National Testing Agency

Question Paper Name :	B Tech 26 Jul 2022 Shift 2
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

The minimum value of the sum of the squares of the roots of

$$x^2 + (3 - a)x + 1 = 2a$$

is:

Options :

A. 4

B. 5

C. 6

D. 8

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 $z = x + iy$ satisfies

$$|z| - 2 = 0$$

and

$$|z - i| - |z + 5i| = 0$$

, then :

Options :

A. $x + 2y - 4 = 0$

B. $x^2 + y - 4 = 0$

C. $x + 2y + 4 = 0$

D. $x^2 - y + 3 = 0$

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 $A = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ and $B = \begin{bmatrix} 9^2 & -10^2 & 11^2 \\ 12^2 & 13^2 & -14^2 \\ -15^2 & 16^2 & 17^2 \end{bmatrix}$, then the value of $A'BA$ is:

Options :

A. 1224

B. 1042

C. 540

D. 539

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

Let P and Q be any points on the curves

$$(x - 1)^2 + (y + 1)^2 = 1$$

and $y = x^2$, respectively. The distance between P and Q is minimum for some value of the abscissa of P in the interval :

Options :

A. $\left(0, \frac{1}{4}\right)$

B. $\left(\frac{1}{2}, \frac{3}{4}\right)$

C. $\left(\frac{1}{4}, \frac{1}{2}\right)$

D. $\left(\frac{3}{4}, 1\right)$

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 the maximum value of a, for which the function

$$f_a(x) = \tan^{-1} 2x - 3ax + 7$$

is non-decreasing in

$$\left(-\frac{\pi}{6}, \frac{\pi}{6}\right)$$

, is $\overline{a}$, then

$$f_{\overline{a}}\left(\frac{\pi}{8}\right)$$

is equal to :

Options :

A. $8 - \frac{9\pi}{4(9+\pi^2)}$

B. $8 - \frac{4\pi}{9(4+\pi^2)}$

C. $8\left(\frac{1+\pi^2}{9+\pi^2}\right)$

D. $8 - \frac{\pi}{4}$

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

Let

$$\beta = \lim_{x \to 0} \frac{\alpha x - \left(e^{3x} - 1\right)}{\alpha x \left(e^{3x} - 1\right)}$$

for some $\alpha \in \mathbb{R}$. Then the value of $\alpha + \beta$ is :

Options :

A. $\frac{14}{5}$

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

C. $\frac{5}{2}$

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

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

The value of

$$\log_e 2\frac{d}{dx}\left(\log_{\cos x}\operatorname{cosec} x\right)$$

at

$$x = \frac{\pi}{4}$$

is

Options :

A. $-2\sqrt{2}$

B. $2\sqrt{2}$

C. -4

D. 4

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

$$\int_0^{20\pi} (|\sin x| + |\cos x|)^2 dx \text{ is equal to}$$

Options :

A. $10(\pi + 4)$

B. $10(\pi + 2)$

C. $20(\pi - 2)$

D. $20(\pi + 2)$

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 solution curve

$$y = f(x)$$

of the differential equation

$$\frac{dy}{dx} + \frac{xy}{x^2 - 1} = \frac{x^4 + 2x}{\sqrt{1 - x^2}}$$

, $x \in (-1,1)$ pass through the origin. Then

$$\int_{-\frac{\sqrt{3}}{2}}^{\frac{\sqrt{3}}{2}} f(x)dx$$

is equal to

Options :

A. $\frac{\pi}{3} - \frac{1}{4}$

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

C. $\frac{\pi}{6} - \frac{\sqrt{3}}{4}$

D. $\frac{\pi}{6} - \frac{\sqrt{3}}{2}$

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 the abscissae of the two points P and Q on a circle be the roots of $x^2 - 4x - 6 = 0$ and the ordinates of P and Q be the roots of $y^2 + 2y - 7 = 0$. If PQ is a diameter of the circle

$$x^2 + y^2 + 2ax + 2by + c = 0$$

, then the value of $(a + b - c)$ is _____.

Options :

A. 12

B. 13

C. 14

D. 16

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 the line $x-1=0$ is a directrix of the hyperbola $kx^2-y^2=6$, then the hyperbola passes through the point :

Options :

A. $(-2\sqrt{5}\ ,6)$

B. $(-\sqrt{5}\ ,3)$

C. $(\sqrt{5}\ ,-2)$

D. $(2\sqrt{5}\ ,3\sqrt{6}\ )$

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

If

$$0<x<\frac{1}{\sqrt{2}}$$

and

$$\frac{\sin^{-1}x}{\alpha}=\frac{\cos^{-1}x}{\beta}$$

, then the value of

$$\sin\left(\frac{2\pi\alpha}{\alpha+\beta}\right)$$

is :

Options :

A. $4\sqrt{(1-x^2)}\ \left(1-2x^2\right)$

B. $4x\sqrt{(1-x^2)}\ \left(1-2x^2\right)$

C. $2x\sqrt{(1-x^2)}\ \left(1-4x^2\right)$

D. $4\sqrt{(1-x^2)}\ \left(1-4x^2\right)$

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

The integral $\int \frac{\left(1-\frac{1}{\sqrt{3}}\right)(\cos x-\sin x)}{\left(1+\frac{2}{\sqrt{3}}\sin 2x\right)}dx$ is equal to

Options :

A. $\frac{1}{2}\log_e\left|\frac{\tan\left(\frac{x}{2}+\frac{\pi}{12}\right)}{\tan\left(\frac{x}{2}+\frac{\pi}{6}\right)}\right|+C$

B. $\frac{1}{2}\log_e\left|\frac{\tan\left(\frac{x}{2}+\frac{\pi}{6}\right)}{\tan\left(\frac{x}{2}+\frac{\pi}{3}\right)}\right|+C$

C. $\log_e\left|\frac{\tan\left(\frac{x}{2}+\frac{\pi}{6}\right)}{\tan\left(\frac{x}{2}+\frac{\pi}{12}\right)}\right|+C$

D. $\frac{1}{2}\log_e\left|\frac{\tan\left(\frac{x}{2}-\frac{\pi}{12}\right)}{\tan\left(\frac{x}{2}-\frac{\pi}{6}\right)}\right|+C$

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 area bounded by the curves

$$y = |x^2 - 1|$$

and $y = 1$ is

Options :

A. $\frac{2}{3}(\sqrt{2}+1)$

B. $\frac{4}{3}(\sqrt{2}-1)$

C. $2(\sqrt{2}-1)$

D. $\frac{8}{3}(\sqrt{2}-1)$

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

$$\sum_{\substack{i,j=0 \\ i \neq j}}^{n} {}^{n}C_i \, {}^{n}C_j$$

is equal to

Options :

A. $2^{2n} - {}^{2n}C_n$

B. $2^{2n-1} - {}^{2n-1}C_{n-1}$

C. $2^{2n} - \frac{1}{2}{}^{2n}C_n$

D. $2^{2n-1} + {}^{2n-1}C_n$

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

The acute angle between the pair of tangents drawn to the ellipse $2x^2 + 3y^2 = 5$ from the point (1,3) is :

Options :

A. $\tan^{-1}\left(\frac{16}{7\sqrt{5}}\right)$

B. $\tan^{-1}\left(\frac{24}{7\sqrt{5}}\right)$

C. $\tan^{-1}\left(\frac{32}{7\sqrt{5}}\right)$

D. $\tan^{-1}\left(\frac{3+8\sqrt{5}}{35}\right)$

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

The equation of a common tangent to the parabolas $y = x^2$ and

$$y = -(x-2)^2$$

is

Options :

A. $y = 4(x-2)$

B. $y = 4(x - 1)$

C. $y = 4(x + 1)$

D. $y = 4(x + 2)$

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

A vector $\vec{a}$ is parallel to the line of intersection of the plane determined by the vectors $\hat{i}, \hat{i} + \hat{j}$ and the plane determined by the vectors $\hat{i} - \hat{j}, \hat{i} + \hat{k}$. The obtuse angle between $\vec{a}$ and the vector

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

is :

Options :

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

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

C. $\frac{4\pi}{5}$

D. $\frac{5\pi}{6}$

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

Negation of the Boolean expression $p \Leftrightarrow (q \Rightarrow p)$ is

Options :

A. $(\sim p) \wedge q$

B. $p \wedge (\sim q)$

C. $(\sim p) \vee (\sim q)$

D. $(\sim p) \wedge (\sim q)$

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

Let X be a binomially distributed random variable with mean 4 and variance $\frac{4}{3}$. Then, $54\,P(X \leq 2)$ is equal to :

Options :

A. $\frac{73}{27}$

B. $\frac{146}{27}$

C. $\frac{146}{81}$

D. $\frac{126}{81}$

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

$$A = \{1,2,3,4,5,6,7\}$$

and

$$B = \{3,6,7,9\}$$

. Then the number of elements in the set $\{C \subseteq A : C \cap B \neq \phi\}$ is _____.

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

Numbers are to be formed between 1000 and 3000 , which are divisible by 4 , using the digits 1,2,3,4,5 and 6 without repetition of digits. Then the total number of such numbers is _____.

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

The mean and standard deviation of 40 observations are 30 and 5 respectively. It was noticed that two of these observations 12 and 10 were wrongly recorded. If σ is the standard deviation of the data after omitting the two wrong observations from the data, then $38\sigma^2$ 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

Suppose

$$y = y(x)$$

be the solution curve to the differential equation

$$\frac{dy}{dx} - y = 2 - e^{-x}$$

such that

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

is finite. If a and b are respectively the x - and y-intercepts of the tangent to the curve at $x = 0$, then the value of $a - 4b$ 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 Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Different A.P.'s are constructed with the first term 100, the last term 199, and integral common differences. The sum of the common differences of all such A.P.'s having at least 3 terms and at most 33 terms 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

The number of matrices

$$A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

, where $a, b, c, d \in \{-1,0,1,2,3, \ldots \ldots, 10\}$, such that $A = A^{-1}$, is _____.

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

The largest value of a, for which the perpendicular distance of the plane containing the lines

$$\vec{r} = (\hat{i} + \hat{j}) + \lambda(\hat{i} + a\hat{j} - \hat{k})$$

and

$$\vec{r} = (\hat{i} + \hat{j}) + \mu(-\hat{i} + \hat{j} - a\hat{k})$$

from the point $(2,1,4)$ is $\sqrt{3}$, is _____.

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

If

$$\sum_{k=1}^{10} \frac{k}{k^4 + k^2 + 1} = \frac{m}{n}$$

, where m and n are co-prime, then $m + n$ is equal to _____.

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

If the sum of solutions of the system of equations

$$2\sin^2\theta - \cos 2\theta = 0$$

and

$$2\cos^2\theta + 3\sin\theta = 0$$

in the interval $[0,2\pi]$ is $k\pi$, then k 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

The plane passing through the line

$$L : lx - y + 3(1 - l)z = 1, x + 2y - z = 2$$

and perpendicular to the plane $3x + 2y + z = 6$ is $3x - 8y + 7z = 4$. If θ is the acute angle between the line L and the y-axis, then $415\cos^2\theta$ 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 :

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

Two projectiles are thrown with same initial velocity making an angle of 45° and 30° with the horizontal respectively. The ratio of their respective ranges will be :

Options :

A. $1:\sqrt{2}$

B. $\sqrt{2}:1$

C. $2:\sqrt{3}$

D. $\sqrt{3}:2$

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

In a Vernier Calipers, 10 divisions of Vernier scale is equal to the 9 divisions of main scale. When both jaws of Vernier calipers touch each other, the zero of the Vernier scale is shifted to the left of zero of the main scale and 4^{th} Vernier scale division exactly coincides with the main scale reading. One main scale division is equal to 1 mm. While measuring diameter of a spherical body, the body is held between two jaws. It is now observed that zero of the Vernier scale lies between 30 and 31 divisions of main scale reading and 6^{th} Vernier scale division exactly coincides with the main scale reading. The diameter of the spherical body will be :

Options :

A. 3.02 cm

B. 3.06 cm

C. 3.10 cm

D. 3.20 cm

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

A ball of mass 0.15 kg hits the wall with its initial speed of 12 ms^{-1} and bounces back without changing its initial speed. If the force applied by the wall on the ball during the contact is 100 N, calculate the time duration of the contact of ball with the wall.

Options :

A. 0.018 s

B. 0.036 s

C. 0.009 s

D. 0.072 s

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 body of mass 8 kg and another of mass 2 kg are moving with equal kinetic energy. The ratio of their respective momentum will be :

Options :

A. 1 : 1

B. 2 : 1

C. 1 : 4

D. 4 : 1

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

Two uniformly charged spherical conductors *A* and *B* of radii 5 mm and 10 mm are separated by a distance of 2 cm. If the spheres are connected by a conducting wire, then in equilibrium condition, the ratio of the magnitudes of the electric fields at the surface of the sphere *A* and *B* will be :

Options :

A. 1 : 2

B. 2 : 1

C. 1 : 1

D. 1 : 4

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

The oscillating magnetic field in a plane electromagnetic wave is given by

$$B_y = 5\times10^{-6}\sin 1000\pi\left(5x - 4\times10^{8}t\right)T$$

. The amplitude of electric field will be :

Options :

A. $15\times10^{2}\ \text{Vm}^{-1}$

B. $5\times10^{-6}\ \text{Vm}^{-1}$

C. $16\times10^{12}\ \text{Vm}^{-1}$

D. $4\times10^{2}\ \text{Vm}^{-1}$

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

Light travels in two media M_1 and M_2 with speeds $1.5\times10^{8}\ \text{ms}^{-1}$ and $2.0\times10^{8}\ \text{ms}^{-1}$ respectively. The critical angle between them is :

Options :

A. $\tan^{-1}\left(\frac{3}{\sqrt{7}}\right)$

B. $\tan^{-1}\left(\frac{2}{3}\right)$

C. $\cos^{-1}\left(\frac{3}{4}\right)$

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

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

A body is projected vertically upwards from the surface of earth with a velocity equal to one third of escape velocity. The maximum height attained by the body will be :

(Take radius of earth

$$= 6400\ \text{km}$$

and

$$g = 10\ \text{ms}^{-2}$$

)

Options :

A. 800 km

B. 1600 km

C. 2133 km

D. 4800 km

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

A nucleus of mass M at rest splits into two parts having masses

$$\frac{M'}{3}$$

and

$$\frac{2M'}{3}(M' < M)$$

. The ratio of de Broglie wavelength of two parts will be :

Options :

A. 1 : 2

B. 2 : 1

C. 1 : 1

D. 2 : 3

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

An ice cube of dimensions 60 cm $\times$ 50 cm $\times$ 20 cm is placed in an insulation box of wall thickness 1 cm. The box keeping the ice cube at 0°C of temperature is brought to a room of temperature 40°C. The rate of melting of ice is approximately :

(Latent heat of fusion of ice is 3.4×10^5 J kg^{-1} and thermal conducting of insulation wall is 0.05 $Wm^{-1}°C^{-1}$)

Options :

A. 61×10^{-3} kg s^{-1}

B. 61×10^{-5} kg s^{-1}

C. 208 kg s^{-1}

D. 30×10^{-5} kg s^{-1}

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

A gas has n degrees of freedom. The ratio of specific heat of gas at constant volume to the specific heat of gas at constant pressure will be :

Options :

A. $\frac{n}{n+2}$

B. $\frac{n+2}{n}$

C. $\frac{n}{2n+2}$

D. $\frac{n}{n-2}$

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

A transverse wave is represented by

$$y = 2\sin(\omega t - kx)\,\text{cm}$$

. The value of wavelength (in cm) for which the wave velocity becomes equal to the maximum particle velocity, will be :

Options :

A. 4π

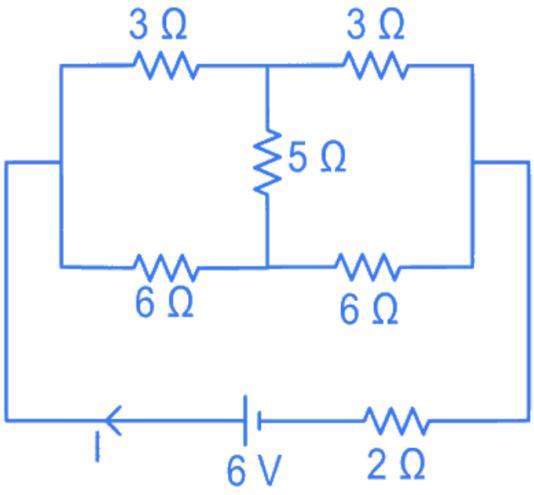
B. 2π

C. π

D. 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

A battery of 6 V is connected to the circuit as shown below. The current I drawn from the battery is :



Options :

A. 1A

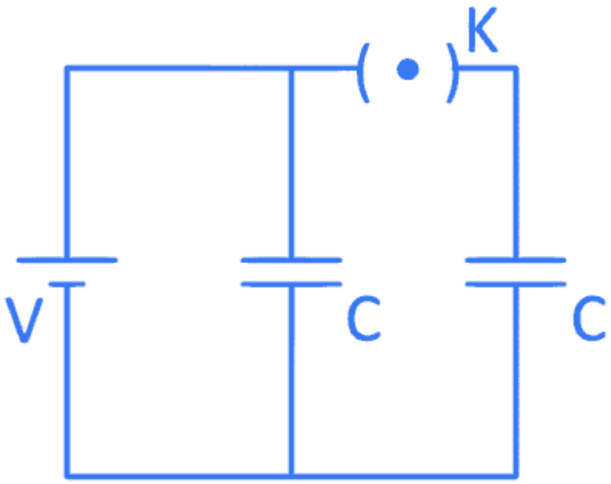
B. 2A

C. $\frac{6}{11}$ A

D. $\frac{4}{3}$ 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 source of potential difference V is connected to the combination of two identical capacitors as shown in the figure. When key 'K' is closed, the total energy stored across the combination is E_1. Now key 'K' is opened and dielectric of dielectric constant 5 is introduced between the plates of the capacitors. The total energy stored across the combination is now E_2. The ratio E_1/E_2 will be :



Options :

A. $\frac{1}{10}$

B. $\frac{2}{5}$

C. $\frac{5}{13}$

D. $\frac{5}{26}$

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

Two concentric circular loops of radii

$$r_1 = 30 \text{ cm}$$

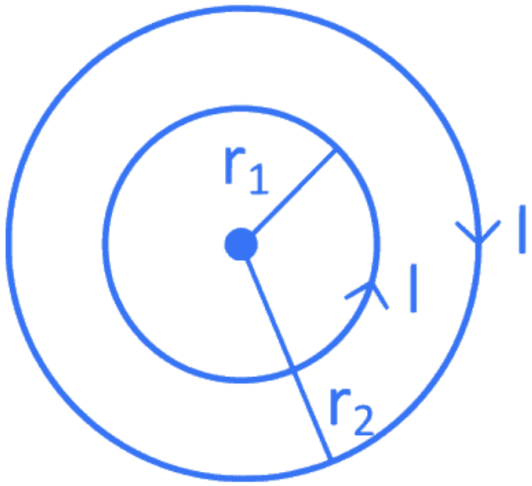
and

$$r_2 = 50 \text{ cm}$$

are placed in X – Y plane as shown in the figure. A current

$$I = 7 \text{ A}$$

is flowing through them in the direction as shown in figure. The net magnetic moment of this system of two circular loops is approximately :



Options :

A. $\frac{7}{2}\hat{k}\,\text{Am}^2$

B. $-\frac{7}{2}\hat{k}\,\text{Am}^2$

C. $7\,\hat{k}\,\text{Am}^2$

D. $-7\,\hat{k}\,\text{Am}^2$

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

A velocity selector consists of electric field

$$\vec{E} = E\hat{k}$$

and magnetic field

$$\vec{B} = B\hat{j}$$

with

$$B = 12\,mT$$

. The value of E required for an electron of energy 728 eV moving along the positive x-axis to pass undeflected is :

(Given, mass of electron

$$= 9.1 \times 10^{-31}\ \text{kg}$$

)

Options :

A. $192\,\text{kVm}^{-1}$

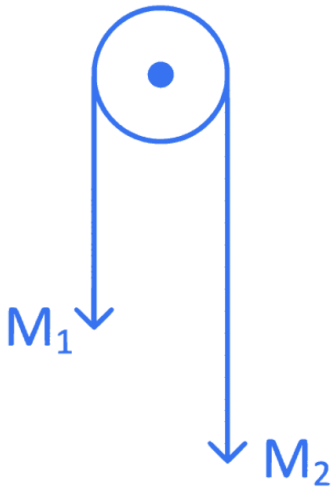
B. $192\,\text{mVm}^{-1}$

C. $9600\,\text{kVm}^{-1}$

D. $16\,\text{kVm}^{-1}$

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

Two masses M_1 and M_2 are tied together at the two ends of a light inextensible string that passes over a frictionless pulley. When the mass M_2 is twice that of M_1, the acceleration of the system is a_1. When the mass M_2 is thrice that of M_1, the acceleration of the system is a_2. The ratio $\frac{a_1}{a_2}$ will be :



Options :

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

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

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

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

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

The area of cross section of the rope used to lift a load by a crane is 2.5×10^{-4} m^2. The maximum lifting capacity of the crane is 10 metric tons. To increase the lifting capacity of the crane to 25 metric tons, the required area of cross section of the rope should be :

(take

$$g = 10\, ms^{-2}$$

)

Options :

A. 6.25×10^{-4} m^2

B. 10×10^{-4} m^2

C. 1×10^{-4} m^2

D. 1.67×10^{-4} m^2

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

The maximum and minimum voltage of an amplitude modulated signal are 60 V and 20 V respectively. The percentage modulation index will be :

Options :

A. 0.5%

B. 50%

C. 2%

D. 30%

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

Mass numbers of two nuclei are in the ratio of 4 : 3. Their nuclear densities will be in the ratio of

Options :

A. $4 : 3$

B. $\left(\frac{3}{4}\right)^{\frac{1}{3}}$

C. $1 : 1$

D. $\left(\frac{4}{3}\right)^{\frac{1}{3}}$

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

If

$$\vec{A} = (2\hat{i} + 3\hat{j} - \hat{k})\,\text{m}$$

and

$$\vec{B} = (\hat{i} + 2\hat{j} + 2\hat{k})\,\text{m}$$

. The magnitude of component of vector $\vec{A}$ along vector $\vec{B}$ will be _____ m.

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

The radius of gyration of a cylindrical rod about an axis of rotation perpendicular to its length and passing through the center will be _____ m.

Given, the length of the rod is $10\sqrt{3}$ m.

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

Text Areas : PlainText

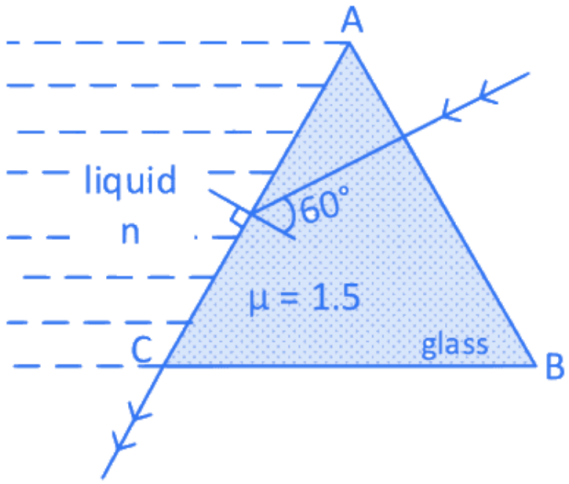
Question Number : 53 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

In the given figure, the face AC of the equilateral prism is immersed in a liquid of refractive index 'n'. For incident angle 60° at the side AC, the refractive light beam just grazes along face AC. The refractive index of the liquid

$$n = \frac{\sqrt{x}}{4}$$

. The value of x is _____.

(Given refractive index of glass $= 1.5$)



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

Two lighter nuclei combine to form a comparatively heavier nucleus by the relation given below :

$$^{2}_{1}X + ^{2}_{1}X = ^{4}_{2}Y$$

The binding energies per nucleon for $^{2}_{1}X$ and $^{4}_{2}Y$ are 1.1 MeV and 7.6 MeV respectively. The energy released in this process is _____ MeV.

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

A uniform heavy rod of mass 20 kg, cross sectional area 0.4 m^2 and length 20 m is hanging from a fixed support. Neglecting the lateral contraction, the elongation in the rod due to its own weight is $x \times 10^{-9}$ m. The value of x is _____.

(Given, young modulus $Y = 2 \times 10^{11}$ Nm^{-2} and $g = 10$ ms^{-2})

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

Three point charges of magnitude $5\mu C, 0.16\mu C$ and $0.3\mu C$ are located at the vertices A, B, C of a right angled triangle whose sides are

$$AB = 3 \text{ cm}, BC = 3\sqrt{2} \text{ cm}$$

and

$$CA = 3 \text{ cm}$$

and point A is the right angle corner. Charge at point A experiences _____ N of electrostatic force due to the other two charges.

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

In a coil of resistance 8 Ω, the magnetic flux due to an external magnetic field varies with time as

$$\phi = \frac{2}{3}(9 - t^2)$$

. The value of total heat produced in the coil, till the flux becomes zero, will be _____ J.

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

As per given figures, two springs of spring constants k and $2k$ are connected to mass m. If the period of oscillation in figure (a) is 3s, then the period of oscillation in figure (b) will be $\sqrt{x}$ s. The value of x is _____.

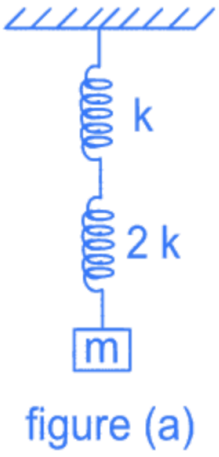


figure (a)

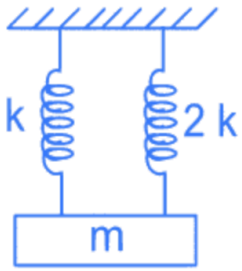
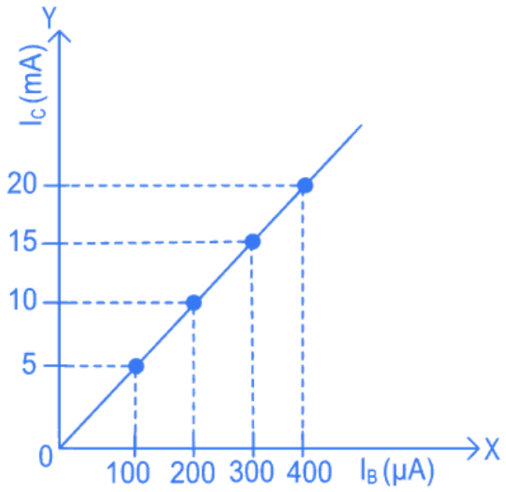


figure (b)

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 typical transfer characteristics of a transistor in CE configuration is shown in figure. A load resistor of 2 $k\Omega$ is connected in the collector branch of the circuit used. The input resistance of the transistor is 0.50 kΩ. The voltage gain of the transistor is _____.



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

A potentiometer wire of length 300 cm is connected in series with a resistance 780 Ω and a standard cell of emf 4V. A constant current flows through potentiometer wire. The length of the null point for cell of emf 20 mV is found to be 60 cm. The resistance of the potentiometer wire is _____ Ω.

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

Hemoglobin contains 0.34% of iron by mass. The number of Fe atoms in 3.3 g of hemoglobin is

(Given: Atomic mass of Fe is

$$56\,\text{u}, N_A = 6.022 \times 10^{23}\ \text{mol}^{-1}$$

.)

Options :

A. 1.21×10^5

B. 12.0×10^{16}

C. 1.21×10^{20}

D. 3.4×10^{22}

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

Arrange the following in increasing order of their covalent character.

A. CaF_2

B. $CaCl_2$

C. $CaBr_2$

D. CaI_2

Choose the correct answer from the options given below.

Options :

A. $B < A < C < D$

B. $A < B < C < D$

C. $A < B < D < C$

D. $A < C < B < D$

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

Class XII students were asked to prepare one litre of buffer solution of pH 8.26 by their Chemistry teacher: The amount of ammonium chloride to be dissolved by the student in 0.2 M ammonia solution to make one litre of the buffer is :

(Given:

$$pK_b(NH_3) = 4.74$$

Molar mass of

$$NH_3 = 17\ g\ mol^{-1}$$

Molar mass of

$$NH_4Cl = 53.5\ g\ mol^{-1}$$

)

Options :

A. 53.5 g

B. 72.3 g

C. 107.0 g

D. 126.0 g

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

At 30°C, the half life for the decomposition of AB_2 is 200 s and is independent of the initial concentration of AB_2. The time required for 80% of the AB_2 to decompose is

Given:

$$\log 2 = 0.30$$
$$\log 3 = 0.48$$

Options :

A. 200 s

B. 323 s

C. 467 s

D. 532 s

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

The metal complex that is diamagnetic is (Atomic number:

Fe, 26; Cu, 29)

Options :

A. $K_3\left[Cu(CN)_4\right]$

B. $K_2\left[Cu(CN)_4\right]$

C. $K_3\left[Fe(CN)_4\right]$

D. $K_4\left[FeCl_6\right]$

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

The correct decreasing order of priority of functional groups in naming an organic Question: compound as per IUPAC system of nomenclature is

Options :

A. $-COOH > -CONH_2 > -COCl > -CHO$

B. $SO_3H > -COCl > -CONH_2 > -CN$

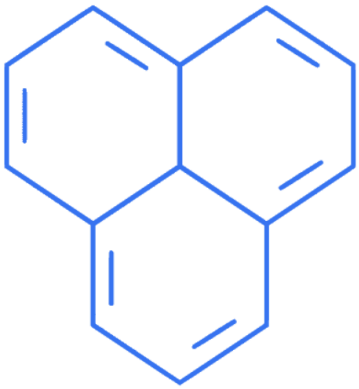
C. $-COOR > -COCl > -NH_2 > C=O$

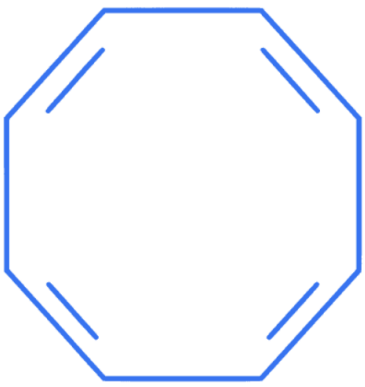
D. $-COOH > -COOR > -CONH_2 > -COCl$

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

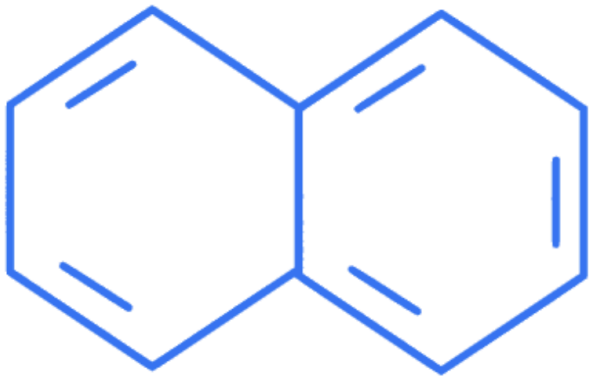
Which of the following is not an example of benzenoid compound?

Options :

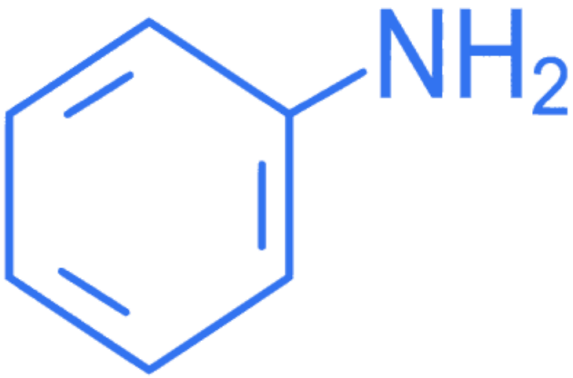
A. 

B. 

C.



D.



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

Hydrolysis of which compound will give carbolic acid?

Options :

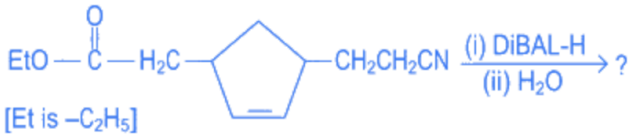
A. Cumene

B. Benzenediazonium chloride

C. Benzal chloride

D. Ethylene glycol ketal

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



Consider the above reaction and predict the major product.

Options :

A.



B.



C.

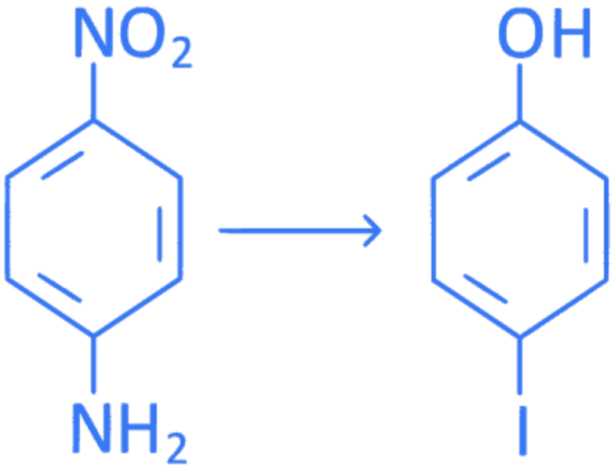


D.



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

The correct sequential order of the reagents for the given reaction is



Options :

A. $HNO_2, Fe/H^+, HNO_2, KI, H_2O/H^+$

B. $HNO_2, KI, Fe/H^+, HNO_2, H_2O/$ warm

C. $HNO_2, KI, HNO_2, Fe/H^+, H_2O/H^+$

D. $HNO_2, Fe/H^+, KI, HNO_2, H_2O/$ warm

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

Animal starch is the other name of

Options :

A. amylose.

B. maltose.

C. glycogen.

D. amylopectin.

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

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

Assertion A: Phenolphthalein is a pH dependent indicator, remains colourless in acidic solution and gives pink colour in basic medium.

Reason R: Phenolphthalein is a weak acid. It doesn't dissociate in basic medium.

In the light of the above statements, choose the most appropriate 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 : 73 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 : Finest gold is red in colour, as the size of the particles increases, it appears purple then blue and finally gold.

Reason R : The colour of the colloidal solution depends on the wavelength of light scattered by the dispersed particles.

In the light of the above statements, choose the most appropriate 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 : 74 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

The metal that has very low melting point and its periodic position is closer to a metalloid is :

Options :

A. Al

B. Ga

C. Se

D. In

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

The metal that is not extracted from its sulfide ore is :

Options :

A. Aluminium

B. Iron

C. Lead

D. Zinc

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

The products obtained from a reaction of hydrogen peroxide and acidified potassium permanganate are :

Options :

A. Mn^{4+}, H_2O only

B. Mn^{2+}, H_2O only

C. Mn^{4+}, H_2O, O_2 only

D. Mn^{2+}, H_2O, O_2 only

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

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

Assertion A:

$$LiF$$

is sparingly soluble in water.

Reason R: The ionic radius of Li^+ ion is smallest among its group members, hence has least hydration enthalpy.

In the light of the above statements, choose the most appropriate 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 : 78 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 : Boric acid is a weak acid.

Reason R : Boric acid is not able to release H^+ ion on its own. It receives OH^- ion from water and releases H^+ ion.

In the light of the above statements, choose the most appropriate 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 correct but R is not correct.

D. A is not correct but R is correct.

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

Match List I with List II.

	List I **Pollutant**		**List II** **Source**
(A)	Microorganisms	(I)	Strip mining
(B)	Plant nutrients	(II)	Domestic sewage
(C)	Toxic heavy metals	(III)	Chemical fertilizer
(D)	Sediment	(IV)	Chemical factory

Choose the correct answer from the options given below :

Options :

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

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

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

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

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

Vulcanization of rubber is carried out by heating a mixture of

Options :

A. isoprene and styrene

B. neoprene and sulphur

C. isoprene and sulphur

D. neoprene and styrene

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

Consider an imaginary ion $^{48}_{22}X^{3-}$. The nucleus contains 'a'% more neutrons than the number of electrons in the ion. The value of 'a' is _____. [nearest integer]

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

For the reaction

$$H_2F_2(g) \rightarrow H_2(g) + F_2(g)$$
$$\Delta U = -59.6 \text{ kJ mol}^{-1}$$

at 27°C.

The enthalpy change for the above reaction is (−) _____ kJ mol^{-1} [nearest integer]

Given:

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

.

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

The elevation in boiling point for 1 molal solution of non-volatile solute A is 3 K. The depression in freezing point for 2 molal solution of A in the same solvent is 6 K. The ratio of K_b and K_f i.e., K_b/K_f is $1 : X$. The value of X is [nearest integer]

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

20 mL of 0.02 M hypo solution is used for the titration of 10 mL of copper sulphate solution, in the presence of excess of KI using starch as an indicator. The molarity of Cu^{2+} is found to be _____ $\times 10^{-2}$ M. [nearest integer]

Given :

$$2\,Cu^{2+} + 4\,I^- \rightarrow Cu_2I_2 + I_2$$
$$I_2 + 2\,S_2O_3^{2-} \rightarrow 2I^- + S_4O_6^{2-}$$

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

The spin-only magnetic moment value of the compound with strongest oxidizing ability among MnF_4, MnF_3 and MnF_2 is _____ B.M. [nearest integer]

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

Total number of isomers (including stereoisomers) obtained on monochlorination of methylcyclohexane is _____.

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

A 100 mL solution of CH_3CH_2MgBr on treatment with methanol produces 2.24 mL of a gas at STP. The weight of gas produced is _____ mg. [nearest integer]

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

A 10 g mixture of hydrogen and helium is contained in a vessel of capacity 0.0125 m^3 at 6 bar and 27°C. The mass of helium in the mixture is _____ g. (nearest integer)

Given:

$$R = 8.3\ J\ K^{-1}\ mol^{-1}$$

(Atomic masses of H and He are 1u and 4u, respectively)

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

The number of non-ionisable protons present in the product B obtained from the following reactions is _____.

$$C_2H_5OH + PCl_3 \rightarrow C_2H_5Cl + A$$
$$A + PCl_3 \rightarrow B$$

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

How many of the following drugs is/are example(s) of broad spectrum antibiotics?

Ofloxacin, Penicillin G, Terpineol, Salvarsan.

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