

National Testing Agency

Question Paper Name :	B Tech 22nd Jan 2026 Shift 1
Subject Name :	B. Tech
Duration :	180
Total Marks :	300
Display Marks:	Yes

B. Tech

Group Number :	1
Group Maximum Duration :	0
Group Minimum Duration :	180
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	300

Mathematics Section A

Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 1 Question Id : 444792157 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Two distinct numbers a and b are selected at random from 1, 2, 3,..., 50. The probability, that their product ab is divisible by 3, is

Options :

444792535. $\frac{664}{1225}$

444792536. $\frac{272}{1225}$

444792537. $\frac{561}{1225}$

444792538. $\frac{8}{25}$

Question Number : 2 Question Id : 444792158 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If a random variable x has the probability distribution

x	0	1	2	3	4	5	6	7
$P(x)$	0	$2k$	k	$3k$	$2k^2$	$2k$	$k^2 + k$	$7k^2$

then $P(3 < x \leq 6)$ is equal to

Options :

444792539. 0.34

444792540. 0.64

444792541. 0.22

444792542. 0.33

Question Number : 3 Question Id : 444792167 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let $f: [1, \infty) \rightarrow \mathbb{R}$ be a differentiable function. If $6 \int_1^x f(t) dt = 3x f(x) + x^3 - 4$

for all $x \geq 1$, then the value of $f(2) - f(3)$ is

Options :

444792575. 4

444792576. 3

444792577. - 3

444792578. - 4

Question Number : 4 Question Id : 444792165 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the image of the point $P(1, 2, a)$ in the line $\frac{x-6}{3} = \frac{y-7}{2} = \frac{7-z}{2}$ is $Q(5, b, c)$, then

$a^2 + b^2 + c^2$ is equal to

Options :

444792567. 264

444792568. 283

444792569. 293

444792570. 298

Question Number : 5 Question Id : 444792160 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the chord joining the points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$ on the parabola $y^2 = 12x$ subtends a right angle at the vertex of the parabola, then $x_1x_2 - y_1y_2$ is equal to

Options :

444792547. 280

444792548. 284

444792549. 288

444792550. 292

Question Number : 6 Question Id : 444792152 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the domain of the function $f(x) = \sin^{-1}\left(\frac{5-x}{3+2x}\right) + \frac{1}{\log_e(10-x)}$ is $(-\infty, \alpha] \cup [\beta, \gamma) - \{\delta\}$, then $6(\alpha + \beta + \gamma + \delta)$ is equal to

Options :

444792515. 66

444792516. 67

444792517. 68

444792518. 70

Question Number : 7 Question Id : 444792164 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let $P(\alpha, \beta, \gamma)$ be the point on the line $\frac{x-1}{2} = \frac{y+1}{-3} = z$ at a distance $4\sqrt{14}$ from the point $(1, -1, 0)$ and nearer to the origin. Then the shortest distance, between the lines $\frac{x-\alpha}{1} = \frac{y-\beta}{2} = \frac{z-\gamma}{3}$ and $\frac{x+5}{2} = \frac{y-10}{1} = \frac{z-3}{1}$, is equal to

Options :

444792563. $4\sqrt{\frac{5}{7}}$

444792564. $2\sqrt{\frac{7}{4}}$

444792565. $7\sqrt{\frac{5}{4}}$

444792566. $4\sqrt{\frac{7}{5}}$

Question Number : 8 Question Id : 444792154 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If $A = \begin{bmatrix} 2 & 3 \\ 3 & 5 \end{bmatrix}$, then the determinant of the matrix $(A^{2025} - 3A^{2024} + A^{2023})$ is

Options :

444792523. 12

444792524. 16

444792525. 24

Question Number : 9 Question Id : 444792151 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let the relation R on the set $M = \{1, 2, 3, \dots, 16\}$ be given by
 $R = \{(x, y) : 4y = 5x - 3, x, y \in M\}$.

Then the minimum number of elements required to be added in R , in order to make the relation symmetric, is equal to

Options :

444792511. 2

444792512. 3

444792513. 4

444792514. 1

Question Number : 10 Question Id : 444792161 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let the set of all values of r , for which the circles $(x + 1)^2 + (y + 4)^2 = r^2$ and $x^2 + y^2 - 4x - 2y - 4 = 0$ intersect at two distinct points be the interval (α, β) . Then $\alpha\beta$ is equal to

Options :

444792551. 25

444792552. 24

444792553. 21

444792554. 20

Question Number : 11 Question Id : 444792169 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let the solution curve of the differential equation $xdy - ydx = \sqrt{x^2 + y^2} dx$, $x > 0$,

$y(1) = 0$, be $y = y(x)$. Then $y(3)$ is equal to

Options :

444792583. 1

444792584. 2

444792585. 4

444792586. 6

Question Number : 12 Question Id : 444792168 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let the line $x = -1$ divide the area of the region $\{(x, y) : 1 + x^2 \leq y \leq 3 - x\}$ in the ratio $m : n$, $\gcd(m, n) = 1$. Then $m + n$ is equal to

Options :

444792579. 25

444792580. 26

444792581. 27

444792582. 28

Question Number : 13 Question Id : 444792162 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The number of solutions of $\tan^{-1} 4x + \tan^{-1} 6x = \frac{\pi}{6}$, where $-\frac{1}{2\sqrt{6}} < x < \frac{1}{2\sqrt{6}}$,

is equal to

Options :

444792555. 0

444792556. 1

444792557. 2

444792558. 3

Question Number : 14 Question Id : 444792163 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let $\overrightarrow{AB} = 2\hat{i} + 4\hat{j} - 5\hat{k}$ and $\overrightarrow{AD} = \hat{i} + 2\hat{j} + \lambda\hat{k}$, $\lambda \in \mathbb{R}$. Let the projection of the vector $\vec{v} = \hat{i} + \hat{j} + \hat{k}$ on the diagonal $\overrightarrow{AC}$ of the parallelogram ABCD be of length one unit. If α, β , where $\alpha > \beta$, be the roots of the equation $\lambda^2 x^2 - 6\lambda x + 5 = 0$, then $2\alpha - \beta$ is equal to

Options :

444792559. 1

444792560. 3

444792561. 4

444792562. 6

Question Number : 15 Question Id : 444792170 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(\frac{1}{[x] + 4} \right) dx$, where $[\cdot]$ denotes the greatest integer function, is

Options :

444792587. $\frac{7}{60}(3\pi - 1)$

444792588. $\frac{7}{60}(\pi - 3)$

444792589. $\frac{1}{60}(\pi - 7)$

444792590. $\frac{1}{60}(21\pi - 1)$

Question Number : 16 Question Id : 444792166 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let $f(x) = x^{2025} - x^{2000}$, $x \in [0, 1]$ and the minimum value of the function $f(x)$ in the interval $[0, 1]$ be $(80)^{80}(n)^{-81}$. Then n is equal to

Options :

444792571. -80

444792572. -81

444792573. -40

444792574. -41

Question Number : 17 Question Id : 444792155 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the sum of the first four terms of an A.P. is 6 and the sum of its first six terms is 4, then the sum of its first twelve terms is

Options :

444792527. -20

444792528. -22

444792529. -24

444792530. -26

Question Number : 18 Question Id : 444792156 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The coefficient of x^{48} in $(1+x) + 2(1+x)^2 + 3(1+x)^3 + \dots + 100(1+x)^{100}$ is equal to

Options :

444792531. $100 \cdot {}^{100}C_{49} - {}^{100}C_{50}$

444792532. ${}^{100}C_{50} + {}^{101}C_{49}$

444792533. $100 \cdot {}^{101}C_{49} - {}^{101}C_{50}$

444792534. $100 \cdot {}^{100}C_{49} - {}^{100}C_{48}$

Question Number : 19 Question Id : 444792153 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The number of distinct real solutions of the equation $x|x+4| + 3|x+2| + 10 = 0$ is

Options :

444792519. 0

444792520. 1

444792521. 2

444792522. 3

Question Number : 20 Question Id : 444792159 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

If the line $\alpha x + 2y = 1$, where $\alpha \in \mathbb{R}$, does not meet the hyperbola $x^2 - 9y^2 = 9$, then a possible value of α is:

Options :

444792543. 0.5

444792544. 0.6

444792545. 0.7

444792546. 0.8

Mathematics Section B

Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	5
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 21 Question Id : 444792172 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let A be a 3×3 matrix such that $A + A^T = O$. If $A \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix} = \begin{bmatrix} 3 \\ 3 \\ 2 \end{bmatrix}$, $A^2 \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix} = \begin{bmatrix} -3 \\ 19 \\ -24 \end{bmatrix}$

and $\det(\text{adj}(2 \text{adj}(A + I))) = (2)^\alpha \cdot (3)^\beta \cdot (11)^\gamma$, α, β, γ are non-negative integers, then $\alpha + \beta + \gamma$ is equal to _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 22 Question Id : 444792171 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let $\alpha = \frac{-1 + i\sqrt{3}}{2}$ and $\beta = \frac{-1 - i\sqrt{3}}{2}$, $i = \sqrt{-1}$. If

$$(7 - 7\alpha + 9\beta)^{20} + (9 + 7\alpha - 7\beta)^{20} + (-7 + 9\alpha + 7\beta)^{20} + (14 + 7\alpha + 7\beta)^{20} = m^{10},$$

then m is _____

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Question Number : 23 Question Id : 444792175 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

If $\int (\sin x)^{\frac{-11}{2}} (\cos x)^{\frac{-5}{2}} dx =$

$-\frac{p_1}{q_1} (\cot x)^{\frac{9}{2}} - \frac{p_2}{q_2} (\cot x)^{\frac{5}{2}} - \frac{p_3}{q_3} (\cot x)^{\frac{1}{2}} + \frac{p_4}{q_4} (\cot x)^{\frac{-3}{2}} + C$, where p_i and q_i are positive integers with $\gcd(p_i, q_i) = 1$ for $i = 1, 2, 3, 4$ and C is the constant of integration, then $\frac{15p_1p_2p_3p_4}{q_1q_2q_3q_4}$ is equal to _____

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

Question Number : 24 Question Id : 444792174 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

If $\frac{\cos^2 48^\circ - \sin^2 12^\circ}{\sin^2 24^\circ - \sin^2 6^\circ} = \frac{\alpha + \beta\sqrt{5}}{2}$, where $\alpha, \beta \in \mathbb{N}$, then $\alpha + \beta$ is equal to

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

Question Number : 25 Question Id : 444792173 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let ABC be a triangle. Consider four points p_1, p_2, p_3, p_4 on the side AB, five points p_5, p_6, p_7, p_8, p_9 on the side BC, and four points $p_{10}, p_{11}, p_{12}, p_{13}$ on the side AC. None of these points is a vertex of the triangle ABC. Then the total number of pentagons, that can be formed by taking all the vertices from the points $p_1, p_2, \dots, p_{13}$, is _____

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

Physics Section A

Section Number :	3
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 26 Question Id : 444792179 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A projectile is thrown upward at an angle 60° with the horizontal. The speed of the projectile is 20 m/s when its direction of motion is 45° with the horizontal. The initial speed of the projectile is _____ m/s.

Options :

444792608. 40

444792609. $40\sqrt{2}$

444792610. $20\sqrt{2}$

444792611. $20\sqrt{3}$

Question Number : 27 Question Id : 444792190 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Three identical coils C_1 , C_2 and C_3 are closely placed such that they share a common axis. C_2 is exactly midway. C_1 carries current I in anti-clockwise direction while C_3 carries current I in clockwise direction. An induced current flows through C_2 will be in clockwise direction when

Options :

444792652. C_1 and C_3 move with equal speeds towards C_2

444792653. C_1 and C_3 move with equal speeds away from C_2

444792654. C_1 moves towards C_2 and C_3 moves away from C_2

444792655. C_1 moves away from C_2 and C_3 moves towards C_2

Question Number : 28 Question Id : 444792193 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

7.9 MeV α -particle scatters from a target material of atomic number 79. From the given data the estimated diameter of nuclei of the target material is (approximately) _____ m.

$$\left[\frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ Nm}^2/\text{C}^2 \text{ and electron charge} = 1.6 \times 10^{-19} \text{ C} \right]$$

Options :

444792664. 1.69×10^{-12}

444792665. 2.88×10^{-14}

444792666. 1.44×10^{-13}

444792667. 5.76×10^{-14}

Question Number : 29 Question Id : 444792192 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider an equilateral prism (refractive index $\sqrt{2}$). A ray of light is incident on its one surface at a certain angle i . If the emergent ray is found to graze along the other surface then the angle of refraction at the incident surface is close to _____.

Options :

444792660. 15°

444792661. 30°

444792662. 20°

444792663. 40°

Question Number : 30 Question Id : 444792183 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Given below are two statements:

Statement I: Pressure of a fluid is exerted only on a solid surface in contact as the fluid-pressure does not exist everywhere in a still fluid.

Statement II: Excess potential energy of the molecules on the surface of a liquid, when compared to interior, results in surface tension.

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

Options :

444792624. Both Statement I and Statement II are true

444792625. Both Statement I and Statement II are false

444792626. Statement I is true but Statement II is false

444792627. Statement I is false but Statement II is true

Question Number : 31 Question Id : 444792185 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The volume of an ideal gas increases 8 times and temperature becomes $(1/4)^{\text{th}}$ of initial temperature during a reversible change. If there is no exchange of heat in this process ($\Delta Q = 0$) then identify the gas from the following options (Assuming the gases given in the options are ideal gases):

Options :

444792632. NH_3

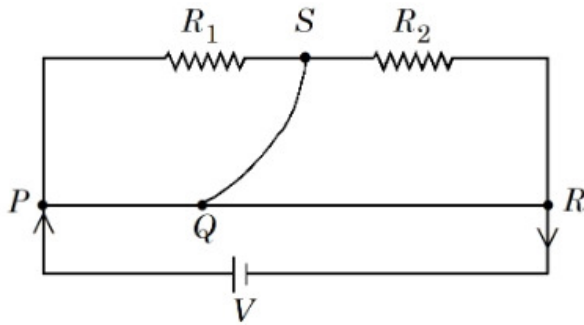
444792633. O_2

444792634. He

444792635. CO_2

Question Number : 32 Question Id : 444792177 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A meter bridge with two resistances R_1 and R_2 as shown in figure was balanced (null point) at 40 cm from the point P . The null point changed to 50 cm from the point P , when $16\ \Omega$ resistance is connected in parallel to R_2 . The values of resistances R_1 and R_2 are _____.



Options :

444792600. $R_2 = 4\ \Omega, R_1 = \frac{4}{3}\ \Omega$

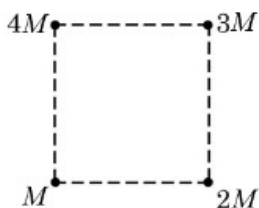
444792601. $R_2 = 8\ \Omega, R_1 = \frac{16}{3}\ \Omega$

444792602. $R_2 = 12\ \Omega, R_1 = \frac{12}{3}\ \Omega$

444792603. $R_2 = 16\ \Omega, R_1 = \frac{16}{3}\ \Omega$

Question Number : 33 Question Id : 444792180 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Net gravitational force at the center of a square is found to be F_1 when four particles having mass $M, 2M, 3M$ and $4M$ are placed at the four corners of the square as shown in figure and it is F_2 when the positions of $3M$ and $4M$ are interchanged. The ratio $\frac{F_1}{F_2}$ is $\frac{\alpha}{\sqrt{5}}$. The value of α is _____.



Options :

444792612. 1

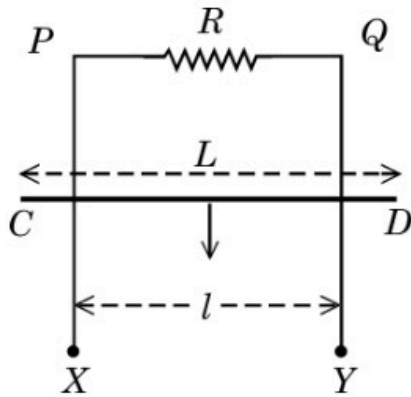
444792613. 2

444792614. $2\sqrt{5}$

444792615. 3

Question Number : 34 Question Id : 444792186 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

$XPQY$ is a vertical smooth long loop having a total resistance R where PX is parallel to QY and separation between them is l . A constant magnetic field B perpendicular to the plane of the loop exists in the entire space. A rod CD of length L ($L > l$) and mass m is made to slide down from rest under the gravity as shown in figure. The terminal speed acquired by the rod is _____ m/s. (g = acceleration due to gravity)



Options :

444792636. $\frac{mgR}{B^2 l^2}$

444792637. $\frac{2mgR}{B^2 l^2}$

444792638. $\frac{2mgR}{B^2 L^2}$

444792639. $\frac{8mgR}{B^2 l^2}$

Question Number : 35 Question Id : 444792178 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The escape velocity from a spherical planet A is 10 km/s. The escape velocity from another planet B whose density and radius are 10% of those of planet A , is _____ m/s.

Options :

444792604. 1000

444792605. $1000\sqrt{2}$

444792606. $100\sqrt{10}$

444792607. $200\sqrt{5}$

Question Number : 36 Question Id : 444792191 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A thin convex lens of focal length 5 cm and a thin concave lens of focal length 4 cm are combined together (without any gap) and this combination has magnification m_1 when an object is placed 10 cm before the convex lens. Keeping the positions of convex lens and object undisturbed a gap of 1 cm is introduced between the lenses by moving the concave lens away, which lead to a change in

magnification of total lens system to m_2 . The value of $\left| \frac{m_1}{m_2} \right|$ is _____.

Options :

444792656. $\frac{5}{9}$

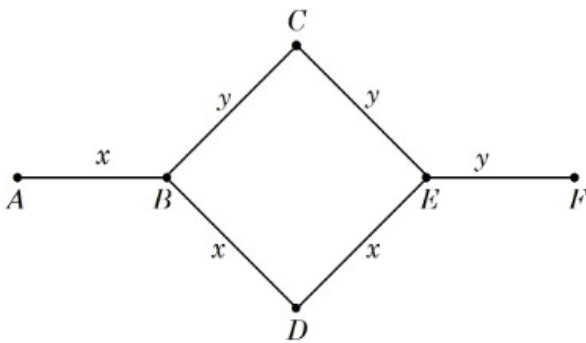
444792657. $\frac{25}{27}$

444792658. $\frac{5}{27}$

444792659. $\frac{3}{2}$

Question Number : 37 Question Id : 444792182 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Rods x and y of equal dimensions but of different materials are joined as shown in figure. Temperatures of end points A and F are maintained at 100°C and 40°C respectively. Given the thermal conductivity of rod x is three times of that of rod y , the temperature at junction points B and E are (close to):



Options :

444792620. 80°C and 60°C respectively

444792621. 60°C and 45°C respectively

444792622. 89°C and 73°C respectively

444792623. 80°C and 70°C respectively

Question Number : 38 Question Id : 444792176 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Match the LIST-I with LIST-II

List-I		List-II	
A.	Spring constant	I.	$ML^2T^{-2}K^{-1}$
B.	Thermal conductivity	II.	ML^0T^{-2}
C.	Boltzmann constant	III.	$ML^2T^{-3}A^{-2}$
D.	Inductive reactance	IV.	$MLT^{-3}K^{-1}$

Choose the **correct** answer from the options given below:

Options :

444792596. A-I, B-IV, C-II, D-III

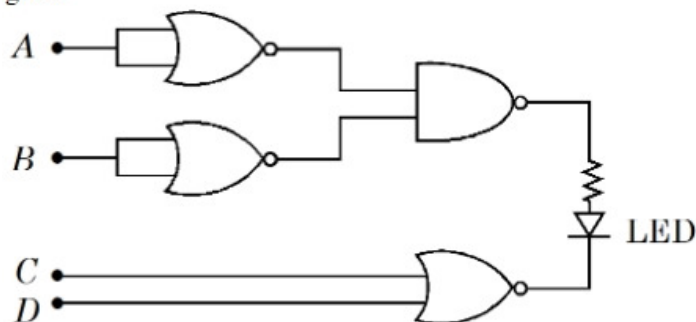
444792597. A-III, B-II, C-IV, D-I

444792598. A-II, B-IV, C-I, D-III

444792599. A-II, B-I, C-IV, D-III

Question Number : 39 Question Id : 444792195 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the correct combination of A, B, C and D inputs which can cause the LED to glow.



Options :

444792672. 0011

444792673. 1101

444792674. 0100

444792675. 1000

Question Number : 40 Question Id : 444792189 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Electric field in a region is given by $\vec{E} = Ax\hat{i} + By\hat{j}$, where $A = 10 \text{ V/m}^2$ and

$B = 5 \text{ V/m}^2$. If the electric potential at a point (10, 20) is 500 V, then the electric potential at origin is _____ V.

Options :

444792648. 0

444792649. 500

444792650. 1000

Question Number : 41 Question Id : 444792188 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A simple pendulum has a bob with mass m and charge q . The pendulum string has negligible mass. When a uniform and horizontal electric field $\vec{E}$ is applied, the tension in the string changes. The final tension in the string, when pendulum attains an equilibrium position is _____.

(g : acceleration due to gravity)

Options :

444792644. $mg + qE$

444792645. $\sqrt{m^2 g^2 + q^2 E^2}$

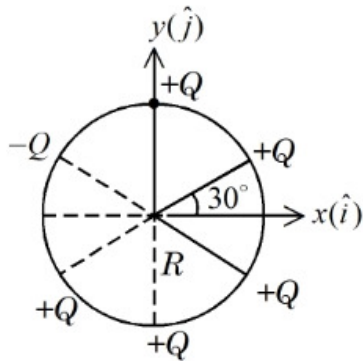
444792646. $mg - qE$

444792647. $\sqrt{m^2 g^2 - q^2 E^2}$

Question Number : 42 Question Id : 444792187 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Six point charges are kept 60° apart from each other on the circumference of a circle of radius R as shown in figure. The net electric field at the center of the circle is _____.

(ϵ_0 is permittivity of free space)



Options :

444792640. $-\frac{5Q}{8\pi\epsilon_0 R^2}(\hat{i} + \sqrt{3}\hat{j})$

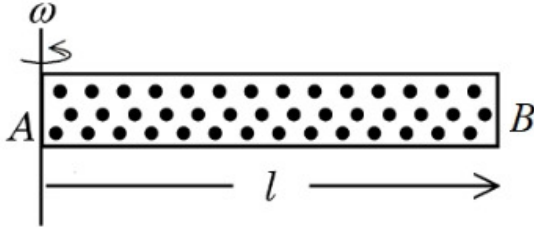
444792641. $-\left(\frac{5Q}{8\pi\epsilon_0 R^2}\right)(\hat{i} - 3\hat{j})$

444792642. $-\frac{Q}{4\pi\epsilon_0 R^2}(\sqrt{3}\hat{i} - \hat{j})$

444792643. $\frac{Q}{4\pi\epsilon_0 R^2}(\sqrt{3}\hat{i} - \hat{j})$

Question Number : 43 Question Id : 444792184 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A cylindrical tube AB of length l , closed at both ends contains an ideal gas of 1 mol having molecular weight M . The tube is rotated in a horizontal plane with constant angular velocity ω about an axis perpendicular to AB and passing through the edge at end A , as shown in the figure. If P_A and P_B are the pressures at A and B respectively, then
(Consider the temperature is same at all points in the tube)



Options :

444792628. $P_B = P_A$

444792629. $P_B = P_A \exp(M\omega^2 l^2 / 2RT)$

444792630. $P_B = P_A \exp(M\omega^2 l^2 / 3RT)$

444792631. $P_B = P_A \exp(M\omega^2 l^2 / RT)$

Question Number : 44 Question Id : 444792181 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A solid sphere of mass 5 kg and radius 10 cm is kept in contact with another solid sphere of mass 10 kg and radius 20 cm. The moment of inertia of this pair of spheres about the tangent passing through the point of contact is _____ kg.m^2 .

Options :

444792616. 0.63

444792617. 0.18

444792618. 0.36

444792619. 0.72

Question Number : 45 Question Id : 444792194 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The minimum frequency of photon required to break a particle of mass 15.348 amu into 4 α particles is _____ kHz.

[mass of He nucleus = 4.002 amu, 1 amu = 1.66×10^{-27} kg, $h = 6.6 \times 10^{-34}$ J.s and $c = 3 \times 10^8$ m/s]

Options :

444792668. 9×10^{20}

444792669. 14.94×10^{19}

444792670. 14.94×10^{20}

444792671. 9×10^{19}

Physics Section B

Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	5
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 46 Question Id : 444792196 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A circular disc has radius R_1 and thickness T_1 . Another circular disc made of the same material has radius R_2 and thickness T_2 . If the moment of inertia of both

discs are same and $\frac{R_1}{R_2} = 2$ then $\frac{T_1}{T_2} = \frac{1}{\alpha}$. The value of α is _____.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 47 Question Id : 444792198 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Inductance of a coil with 10^4 turns is 10 mH and it is connected to a dc source of 10 V with internal resistance of 10 Ω . The energy density in the inductor when the

current reaches $\left(\frac{1}{e}\right)$ of its maximum value is $\alpha\pi \times \frac{1}{e^2}$ J / m³. The value of α is _____.

($\mu_0 = 4\pi \times 10^{-7}$ Tm/A).

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 48 Question Id : 444792200 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A parallel beam of light travelling in air (refractive index 1.0) is incident on a convex spherical glass surface of radius of curvature 50 cm. Refractive index of glass is 1.5. The rays converge to a point at a distance x cm from the centre of the curvature of the spherical surface. The value of x is _____ cm.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 49 Question Id : 444792199 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The electric field of a plane electromagnetic wave, travelling in an unknown non-magnetic medium is given by,

$$E_y = 20 \sin(3 \times 10^6 x - 4.5 \times 10^{14} t) \text{ V/m}$$

(where x , t and other values have S.I. units). The dielectric constant of the medium is _____

(speed of light in free space is 3×10^8 m/s)

Response Type : Numeric

Evaluation Required For SA : Yes

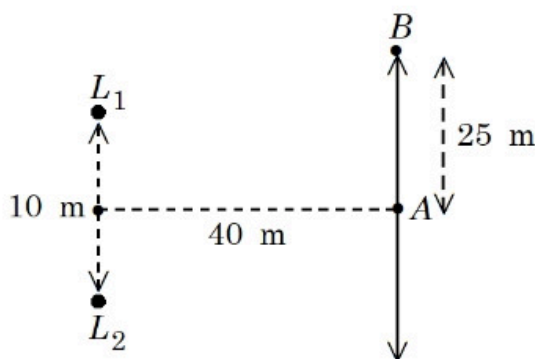
Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 50 Question Id : 444792197 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Two loudspeakers (L_1 and L_2) are placed with a separation of 10 m, as shown in figure. Both speakers are fed with an audio input signal of same frequency with constant volume. A voice recorder, initially at point A , at equidistance to both loudspeakers, is moved by 25 m along the line AB while monitoring the audio signal. The measured signal was found to undergo 10 cycles of minima and maxima during the movement. The frequency of the input signal is _____ Hz (Speed of sound in air is 324 m/s and $\sqrt{5} = 2.23$)



Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Chemistry Section A

Section Number :	5
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 51 Question Id : 444792214 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct order of reactivity of CH_3Br in methanol with the following nucleophiles is

F^- , I^- , $\text{C}_2\text{H}_5\text{O}^-$ and $\text{C}_6\text{H}_5\text{O}^-$

Options :

444792733. $\text{I}^- > \text{F}^- > \text{C}_6\text{H}_5\text{O}^- > \text{C}_2\text{H}_5\text{O}^-$

444792734. $\text{I}^- > \text{C}_6\text{H}_5\text{O}^- > \text{F}^- > \text{C}_2\text{H}_5\text{O}^-$

444792735. $\text{I}^- > \text{C}_2\text{H}_5\text{O}^- > \text{C}_6\text{H}_5\text{O}^- > \text{F}^-$

444792736. $\text{I}^- > \text{C}_2\text{H}_5\text{O}^- > \text{F}^- > \text{C}_6\text{H}_5\text{O}^-$

Question Number : 52 Question Id : 444792218 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Match the LIST-I with LIST-II

List-I Reagents		List-II Name of Reaction involving carbonyl compounds	
A.	$\text{NH}_2 - \text{NH}_2$, KOH	I.	Tollen's Test
B.	$\text{Ag}(\text{NH}_3)_2\text{OH}$	II.	Clemmensen Reduction
C.	Aq. CuSO_4 , Sodium Potassium tartarate, KOH	III.	Wolff - Kishner Reduction
D.	Zn - Hg, HCl	IV.	Fehling's Test

Choose the *correct* answer from the options given below:

Options :

444792749. A-IV, B-III, C-II, D-I

444792750. A-III, B-I, C-IV, D-II

444792751. A-II, B-I, C-IV, D-III

444792752. A-III, B-IV, C-I, D-II

Question Number : 53 Question Id : 444792217 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

As compared with chlorocyclohexane, which of the following statements correctly apply to chlorobenzene?

- A. The magnitude of negative charge is more on chlorine atom.
- B. The C – Cl bond has partial double bond character.
- C. C – Cl bond is less polar.
- D. C – Cl bond is longer due to repulsion between delocalised electrons of the aromatic ring and lone pairs of electrons of chlorine.
- E. The C – Cl bond is formed using sp^2 hybridised orbital of carbon.

Choose the correct answer from the options given below:

Options :

444792745. B, C and E Only

444792746. A, D and E Only

444792747. B, C and D Only

444792748. A, C and E Only

Question Number : 54 Question Id : 444792202 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The energy required by electrons, present in the first Bohr orbit of hydrogen atom to be excited to second Bohr orbit is _____ J mol^{-1} .

Given: $R_H = 2.18 \times 10^{-11}$ ergs.

Options :

444792685. 1.635×10^{-11}

444792686. 9.835×10^5

444792687. 9.835×10^{12}

444792688. 1.635×10^{-18}

Question Number : 55 Question Id : 444792212 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider the transition metal ions Mn^{3+} , Cr^{3+} , Fe^{3+} and Co^{3+} and all form low spin octahedral complexes. The correct decreasing order of unpaired electrons in their respective d-orbitals of the complexes is

Options :

444792725. $\text{Cr}^{3+} > \text{Fe}^{3+} > \text{Co}^{3+} > \text{Mn}^{3+}$

444792726. $\text{Mn}^{3+} > \text{Fe}^{3+} > \text{Co}^{3+} > \text{Cr}^{3+}$

444792727. $\text{Fe}^{3+} > \text{Co}^{3+} > \text{Mn}^{3+} > \text{Cr}^{3+}$

444792728. $\text{Cr}^{3+} > \text{Mn}^{3+} > \text{Fe}^{3+} > \text{Co}^{3+}$

Question Number : 56 Question Id : 444792211 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A first row transition metal (M) does not liberate H_2 gas from dilute HCl . 1 mol of aqueous solution of MSO_4 is treated with excess of aqueous KCN and then $\text{H}_2\text{S}(\text{g})$ is passed through the solution. The amount of MS (metal sulphide) formed from the above reaction is _____ mol.

Options :

444792721. 3

444792722. 2

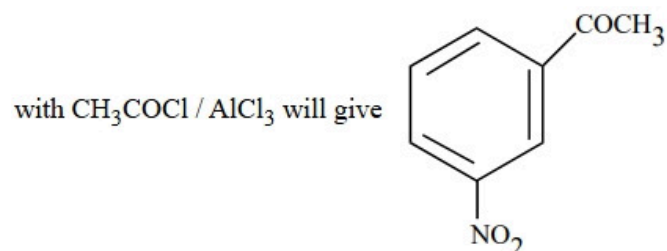
444792723. 0

444792724. 1

Question Number : 57 Question Id : 444792215 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Given below are two statements:

Statement I: Benzene is nitrated to give nitrobenzene, which on further treatment



Statement II: $-\text{NO}_2$ group is a *m*-directing, and deactivating group.

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

Options :

444792737. Both Statement I and Statement II are correct
444792738. Both Statement I and Statement II are incorrect
444792739. Statement I is correct but Statement II is incorrect
444792740. Statement I is incorrect but Statement II is correct

Question Number : 58 Question Id : 444792205 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Given below are two statements:

Statement I: The Henry's law constant K_H is constant with respect to variations in solution's concentration over the range for which the solution is ideally dilute.

Statement II: K_H does not differ for the same solute in different solvents.

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

Options :

444792697. Both Statement I and Statement II are true
444792698. Both Statement I and Statement II are false
444792699. Statement I is true but Statement II is false
444792700. Statement I is false but Statement II is true

Question Number : 59 Question Id : 444792209 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Two p-block elements X and Y form fluorides of the type EF_3 . The fluoride compound XF_3 is a Lewis acid and YF_3 is a Lewis base. The hybridizations of the central atoms of XF_3 and YF_3 respectively are

Options :

444792713. Both sp^2
444792714. Both sp^3
444792715. sp^3 and sp^2
444792716. sp^2 and sp^3

Question Number : 60 Question Id : 444792207 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A 'p'-block element (E) and hydrogen form a binary cation $(EH_x)^+$, while EH_3 on treatment with K_2HgI_4 in alkaline medium gives a precipitate of basic mercury(II)amido-iodine. Given below are first ionisation enthalpy values (kJ mol^{-1}) for first element each from group 13, 14, 15 and 16. Identify the correct first ionisation enthalpy value for element E.

Options :

444792705. 801

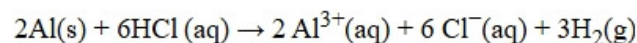
444792706. 1086

444792707. 1402

444792708. 1312

Question Number : 61 Question Id : 444792201 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In the reaction,



Options :

444792681. 12 L HCl(aq) is consumed for every 6L H₂(g) produced.

444792682. 33.6 L H₂(g) is produced regardless of temperature and pressure for every mole of Al that reacts.

444792683. 67.2 L H₂(g) at STP is produced for every mole of Al that reacts.

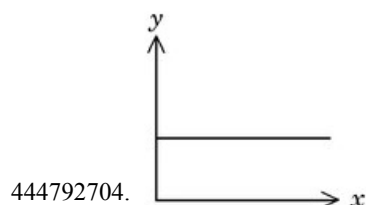
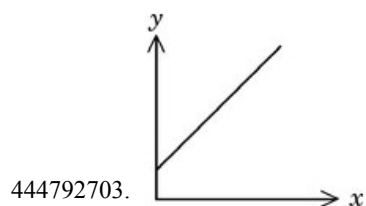
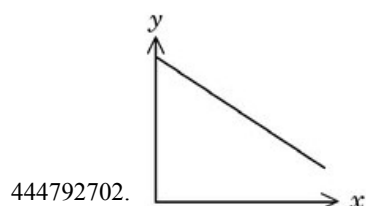
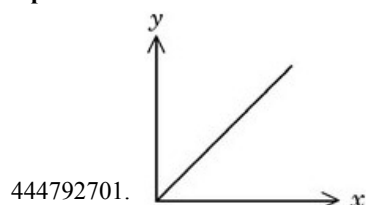
444792684. 11.2 L H₂(g) at STP is produced for every mole of HCl consumed.

Question Number : 62 Question Id : 444792206 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Consider a solution of CO₂(g) dissolved in water in a closed container.

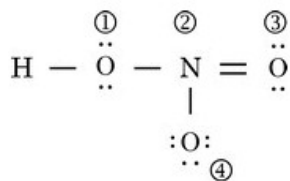
Which one of the following plots correctly represents variation of log (partial pressure of CO₂ in vapour phase above water) [y-axis] with log (mole fraction of CO₂ in water) [x-axis] at 25°C?

Options :



Question Number : 63 Question Id : 444792203 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The formal charges on the atoms marked as (1) to (4) in the Lewis representation of HNO_3 molecule respectively are



Options :

444792689. 0, +1, 0, -1

444792690. 0, -1, 0, +1

444792691. 0, 0, -1, +1

444792692. +1, 0, 0, -1

Question Number : 64 Question Id : 444792210 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Given below are two statements:

Statement I: The halogen that makes longest bond with hydrogen in HX, has the smallest covalent radius in its group.

Statement II: A group 15 element's hydride EH_3 has the lowest boiling point among corresponding hydrides of other group 15 elements. The maximum covalency of that element E is 4.

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

Options :

444792717. Both Statement I and Statement II are true

444792718. Both Statement I and Statement II are false

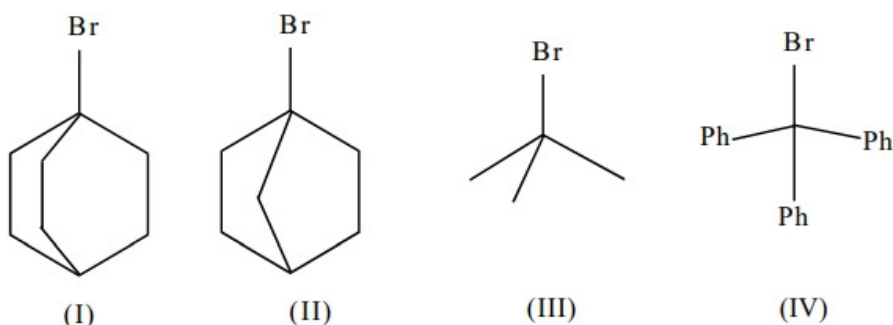
444792719. Statement I is true but Statement II is false

444792720. Statement I is false but Statement II is true

Question Number : 65 Question Id : 444792216 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The correct order of the rate of reaction of the following reactants with nucleophile by $\text{S}_{\text{N}}1$ mechanism is :

(Given : Structures I and II are rigid)



Options :

444792741. $\text{III} < \text{I} < \text{II} < \text{IV}$

444792742. $\text{I} < \text{II} < \text{III} < \text{IV}$

444792743. $\text{IV} < \text{III} < \text{II} < \text{I}$

444792744. $\text{II} < \text{I} < \text{III} < \text{IV}$

Question Number : 66 Question Id : 444792213 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Given below are two statements:

Statement I: Phenol on treatment with $\text{CHCl}_3/\text{aq. KOH}$ under refluxing condition, followed by acidification produces *p*-hydroxy benzaldehyde as the major product and *o*-hydroxy benzaldehyde as the minor product.

Statement II: The mixture of *p*-hydroxybenzaldehyde and *o*-hydroxybenzaldehyde can be easily separated through steam distillation.

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

Options :

444792729. Both Statement I and Statement II are true

444792730. Both Statement I and Statement II are false

444792731. Statement I is true but Statement II is false

444792732. Statement I is false but Statement II is true

Question Number : 67 Question Id : 444792220 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical
Given below are two statements:

Statement I: Sucrose is dextrorotatory. However, sucrose upon hydrolysis gives a solution having mixture of products. This solution shows laevorotation.

Statement II: Hydrolysis of sucrose gives glucose and fructose. Since the laevorotation of glucose is more than the dextrorotation of fructose, the resulting solution becomes laevorotatory.

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

Options :

444792757. Both Statement I and Statement II are true

444792758. Both Statement I and Statement II are false

444792759. Statement I is true but Statement II is false

444792760. Statement I is false but Statement II is true

Match the LIST-I with LIST-II

List-I		List-II	
Thermodynamic Process		Magnitude in kJ	
A.	Work done in reversible, isothermal expansion of 2 mol of ideal gas from 2 dm ³ to 20 dm ³ at 300 K.	I.	4
B.	Work done in irreversible isothermal expansion of 1 mol ideal gas from 1 m ³ to 3 m ³ at 300 K against a constant pressure of 3kPa.	II.	11.5
C.	Change in internal energy for adiabatic expansion of a 1 mol ideal gas with change of temperature = 320 K and $\bar{C}_V = \frac{3}{2} R$.	III.	6
D.	Change in enthalpy at constant pressure of 1 mol ideal gas with change of temperature = 337 K and $\bar{C}_p = \frac{5}{2} R$.	IV.	7

Choose the **correct** answer from the options given below:

Options :

444792693. A-II, B-III, C-I, D-IV

444792694. A-II, B-I, C-III, D-IV

444792695. A-I, B-II, C-III, D-IV

444792696. A-III, B-II, C-IV, D-I

A → product (First order reaction).

Three sets of experiment were performed for a reaction under similar experimental conditions:

Run 1 ⇒ 100 mL of 10 M solution of reactant A

Run 2 ⇒ 200 mL of 10 M solution of reactant A

Run 3 ⇒ 100 mL of 10 M solution of reactant A + 100 mL of H₂O added.

The correct variation of rate of reaction is

Options :

444792709. Run 1 = Run 2 = Run 3

444792710. Run 3 < Run 1 = Run 2

444792711. Run 3 < Run 1 < Run 2

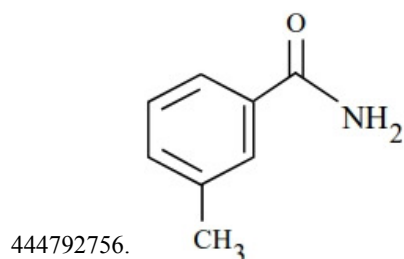
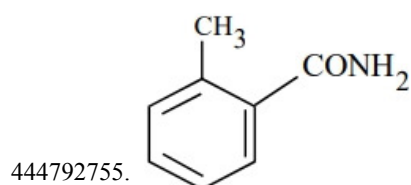
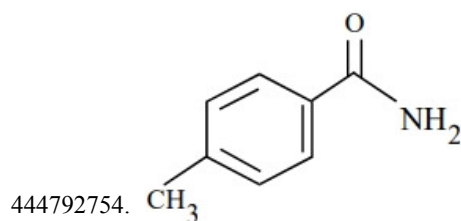
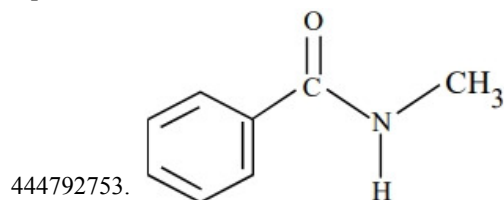
444792712. Run 1 < Run 2 < Run 3

Question Number : 70 Question Id : 444792219 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

'A' is a neutral organic compound (M. F : C_8H_9ON). On treatment with aqueous

$Br_2/HO^{(-)}$, 'A' forms a compound 'B' which is soluble in dilute acid. 'B' on treatment with aqueous $NaNO_2 / HCl$ ($0-5^\circ C$) produces a compound 'C' which on treatment with $CuCN/NaCN$ produces 'D'. Hydrolysis of 'D' produces 'E' which is also obtainable from the hydrolysis of 'A'. 'E' on treatment with acidified $KMnO_4$ produces 'F'. 'F' contains two different types of hydrogen atoms. The structure of 'A' is

Options :

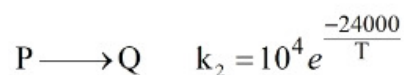
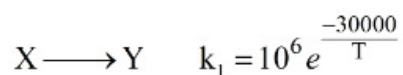


Chemistry Section B

Section Number :	6
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	5
Number of Questions to be attempted :	5
Section Marks :	20
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

Question Number : 71 Question Id : 444792223 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The temperature at which the rate constants of the given below two gaseous reactions become equal is _____ K. (Nearest integer)



Given: $\ln 10 = 2.303$

Response Type : Numeric

Evaluation Required For SA : Yes

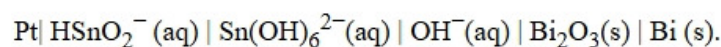
Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 72 Question Id : 444792222 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Consider the following electrochemical cell at 298K



If the reaction quotient at a given time is 10^6 , then the cell EMF (E_{cell}) is _____ $\times 10^{-1}$ V (Nearest integer).

Given the standard half-cell reduction potential as

$$E^\circ_{\text{Bi}_2\text{O}_3/\text{Bi}, \text{OH}^-} = -0.44 \text{ V} \text{ and } E^\circ_{\text{Sn}(\text{OH})_6^{2-}/\text{HSnO}_2^-, \text{OH}^-} = -0.90 \text{ V}$$

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 73 Question Id : 444792224 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The cycloalkene (X) on bromination consumes one mole of bromine per mole of (X) and gives the product (Y) in which C:Br ratio is 3:1. The percentage of bromine in the product (Y) is _____ %. (Nearest integer)

(Given : molar mass in g mol^{-1} H : 1, C : 12, O : 16, Br : 80)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

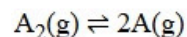
Answers Type : Equal

Text Areas : PlainText

Question Number : 74 Question Id : 444792221 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Dissociation of a gas A_2 takes place according to the following chemical reaction.

At equilibrium, the total pressure is 1 bar at 300K.



The standard Gibbs energy of formation of the involved substances has been provided below:

Substance	$\Delta G_f^\circ / \text{kJ mol}^{-1}$
A_2	-100.00
A	-50.832

The degree of dissociation of $A_2(g)$ is given by $(x \times 10^{-2})^{1/2}$ where $x =$ _____. (Nearest integer).

[Given: $R = 8 \text{ J mol}^{-1} \text{ K}^{-1}$, $\log 2 = 0.3010$, $\log 3 = 0.48$]

Assume degree of dissociation is not negligible.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Question Number : 75 Question Id : 444792225 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Sodium fusion extract of an organic compound (Y) with CHCl_3 and chlorine water

gives violet color to the CHCl_3 layer. 0.15g of (Y) gave 0.12 g of the silver halide

precipitate in Carius method. Percentage of halogen in the compound (Y) is

_____. (Nearest integer)

(Given : molar mass g mol^{-1} C : 12, H : 1, Cl : 35.5, Br : 80, I : 127)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText