National Testing Agency

Question Paper Name :	B Tech 29 Jul 2022 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 Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Let R be a relation from the set {1,2,3, ... , 60} to itself such that

$$R = \{(a, b) : b = pq$$

, where $p, q \geqslant 3$ are prime numbers}. Then, the number of elements in R is :

Options :

A. 600

B. 660

C. 540

D. 720

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

If $z = 2 + 3i$, then $z^5 + (\overline{z})^5$ is equal to :

Options :

A. 244

B. 224

C. 245

D. 265

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

Let A and B be two 3×3 non-zero real matrices such that AB is a zero matrix. Then

Options :

A. the system of linear equations $AX = 0$ has a unique solution

B. the system of linear equations $AX = 0$ has infinitely many solutions

C. B is an invertible matrix

D. adj(A) is an invertible matrix

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

If

$$\frac{1}{(20-a)(40-a)} + \frac{1}{(40-a)(60-a)} + \ \ldots \ + \frac{1}{(180-a)(200-a)} = \frac{1}{256}$$

, then the maximum value of a is :

Options :

A. 198

B. 202

C. 212

D. 218

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

If

$$\lim_{x \to 0} \frac{\alpha e^x + \beta e^{-x} + \gamma \sin x}{x \sin^2 x} = \frac{2}{3}$$

, where $\alpha, \beta, \gamma \in \mathbf{R}$, then which of the following is NOT correct?

Options :

A. $\alpha^2 + \beta^2 + \gamma^2 = 6$

B. $\alpha\beta + \beta\gamma + \gamma\alpha + 1 = 0$

C. $\alpha\beta^2 + \beta\gamma^2 + \gamma\alpha^2 + 3 = 0$

D. $\alpha^2 - \beta^2 + \gamma^2 = 4$

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

The integral

$$\int_0^{\frac{\pi}{2}} \frac{1}{3 + 2\sin x + \cos x}\,dx$$

is equal to :

Options :

A. $\tan^{-1}(2)$

B. $\tan^{-1}(2) - \frac{\pi}{4}$

C. $\frac{1}{2}\tan^{-1}(2) - \frac{\pi}{8}$

D. $\frac{1}{2}$

Question Number : 7 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

$$y = y(x)$$

of the differential equation

$$\left(1 + e^{2x}\right)\left(\frac{dy}{dx} + y\right) = 1$$

pass through the point

$$\left(0, \frac{\pi}{2}\right)$$

. Then,

$$\lim_{x \to \infty} e^x y(x)$$

is equal to :

Options :

A. $\frac{\pi}{4}$

B. $\frac{3\pi}{4}$

C. $\frac{\pi}{2}$

D. $\frac{3\pi}{2}$

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

Let a line L pass through the point of intersection of the lines $bx + 10y - 8 = 0$ and

$$2x - 3y = 0,\ \mathrm{b} \in \mathbf{R} - \left\{\frac{4}{3}\right\}$$

. If the line L also passes through the point (1,1) and touches the circle

$$17\left(x^2 + y^2\right) = 16$$

, then the eccentricity of the ellipse

$$\frac{x^2}{5} + \frac{y^2}{\mathrm{b}^2} = 1$$

is :

Options :

A. $\frac{2}{\sqrt{5}}$

B. $\sqrt{\frac{3}{5}}$

C. $\frac{1}{\sqrt{5}}$

D. $\sqrt{\frac{2}{5}}$

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

Let the circumcentre of a triangle with vertices A(a, 3), B(b, 5) and C(a, b), ab > 0 be P(1,1). If the line AP intersects the line BC at the point $\mathrm{Q}\left(k_1, k_2\right)$, then $k_1 + k_2$ is equal to :

Options :

A. 2

B. $\frac{4}{7}$

C. $\frac{2}{7}$

D. 4

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

Let $\hat{a}$ and $\hat{b}$ be two unit vectors such that the angle between them is $\frac{\pi}{4}$. If θ is the angle between the vectors $(\hat{a}+\hat{b})$ and $(\hat{a}+2\hat{b}+2(\hat{a}\times\hat{b}))$, then the value of $164\cos^2\theta$ is equal to :

Options :

A. $90+27\sqrt{2}$

B. $45+18\sqrt{2}$

C. $90+3\sqrt{2}$

D. $54+90\sqrt{2}$

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

If

$$f(\alpha)=\int_1^{\alpha}\frac{\log_{10}t}{1+t}dt,\alpha>0$$

, then $f\left(e^3\right)+f\left(e^{-3}\right)$ is equal to :

Options :

A. 9

B. $\frac{9}{2}$

C. $\frac{9}{\log_e(10)}$

D. $\frac{9}{2\log_e(10)}$

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

The area of the region

$\left\{(x, y) : |x-1| \leq y \leq \sqrt{5-x^2}\right\}$ is equal to :

Options :

A. $\frac{5}{2}\sin^{-1}\left(\frac{3}{5}\right) - \frac{1}{2}$

B. $\frac{5\pi}{4} - \frac{3}{2}$

C. $\frac{3\pi}{4} + \frac{3}{2}$

D. $\frac{5\pi}{4} - \frac{1}{2}$

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

Let the focal chord of the parabola

$$\mathrm{P} : y^2 = 4x$$

along the line

$$\mathrm{L} : y = \mathrm{m}x + \mathrm{c}, \mathrm{m} > 0$$

meet the parabola at the points M and N. Let the line L be a tangent to the hyperbola

$$\mathrm{H} : x^2 - y^2 = 4$$

. If O is the vertex of P and F is the focus of H on the positive x-axis, then the area of the quadrilateral OMFN is :

Options :

A. $2\sqrt{6}$

B. $2\sqrt{14}$

C. $4\sqrt{6}$

D. $4\sqrt{14}$

Question Number : 14 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 points, where the function $f : \mathbf{R} \to \mathbf{R}$,

$$f(x) = |x-1|\cos|x-2|\sin|x-1| + (x-3)\left|x^2 - 5x + 4\right|$$

, is NOT differentiable, is :

Options :

A. 1

B. 2

C. 3

D. 4

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

Let

$$S = \{1,2,3, \ldots, 2022\}$$

. Then the probability, that a randomly chosen number n from the set S such that

$$\mathrm{HCF}(n, 2022) = 1$$

, is :

Options :

A. $\frac{128}{1011}$

B. $\frac{166}{1011}$

C. $\frac{127}{337}$

D. $\frac{112}{337}$

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

Let

$$f(x) = 3^{\left(x^2-2\right)^3+4}, x \in \mathrm{R}$$

. Then which of the following statements are true?

$$\mathrm{P}: x = 0$$

is a point of local minima of f

$$\mathrm{Q}: x = \sqrt{2}$$

is a point of inflection of f

$R: f^{'}$ is increasing for

$$x > \sqrt{2}$$

Options :

A. Only P and Q

B. Only P and R

C. Only Q and R

D. All P, Q and R

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

If the foot of the perpendicular from the point $\mathrm{A}(-1,4,3)$ on the plane

$$\mathrm{P}: 2x + \mathrm{m}y + \mathrm{n}z = 4$$

, is

$$\left(-2, \frac{7}{2}, \frac{3}{2}\right)$$

, then the distance of the point A from the plane P, measured parallel to a line with direction ratios $3, -1, -4$, is equal to :

Options :

A. 1

B. $\sqrt{26}$

C. $2\sqrt{2}$

D. $\sqrt{14}$

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

Let

$$\vec{a} = 3\hat{i} + \hat{j}$$

and

$$\vec{b} = \hat{i} + 2\hat{j} + \hat{k}$$

. Let $\vec{c}$ be a vector satisfying

$$\vec{a} \times (\vec{b} \times \vec{c}) = \vec{b} + \lambda\vec{c}$$

. If $\vec{b}$ and $\vec{c}$ are non-parallel, then the value of λ is :

Options :

A. -5

B. 5

C. 1

D. -1

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

The angle of elevation of the top of a tower from a point A due north of it is α and from a point B at a distance of 9 units due west of A is

$$\cos^{-1}\left(\frac{3}{\sqrt{13}}\right)$$

. If the distance of the point B from the tower is 15 units, then $\cot\alpha$ is equal to :

Options :

A. $\frac{6}{5}$

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

C. $\frac{4}{3}$

D. $\frac{7}{3}$

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

The statement $(p \wedge q) \Rightarrow (p \wedge r)$ is equivalent to :

Options :

A. $q \Rightarrow (p \wedge r)$

B. $p \Rightarrow (\mathrm{p} \wedge \mathrm{r})$

C. $(\mathrm{p} \wedge \mathrm{r}) \Rightarrow (\mathrm{p} \wedge \mathrm{q})$

D. $(p \wedge q) \Rightarrow r$

Mathematics Section B

Section Number :	2
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
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 Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let the mean and the variance of 20 observations $x_1, x_2, \ldots, x_{20}$ be 15 and 9 , respectively. For $\alpha \in \mathbf{R}$, if the mean of $(x_1+\alpha)^2, (x_2+\alpha)^2, \ldots, (x_{20}+\alpha)^2$ is 178 , then the square of the maximum value of α 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 Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let $a_1, a_2, a_3, \ldots$ be an A.P. If

$$\sum_{r=1}^{\infty} \frac{a_r}{2^r} = 4$$

, then $4a_2$ is equal to _____.

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

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

Let the ratio of the fifth term from the beginning to the fifth term from the end in the binomial expansion of

$$\left(\sqrt[4]{2} + \frac{1}{\sqrt[4]{3}}\right)^n$$

, in the increasing powers of

$$\frac{1}{\sqrt[4]{3}}$$

be $\sqrt[4]{6}$: 1. If the sixth term from the beginning is

$$\frac{\alpha}{\sqrt[4]{3}}$$

, then α 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 Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The number of matrices of order 3×3, whose entries are either 0 or 1 and the sum of all the entries is a prime number, is _____.

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

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

Let p and p + 2 be prime numbers and let

$$\Delta = \begin{vmatrix} p! & (p+1)! & (p+2)! \\ (p+1)! & (p+2)! & (p+3)! \\ (p+2)! & (p+3)! & (p+4)! \end{vmatrix}$$

Then the sum of the maximum values of α and β, such that p^{α} and $(p+2)^{\beta}$ divide Δ, is _____.

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

Question Number : 26 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let

$$S = \{4,6,9\}$$

and

$$T = \{9,10,11, \ldots, 1000\}$$

. If

$$A = \{a_1 + a_2 + \ldots + a_k : k \in \mathbf{N}, a_1, a_2, a_3, \ldots, a_k \in S\}$$

, then the sum of all the elements in the set $T - A$ is equal to _____.

Response Type : Numeric

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

Question Number : 27 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let the mirror image of a circle

$$c_1 : x^2 + y^2 - 2x - 6y + \alpha = 0$$

in line $y = x + 1$ be

$$c_2 : 5x^2 + 5y^2 + 10gx + 10fy + 38 = 0$$

. If r is the radius of circle c_2, then $\alpha + 6r^2$ is equal to _____.

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

Question Number : 28 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let

$$S = \left\{\theta \in (0,2\pi) : 7\cos^2\theta - 3\sin^2\theta - 2\cos^2 2\theta = 2\right\}$$

. Then, the sum of roots of all the equations

$$x^2 - 2\left(\tan^2\theta + \cot^2\theta\right)x + 6\sin^2\theta = 0, \theta \in S$$

, is _____.

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

Question Number : 29 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Let a line with direction ratios $a, -4a, -7$ be perpendicular to the lines with direction ratios $3, -1, 2b$ and $b, a, -2$. If the point of intersection of the line

$$\frac{x+1}{a^2+b^2} = \frac{y-2}{a^2-b^2} = \frac{z}{1}$$

and the plane $x - y + z = 0$ is (α, β, γ), 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 : 30 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

If

$$\frac{1}{2\times3\times4} + \frac{1}{3\times4\times5} + \frac{1}{4\times5\times6} + \ \ldots\ + \frac{1}{100\times101\times102} = \frac{k}{101}$$

, then 34 k is equal to _____.

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 : 31 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 : One is labelled as Assertion (A) and other is labelled as Reason (R).

Assertion (A) : Time period of oscillation of a liquid drop depends on surface tension (S), if density of the liquid is ρ and radius of the drop is r, then

$$T = K\sqrt{\rho r^3/S^{3/2}}$$

is dimensionally correct, where K is dimensionless.

Reason (R) : Using dimensional analysis we get R.H.S. having different dimension than that of time period.

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

Options :

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true but (R) is not the correct explanation of (A)

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

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

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

A ball is thrown up vertically with a certain velocity so that, it reaches a maximum height h. Find the ratio of the times in which it is at height $\frac{h}{3}$ while going up and coming down respectively.

Options :

A. $$\frac{\sqrt{2}-1}{\sqrt{2}+1}$$

B. $$\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$$

C. $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

D. $\frac{1}{3}$

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

If

$$t = \sqrt{x} + 4$$

, then

$$\left(\frac{dx}{dt}\right)_{t=4}$$

is :

Options :

A. 4

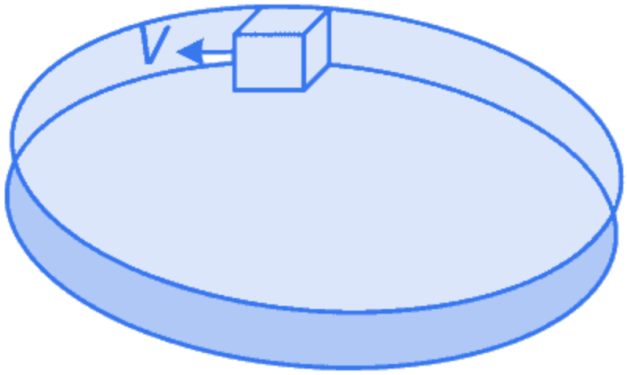
B. zero

C. 8

D. 16

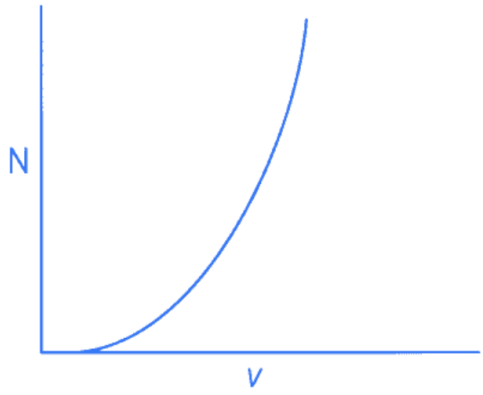
Question Number : 34 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A smooth circular groove has a smooth vertical wall as shown in figure. A block of mass m moves against the wall with a speed v. Which of the following curve represents the correct relation between the normal reaction on the block by the wall (N) and speed of the block (v) ?

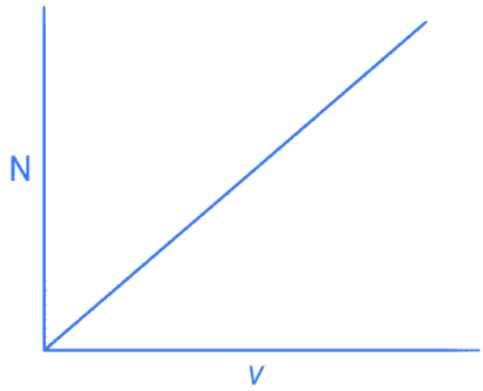


Options :

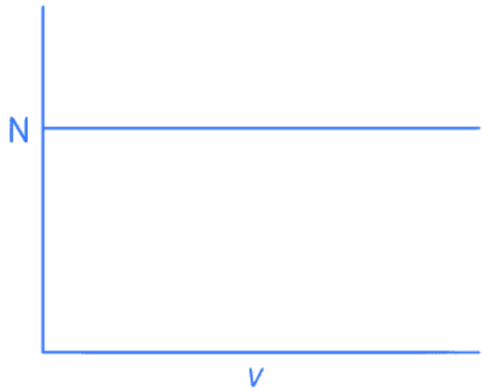
A.



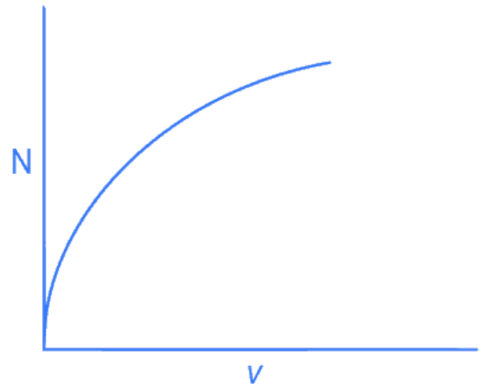
B.



C.



D.



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

A ball is projected with kinetic energy E, at an angle of 60° to the horizontal. The kinetic energy of this ball at the highest point of its flight will become :

Options :

A. Zero

B. $\frac{E}{2}$

C. $\frac{E}{4}$

D. E

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

Two bodies of mass 1 kg and 3 kg have position vectors $\hat{i} + 2\hat{j} + \hat{k}$ and $-3\hat{i} - 2\hat{j} + \hat{k}$ respectively. The magnitude of position vector of centre of mass of this system will be similar to the magnitude of vector :

Options :

A. $\hat{i} + 2\hat{j} + \hat{k}$

B. $-3\hat{i} - 2\hat{j} + \hat{k}$

C. $-2\hat{i} + 2\hat{k}$

D. $2\hat{i} - \hat{j} + 2\hat{k}$

Question Number : 37 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 : One is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): Clothes containing oil or grease stains cannot be cleaned by water wash.

Reason (R): Because the angle of contact between the oil/grease and water is obtuse.

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

Options :

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true but (R) is not the correct explanation of (A)

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

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

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

If the length of a wire is made double and radius is halved of its respective values. Then, the Young's modulus of the material of the wire will :

Options :

A. remain same

B. become 8 times its initial value

C. become $\frac{1}{4}$ of its initial value

D. become 4 times its initial value

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

The time period of oscillation of a simple pendulum of length L suspended from the roof of a vehicle, which moves without friction down an inclined plane of inclination α, is given by :

Options :

A. $2\pi\sqrt{L/(g\cos\alpha)}$

B. $2\pi\sqrt{L/(g\sin\alpha)}$

C. $2\pi\sqrt{L/g}$

D. $2\pi\sqrt{L/(g\tan\alpha)}$

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

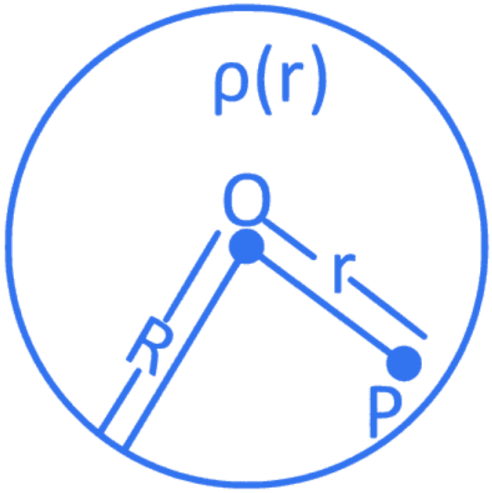
A spherically symmetric charge distribution is considered with charge density varying as

$$\rho(r) = \begin{cases} \rho_0\left(\frac{3}{4} - \frac{r}{R}\right) & \text{for } r \le R \\ \text{zero} & \text{for } r > R \end{cases}$$

Where,

$$r(r < R)$$

is the distance from the centre O (as shown in figure). The electric field at point P will be:



Options :

A. $\frac{\rho_0 r}{4\varepsilon_0}\left(\frac{3}{4} - \frac{r}{R}\right)$

B. $\frac{\rho_0 r}{3\varepsilon_0}\left(\frac{3}{4} - \frac{r}{R}\right)$

C. $\frac{\rho_0 r}{4\varepsilon_0}\left(1 - \frac{r}{R}\right)$

D. $\frac{\rho_0 r}{5\varepsilon_0}\left(1 - \frac{r}{R}\right)$

Question Number : 41 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 : Electric potential is constant within and at the surface of each conductor.

Statement II : Electric field just outside a charged conductor is perpendicular to the surface of the conductor at every point.

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

Options :

A. Both Statement I and Statement II are correct

B. Both Statement I and Statement II are incorrect

C. Statement I is correct but Statement II is incorrect

D. Statement I is incorrect but Statement II is correct

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

Two metallic wires of identical dimensions are connected in series. If σ_1 and σ_2 are the conductivities of the these wires respectively, the effective conductivity of the combination is :

Options :

A. $\frac{\sigma_1\sigma_2}{\sigma_1+\sigma_2}$

B. $\frac{2\sigma_1\sigma_2}{\sigma_1+\sigma_2}$

C. $\frac{\sigma_1+\sigma_2}{2\sigma_1\sigma_2}$

D. $\frac{\sigma_1+\sigma_2}{\sigma_1\sigma_2}$

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

An alternating emf

$$E = 440 \sin 100\pi t$$

is applied to a circuit containing an inductance of

$$\frac{\sqrt{2}}{\pi} H$$

. If an a.c. ammeter is connected in the circuit, its reading will be :

Options :

A. 4.4 A

B. 1.55 A

C. 2.2 A

D. 3.11 A

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

A coil of inductance 1 H and resistance 100 Ω is connected to a battery of 6 V. Determine approximately :

(a) The time elapsed before the current acquires half of its steady - state value.

(b) The energy stored in the magnetic field associated with the coil at an instant 15 ms after the circuit is switched on. (Given

$$\ln 2 = 0.693, e^{-3/2} = 0.25$$

)

Options :

A. t = 10 ms; U = 2 mJ

B. t = 10 ms; U = 1 mJ

C. t = 7 ms; U = 1 mJ

D. t = 7 ms; U = 2 mJ

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

Match List - I with List - II :

	List - I		**List - II**
(a)	UV rays	(i)	Diagnostic tool in medicine
(b)	X-rays	(ii)	Water purification
(c)	Microwave	(iii)	Communication, Radar
(d)	Infrared wave	(iv)	Improving visibility in foggy days

Choose the correct answer from the options given below :

Options :

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

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

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

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

Question Number : 46 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The kinetic energy of emitted electron is E when the light incident on the metal has wavelength λ. To double the kinetic energy, the incident light must have wavelength:

Options :

A. $\frac{hc}{E\lambda - hc}$

B. $\frac{hc\lambda}{E\lambda + hc}$

C. $\frac{h\lambda}{E\lambda + hc}$

D. $\frac{hc\,\lambda}{E\lambda - hc}$

Question Number : 47 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the ratio of energies of photons produced due to transition of an electron of hydrogen atom from its (i) second permitted energy level to the first level, and (ii) the highest permitted energy level to the first permitted level.

Options :

A. 3 : 4

B. 4 : 3

C. 1 : 4

D. 4 : 1

Question Number : 48 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

A travelling microscope has 20 divisions per cm on the main scale while its vernier scale has total 50 divisions and 25 vernier scale divisions are equal to 24 main scale divisions, what is the least count of the travelling microscope?

Options :

A. 0.001 cm

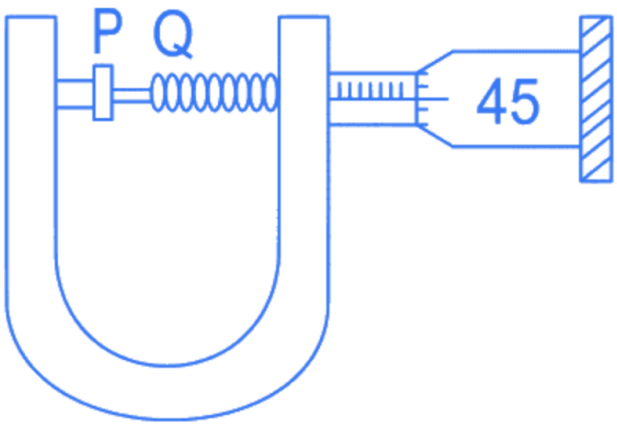
B. 0.002 mm

C. 0.002 cm

D. 0.005 cm

Question Number : 49 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In an experiment to find out the diameter of wire using screw gauge, the following observations were noted :



(A) Screw moves 0.5 mm on main scale in one complete rotation

(B) Total divisions on circular scale $= 50$

(C) Main scale reading is 2.5 mm

(D) 45^{th} division of circular scale is in the pitch line

(E) Instrument has 0.03 mm negative error

Then the diameter of wire is :

Options :

A. 2.92 mm

B. 2.54 mm

C. 2.98 mm

D. 3.45 mm

Question Number : 50 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find the modulation index of an AM wave having 8 V variation where maximum amplitude of the AM wave is 9 V.

Options :

A. 0.8

B. 0.5

C. 0.2

D. 0.1

Physics Section B

Section Number :	4
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	10
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 : 51 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

An object is projected in the air with initial velocity u at an angle θ. The projectile motion is such that the horizontal range R, is maximum. Another object is projected in the air with a horizontal range half of the range of first object. The initial velocity remains same in both the case. The value of the angle of projection, at which the second object is projected, will be _____ degree.

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

Question Number : 52 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

If the acceleration due to gravity experienced by a point mass at a height h above the surface of earth is same as that of the acceleration due to gravity at a depth

$$\alpha h\left(h << R_e\right)$$

from the earth surface. The value of α will be _____.

(use

$$R_e = 6400\ \text{km}\Big)$$

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

Question Number : 53 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The pressure P_1 and density d_1 of diatomic gas

$$\left(\gamma = \frac{7}{5}\right)$$

changes suddenly to

$$P_2\left(> P_1\right)$$

and d_2 respectively during an adiabatic process. The temperature of the gas increases and becomes _____ times of its initial temperature. (given

$$\frac{d_2}{d_1} = 32$$

)

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes

Answers Type : Equal
Text Areas : PlainText

Question Number : 54 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

One mole of a monoatomic gas is mixed with three moles of a diatomic gas. The molecular specific heat of mixture at constant volume is

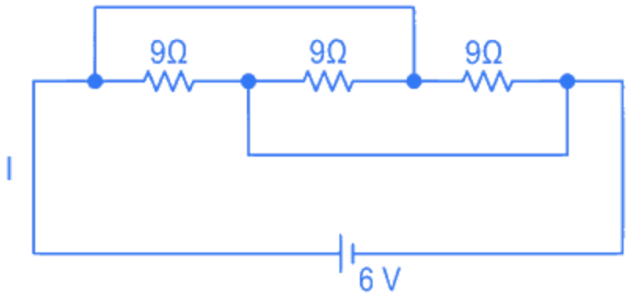
$$\frac{\alpha^2}{4}\text{R J/mol K}$$

; then the value of α will be _____. (Assume that the given diatomic gas has no vibrational mode).

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

Question Number : 55 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The current I flowing through the given circuit will be _____A.



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

Question Number : 56 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A closely wounded circular coil of radius 5 cm produces a magnetic field of 37.68×10^{-4} T at its center. The current through the coil is _____A.

[Given, number of turns in the coil is 100 and $\pi = 3.14$]

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

Question Number : 57 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Two light beams of intensities 4I and 9I interfere on a screen. The phase difference between these beams on the screen at point A is zero and at point B is π. The difference of resultant intensities, at the point A and B, will be _____ I.

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

Question Number : 58 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A wire of length 314 cm carrying current of 14 A is bent to form a circle. The magnetic moment of the coil is _____ $A-m^2$. [Given $\pi = 3.14$]

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

Question Number : 59 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The X-Y plane be taken as the boundary between two transparent media M_1 and M_2. M_1 in $Z \geqslant 0$ has a refractive index of $\sqrt{2}$ and M_2 with $Z < 0$ has a refractive index of $\sqrt{3}$. A ray of light travelling in M_1 along the direction given by the vector

$$\vec{P} = 4\sqrt{3}\ \hat{i} - 3\sqrt{3}\ \hat{j} - 5\hat{k}$$

, is incident on the plane of separation. The value of difference between the angle of incident in M_1 and the angle of refraction in M_2 will be _____ degree.

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

Question Number : 60 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

If the potential barrier across a p-n junction is 0.6 V. Then the electric field intensity, in the depletion region having the width of 6×10^{-6} m, will be _____ $\times 10^5$ N/C.

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

Which of the following pair of molecules contain odd electron molecule and an expanded octet molecule?

Options :

A. BCl_3 and SF_6

B. NO and H_2SO_4

C. SF_6 and H_2SO_4

D. BCl_3 and NO

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

$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$$
$$20\ g \qquad 5\ g$$

Consider the above reaction, the limiting reagent of the reaction and number of moles of NH_3 formed respectively are :

Options :

A. H_2, 1.42 moles

B. H_2, 0.71 moles

C. N_2, 1.42 moles

D. N_2, 0.71 moles

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

The first ionization enthalpy of Na, Mg and Si, respectively, are : 496, 737 and 786 kJ mol^{-1}. The first ionization enthalpy (kJ mol^{-1}) of Al is :

Options :

A. 487

B. 768

C. 577

D. 856

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

The reaction of zinc with excess of aqueous alkali, evolves hydrogen gas and gives :

Options :

A. $Zn(OH)_2$

B. ZnO

C. $\left[Zn(OH)_4\right]^{2-}$

D. $\left[ZnO_2\right]^{2-}$

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

Number of lone pairs of electrons in the central atom of SCl_2, O_3, ClF_3 and SF_6, respectively, are :

Options :

A. 0, 1, 2 and 2

B. 2, 1, 2 and 0

C. 1, 2, 2 and 0

D. 2, 1, 0 and 2

Question Number : 66 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In following pairs, the one in which both transition metal ions are colourless is :

Options :

A. Sc^{3+}, Zn^{2+}

B. Ti^{4+}, Cu^{2+}

C. V^{2+}, Ti^{3+}

D. Zn^{2+}, Mn^{2+}

Question Number : 67 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In neutral or faintly alkaline medium, $KMnO_4$ being a powerful oxidant can oxidize, thiosulphate almost quantitatively, to sulphate. In this reaction overall change in oxidation state of manganese will be :

Options :

A. 5

B. 1

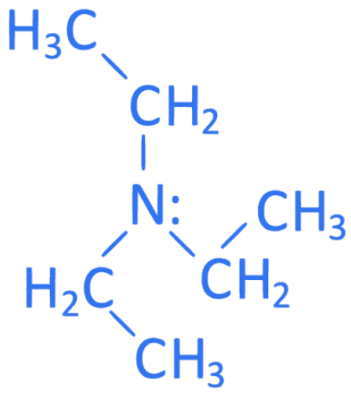
C. 0

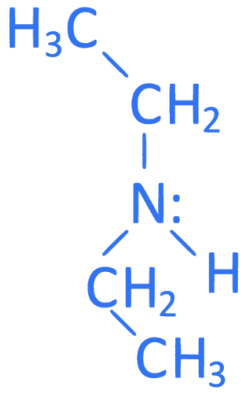
D. 3

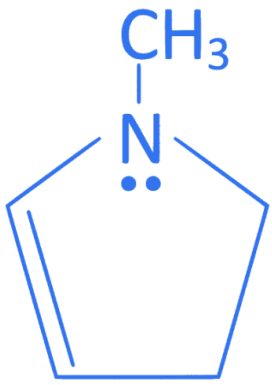
Question Number : 68 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

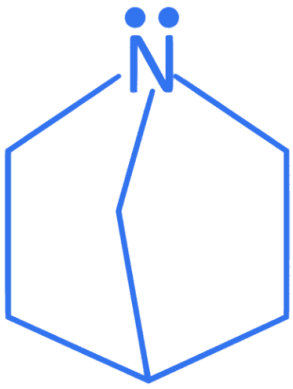
Which among the following is the strongest Bronsted base?

Options :

A. 

B. 

C. 

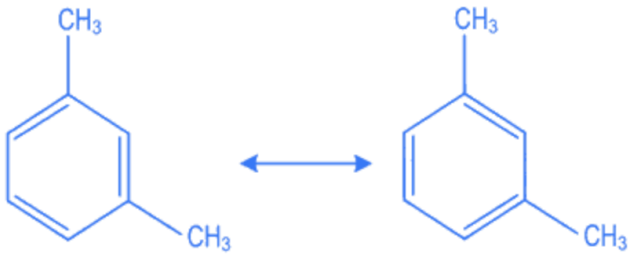
D. 

Question Number : 69 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

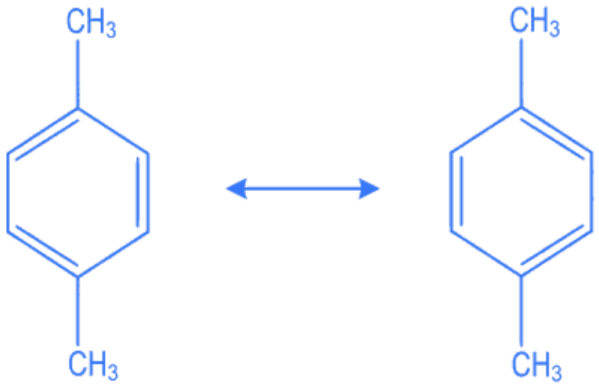
Which among the following pairs of the structures will give different products on ozonolysis? (Consider the double bonds in the structures are rigid and not delocalized.)

Options :

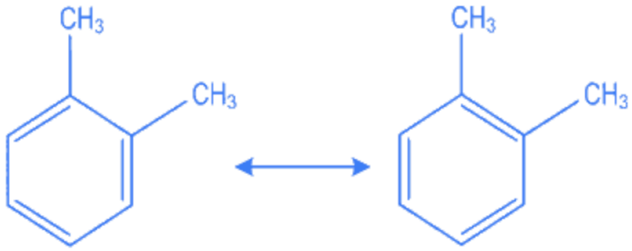
A.



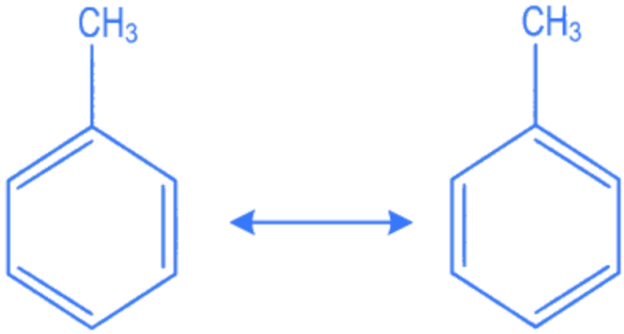
B.



C.



D.



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



Considering the above reactions, the compound 'A' and compound 'B' respectively are :

Options :

A.

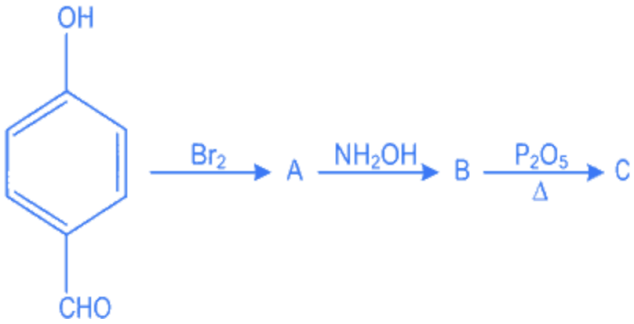


B. 

C. 

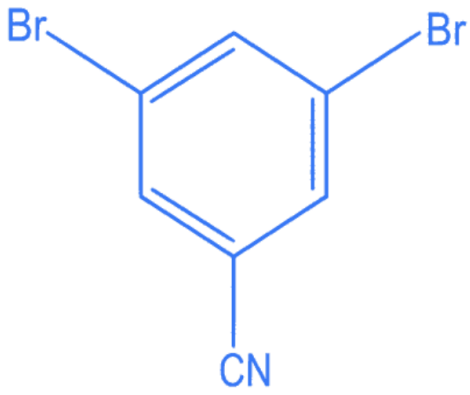
D. 

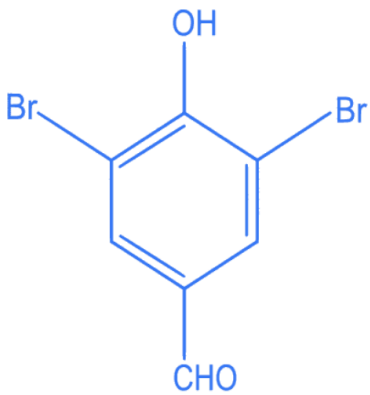
Question Number : 71 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical



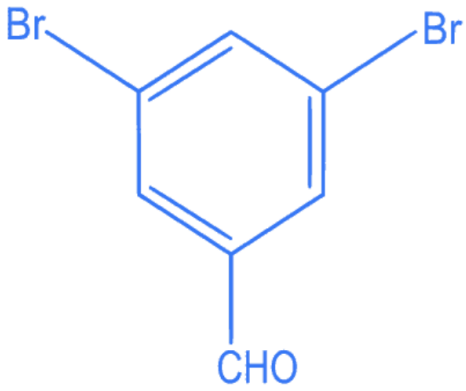
Consider the above reaction sequence, the Product 'C' is :

Options :

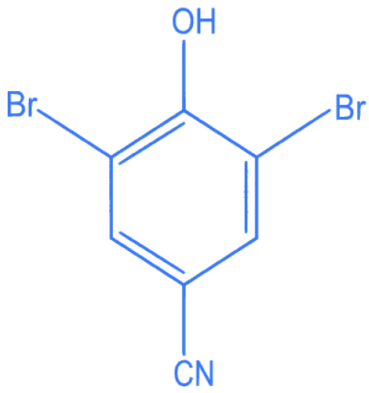
A. 

B. 

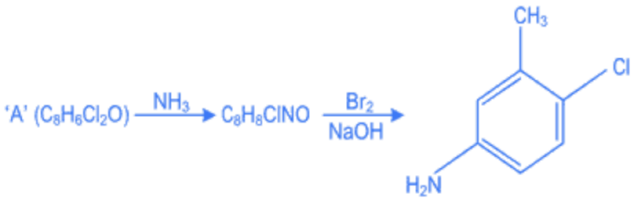
C.



D.



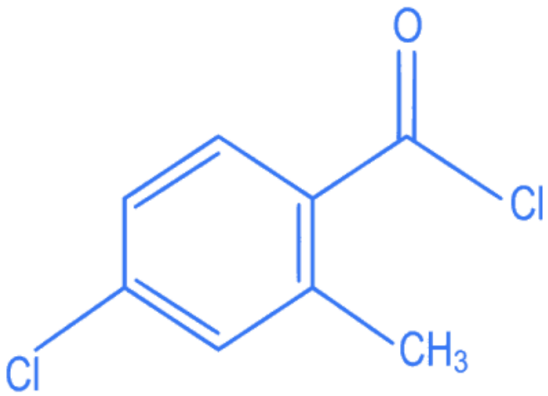
Question Number : 72 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical



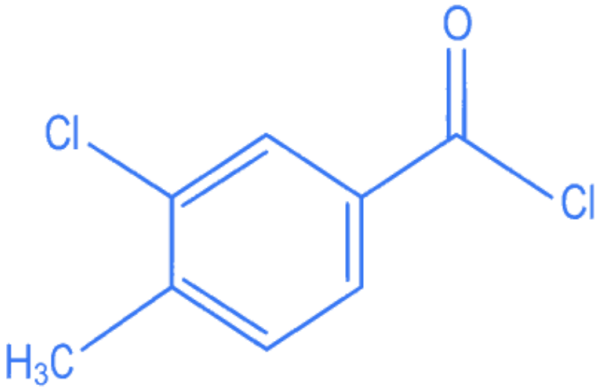
Consider the above reaction, the compound 'A' is :

Options :

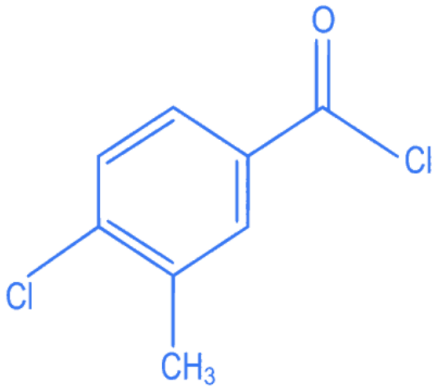
A.



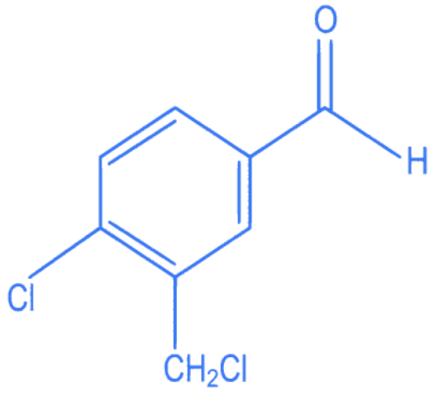
B.



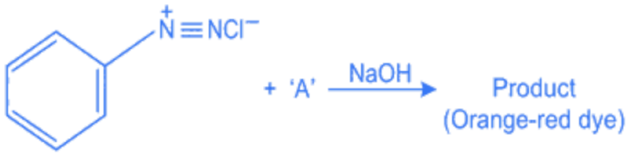
C.



D.



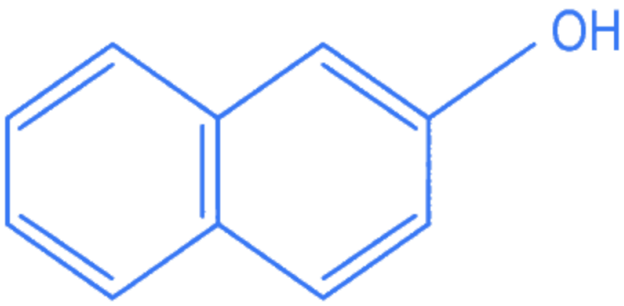
Question Number : 73 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical



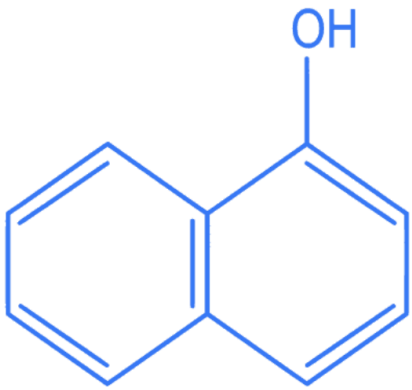
Which among the following represent reagent 'A'?

Options :

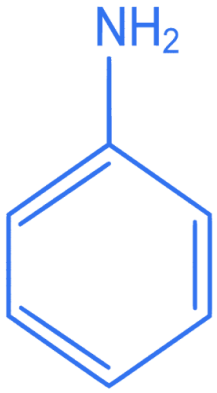
A.



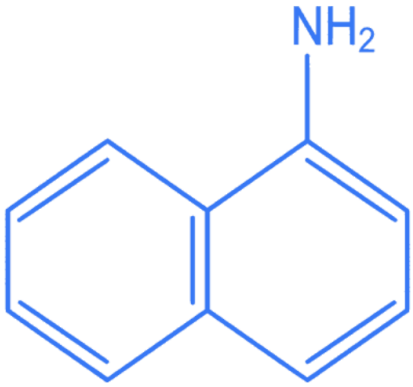
B.



C.

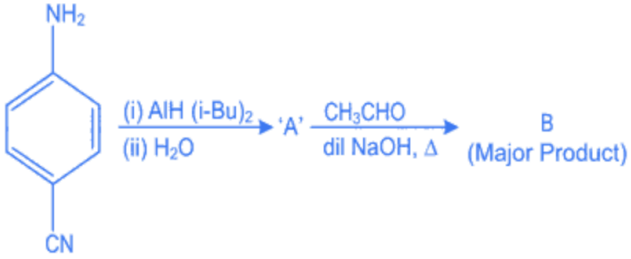


D.



Question Number : 74 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

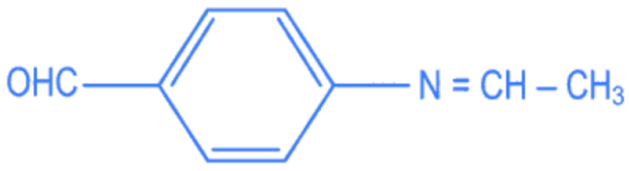
Consider the following reaction sequence:



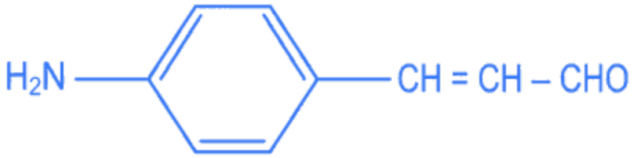
The product 'B' is :

Options :

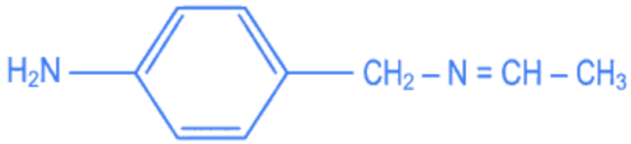
A.



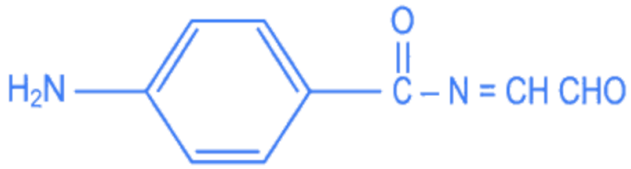
B.



C.



D.

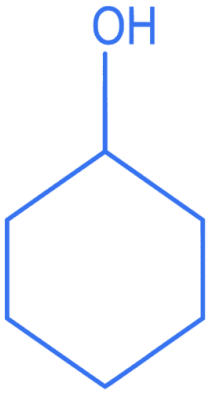


Question Number : 75 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

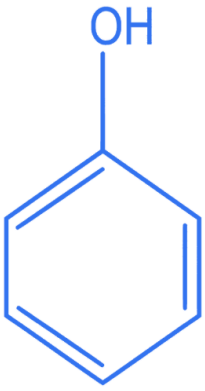
A compound 'X' is acidic and it is soluble in NaOH solution, but insoluble in $NaHCO_3$ solution. Compound 'X' also gives violet colour with neutral $FeCl_3$ solution. The compound 'X' is :

Options :

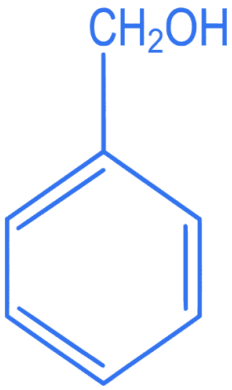
A.



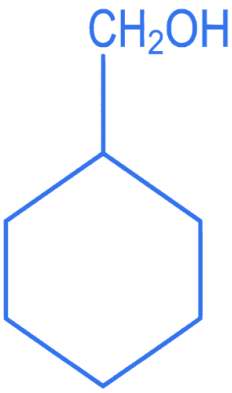
B.



C.



D.



Question Number : 76 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

100 mL of 5% (w/v) solution of NaCl in water was prepared in 250 mL beaker. Albumin from the egg was poured into NaCl solution and stirred well. This resulted in a/an :

Options :

A. Lyophilic sol

B. Lyophobic sol

C. Emulsion

D. Precipitate

Question Number : 77 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

In metallurgy the term "gangue" is used for :

Options :

A. Contamination of undesired earthy materials.

B. Contamination of metals, other than desired metal.

C. Minerals which are naturally occurring in pure form

D. Magnetic impurities in an ore.

Question Number : 78 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Lithium nitrate and sodium nitrate, when heated separately, respectively, give :

Options :

A. $LiNO_2$ and $NaNO_2$

B. Li_2O and Na_2O

C. Li_2O and $NaNO_2$

D. $LiNO_2$ and Na_2O

Question Number : 79 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which among the following pairs has only herbicides?

Options :

A. Aldrin and Dieldrin

B. Sodium chlorate and Aldrin

C. Sodium arsinate and Dieldrin

D. Sodium chlorate and sodium arsinite

Question Number : 80 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Which of the following compounds is an example of hypnotic drug?

Options :

A. Seldane

B. Amytal

C. Aspartame

D. Prontosil

Chemistry Section B

Section Number : 6
Section type : Online

Mandatory or Optional :	Mandatory
Number of Questions :	10
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 : 81 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Resistance of a conductivity cell (cell constant 129 m^{-1}) filled with 74.5 ppm solution of KCl is 100 Ω (labelled as solution 1). When the same cell is filled with KCl solution of 149 ppm, the resistance is 50 Ω (labelled as solution 2). The ratio of molar conductivity of solution 1 and solution 2 is i.e.

$$\frac{\Lambda_1}{\Lambda_2} = x \times 10^{-3}$$

. The value of x is _____. (Nearest integer)

Given, molar mass of KCl is 74.5 g mol^{-1}.

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

Question Number : 82 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The minimum uncertainty in the speed of an electron in an one dimensional region of length $2a_o$ (Where $a_o =$ Bohr radius 52.9 pm) is _____ km s^{-1}.

(Given : Mass of electron = 9.1×10^{-31} kg, Planck's constant h = 6.63×10^{-34} Js)

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

Question Number : 83 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

When 600 mL of 0.2 M HNO_3 is mixed with 400 mL of 0.1 M NaOH solution in a flask, the rise in temperature of the flask is _____ $\times 10^{-2}$ °C.

(Enthalpy of neutralisation $= 57$ kJ mol^{-1} and Specific heat of water $= 4.2$ JK^{-1} g^{-1}) (Neglect heat capacity of flask)

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

Question Number : 84 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

If O_2 gas is bubbled through water at 303 K, the number of millimoles of O_2 gas that dissolve in 1 litre of water is _____. (Nearest Integer)

(Given : Henry's Law constant for O_2 at 303 K is 46.82 k bar and partial pressure of

$$O_2 = 0.920$$

bar)

(Assume solubility of O_2 in water is too small, nearly negligible)

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

Question Number : 85 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

If the solubility product of PbS is 8×10^{-28}, then the solubility of PbS in pure water at 298 K is $x \times 10^{-16}$ mol L^{-1}. The value of x is _____. (Nearest Integer)

[Given :

$$\sqrt{2}$$

$= 1.41$]

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

Question Number : 86 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

The reaction between X and Y is first order with respect to X and zero order with respect to Y.

Experiment	$\frac{[X]}{mol\,L^{-1}}$	$\frac{[Y]}{mol\,L^{-1}}$	$\frac{Initial\,rate}{mol\,L^{-1}\,min^{-1}}$
I	0.1	0.1	2×10^{-3}
I	L	0.2	4×10^{-3}
III	0.4	0.4	$M \times 10^{-3}$
IV	0.1	0.2	2×10^{-3}

Examine the data of table and calculate ratio of numerical values of M and L. (Nearest Integer)

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

Question Number : 87 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

In a linear tetrapeptide (Constituted with different amino acids), (number of amino acids) − (number of peptide bonds) is _____.

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

Question Number : 88 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

In bromination of Propyne, with Bromine, 1, 1, 2, 2-tetrabromopropane is obtained in 27% yield. The amount of 1, 1, 2, 2-tetrabromopropane obtained from 1 g of Bromine in this reaction is _____ $\times 10^{-1}$ g. (Nearest integer)

(Molar Mass : Bromine = 80 g/mol)

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

Question Number : 89 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

$\left[Fe(CN)_6\right]^{3-}$ should be an inner orbital complex. Ignoring the pairing energy, the value of crystal field stabilization energy for this complex is $(-)$ _____ Δ_0. (Nearest integer)

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

Question Number : 90 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Ionic radii of cation A^+ and anion B^- are 102 and 181 pm respectively. These ions are allowed to crystallize into an ionic solid. This crystal has cubic close packing for B^-. A^+ is present in all octahedral voids. The edge length of the unit cell of the crystal AB is _____ pm. (Nearest Integer)

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