National Testing Agency

Question Paper Name :	B Tech 25 Jan 2023 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 equations of two sides of a variable triangle are $x = 0$ and $y = 3$, and its third side is a tangent to the parabola $y^2 = 6x$. The locus of its circumcentre is :

Options :

A. $4y^2 - 18y - 3x - 18 = 0$

B. $4y^2 + 18y + 3x + 18 = 0$

C. $4y^2 - 18y + 3x + 18 = 0$

D. $4y^2 - 18y - 3x + 18 = 0$

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

The foot of perpendicular of the point (2, 0, 5) on the line

$$\frac{x+1}{2} = \frac{y-1}{5} = \frac{z+1}{-1}$$

is (α, β, γ). Then, which of the following is NOT correct?

Options :

A. $\frac{\alpha}{\beta} = -8$

B. $\frac{\alpha\beta}{\gamma} = \frac{4}{15}$

C. $\frac{\beta}{\gamma} = -5$

D. $\frac{\gamma}{\alpha} = \frac{5}{8}$

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

The number of functions

$$f : \{1,2,3,4\} \to \{a \in Z | a| \leq 8\}$$

satisfying

$$f(n) + \frac{1}{n} f(n+1) = 1, \forall n \in \{1,2,3\}$$

is

Options :

A. 2

B. 3

C. 1

D. 4

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 N be the sum of the numbers appeared when two fair dice are rolled and let the probability that $N-2, \sqrt{3N}, N+2$ are in geometric progression be $\frac{k}{48}$. Then the value of k is :

Options :

A. 8

B. 16

C. 2

D. 4

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 function

$$f(x)=\begin{cases}(1+|\cos x|)^{\frac{\lambda}{|\cos x|}} & , \quad 0<x<\frac{\pi}{2} \\ \mu & , \quad x=\frac{\pi}{2} \\ e^{\frac{\cot 6x}{\cot 4x}} & , \quad \frac{\pi}{2}<x<\pi\end{cases}$$

is continuous at

$$x=\frac{\pi}{2}$$

, then $9\lambda+6\log_e\mu+\mu^6-e^{6\lambda}$ is equal to

Options :

A. 11

B. 10

C. 8

D. $2e^4+8$

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 A, B, C be 3×3 matrices such that A is symmetric and B and C are skew-symmetric. Consider the statements

(S1) $A^{13}\,B^{26}-B^{26}\,A^{13}$ is symmetric

(S2) $A^{26}\,C^{13}-C^{13}\,A^{26}$ is symmetric

Then,

Options :

A. Only S2 is true

B. Only S1 is true

C. Both S1 and S2 are false

D. Both S1 and S2 are true

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 shortest distance between the lines $x+1=2y=-12z$ and $x=y+2=6z-6$ is :

Options :

A. 3

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

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

D. 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 T and C respectively be the transverse and conjugate axes of the hyperbola

$$16x^2-y^2+64x+4y+44=0$$

. Then the area of the region above the parabola $x^2=y+4$, below the transverse axis T and on the right of the conjugate axis C is :

Options :

A. $4\sqrt{6}-\frac{28}{3}$

B. $4\sqrt{6}-\frac{44}{3}$

C. $4\sqrt{6}+\frac{28}{3}$

D. $4\sqrt{6}+\frac{44}{3}$

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 function

$$f(x)=2x^3+(2p-7)x^2+3(2p-9)x-6$$

have a maxima for some value of $x<0$ and a minima for some value of $x>0$. Then, the set of all values of p is

Options :

A. $\left(-\frac{9}{2}, \frac{9}{2}\right)$

B. $\left(\frac{9}{2}, \infty\right)$

C. $\left(0, \frac{9}{2}\right)$

D. $\left(-\infty, \frac{9}{2}\right)$

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 z be a complex number such that

$$\left|\frac{z-2i}{z+i}\right| = 2, z \neq -i$$

. Then z lies on the circle of radius 2 and centre :

Options :

A. $(0, -2)$

B. $(0, 0)$

C. $(0, 2)$

D. $(2, 0)$

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

The integral

$$16\int_{1}^{2} \frac{dx}{x^3\left(x^2+2\right)^2}$$

is equal to

Options :

A. $\frac{11}{12} + \log_e 4$

B. $\frac{11}{6} + \log_e 4$

C. $\frac{11}{12} - \log_e 4$

D. $\frac{11}{6} - \log_e 4$

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

Let $f : \mathbb{R} \to \mathbb{R}$ be a function defined by

$$f(x) = \log_{\sqrt{m}} \{\sqrt{2}\ (\sin x - \cos x) + m - 2\}$$

, for some m, such that the range of f is [0, 2]. Then the value of m is _____

Options :

A. 4

B. 3

C. 5

D. 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

The number of numbers, strictly between 5000 and 10000 can be formed using the digits 1, 3, 5, 7, 9 without repetition, is :

Options :

A. 120

B. 6

C. 72

D. 12

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

Let

$$y = y(t)$$

be a solution of the differential equation

$$\frac{dy}{dt} + \alpha y = \gamma e^{-\beta t}$$

where,

$$\alpha > 0, \beta > 0$$

and

$$\gamma > 0$$

. Then

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

Options :

A. is 0

B. is 1

C. is -1

D. does not exist

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

$$A = \begin{bmatrix} \frac{1}{\sqrt{10}} & \frac{3}{\sqrt{10}} \\ \frac{-3}{\sqrt{10}} & \frac{1}{\sqrt{10}} \end{bmatrix}$$

and

$$B = \begin{bmatrix} 1 & -i \\ 0 & 1 \end{bmatrix}$$

, where

$$i = \sqrt{-1}$$

. If

$$\mathrm{M} = \mathrm{A}^{\mathrm{T}}\mathrm{BA}$$

, then the inverse of the matrix $\mathrm{AM}^{2023}\mathrm{A}^{\mathrm{T}}$ is

Options :

A. $\begin{bmatrix} 1 & -2023i \\ 0 & 1 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 0 \\ 2023i & 1 \end{bmatrix}$

C. $\begin{bmatrix} 1 & 2023i \\ 0 & 1 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 0 \\ -2023i & 1 \end{bmatrix}$

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

$$\sum_{k=0}^{6} {}^{51-k}C_3$$

is equal to :

Options :

A. ${}^{51}C_4 - {}^{45}C_4$

B. ${}^{51}C_3 - {}^{45}C_3$

C. ${}^{52}C_3 - {}^{45}C_3$

D. ${}^{52}C_4 - {}^{45}C_4$

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

Let

$$f(x) = 2x^n + \lambda, \lambda \in R, n \in N$$

, and

$$f(4) = 133, f(5) = 255$$

. Then the sum of all the positive integer divisors of $(f(3) - f(2))$ is

Options :

A. 60

B. 58

C. 61

D. 59

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 $\Delta, \nabla \in \{ \wedge , \vee \}$ be such that $(p \rightarrow q)\Delta(p\nabla q)$ is a tautology. Then

Options :

A. $\Delta = \vee , \nabla = \vee$

B. $\Delta = \vee , \nabla = \wedge$

C. $\Delta = \wedge , \nabla = \wedge$

D. $\Delta = \wedge , \nabla = \vee$

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

Let

$$\vec{a} = -\hat{i} - \hat{j} + \hat{k}, \vec{a} \,.\, \vec{b} = 1$$

and

$$\vec{a} \times \vec{b} = \hat{i} - \hat{j}$$

. Then $\vec{a} - 6\vec{b}$ is equal to :

Options :

A. $3\left(\hat{i} + \hat{j} + \hat{k}\right)$

B. $3\left(\hat{i} - \hat{j} - \hat{k}\right)$

C. $3\left(\hat{i} + \hat{j} - \hat{k}\right)$

D. $3\left(\hat{i} - \hat{j} + \hat{k}\right)$

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

If the four points, whose position vectors are

$$3\hat{i} - 4\hat{j} + 2\hat{k}, \hat{i} + 2\hat{j} - \hat{k}, -2\hat{i} - \hat{j} + 3\hat{k}$$

and $5\hat{i} - 2\alpha\hat{j} + 4\hat{k}$ are coplanar, then α is equal to :

Options :

A. $\frac{73}{17}$

B. $-\frac{73}{17}$

C. $-\frac{107}{17}$

D. $\frac{107}{17}$

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

25% of the population are smokers. A smoker has 27 times more chances to develop lung cancer than a non smoker. A person is diagnosed with lung cancer and the probability that this person is a smoker is

$$\frac{k}{10}$$

. Then the value of k 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

A triangle is formed by X-axis, Y-axis and the line $3x + 4y = 60$. Then the number of points P(a, b) which lie strictly inside the triangle, where a is an integer and b is a multiple of a, 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 remainder when $(2023)^{2023}$ is divided by 35 is _____.

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

If

$$\int_{\frac{1}{3}}^{3} |\log_e x| dx = \frac{m}{n}\log_e\left(\frac{n^2}{e}\right)$$

, where m and n are coprime natural numbers, then $m^2 + n^2 - 5$ 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

Suppose Anil's mother wants to give 5 whole fruits to Anil from a basket of 7 red apples, 5 white apples and 8 oranges. If in the selected 5 fruits, at least 2 oranges, at least one red apple and at least one white apple must be given, then the number of ways, Anil's mother can offer 5 fruits to Anil 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

For the two positive numbers $a, b,$ if a, b and $\frac{1}{18}$ are in a geometric progression, while

$$\frac{1}{a}, 10$$

and $\frac{1}{b}$ are in an arithmetic progression, then $16a + 12b$ 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

If the shortest distance between the line joining the points (1, 2, 3) and (2, 3, 4), and the line

$$\frac{x-1}{2} = \frac{y+1}{-1} = \frac{z-2}{0}$$

is α, then $28\alpha^2$ 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 $\alpha \in \mathbb{R}$ and let α, β be the roots of the equation

$$x^2 + 60^{\frac{1}{4}}x + a = 0$$

. If $\alpha^4 + \beta^4 = -30$, then the product of all possible values of a 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

If m and n respectively are the numbers of positive and negative values of θ in the interval $[-\pi, \pi]$ that satisfy the equation

$$\cos 2\theta \cos\frac{\theta}{2} = \cos 3\theta \cos\frac{9\theta}{2}$$

, then mn 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

Points P$(-3, 2)$, Q$(9, 10)$ and R$(\alpha, 4)$ lie on a circle C and PR as its diameter. The tangents to C at the points Q and R intersect at the point S. If S lies on the line $2x - ky = 1$, then 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

The light rays from an object have been reflected towards an observer from a standard flat mirror, the image observed by the observer are :-

A. Real

B. Erect

C. Smaller in size then object

D. Laterally inverted

Choose the most appropriate answer from the options given below :

Options :

A. B and D only

B. A, C, and D only

C. A and D only

D. B and C only

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 particle executes simple harmonic motion between $x = -A$ and $x = +A$. If time taken by particle to go from $x = 0$ to $\frac{A}{2}$ is 2 s; then time taken by particle in going from

$$x = \frac{A}{2}$$

to A is

Options :

A. 4 s

B. 1.5 s

C. 3 s

D. 2 s

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

The distance travelled by a particle is related to time t as

$$x = 4t^2$$

. The velocity of the particle at t=5s is :-

Options :

A. $25\ ms^{-1}$

B. $20\ ms^{-1}$

C. $8\ ms^{-1}$

D. $40\ ms^{-1}$

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

Match List I with List II

	List I		**List II**
A.	Isothermal Process	I.	Work done by the gas decreases internal energy
B.	Adiabatic Process	II.	No change in internal energy
C.	Isochoric Process	III.	The heat absorbed goes partly to increase internal energy and partly to do work
D.	Isobaric Process	IV.	No work is done on or by the gas

Choose the correct answer from the options given below :

Options :

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

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

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

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

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 wire of length 1m moving with velocity 8 m/s at right angles to a magnetic field of 2T. The magnitude of induced emf, between the ends of wire will be _____.

Options :

A. 20 V

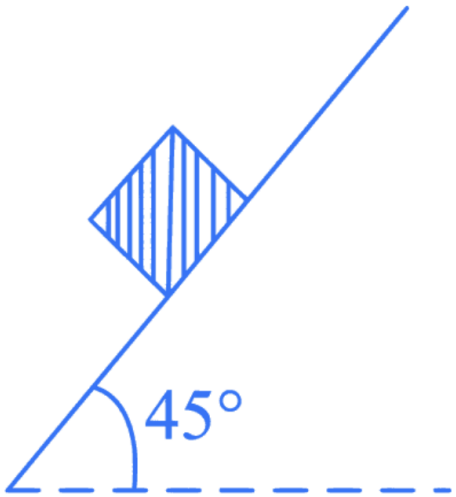
B. 8 V

C. 16 V

D. 12 V

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

Consider a block kept on an inclined plane (incline at 45°) as shown in the figure. If the force required to just push it up the incline is 2 times the force required to just prevent it from sliding down, the coefficient of friction between the block and inclined plane(μ) is equal to :



Options :

A. 0.60

B. 0.33

C. 0.25

D. 0.50

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

Match List I with List II

	List I		**List II**
A.	Gauss's Law in Electrostatics	I.	$\oint \vec{E} . d\vec{l} = -\frac{d\phi_B}{dt}$
B.	Faraday's Law	II.	$\oint \vec{B} . d\vec{A} = 0$
C.	Gauss's Law in Magnetism	III.	$\oint \vec{B} . d\vec{l} = \mu_0 i_c + \mu_0 \in_0 \frac{d\phi_E}{dt}$
D.	Ampere-Maxwell Law	IV.	$\oint \vec{E} . d\vec{s} = \frac{q}{\in_0}$

Choose the correct answer from the options given below :

Options :

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

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

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

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

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

Every planet revolves around the sun in an elliptical orbit :-

A. The force acting on a planet is inversely proportional to square of distance from sun.

B. Force acting on planet is inversely proportional to product of the masses of the planet and the sun.

C. The Centripetal force acting on the planet is directed away from the sun.

D. The square of time period of revolution of planet around sun is directly proportional to cube of semi-major axis of elliptical orbit.

Choose the correct answer from the options given below :

Options :

A. C and D only

B. B and C only

C. A and D only

D. A and C only

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

Two objects are projected with same velocity 'u' however at different angles α and β with the horizontal. If

$$\alpha + \beta = 90^\circ$$

, the ratio of horizontal range of the first object to the 2nd object will be :

Options :

A. 1 : 1

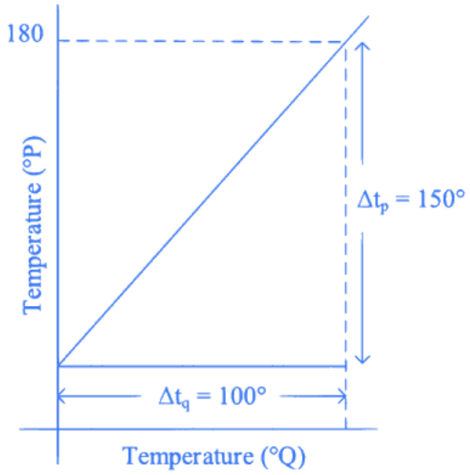
B. 2 : 1

C. 1 : 2

D. 4 : 1

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

The graph between two temperature scales P and Q is shown in the figure. Between upper fixed point and lower fixed point there are 150 equal divisions of scale P and 100 divisions on scale Q. The relationship for conversion between the two scales is given by :-



Options :

A. $\frac{t_P}{100} = \frac{t_Q - 180}{150}$

B. $\frac{t_P}{180} - \frac{t_Q - 40}{100}$

C. $\frac{t_Q}{150} = \frac{t_P - 180}{100}$

D. $\frac{t_Q}{100} = \frac{t_P - 30}{150}$

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 point charge of 10 μC is placed at the origin. At what location on the X-axis should a point charge of 40 μ C be placed so that the net electric field is zero at $x = 2$cm on the X-axis?

Options :

A. $x = 6$ cm

B. $x = 8$ cm

C. $x = 4$ cm

D. $x = -4$ cm

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

The resistance of a wire is 5 Ω. It's new resistance in ohm if stretched to 5 times of it's original length will be :

Options :

A. 25

B. 625

C. 5

D. 125

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

Match List I with List II

	List I		**List II**
A.	Young's Modulus (Y)	I.	$[ML^{-1}T^{-1}]$
B.	Co-efficient of Viscosity (η)	II.	$[ML^{2}T^{-1}]$
C.	Planck's Constant (h)	III.	$[ML^{-1}T^{-2}]$
D.	Work function (φ)	IV.	$[ML^{2}T^{-2}]$

Choose the correct answer from the options given below :

Options :

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

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

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

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

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

Statement I : When a Si sample is doped with Boron, it becomes P type and when doped by Arsenic it becomes N-type semi conductor such that P-type has excess holes and N-type has excess electrons.

Statement II : When such P-type and N-type semi-conductors, are fused to make a junction, a current will automatically flow which can be detected with an externally connected ameter.

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

Options :

A. Statement I is incorrect but statement II is correct

B. Both Statement I and statement II are correct

C. Statement I is correct but statement II is incorrect

D. Both Statement I and Statement II are incorrect

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

According to law of equipartition of energy the molar specific heat of a diatomic gas at constant volume where the molecule has one additional vibrational mode is :-

Options :

A. $\frac{9}{2}R$

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

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

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

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 body of mass is taken from earth surface to the height h equal to twice the radius of earth (R_e), the increase in potential energy will be :

(g = acceleration due to gravity on the surface of Earth)

Options :

A. $\frac{1}{2}mgR_e$

B. $3\ mgR_e$

C. $\frac{1}{3}mgR_e$

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

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

For a moving coil galvanometer, the deflection in the coil is 0.05 rad when a current of 10 mA is passes through it. If the torsional constant of suspension wire is 4.0×10^{-5}N m rad^{-1}, the magnetic field is 0.01T and the number of turns in the coil is 200, the area of each turn (in cm^2) is :

Options :

A. 1.5

B. 2.0

C. 0.5

D. 1.0

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

Given below are two statements :

Statement I : Stopping potential in photoelectric effect does not depend on the power of the light source.

Statement II : For a given metal, the maximum kinetic energy of the photoelectron depends on the wavelength of the incident light.

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

Options :

A. Both Statement I and Statement II are incorrect

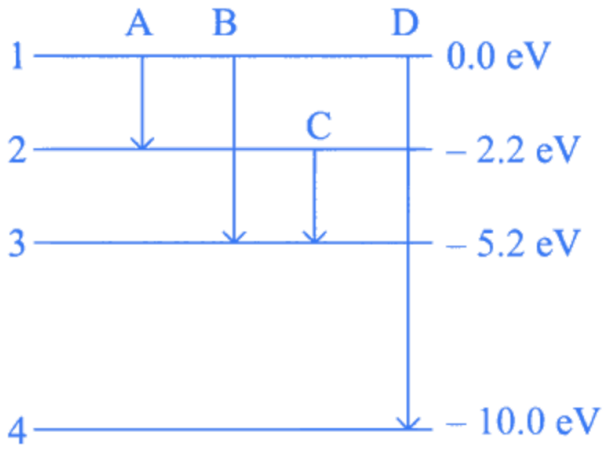
B. Statement I is correct but Statement II is incorrect

C. Both Statement I and Statement II are correct

D. Statement I is incorrect but Statement II is correct

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 energy levels of an atom is shown in figure.



Which one of these transitions will result in the emission of a photon of wavelength 124.1 nm?

Given ($h = 6.62 \times 10^{-34}$ Js)

Options :

A. C

B. B

C. A

D. D

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

Match List I with List II

	List I		**List II**
A.	Troposphere	I.	Approximate 65-75 km over Earth's surface
B.	E-Part of Stratosphere	II.	Approximate 300 km over Earth's surface
C.	F_2-Part of Thermosphere	III.	Approximate 10 km over Earth's surface
D.	D-Part of Stratosphere	IV.	Approximate 100 km over Earth's surface

Choose the correct answer from the options given below :

Options :

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

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

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

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

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

Two long parallel wires carrying currents 8A and 15A in opposite directions are placed at a distance of 7 cm from each other. A point P is at equidistant from both the wires such that the lines joining the point P to the wires are perpendicular to each other. The magnitude of magnetic field at P is _____ $\times 10^{-6}$ T.

(Given :

$$\sqrt{2} = 1.4$$

)

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

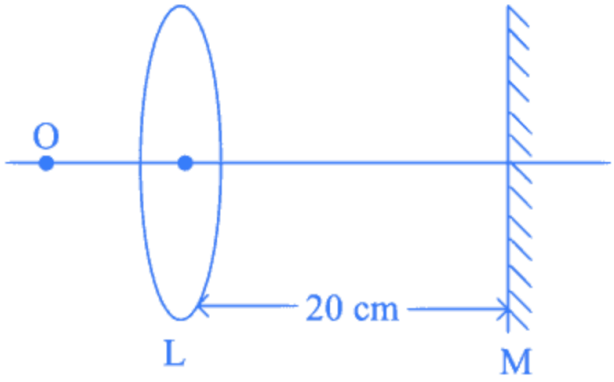
Question Number : 52 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

A capacitor has capacitance 5μF when it's parallel plates are separated by air medium of thickness d. A slab of material of dielectric constant 1.5 having area equal to that of plates but thickness $\frac{d}{2}$ is inserted between the plates. Capacitance of the capacitor in the presence of slab will be _____ μF.

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

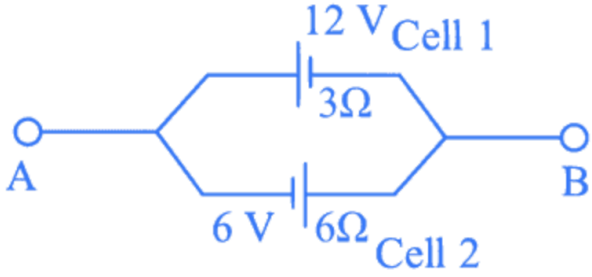
An object is placed on the principal axis of convex lens of focal length 10cm as shown. A plane mirror is placed on the other side of lens at a distance of 20 cm. The image produced by the plane mirror is 5cm inside the mirror. The distance of the object from the lens is _____ cm.



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 cells are connected between points A and B as shown. Cell 1 has emf of 12 V and internal resistance of 3Ω. Cell 2 has emf of 6V and internal resistance of 6Ω. An external resistor R of 4Ω is connected across A and B. The current flowing through R will be _____ A.



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 series LCR circuit is connected to an AC source of 220 V, 50 Hz. The circuit contains a resistance R = 80Ω , an inductor of inductive reactance

$$X_L = 70\Omega$$

, and a capacitor of capacitive reactance

$$X_C = 130\Omega$$

. The power factor of circuit is $\frac{x}{10}$. The value of x is :

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

If a solid sphere of mass 5 kg and a disc of mass 4 kg have the same radius. Then the ratio of moment of inertia of the disc about a tangent in its plane to the moment of inertia of the sphere about its tangent will be $\frac{x}{7}$. The value of x is _____.

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

A body of mass 1 kg collides head on elastically with a stationary body of mass 3 kg. After collision, the smaller body reverses its direction of motion and moves with a speed of 2 m/s. The initial speed of the smaller body before collision is _____ ms^{-1}.

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 spherical drop of liquid splits into 1000 identical spherical drops. If u_i is the surface energy of the original drop and u_f is the total surface energy of the resulting drops, the (ignoring evaporation),

$$\frac{u_f}{u_i} = \left(\frac{10}{x}\right)$$

. Then value of x is _____ :

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

A nucleus disintegrates into two smaller parts, which have their velocities in the ratio 3 : 2. The ratio of their nuclear sizes will be

$$\left(\frac{x}{3}\right)^{\frac{1}{3}}$$

. The value of 'x' 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 train blowing a whistle of frequency 320 Hz approaches an observer standing on the platform at a speed of 66 m/s. The frequency observed by the observer will be (given speed of sound = 330 ms^{-1}) _____ Hz.

Response Type : Numeric
Evaluation Required For SA : Yes

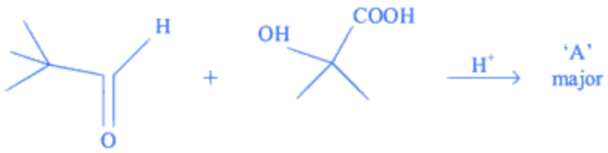
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText

Chemistry Section A

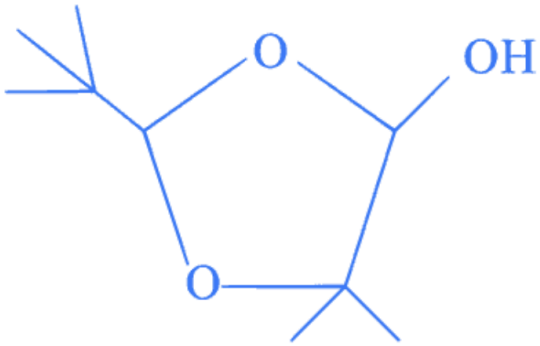
Section Number :	5
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	20
Number of Questions to be attempted :	20
Section Marks :	80
Maximum Instruction Time :	0
Sub-Section Number :	1
Question Shuffling Allowed :	Yes
Is Section Default? :	No

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

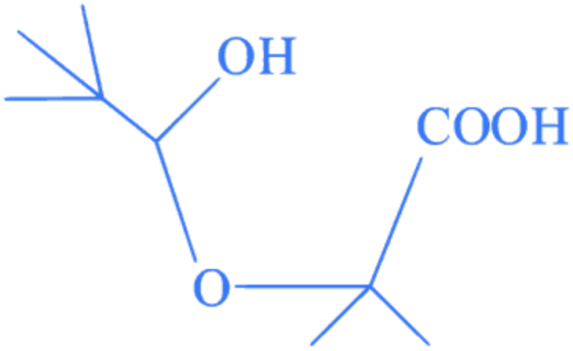
'A' in the given reaction is



Options :

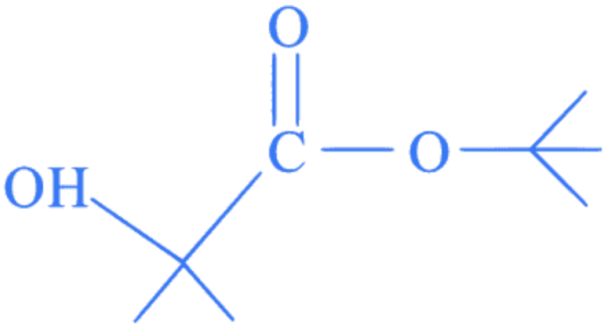


A.

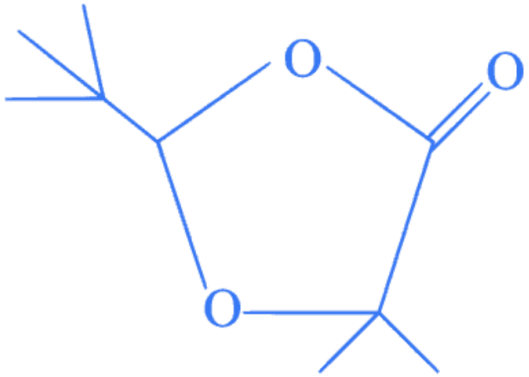


B.

C.



D.



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

When the hydrogen ion concentration $[H^+]$ changes by a factor of 1000, the value of pH of the solution _____

Options :

A. decreases by 2 units

B. increases by 2 units

C. decreases by 3 units

D. increases by 1000 units

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

Match List I with List II

	List I (Amines)		**List II (pK_b)**
A.	Aniline	I.	3.25
B.	Ethanamine	II.	3.00
C.	N-Ethylethanamine	III.	9.38
D.	N, N-Diethylethanamine	IV.	3.29

Choose the correct answer from the options given below :

Options :

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

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

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

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

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

What is the mass ratio of ethylene glycol ($C_2H_6O_2$, molar mass = 62 g/mol) required for making 500 g of 0.25 molal aqueous solution and 250 mL of 0.25 molar aqueous solution?

Options :

A. 1 : 2

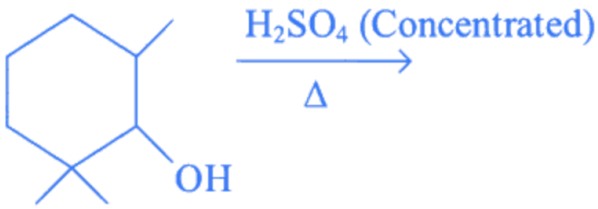
B. 1 : 1

C. 2 : 1

D. 3 : 1

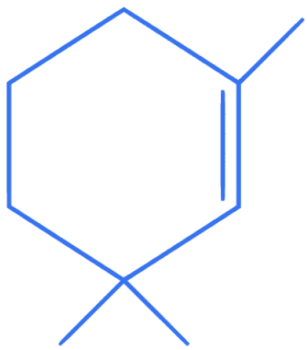
Question Number : 65 Question Type : MCQ Option Shuffling : Yes Display Question Number : Yes Is Question Mandatory : No Single Line Question Option : No Option Orientation : Vertical

Find out the major product from the following reaction.

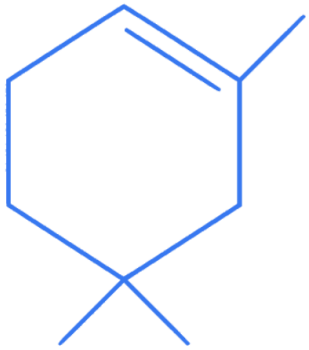


Options :

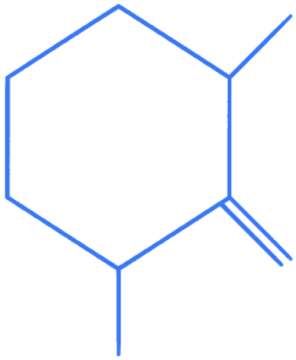
A.



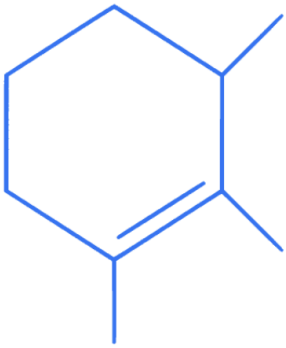
B.



C.



D.



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 isomeric deuterated bromide with molecular formula C_4H_8DBr having two chiral carbon atoms is

Options :

A. 2 - Bromo - 1 - deuterobutane

B. 2 - Bromo - 1 - deutero - 2 - methylpropane

C. 2 - Bromo - 3 - deuterobutane

D. 2 - Bromo - 2 - deuterobutane

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

Match List I with List II

	List I **Isomeric pairs**		**List II** **Type of isomers**
A.	Propanamine and N-Methylethanamine	I.	Metamers
B.	Hexan-2-one and Hexan-3-one	II.	Positional isomers
C.	Ethanamide and Hydroxyethanimine	III.	Functional isomers
D.	o-nitrophenol and p-nitrophenol	IV.	Tautomers

Choose the correct answer from the options given below :

Options :

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

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

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

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

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

A. Ammonium salts produce haze in atmosphere.

B. Ozone gets produced when atmospheric oxygen reacts with chlorine radicals.

C. Polychlorinated biphenyls act as cleansing solvents.

D. 'Blue baby' syndrome occurs due to the presence of excess of sulphate ions in water.

Choose the correct answer from the options given below :

Options :

A. B and C only

B. A and D only

C. A, B and C only

D. A and C only

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

Statement I : Dipole moment is a vector quantity and by convention it is depicted by a small arrow with tail on the negative centre and head pointing towards the positive centre.

Statement II : The crossed arrow of the dipole moment symbolizes the direction of the shift of charges in the molecules.

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

Options :

A. Statement I is correct but Statement II is incorrect

B. Statement I is incorrect but Statement II is correct

C. Both Statement I and Statement II are correct

D. Both Statement I and Statement II are incorrect

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

Match List I with List II

	List I Coordination entity		**List II Wavelength of light absorbed in nm**
A.	$[CoCl(NH_3)_5]^{2+}$	I.	310
B.	$[Co(NH_3)_6]^{3+}$	II.	475
C.	$[Co(CN)_6]^{3-}$	III.	535
D.	$[Cu(H_2O)_4]^{2+}$	IV.	600

Choose the correct answer from the options given below :

Options :

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

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

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

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

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

A chloride salt solution acidified with dil.HNO_3 gives a curdy white precipitate, [A], on addition of $AgNO_3$. [A] on treatment with NH_4OH gives a clear solution B. A and B are respectively :

Options :

A. $H[AgCl_3]$ & $(NH_4)[Ag(OH)_2]$

B. $AgCl$ & $[Ag(NH_3)_2]Cl$

C. $H[AgCl_3]$ & $[Ag(NH_3)_2]Cl$

D. $AgCl$ & $(NH_4)[Ag(OH)_2]$

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 : Butylated hydroxy anisole when added to butter increases its shelf life.

Reason R : Butylated hydroxy anisole is more reactive towards oxygen than food.

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

Options :

A. A is correct but R is not correct

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

C. Both A and R are correct and R is the correct explanation of A

D. A is not correct but R is correct

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

Potassium dichromate acts as a strong oxidizing agent in acidic solution. During this process, the oxidation state changes from :

Options :

A. + 2 to + 1

B. + 6 to + 2

C. + 6 to + 3

D. + 3 to + 1

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

Which one among the following metals is the weakest reducing agent?

Options :

A. K

B. Na

C. Li

D. Rb

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

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

Assertion A : Carbon forms two important oxides - CO and CO_2. CO is neutral whereas CO_2 is acidic in nature

Reason R : CO_2 can combine with water in a limited way to form carbonic acid, while CO is sparingly soluble in water

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

Options :

A. A is not correct but R is correct

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

C. Both A and R are correct and R is the correct explanation of A

D. A is correct but R is not correct

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

Match List I with List II

	List I (Name of polymer)		**List II (Uses)**
A.	Glyptal	I.	Flexible pipes
B.	Neoprene	II.	Synthetic wool
C.	Acrilan	III.	Paints and Lacquers
D.	LDP	IV.	Gaskets

Choose the correct answer from the options given below :

Options :

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

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

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

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

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 :

Statement I : In froth floatation method of rotating paddle agitates the mixture to drive air out of it.

Statement II : Iron pyrites and generally avoided for extraction of iron due to environmental reasons.

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

Options :

A. Statement I is true but Statement II is false

B. Statement I is false but Statement II is true

C. Both Statement I and Statement II are true

D. Both Statement I and Statement II are false

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

Match List I with List II

	List I		**List II**
A.	Cobalt catalyst	I.	$(H_2 + Cl_2)$ production
B.	Syngas	II.	Water gas production
C.	Nickel catalyst	III.	Coal gasification
D.	Brine solution	IV.	Methanol production

Choose the correct answer from the options given below :

Options :

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

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

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

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

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 of the following represents the correct order of metallic character of the given elements?

Options :

A. $K < Mg < Be < Si$

B. $Si < Be < Mg < K$

C. $Be < Si < Mg < K$

D. $Be < Si < K < Mg$

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

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

Assertion A : The alkali metals and their salts impart characteristic colour to reducing flame.

Reason R : Alkali metals can be detected using flame tests.

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

Options :

A. A is not correct but R is correct

B. A is correct but R is not correct

C. Both A and R are correct and R is the correct explanation of A

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

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

28.0 L of CO_2 is produced on complete combustion of 16.8 L gaseous mixture of ethene and methane at 25°C and 1 atm. Heat evolved during the combustion process is _____ kJ.

Given :

$$\Delta H_c\,(CH_4) = -900\ \text{kJ mol}^{-1}$$

$$\Delta H_c\,(C_2H_4) = -1400\ \text{kJ mol}^{-1}$$

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 number of pairs of the solutions having the same value of the osmotic pressure from the following is _____.

(Assume 100% ionization)

A. 0.500 M C_2H_5OH (aq) and 0.25 M KBr (aq)

B. 0.100 M $K_4[Fe(CN)_6]$ (aq) and 0.100 M $FeSO_4(NH_4)_2SO_4$ (aq)

C. 0.05 M $K_4[Fe(CN)_6]$ (aq) and 0.25 M NaCl (aq)

D. 0.15 M NaCl (aq) and 0.1 M $BaCl_2$ (aq)

E. 0.02 M $KCl.MgCl_2.6H_2O$ (aq) and 0.05 M KCl (aq)

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

A first order reaction has the rate constant,

$$k = 4.6 \times 10^{-3}\ s^{-1}$$

. The number of correct statement/s from the following is/are _____

Given :

$$\log 3 = 0.48$$

A. Reaction completes in 1000 s.

B. The reaction has a half-life of 500 s.

C. The time required for 10% completion is 25 times the time required for 90% completion.

D. The degree of dissociation is equal to $(1 - e^{-kt})$

E. The rate and the rate constant have the same unit.

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

$$Pt(s)|H_2(g)(1\,bar)|H^+(aq)(1\,M)||M^{3+}(aq), M^+(aq)|Pt(s)$$

The E_{cell} for the given cell is 0.1115 V at 298 K when

$$\frac{[M^+(aq)]}{[M^{3+}(aq)]} = 10^a$$

The value of a is _____

Given :

$$E^{\theta}_{M^{3+}/M^+} = 0.2$$

V

$$\frac{2.303RT}{F} = 0.059V$$

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 number of given orbitals which have electron density along the axis is _____

$$p_x, p_y, p_z, d_{xy}, d_{yz}, d_{xz}, d_{z^2}, d_{x^2-y^2}$$

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

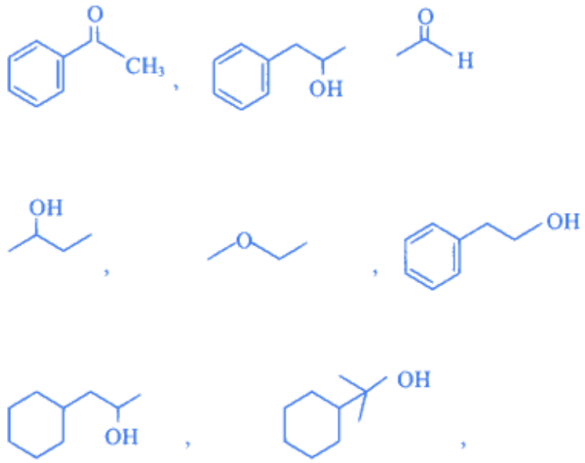
Question Number : 86 Question Type : SA Display Question Number : Yes Keyboard Layout : Inscript

Total number of moles of AgCl precipitated on addition of excess of $AgNO_3$ to one mole each of the following complexes $[Co(NH_3)_4Cl_2]Cl$, $[Ni(H_2O)_6]Cl_2$, $[Pt(NH_3)_2Cl_2]$ and $[Pd(NH_3)_4]Cl_2$ 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

Number of compounds giving (i) red colouration with ceric ammonium nitrate and also (ii) positive iodoform test from the following 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

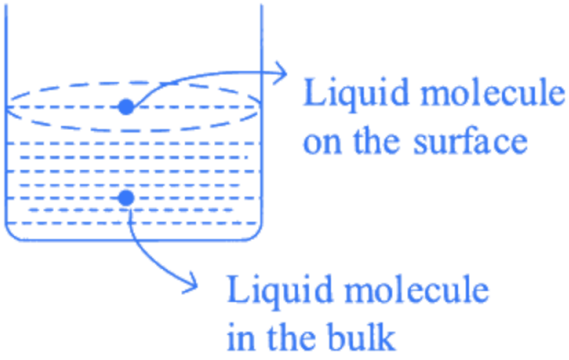
Number of hydrogen atoms per molecule of a hydrocarbon A having 85.8% carbon is _____

(Given : Molar mass of A = 84 g mol^{-1})

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

Based on the given figure, the number of **correct** statement/s is/are _____.



A. Surface tension is the outcome of equal attractive and repulsive forces acting on the liquid molecule in bulk.

B. Surface tension is due to uneven forces acting on the molecules present on the surface.

C. The molecule in the bulk can never come to the liquid surface.

D. The molecules on the surface are responsible for vapour pressure if the system is a closed system.

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

The number of incorrect statement/s from the following is/are _____

A. Water vapours are adsorbed by anhydrous calcium chloride.

B. There is a decrease in surface energy during adsorption.

C. As the adsorption proceeds, ΔH becomes more and more negative.

D. Adsorption is accompanied by decrease in entropy of the system.

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