show Word Count : Yes  
Answers Type : Equal  
Text Areas : PlainText  
Possible Answers : 100

Question Number : 52  Question Id : 8643512032  Question Type : SA  
Correct Marks : 4  Wrong Marks : 0  
Ga (atomic mass 70 u) crystallizes in a hexagonal close packed structure. The total number of voids in 0.581 g of Ga is \[\_\_\_\_\_\times 10^{21}\]. (Round off to the Nearest Integer).

\[N_A = 6.023 \times 10^{23}\] 

Response Type : Numeric  
Evaluation Required For SA : Yes  
Show Word Count : Yes  
Answers Type : Equal  
Text Areas : PlainText  
Possible Answers : 100
The number of orbitals with \( n = 5, m_l = +2 \) is _______. (Round off to the Nearest Integer).

**Response Type**: Numeric
**Evaluation Required For SA**: Yes
**Show Word Count**: Yes
**Answers Type**: Equal
**Text Areas**: PlainText
**Possible Answers**:
100

At 25°C, 50 g of iron reacts with HCl to form FeCl₂. The evolved hydrogen gas expands against a constant pressure of 1 bar. The work done by the gas during this expansion is _________ J.

(Round off to the Nearest Integer).

[Given: \( R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1} \). Assume, hydrogen is an ideal gas]

[Atomic mass of Fe is 55.85 u]

**Response Type**: Numeric
**Evaluation Required For SA**: Yes
**Show Word Count**: Yes
**Answers Type**: Equal
**Text Areas**: PlainText
**Possible Answers**:
100
25°C లో, 50 g లో లేదా HCl లో మరియు FeCl₂ లో వాటి సంఖ్య. అంతేది, ప్రత్యేక సంఖ్యలు, 1 bar లో సాధారణ ప్రాంతాలు నిర్ధిష్టం. అంతేది, వాటి సంఖ్యలు అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత 

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

\[ \text{Fe}^{2+} \text{ ని మనం లేదు అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత} \]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
100

Question Number : 55 Question Id : 8643512035 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

At 363 K, the vapour pressure of A is 21 kPa and that of B is 18 kPa. One mole of A and 2 moles of B are mixed. Assuming that this solution is ideal, the vapour pressure of the mixture is _________ kPa. (Round off to the Nearest Integer).

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
100

Question Number : 55 Question Id : 8643512035 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

363 K లో, A మైదాన వాటి సంఖ్య 21 kPa మరియు B వాటి సంఖ్య 18 kPa. అంతేది A మరియు 2 మరియు B మరియు చాలా మంది. ప్రత్యేకముగా, అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత అంధ్రప్రదేశ్ ఉత్తరాధికారిత్వ చేసే తరువాత 

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Sulphurous acid (H₂SO₃) has Ka₁ = 1.7 × 10⁻² and Ka₂ = 6.4 × 10⁻⁸. The pH of 0.588 M H₂SO₃ is _________. (Round off to the Nearest Integer).

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
100
Question Number : 57 Question Id : 8643512037 Question Type : SA  
Correct Marks : 4 Wrong Marks : 0  
\[ \text{conductance} \] 0.55 mS  
\[ \text{m}^2 \text{mol}^{-1} \text{min}^{-1} \].  

Response Type : Numeric  
Evaluation Required For SA : Yes  
Show Word Count : Yes  
Answers Type : Equal  
Text Areas : PlainText  
Possible Answers :  
100

Question Number : 58 Question Id : 8643512038 Question Type : SA  
Correct Marks : 4 Wrong Marks : 0  
A and B decompose via first order kinetics with half-lives 54.0 min and 18.0 min respectively. Starting from an equimolar non reactive mixture of A and B, the time taken for the concentration of A to become 16 times that of B is ________ min.  
(Round off to the Nearest Integer).

Response Type : Numeric  
Evaluation Required For SA : Yes  
Show Word Count : Yes  
Answers Type : Equal  
Text Areas : PlainText  
Possible Answers :  
100

Question Number : 58 Question Id : 8643512038 Question Type : SA  
Correct Marks : 4 Wrong Marks : 0  
A и B устойчивы к реакции, они не взаимодействуют. Начальная концентрация A и B в инициале (A, B и неустойчивы на реакции) значит, что A и B равны 16 т. е. они взаимодействуют ________ мин.  
(округление до ближайшей ближайшей целой минуты).

Response Type : Numeric  
Evaluation Required For SA : Yes  
Show Word Count : Yes
Question Number : 59 Question Id : 8643512039 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

\([\text{Ti(H}_2\text{O)}_6\text{]}^{3+}\) absorbs light of wavelength 498 nm during a d – d transition. The octahedral splitting energy for the above complex is \(\underline{\text{______}} \times 10^{-19}\) J. (Round off to the Nearest Integer). \(\ h = 6.626 \times 10^{-34}\) Js; \(c = 3 \times 10^8\) ms\(^{-1}\)

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

100

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Question Number : 59 Question Id : 8643512039 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

\([\text{Ti(H}_2\text{O)}_6\text{]}^{3+}\), 498 nm రంగానుమతి కంటే ఉంది. ఇది d – d కాశనంతో సంబంధించింది. అదే కాశనం అంతే నిష్టలు ఉన్నాయి, కాబట్టి మూడు చివరి \\(\underline{\text{______}} \times 10^{-19}\) J. (నాభితే దానికి సంబంధించిన).
\(h = 6.626 \times 10^{-34}\) Js; \(c = 3 \times 10^8\) ms\(^{-1}\)

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

100

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Question Number : 60 Question Id : 8643512040 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

In Duma’s method of estimation of nitrogen, 0.1840 g of an organic compound gave 30 mL of nitrogen collected at 287 K and 758 mm of Hg pressure. The percentage composition of nitrogen in the compound is \(\underline{\text{______}}\). (Round off to the Nearest Integer).

[Given : Aqueous tension at 287 K = 14 mm of Hg]

Response Type : Numeric
Evaluation Required For SA : Yes
Question Number : 60 Question Id : 8643512040 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

\[ \text{Given: } 0.1840 \text{ g of } H_2 \text{ and } 287 \text{ K and } 758 \text{ mm Hg, } 30 \text{ mL of } \text{H}_2 \text{ gas.}
\]

Find the pressure of the gas in the container after the reaction. (Assume ideal gas behavior.)

\[ [287 \text{ K and } 758 \text{ mm Hg} = 14 \text{ mm of Hg}] \]

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
100

Mathematics Section A

Section Id : 864351137
Section Number : 5
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 : 864351137
Question Shuffling Allowed : Yes

Question Number : 61 Question Id : 8643512041 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
If the foot of the perpendicular from point \((4, 3, 8)\) on the line \(L_1: \frac{x-a}{l} = \frac{y-2}{3} = \frac{z-b}{4}\), \(l \neq 0\) is \((3, 5, 7)\), then the shortest distance between the line \(L_1\) and line \(L_2: \frac{x-2}{3} = \frac{y-4}{4} = \frac{z-5}{5}\) is equal to:

Options:

\[
\begin{align*}
1 & \quad \frac{1}{\sqrt{6}} \\
& \quad \frac{1}{2} \\
& \quad \frac{1}{\sqrt{3}} \\
& \quad \frac{2}{\sqrt{3}} \\
& \quad \sqrt{3}
\end{align*}
\]
Let the lengths of intercepts on x-axis and y-axis made by the circle \( x^2 + y^2 + ax + 2ay + c = 0, \) (\( a < 0 \)) be \( 2\sqrt{2} \) and \( 2\sqrt{5} \), respectively. Then the shortest distance from origin to a tangent to this circle which is perpendicular to the line \( x + 2y = 0 \), is equal to:

Options:
8643516125. \( \sqrt{10} \)
8643516126. \( \sqrt{11} \)
8643516127. \( \sqrt{7} \)
8643516128. \( \sqrt{6} \)
Let \( \vec{a} = \hat{i} + 2\hat{j} - 3\hat{k} \) and \( \vec{b} = 2\hat{i} - 3\hat{j} + 5\hat{k} \). If \( \vec{r} \times \vec{a} = \vec{b} \times \vec{r} \), \( \vec{r} \cdot (\alpha \hat{i} + 2\hat{j} + \hat{k}) = 3 \)

and \( \vec{r} \cdot (2\hat{i} + 5\hat{j} - \alpha\hat{k}) = -1 \), \( \alpha \in \mathbb{R} \), then the value of \( \alpha + |\vec{r}|^2 \) is equal to:

Options:

8643516129. 9
8643516130. 11
8643516131. 13
8643516132. 15

Question Number : 63 Question Id : 8643512043 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Question Number : 64 Question Id : 8643512044 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Let \( f \) be a real valued function, defined on \( \mathbb{R} - \{-1, 1\} \) and given by
\[
f(x) = 3 \log_e \frac{x - 1}{x + 1} - \frac{2}{x - 1}.
\]

Then in which of the following intervals, function \( f(x) \) is increasing?

**Options:**

8643516133.

\[ (-\infty, -1) \cup \left[ \left( -1, \frac{1}{2} \right), \infty \right) - \{1\} \]

8643516134.

\[ (-\infty, \frac{1}{2}] - \{-1\} \]

8643516135.

\[ (-1, \frac{1}{2}] \]

8643516136.
\[ (-1, \frac{1}{2}] \]

8643516136.

Question Number : 65 Question Id : 8643512045 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

If the points of intersections of the ellipse \( \frac{x^2}{16} + \frac{y^2}{b^2} = 1 \) and the circle \( x^2 + y^2 = 4b, b > 4 \) lie on the curve \( y^2 = 3x^2 \), then \( b \) is equal to :

Options :
8643516137. 5
8643516138. 6
8643516139. 10
8643516140. 12

Question Number : 65 Question Id : 8643512045 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

\[ \frac{x^2}{16} + \frac{y^2}{b^2} = 1 \] 若椭圆心与圆心 \( x^2 + y^2 = 4b, b > 4 \) 的交点在曲线 \( y^2 = 3x^2 \) 上，\( b \) 等于:

Options :
8643516137. 5
8643516138. 6
8643516139. 10
8643516140. 12

Question Number : 66 Question Id : 8643512046 Question Type : MCQ Option Shuffling : Yes Is
Let C be the locus of the mirror image of a point on the parabola $y^2 = 4x$ with respect to the line $y = x$. Then the equation of tangent to C at P(2, 1) is:

Options:

1. $x + 3y = 5$
2. $2x + y = 5$
3. $x - y = 1$
4. $x + 2y = 4$

Let A denote the event that a 6-digit integer formed by 0, 1, 2, 3, 4, 5, 6 without repetitions, be divisible by 3. Then probability of event A is equal to:

Options:

\[
\frac{4}{9}
\]
Question Number : 67 Question Id : 8643512047 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Options : 
\[
\frac{3}{7} \quad 8643516146.
\]
\[
\frac{11}{27} \quad 8643516147.
\]
\[
\frac{9}{56} \quad 8643516148.
\]

Question Number : 68 Question Id : 8643512048 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1
Options : 
If \( y = y(x) \) is the solution of the differential equation \( \frac{dy}{dx} + (\tan x) y = \sin x, \ 0 \leq x \leq \frac{\pi}{3} \), with \( y(0) = 0 \), then \( y\left(\frac{\pi}{4}\right) \) equal to :
Options :
\[
\left( \frac{1}{2\sqrt{2}} \right) \log_e 2
\]

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

\[
\log_e 2
\]

\[
\frac{1}{4} \log_e 2
\]

**Question Number : 68**

**Question Id : 8643512048**

**Question Type : MCQ**

**Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4**

**Wrong Marks : 1**

**Options :**

\[
\left( \frac{1}{2\sqrt{2}} \right) \log_e 2
\]

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

\[
\log_e 2
\]

\[
\frac{1}{4} \log_e 2
\]

**Question Number : 69**

**Question Id : 8643512049**

**Question Type : MCQ**

**Option Shuffling : Yes**

**Is Question Mandatory : No**

**Correct Marks : 4**

**Wrong Marks : 1**
Let \( \alpha \in \mathbb{R} \) be such that the function 
\[
f(x) = \begin{cases} 
\frac{\cos^{-1}(1 - \{x\}^2) \sin^{-1}(1 - \{x\})}{\{x\} - \{x\}^3}, & x \neq 0 \\
\alpha, & x = 0
\end{cases}
\]
is continuous at \( x = 0 \), where \( \{x\} = x - [x] \), [x] is the greatest integer less than or equal to \( x \).

Then:

**Options:**

8643516153. \( \alpha = 0 \)

8643516154. no such \( \alpha \) exists

8643516155. \( \alpha = \frac{\pi}{\sqrt{2}} \)

8643516156. \( \alpha = \frac{\pi}{4} \)
If \((x, y, z)\) be an arbitrary point lying on a plane \(P\) which passes through the points \((42, 0, 0)\), \((0, 42, 0)\) and \((0, 0, 42)\), then the value of the expression

\[
3 + \frac{x-11}{(y-19)^2 (z-12)^2} + \frac{y-19}{(x-11)^2 (z-12)^2} + \frac{z-12}{(x-11)^2 (y-19)^2} - \frac{x+y+z}{14(x-11)(y-19)(z-12)}
\]

is equal to:

Options:

- \(8643516157\). \(-45\)
- \(8643516158\). \(39\)
- \(8643516159\). \(0\)
- \(8643516160\). \(3\)
Question Number: 71  Question Id: 8643512051  Question Type: MCQ  Option Shuffling: Yes  Is Question Mandatory: No
Correct Marks: 4  Wrong Marks: 1

Let $A = \{2, 3, 4, 5, \ldots, 30\}$ and $\sim$ be an equivalence relation on $A \times A$, defined by $(a, b) \sim (c, d)$ if and only if $ad = bc$. Then the number of ordered pairs which satisfy this equivalence relation with ordered pair $(4, 3)$ is equal to:

Options:

8643516161. 5
8643516162. 6
8643516163. 7
8643516164. 8
Let \( P(x) = x^2 + bx + c \) be a quadratic polynomial with real coefficients such that \( \int_0^1 P(x) \, dx = 1 \) and \( P(x) \) leaves remainder 5 when it is divided by \( (x - 2) \). Then the value of \( 9(b + c) \) is equal to:

**Options:**

1. 8643516165.
2. 8643516166.
3. 8643516167.
4. 8643516168.

---

Question Number : 73 Question Id : 8643512053 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

\[(x - 2) \text{ ఒకే మార్గానిక అంతే} 5 \text{ మార్గానిక మాంత్రితులు,} \int_0^1 P(x) \, dx = 1 \text{ ఎంపికి అంతే హంచు నుంచి వాటి మార్గానిక}

\( \text{గాంచివేయంచాలి} \) నే కంటే ఎంత మార్గానిక యేస్తే \( P(x) = x^2 + bx + c \) ఎంపికి అంతే. అలాంటిగా హంచు నుంచి 9(b + c) ఎంపికి మాంత్రితులు :

**Options:**

1. 8643516165.
2. 8643516166.
3. 8643516167.
4. 8643516168.

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Question Number : 74 Question Id : 8643512054 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

\[(x^2 + bx + c) \text{ ఒకే మార్గానిక అంతే} 5 \text{ మార్గానిక మాంత్రితులు,} \int_0^1 P(x) \, dx = 1 \text{ ఎంపికి అంతే హంచు నుంచి వాటి మార్గానిక}

\( \text{గాంచివేయంచాలి} \) నే కంటే ఎంత మార్గానిక యేస్తే \( P(x) = x^2 + bx + c \) ఎంపికి అంతే. అలాంటిగా హంచు నుంచి 9(b + c) ఎంపికి మాంత్రితులు :

**Options:**

1. 8643516165.
2. 8643516166.
3. 8643516167.
4. 8643516168.
Consider a rectangle ABCD having 5, 7, 6, 9 points in the interior of the line segments AB, CD, BC, DA respectively. Let $\alpha$ be the number of triangles having these points from different sides as vertices and $\beta$ be the number of quadrilaterals having these points from different sides as vertices. Then $(\beta - \alpha)$ is equal to:

Options:

8643516169. 1173

8643516170. 1890

8643516171. 717

8643516172. 795

Question Number: 73 Question Id: 8643512053 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1

8643516169. 1173

8643516170. 1890

8643516171. 717

8643516172. 795

Question Number: 74 Question Id: 8643512054 Question Type: MCQ Option Shuffling: Yes Is Question Mandatory: No
Correct Marks: 4 Wrong Marks: 1
Consider the integral
\[ I = \int_0^{10} \frac{[x] e^{[x]}}{e^{x-1}} \, dx, \]
where \([x]\) denotes the greatest integer less than or equal to \(x\). Then the value of \(I\) is equal to:

Options:

- 8643516173. 45 \((e+1)\)
- 8643516174. 9 \((e+1)\)
- 8643516175. 45 \((e-1)\)
- 8643516176. 9 \((e-1)\)

Question Number: 75
Question Id: 8643512055
Question Type: MCQ
Option Shuffling: Yes
Is Question Mandatory: No
Correct Marks: 4
Wrong Marks: 1

\(x\) యొక్క రాశి యొక్క గ్రెటేట్‌స్టీట్‌ పిటిషన్ \([x]\) కనిపించంటే, \(I = \int_0^{10} \frac{[x] e^{[x]}}{e^{x-1}} \, dx\) యొక్క స్థాయిమించండి.

అప్పుడు \(I\) కంటే సాధనం =:

Options:

- 8643516173. 45 \((e+1)\)
- 8643516174. 9 \((e+1)\)
- 8643516175. 45 \((e-1)\)
- 8643516176. 9 \((e-1)\)
Let \( A(-1, 1), B(3, 4) \) and \( C(2, 0) \) be given three points. A line \( y = mx, m > 0 \), intersects lines AC and BC at point P and Q respectively. Let \( A_1 \) and \( A_2 \) be the areas of \( \Delta ABC \) and \( \Delta PQC \) respectively, such that \( A_1 = 3A_2 \), then the value of \( m \) is equal to:

Options:

1. \( \frac{4}{15} \)
2. 8643516177
3. 8643516178
4. 8643516179
5. 8643516180
The least value of $|z|$ where $z$ is complex number which satisfies the inequality

$$\exp \left( \frac{(|z| + 3)(|z| - 1)}{|z| + 1} \log_e 2 \right) \geq \log_\sqrt{2} |5\sqrt{7} + 9i|, \quad i = \sqrt{-1},$$

is equal to:

Options:

8643516181. 2

8643516182. $\sqrt{5}$

8643516183. 3

8643516184. 8

---

Question Number : 76 Question Id : 8643512056 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The least value of $|z|$ where $z$ is complex number which satisfies the inequality

$$\exp \left( \frac{(|z| + 3)(|z| - 1)}{|z| + 1} \log_e 2 \right) \geq \log_\sqrt{2} |5\sqrt{7} + 9i|, \quad i = \sqrt{-1},$$

is equal to:

Options:

8643516181. 2

8643516182. $\sqrt{5}$

8643516183. 3

8643516184. 8

---

Question Number : 77 Question Id : 8643512057 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

The maximum value of $f(x) = \begin{vmatrix} \sin^2 x & 1 + \cos^2 x & \cos 2x \\ 1 + \sin^2 x & \cos^2 x & \cos 2x \\ \sin^2 x & \cos^2 x & \sin 2x \end{vmatrix}, \quad x \in \mathbb{R}$ is:
Question Number : 77 Question Id : 8643512057 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ x \in \mathbb{R}, f(x) = \begin{vmatrix}
\sin^2 x & 1 + \cos^2 x & \cos 2x \\
1 + \sin^2 x & \cos^2 x & \cos 2x \\
\sin^2 x & \cos^2 x & \sin 2x
\end{vmatrix}, \text{Evaluate :}
\]

Options :

8643516185. \sqrt{5}

8643516186. 5

8643516187. \sqrt{7}

8643516188. \frac{3}{4}

---

Question Number : 78 Question Id : 8643512058 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Given that the inverse trigonometric functions take principal values only. Then, the number of real values of \( x \) which satisfy \( \sin^{-1}\left(\frac{3x}{5}\right) + \sin^{-1}\left(\frac{4x}{5}\right) = \sin^{-1}x \) is equal to :

Options :

8643516189. 0
Question Number : 78 Question Id : 8643512058 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

\[ \sin^{-1}\left(\frac{3x}{5}\right) + \sin^{-1}\left(\frac{4x}{5}\right) = \sin^{-1}x \text{ के समाधानीय मात्र क्रम के } x \text{ के समांत्र =} : \]

Options :

8643516189. 0

8643516190. 1

8643516191. 2

8643516192. 3

---

Question Number : 79 Question Id : 8643512059 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No Correct Marks : 4 Wrong Marks : 1

Let \( f : S \to S \) where \( S = (0, \infty) \) be a twice differentiable function such that \( f(x + 1) = xf(x) \). If \( g : S \to \mathbb{R} \) be defined as \( g(x) = \log_e f(x) \), then the value of \( |g''(5) - g''(1)| \) is equal to :

Options :

\[ \frac{205}{144} \]

8643516193. \[ \frac{197}{144} \]
Question Number : 79 Question Id : 8643512059 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

\[ f(x + 1) = xf(x) \] for \( f : S \to S, \ S = (0, \infty) \) function. The function attain its maximum at \( x = \frac{3}{2} \) and minimum at \( x = 1 \) with equilibrium points at \( x = 2 \). 

\[ \text{g : } S \to \mathbb{R}, \ g(x) = \log \left( \frac{f(x)}{x} \right) \] \( g'(5) - g'(1) \) is equal to:

Options :

\[ \begin{align*}
\text{A} & : 205 \\
\text{B} & : 197 \\
\text{C} & : 187 \\
\text{D} & : 197
\end{align*} \]

Question Number : 80 Question Id : 8643512060 Question Type : MCQ Option Shuffling : Yes Is Question Mandatory : No
Correct Marks : 4 Wrong Marks : 1

Let \( C_1 \) be the curve obtained by the solution of differential equation \( 2xy \frac{dy}{dx} = y^2 - x^2, \ x > 0. \)

Let the curve \( C_2 \) be the solution of \( \frac{2xy}{x^2 - y^2} = \frac{dy}{dx}. \) If both the curves pass through \((1, 1)\), then the area enclosed by the curves \( C_1 \) and \( C_2 \) is equal to:

Options :

\[ \frac{\pi}{4} + 1 \]
\[ \frac{\pi}{2} - 1 \]

8643516200.  \( \pi + 1 \)

---

**Question Number:** 80  **Question Id:** 8643512060  **Question Type:** MCQ  **Option Shuffling:** Yes  **Is Question Mandatory:** No  **Correct Marks:** 4  **Wrong Marks:** 1

\[
2xy \frac{dy}{dx} = y^2 - x^2, \quad x > 0 \text{ అంశాలలో} \quad \text{చేసేతీ నిర్ణయించండి దీనితో ఎమిడి అభివృద్ధి అడుగు రాయుండో సంఖ్యా} \quad C_1
\]

\[ \frac{2xy}{x^2 - y^2} = \frac{dy}{dx} \quad \text{దీనితో ఎమిడి అభివృద్ధి అడుగు రాయుండో C_2 ఎమిడి ఎంతో. అంటే ఎమిడి} \]

\((1, 1), \) నాయక ఎండా వి, \( C_1 \) అడుగు వి, \( C_2 \) వి మితిభాగించే ఎండా అడుగుండుండే? =:

**Options:**

\[ \frac{\pi}{4} + 1 \]

8643516197.

8643516198.  \( \pi - 1 \)

8643516199.  \[ \frac{\pi}{2} - 1 \]

8643516200.  \( \pi + 1 \)

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**Mathematics Section B**

**Section Id:** 864351138  
**Section Number:** 6  
**Section type:** Online  
**Mandatory or Optional:** Mandatory  
**Number of Questions:** 10  
**Number of Questions to be attempted:** 5  
**Section Marks:** 20
For real numbers $\alpha, \beta, \gamma$ and $\delta$, if

$$\int \frac{(x^2 - 1) + \tan^{-1}\left(\frac{x^2 + 1}{x}\right)}{(x^4 + 3x^2 + 1) \tan^{-1}\left(\frac{x^2 + 1}{x}\right)} \, dx$$

$$= \alpha \log_e \left(\tan^{-1}\left(\frac{x^2 + 1}{x}\right)\right) + \beta \tan^{-1}\left(\frac{\gamma(x^2 - 1)}{x}\right) + \delta \tan^{-1}\left(\frac{x^2 + 1}{x}\right) + C$$

where $C$ is an arbitrary constant, then the value of $10(\alpha + \beta \gamma + \delta)$ is equal to _________.

Response Type: Numeric
Evaluation Required For SA: Yes
Show Word Count: Yes
Answers Type: Equal
Text Areas: PlainText
Possible Answers: 100
\[ \int \frac{(x^2-1) + \tan^{-1}\left(\frac{x^2+1}{x}\right)}{x^4 + 3x^2 + 1} \tan^{-1}\left(\frac{x^2+1}{x}\right) \, dx \]

\[ = \alpha \log_{e} \left(\tan^{-1}\left(\frac{x^2+1}{x}\right)\right) + \beta \tan^{-1}\left(\gamma(x^2-1)\right) + \delta \tan^{-1}\left(\frac{x^2+1}{x}\right) + C \]

(>Select $C$ so that the expression matches $10(\alpha + \beta + \gamma + \delta)$ exactly. Enter your answer.)

**Response Type**: Numeric
**Evaluation Required For SA**: Yes
**Show Word Count**: Yes
**Answers Type**: Equal
**Text Areas**: PlainText
**Possible Answers**: 100

**Question Number**: 82  **Question Id**: 8643512062  **Question Type**: SA

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

In $\triangle ABC$, the lengths of sides $AC$ and $AB$ are 12 cm and 5 cm, respectively. If the area of $\triangle ABC$ is 30 cm$^2$ and $R$ and $r$ are respectively the radii of circumcircle and incircle of $\triangle ABC$, then the value of $2R + r$ (in cm) is equal to ________.

**Response Type**: Numeric
**Evaluation Required For SA**: Yes
**Show Word Count**: Yes
**Answers Type**: Equal
**Text Areas**: PlainText
**Possible Answers**: 100

**Question Number**: 82  **Question Id**: 8643512062  **Question Type**: SA

**Correct Marks**: 4  **Wrong Marks**: 0
If the distance of the point (1, -2, 3) from the plane \( x + 2y - 3z + 10 = 0 \) measured parallel to the line, \( \frac{x - 1}{3} = \frac{2 - y}{m} = \frac{z + 3}{1} \), is \( \frac{\sqrt{7}}{\sqrt{2}} \), then the value of \(|m|\) is equal to \( \boxed{\text{__________}} \).
Let $\vec{c}$ be a vector perpendicular to the vectors $\vec{a} = \hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + \hat{k}$. If $\vec{c} \cdot (\hat{i} + \hat{j} + 3\hat{k}) = 8$ then the value of $\vec{c} \cdot (\vec{a} \times \vec{b})$ is equal to __________.

**Response Type**: Numeric
**Evaluation Required For SA**: Yes
**Show Word Count**: Yes
**Answers Type**: Equal
**Text Areas**: PlainText
**Possible Answers**:
100

Let $\vec{a} = \hat{i} + \hat{j} - \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + \hat{k}$. If $\vec{c}$ is a vector such that $\vec{c} \cdot (\hat{i} + \hat{j} + 3\hat{k}) = 8$, then the value of $\vec{c} \cdot (\vec{a} \times \vec{b})$ is __________.

**Response Type**: Numeric
**Evaluation Required For SA**: Yes
**Show Word Count**: Yes
**Answers Type**: Equal
**Text Areas**: PlainText
**Possible Answers**:
100

Let $f: \mathbb{R} \to \mathbb{R}$ and $g: \mathbb{R} \to \mathbb{R}$ be defined as

$$f(x) = \begin{cases} x + a, & x < 0 \\ |x - 1|, & x \geq 0 \end{cases}$$

and

$$g(x) = \begin{cases} x + 1, & x < 0 \\ (x - 1)^2 + b, & x \geq 0 \end{cases}$$

where $a$, $b$ are non-negative real numbers. If $(gof)(x)$ is continuous for all $x \in \mathbb{R}$, then $a + b$ is equal to __________.

**Response Type**: Numeric
**Evaluation Required For SA**: Yes
Question Number : 85 Question Id : 8643512065 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

\[ f : \mathbb{R} \to \mathbb{R} \quad g : \mathbb{R} \to \mathbb{R} \quad \]

\[ f(x) = \begin{cases} 
  x + a, & x < 0 \\
  |x - 1|, & x \geq 0
\end{cases} \quad g(x) = \begin{cases} 
  x + 1, & x < 0 \\
  (x-1)^2 + b, & x \geq 0
\end{cases} \]

Hint: Verify that \( a \) and \( b \) are constants. For all \( x \in \mathbb{R} \), \((gof)(x)\) is a finite valued function. Hence, \( a + b = \ldots \).

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : Plaintext
Possible Answers : 100

Question Number : 86 Question Id : 8643512066 Question Type : SA
Correct Marks : 4 Wrong Marks : 0

Consider the statistics of two sets of observations as follows:

<table>
<thead>
<tr>
<th>Size</th>
<th>Mean</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation I</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Observation II</td>
<td>( n )</td>
<td>3</td>
</tr>
</tbody>
</table>

If the variance of the combined set of these two observations is \( \frac{17}{9} \), then the value of \( n \) is equal to \ldots .

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : Plaintext
Possible Answers : 
Let $n$ be a positive integer. Let $A = \sum_{k=0}^{n} (-1)^k n \binom{n}{k} \left( \frac{1}{2} \right)^k + \frac{3}{4} \cdot \frac{7}{8} + \frac{15}{16} + \frac{31}{32} \right)^k$.

If $63A = 1 - \frac{1}{2^{30}}$, then $n$ is equal to ________.

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

100
\[ n \text{ is the number of terms. } A = \sum_{k=0}^{n} (-1)^k nC_k \left[ \left( \frac{1}{2} \right)^k + \left( \frac{3}{4} \right)^k + \left( \frac{7}{8} \right)^k + \left( \frac{15}{16} \right)^k + \left( \frac{31}{32} \right)^k \right] \]

\[ \text{Since } 63A = 1 - \frac{1}{2^{30}}, \text{ hence } n = \underline{\underline{n}}. \]

**Response Type**: Numeric  
**Evaluation Required For SA**: Yes  
**Show Word Count**: Yes  
**Answers Type**: Equal  
**Text Areas**: PlainText  
**Possible Answers**: 100

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**Question Number**: 88  
**Question Id**: 8643512068  
**Question Type**: SA  
**Correct Marks**: 4  
**Wrong Marks**: 0

Let \( A = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix} \) and \( B = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix} \) be two \( 2 \times 1 \) matrices with real entries such that \( A = XB \), where

\[
X = \frac{1}{\sqrt{3}} \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}, \text{ and } k \in \mathbb{R}. \text{ If } a_1^2 + a_2^2 = \frac{2}{3} (b_1^2 + b_2^2) \text{ and } (k^2 + 1) b_2^2 \neq -2 b_1 b_2, \text{ then the value of } k \text{ is } \underline{\underline{k}}. 
\]

**Response Type**: Numeric  
**Evaluation Required For SA**: Yes  
**Show Word Count**: Yes  
**Answers Type**: Equal  
**Text Areas**: PlainText  
**Possible Answers**: 100

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**Question Number**: 88  
**Question Id**: 8643512068  
**Question Type**: SA  
**Correct Marks**: 4  
**Wrong Marks**: 0

\[
A = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix} \text{ and } B = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix} \text{ be two } 2 \times 1 \text{ matrices with real entries such that } A = XB, \]

\[
X = \frac{1}{\sqrt{3}} \begin{bmatrix} 1 \\ -1 \\ 1 \end{bmatrix}, \text{ and } k \in \mathbb{R}. \text{ If } a_1^2 + a_2^2 = \frac{2}{3} (b_1^2 + b_2^2) \text{ and } (k^2 + 1) b_2^2 \neq -2 b_1 b_2, \text{ then the value of } k \text{ is } \underline{\underline{k}}. 
\]

**(k^2 + 1) b_2^2 \neq -2 b_1 b_2 \text{ hence, } k \text{ must be } \underline{\underline{k}}.\]
Let $\frac{1}{16}, a$ and $b$ be in G.P. and $\frac{1}{a}, \frac{1}{b}, 6$ be in A.P., where $a, b > 0$. Then $72(a + b)$ is equal to 

\[ \text{__________}. \]

Response Type: Numeric  
Evaluation Required For SA: Yes  
Show Word Count: Yes  
Answers Type: Equal  
Text Areas: PlainText  
Possible Answers: 
100
\[ S_n(x) = \log_{a^{1/2}} x + \log_{a^{1/3}} x + \log_{a^{1/6}} x + \log_{a^{1/11}} x + \log_{a^{1/18}} x + \log_{a^{1/27}} x + \ldots \] 

\[ \text{for } n \text{ terms.} \]

\[ a > 1. \quad S_{24}(x) = 1093 \quad \text{and} \quad S_{12}(2x) = 265 \quad \text{are given}, \quad a \quad \text{therefore} \quad \text{answer} = \ldots \]

**Question Number : 90  Question Id : 8643512070  Question Type : SA  Correct Marks : 4  Wrong Marks : 0**

Response Type : Numeric  Evaluation Required For SA : Yes  Show Word Count : Yes  Answers Type : Equal  Text Areas : PlainText  Possible Answers : 100