

NTA JEE 2024_27 29 30 31 Jan 1st Feb 2024

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Subject	B. Tech

Section : Mathematics Section A

Q.1 Let α and β be the roots of the equation $px^2 + qx - r = 0$, where $p \neq 0$. If p, q and r be the consecutive terms of a non constant G.P. and $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{3}{4}$, then the value of $(\alpha - \beta)^2$ is :

Options

1. $\frac{80}{9}$
2. $\frac{20}{3}$
3. 8
4. 9

Question Type : MCQ

Question ID : 9561771219

Option 1 ID : 9561772564

Option 2 ID : 9561772565

Option 3 ID : 9561772566

Option 4 ID : 9561772563

Status : Not Answered

Chosen Option : --

Q.2

The value of $\int_0^1 (2x^3 - 3x^2 - x + 1)^{\frac{1}{3}} dx$ is equal to :

Options

1. -1
2. 0
3. 1
4. 2

Question Type : MCQ

Question ID : 9561771226

Option 1 ID : 9561772591

Option 2 ID : 9561772592

Option 3 ID : 9561772593

Option 4 ID : 9561772594

Status : Not Answered

Chosen Option : --

Q.3

If the domain of the function $f(x) = \frac{\sqrt{x^2 - 25}}{(4 - x^2)} + \log_{10}(x^2 + 2x - 15)$ is $(-\infty, \alpha) \cup [\beta, \infty)$, then

$\alpha^2 + \beta^3$ is equal to :

Options

1. 150
2. 175
3. 140
4. 125

Question Type : **MCQ**

Question ID : **9561771216**

Option 1 ID : **9561772553**

Option 2 ID : **9561772554**

Option 3 ID : **9561772552**

Option 4 ID : **9561772551**

Status : **Not Answered**

Chosen Option : --

Q.4

Let Ajay will not appear in JEE exam with probability $p = \frac{2}{7}$, while both Ajay and Vijay will

appear in the exam with probability $q = \frac{1}{5}$. Then the probability, that Ajay will appear in the exam and Vijay will not appear is :

Options

1. $\frac{3}{35}$
2. $\frac{18}{35}$
3. $\frac{9}{35}$
4. $\frac{24}{35}$

Question Type : **MCQ**

Question ID : **9561771233**

Option 1 ID : **9561772619**

Option 2 ID : **9561772621**

Option 3 ID : **9561772622**

Option 4 ID : **9561772620**

Status : **Not Answered**

Chosen Option : --

Q.5

Consider 10 observations x_1, x_2, \dots, x_{10} such that $\sum_{i=1}^{10} (x_i - \alpha) = 2$ and $\sum_{i=1}^{10} (x_i - \beta)^2 = 40$, where α, β

are positive integers. Let the mean and the variance of the observations be $\frac{6}{5}$ and $\frac{84}{25}$ respectively.

Then $\frac{\beta}{\alpha}$ is equal to :

Options

1. 1
2. $\frac{3}{2}$
3. $\frac{5}{2}$
4. 2

Question Type : MCQ

Question ID : 9561771234

Option 1 ID : 9561772623

Option 2 ID : 9561772625

Option 3 ID : 9561772626

Option 4 ID : 9561772624

Status : Not Answered

Chosen Option : --

Q.6

Let P be a point on the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$. Let the line passing through P and parallel to y-axis

meet the circle $x^2 + y^2 = 9$ at point Q such that P and Q are on the same side of the x-axis. Then, the eccentricity of the locus of the point R on PQ such that $PR : RQ = 4 : 3$ as P moves on the ellipse, is :

Options

1. $\frac{13}{21}$
2. $\frac{\sqrt{139}}{23}$
3. $\frac{\sqrt{13}}{7}$
4. $\frac{11}{19}$

Question Type : MCQ

Question ID : 9561771228

Option 1 ID : 9561772602

Option 2 ID : 9561772601

Option 3 ID : 9561772599

Option 4 ID : 9561772600

Status : Not Answered

Chosen Option : --

Q.7 Let the system of equations $x+2y+3z=5$, $2x+3y+z=9$, $4x+3y+\lambda z=\mu$ have infinite number of solutions. Then $\lambda + 2\mu$ is equal to :

Options

1. 22
2. 28
3. 17
4. 15

Question Type : **MCQ**

Question ID : **9561771220**

Option 1 ID : **9561772568**

Option 2 ID : **9561772570**

Option 3 ID : **9561772567**

Option 4 ID : **9561772569**

Status : **Not Answered**

Chosen Option : --

Q.8

If the mirror image of the point P(3, 4, 9) in the line $\frac{x-1}{3} = \frac{y+1}{2} = \frac{z-2}{1}$ is (α, β, γ) , then $\alpha + \beta + \gamma$ is :

Options

1. 132
2. 108
3. 102
4. 138

Question Type : **MCQ**

Question ID : **9561771230**

Option 1 ID : **9561772609**

Option 2 ID : **9561772608**

Option 3 ID : **9561772607**

Option 4 ID : **9561772610**

Status : **Not Answered**

Chosen Option : --

Q.9 Let α be a non-zero real number. Suppose $f: \mathbf{R} \rightarrow \mathbf{R}$ is a differentiable function such that $f(0) = 2$ and $\lim_{x \rightarrow -\infty} f(x) = 1$. If $f'(x) = \alpha f(x) + 3$, for all $x \in \mathbf{R}$, then $f(-\log_e 2)$ is equal to _____.

Options

1. 7
2. 3
3. 5
4. 9

Question Type : MCQ
Question ID : 9561771227
Option 1 ID : 9561772597
Option 2 ID : 9561772595
Option 3 ID : 9561772596
Option 4 ID : 9561772598
Status : Not Answered
Chosen Option : --

Q.10

If z is a complex number such that $|z| \geq 1$, then the minimum value of $\left| z + \frac{1}{2}(3 + 4i) \right|$ is :

Options

1. 3
2. $\frac{5}{2}$
3. 2
4. $\frac{3}{2}$

Question Type : MCQ
Question ID : 9561771218
Option 1 ID : 9561772562
Option 2 ID : 9561772561
Option 3 ID : 9561772560
Option 4 ID : 9561772559
Status : Not Answered
Chosen Option : --

Q.11

If $\int_0^{\frac{\pi}{3}} \cos^4 x \, dx = a\pi + b\sqrt{3}$, where a and b are rational numbers, then $9a + 8b$ is equal to :

Options

1. 2
2. 1
3. $\frac{3}{2}$
4. 3

Question Type : **MCQ**Question ID : **9561771225**Option 1 ID : **9561772588**Option 2 ID : **9561772590**Option 3 ID : **9561772589**Option 4 ID : **9561772587**Status : **Not Answered**

Chosen Option : --

Q.12

Let P and Q be the points on the line $\frac{x+3}{8} = \frac{y-4}{2} = \frac{z+1}{2}$ which are at a distance of 6 units from the point R (1, 2, 3). If the centroid of the triangle PQR is (α, β, γ) , then $\alpha^2 + \beta^2 + \gamma^2$ is :

Options

1. 24
2. 36
3. 18
4. 26

Question Type : **MCQ**Question ID : **9561771231**Option 1 ID : **9561772612**Option 2 ID : **9561772614**Option 3 ID : **9561772611**Option 4 ID : **9561772613**Status : **Not Answered**

Chosen Option : --

Q.13 Let $f(x) = |2x^2 + 5|x| - 3|$, $x \in \mathbb{R}$. If m and n denote the number of points where f is **not** continuous and not differentiable respectively, then $m+n$ is equal to :

Options

1. 2
2. 0
3. 5
4. 3

Question Type : **MCQ**

Question ID : **9561771223**

Option 1 ID : **9561772580**

Option 2 ID : **9561772579**

Option 3 ID : **9561772582**

Option 4 ID : **9561772581**

Status : **Not Answered**

Chosen Option : --

Q.14

Let $f(x) = \begin{cases} x - 1, & x \text{ is even}, \\ 2x, & x \text{ is odd}, \end{cases} x \in \mathbb{N}$. If for some $a \in \mathbb{N}$, $f(f(f(a))) = 21$, then $\lim_{x \rightarrow a^-} \left\{ \frac{|x|^3}{a} - \left[\frac{x}{a} \right] \right\}$, where $[t]$ denotes the greatest integer less than or equal to t , is equal to :

Options

1. 121
2. 225
3. 169
4. 144

Question Type : **MCQ**

Question ID : **9561771224**

Option 1 ID : **9561772583**

Option 2 ID : **9561772586**

Option 3 ID : **9561772585**

Option 4 ID : **9561772584**

Status : **Not Answered**

Chosen Option : --

Q.15

Let S_n denote the sum of the first n terms of an arithmetic progression. If $S_{10} = 390$ and the ratio of the tenth and the fifth terms is $15 : 7$, then $S_{15} - S_5$ is equal to :

Options

1. 890
2. 800
3. 690
4. 790

Question Type : **MCQ**

Question ID : **9561771222**

Option 1 ID : **9561772577**

Option 2 ID : **9561772576**

Option 3 ID : **9561772575**

Option 4 ID : **9561772578**

Status : **Not Answered**

Chosen Option : --

Q.16 Let the locus of the midpoints of the chords of the circle $x^2 + (y - 1)^2 = 1$ drawn from the origin intersect the line $x + y = 1$ at P and Q. Then, the length of PQ is :

Options

1. $\frac{1}{\sqrt{2}}$
2. 1
3. $\frac{1}{2}$
4. $\sqrt{2}$

Question Type : **MCQ**

Question ID : **9561771229**

Option 1 ID : **9561772605**

Option 2 ID : **9561772603**

Option 3 ID : **9561772606**

Option 4 ID : **9561772604**

Status : **Not Answered**

Chosen Option : --

Q.17 Let m and n be the coefficients of seventh and thirteenth terms respectively in the expansion of

$$\left(\frac{1}{3}x^{\frac{1}{3}} + \frac{1}{2x^3} \right)^{18}. \text{ Then } \left(\frac{n}{m} \right)^{\frac{1}{3}} \text{ is :}$$

Options

1. $\frac{1}{9}$
2. $\frac{4}{9}$
3. $\frac{1}{4}$
4. $\frac{9}{4}$

Question Type : **MCQ**

Question ID : **9561771221**

Option 1 ID : **9561772572**

Option 2 ID : **9561772573**

Option 3 ID : **9561772571**

Option 4 ID : **9561772574**

Status : **Not Answered**

Chosen Option : --

Q.18 Consider the relations R_1 and R_2 defined as $aR_1b \Leftrightarrow a^2 + b^2 = 1$ for all $a, b \in \mathbb{R}$ and $(a, b)R_2(c, d) \Leftrightarrow a + d = b + c$ for all $(a, b), (c, d) \in \mathbb{N} \times \mathbb{N}$. Then

Options

1. R_1 and R_2 both are equivalence relations
2. Neither R_1 nor R_2 is an equivalence relation
3. Only R_2 is an equivalence relation
4. Only R_1 is an equivalence relation

Question Type : **MCQ**

Question ID : **9561771217**

Option 1 ID : **9561772557**

Option 2 ID : **9561772558**

Option 3 ID : **9561772556**

Option 4 ID : **9561772555**

Status : **Not Answered**

Chosen Option : --

Q.19 The number of solutions of the equation $4 \sin^2 x - 4 \cos^3 x + 9 - 4 \cos x = 0; x \in [-2\pi, 2\pi]$ is :

Options

1. 1
2. 3
3. 2
4. 0

Question Type : **MCQ**

Question ID : **9561771235**

Option 1 ID : **9561772628**

Option 2 ID : **9561772630**

Option 3 ID : **9561772629**

Option 4 ID : **9561772627**

Status : **Not Answered**

Chosen Option : --

- Q.20** Consider a ΔABC where $A(1, 3, 2)$, $B(-2, 8, 0)$ and $C(3, 6, 7)$. If the angle bisector of $\angle BAC$ meets the line BC at D, then the length of the projection of the vector \vec{AD} on the vector \vec{AC} is :

Options

1. $\frac{37}{2\sqrt{38}}$
2. $\frac{39}{2\sqrt{38}}$
3. $\frac{\sqrt{38}}{2}$
4. $\sqrt{19}$

Question Type : MCQ

Question ID : 9561771232

Option 1 ID : 9561772616

Option 2 ID : 9561772618

Option 3 ID : 9561772617

Option 4 ID : 9561772615

Status : Not Answered

Chosen Option : --

Section : Mathematics Section B

- Q.21** Three points O(0, 0), P(a, a²), Q(-b, b²), a > 0, b > 0, are on the parabola $y = x^2$. Let S_1 be the area of the region bounded by the line PQ and the parabola, and S_2 be the area of the triangle OPQ. If

the minimum value of $\frac{S_1}{S_2}$ is $\frac{m}{n}$, gcd(m, n) = 1, then m + n is equal to _____.

Given --

Answer :

Question Type : SA

Question ID : 9561771243

Status : Not Answered

- Q.22** If three successive terms of a G.P. with common ratio r ($r > 1$) are the lengths of the sides of a triangle and [r] denotes the greatest integer less than or equal to r, then $3[r] + [-r]$ is equal to _____.

Given --

Answer :

Question Type : SA

Question ID : 9561771238

Status : Not Answered

- Q.23** Let ABC be an isosceles triangle in which A is at $(-1, 0)$, $\angle A = \frac{2\pi}{3}$, AB = AC and B is on the positive x-axis. If $BC = 4\sqrt{3}$ and the line BC intersects the line $y = x + 3$ at (α, β) , then $\frac{\beta^4}{\alpha^2}$ is _____.

Given --

Answer :

Question Type : SA

Question ID : 9561771244

Status : Not Answered

Q.24 If $y = \frac{(\sqrt{x}+1)(x^2 - \sqrt{x})}{x\sqrt{x} + x + \sqrt{x}} + \frac{1}{15}(3\cos^2 x - 5)\cos^3 x$, then $96 y' \left(\frac{\pi}{6} \right)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 9561771240
Status : Not Answered

Q.25 If $\frac{dx}{dy} = \frac{1+x-y^2}{y}$, $x(1)=1$, then $5x(2)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 9561771242
Status : Not Answered

Q.26 Let $f : (0, \infty) \rightarrow \mathbb{R}$ and $F(x) = \int_0^x t f(t) dt$. If $F(x^2) = x^4 + x^5$, then $\sum_{r=1}^{12} f(r^2)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 9561771239
Status : Not Answered

Q.27 The sum of squares of all possible values of k , for which area of the region bounded by the parabolas $2y^2 = kx$ and $ky^2 = 2(y - x)$ is maximum, is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 9561771241
Status : Not Answered

Q.28 Let $A = I_2 - 2 MM^T$, where M is a real matrix of order 2×1 such that the relation $M^T M = I_1$ holds. If λ is a real number such that the relation $AX = \lambda X$ holds for some non-zero real matrix X of order 2×1 , then the sum of squares of all possible values of λ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 9561771236
Status : Not Answered

Q.29 The lines L_1, L_2, \dots, L_{20} are distinct. For $n=1, 2, 3, \dots, 10$ all the lines L_{2n-1} are parallel to each other and all the lines L_{2n} pass through a given point P . The maximum number of points of intersection of pairs of lines from the set $\{L_1, L_2, \dots, L_{20}\}$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 9561771237
Status : Not Answered

Q.30 Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = -\hat{i} - 8\hat{j} + 2\hat{k}$ and $\vec{c} = 4\hat{i} + c_2\hat{j} + c_3\hat{k}$ be three vectors such that

$\vec{b} \times \vec{a} = \vec{c} \times \vec{a}$. If the angle between the vector \vec{c} and the vector $3\hat{i} + 4\hat{j} + \hat{k}$ is θ , then the greatest integer less than or equal to $\tan^2\theta$ is _____.

Given--

Answer :

Question Type : **SA**

Question ID : **9561771245**

Status : **Not Answered**

Section : Physics Section A

Q.31 A big drop is formed by coalescing 1000 small droplets of water. The surface energy will become :

Options

1. $\frac{1}{100}$ th
2. 100 times
3. 10 times
4. $\frac{1}{10}$ th

Question Type : **MCQ**

Question ID : **9561771252**

Option 1 ID : **9561772665**

Option 2 ID : **9561772668**

Option 3 ID : **9561772667**

Option 4 ID : **9561772666**

Status : **Not Answered**

Chosen Option : --

Q.32 Monochromatic light of frequency 6×10^{14} Hz is produced by a laser. The power emitted is 2×10^{-3} W. How many photons per second on an average, are emitted by the source ?

(Given $h = 6.63 \times 10^{-34}$ Js)

Options

1. 5×10^{15}
2. 9×10^{18}
3. 7×10^{16}
4. 6×10^{15}

Question Type : **MCQ**

Question ID : **9561771261**

Option 1 ID : **9561772701**

Option 2 ID : **9561772704**

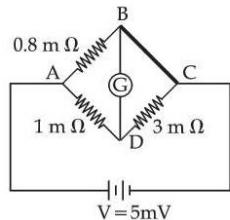
Option 3 ID : **9561772702**

Option 4 ID : **9561772703**

Status : **Answered**

Chosen Option : **1**

- Q.33** To measure the temperature coefficient of resistivity α of a semiconductor, an electrical arrangement shown in the figure is prepared. The arm BC is made up of the semiconductor. The experiment is being conducted at 25°C and resistance of the semiconductor arm is $3 \text{ m}\Omega$. Arm BC is cooled at a constant rate of $2^\circ\text{C}/\text{s}$. If the galvanometer G shows no deflection after 10 s, then α is :

**Options**

1. $-2 \times 10^{-2} \text{ } ^\circ\text{C}^{-1}$
2. $-2.5 \times 10^{-2} \text{ } ^\circ\text{C}^{-1}$
3. $-1.5 \times 10^{-2} \text{ } ^\circ\text{C}^{-1}$
4. $-1 \times 10^{-2} \text{ } ^\circ\text{C}^{-1}$

Question Type : MCQ

Question ID : 9561771264

Option 1 ID : 9561772715

Option 2 ID : 9561772716

Option 3 ID : 9561772714

Option 4 ID : 9561772713

Status : Not Answered

Chosen Option : --

- Q.34** Match List - I with List - II.

List - I (Number)	List - II (Significant figure)
(A) 1001	(I) 3
(B) 010.1	(II) 4
(C) 100.100	(III) 5
(D) 0.0010010	(IV) 6

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

1. (A)-(III), (B)-(IV), (C)-(II), (D)-(I)
2. (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
3. (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
4. (A)-(II), (B)-(I), (C)-(IV), (D)-(III)

Question Type : MCQ

Question ID : 9561771246

Option 1 ID : 9561772643

Option 2 ID : 9561772644

Option 3 ID : 9561772641

Option 4 ID : 9561772642

Status : Answered

Chosen Option : 4

Q.35 Train A is moving along two parallel rail tracks towards north with speed 72 km/h and train B is moving towards south with speed 108 km/h. Velocity of train B with respect to A and velocity of ground with respect to B are (in ms^{-1}) :

Options 1. -50 and 30

2. -50 and -30

3. 50 and -30

4. -30 and 50

Question Type : MCQ

Question ID : 9561771247

Option 1 ID : 9561772645

Option 2 ID : 9561772647

Option 3 ID : 9561772646

Option 4 ID : 9561772648

Status : Answered

Chosen Option : 3

Q.36 A body of mass 4 kg experiences two forces $\vec{F}_1 = 5\hat{i} + 8\hat{j} + 7\hat{k}$ and $\vec{F}_2 = 3\hat{i} - 4\hat{j} - 3\hat{k}$. The acceleration acting on the body is :

Options 1. $2\hat{i} + \hat{j} + \hat{k}$

2. $4\hat{i} + 2\hat{j} + 2\hat{k}$

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

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

Question Type : MCQ

Question ID : 9561771249

Option 1 ID : 9561772653

Option 2 ID : 9561772654

Option 3 ID : 9561772656

Option 4 ID : 9561772655

Status : Answered

Chosen Option : 1

Q.37 Conductivity of a photodiode starts changing only if the wavelength of incident light is less than

660 nm. The band gap of photodiode is found to be $\left(\frac{X}{8}\right)$ eV. The value of X is :

(Given, $h = 6.6 \times 10^{-34}$ Js, $e = 1.6 \times 10^{-19}$ C)

Options

1. 15
2. 21
3. 11
4. 13

Question Type : **MCQ**

Question ID : **9561771263**

Option 1 ID : **9561772711**

Option 2 ID : **9561772712**

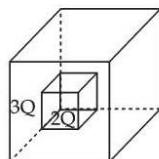
Option 3 ID : **9561772709**

Option 4 ID : **9561772710**

Status : **Answered**

Chosen Option : **1**

Q.38 C_1 and C_2 are two hollow concentric cubes enclosing charges $2Q$ and $3Q$ respectively as shown in figure. The ratio of electric flux passing through C_1 and C_2 is :



Options

1. 2 : 3
2. 3 : 2
3. 2 : 5
4. 5 : 2

Question Type : **MCQ**

Question ID : **9561771255**

Option 1 ID : **9561772677**

Option 2 ID : **9561772679**

Option 3 ID : **9561772678**

Option 4 ID : **9561772680**

Status : **Answered**

Chosen Option : **3**

Q.39 A transformer has an efficiency of 80% and works at 10 V and 4 kW. If the secondary voltage is 240 V, then the current in the secondary coil is :

- Options**
- 1. 13.33 A
 - 2. 1.59 A
 - 3. 1.33 A
 - 4. 15.1 A

Question Type : MCQ
Question ID : 9561771258
Option 1 ID : 9561772689
Option 2 ID : 9561772692
Option 3 ID : 9561772691
Option 4 ID : 9561772690
Status : Not Answered
Chosen Option : --

Q.40 In a metre-bridge when a resistance in the left gap is $2\ \Omega$ and unknown resistance in the right gap, the balance length is found to be 40 cm. On shunting the unknown resistance with $2\ \Omega$, the balance length changes by :

- Options**
- 1. 62.5 cm
 - 2. 20 cm
 - 3. 65 cm
 - 4. 22.5 cm

Question Type : MCQ
Question ID : 9561771265
Option 1 ID : 9561772717
Option 2 ID : 9561772720
Option 3 ID : 9561772719
Option 4 ID : 9561772718
Status : Answered
Chosen Option : 4

Q.41 A cricket player catches a ball of mass 120 g moving with 25 m/s speed. If the catching process is completed in 0.1 s then the magnitude of force exerted by the ball on the hand of player will be (in SI unit) :

- Options**
- 1. 30
 - 2. 25
 - 3. 24
 - 4. 12

Question Type : MCQ
Question ID : 9561771248
Option 1 ID : 9561772651
Option 2 ID : 9561772650
Option 3 ID : 9561772652
Option 4 ID : 9561772649
Status : Answered
Chosen Option : 1

Q.42 If frequency of electromagnetic wave is 60 MHz and it travels in air along z direction then the corresponding electric and magnetic field vectors will be mutually perpendicular to each other and the wavelength of the wave (in m) is :

Options 1. 10

2. 2

3. 2.5

4. 5

Question Type : MCQ

Question ID : 9561771259

Option 1 ID : 9561772693

Option 2 ID : 9561772696

Option 3 ID : 9561772695

Option 4 ID : 9561772694

Status : Answered

Chosen Option : 4

Q.43 A light planet is revolving around a massive star in a circular orbit of radius R with a period of revolution T . If the force of attraction between planet and star is proportional to $R^{-3/2}$ then choose the correct option :

Options

1. $T^2 \propto R^3$

2. $T^2 \propto R^{7/2}$

3. $T^2 \propto R^{5/2}$

4. $T^2 \propto R^{3/2}$

Question Type : MCQ

Question ID : 9561771251

Option 1 ID : 9561772661

Option 2 ID : 9561772662

Option 3 ID : 9561772663

Option 4 ID : 9561772664

Status : Answered

Chosen Option : 1

Q.44 A diatomic gas ($\gamma = 1.4$) does 200 J of work when it is expanded isobarically. The heat given to the gas in the process is :

Options

1. 600 J
2. 850 J
3. 800 J
4. 700 J

Question Type : MCQ

Question ID : 9561771253

Option 1 ID : 9561772669

Option 2 ID : 9561772672

Option 3 ID : 9561772671

Option 4 ID : 9561772670

Status : Not Answered

Chosen Option : --

Q.45 A disc of radius R and mass M is rolling horizontally without slipping with speed v . It then moves up an inclined smooth surface as shown in figure. The maximum height that the disc can go up the incline is :



Options

1. $\frac{v^2}{g}$
2. $\frac{3}{4} \frac{v^2}{g}$
3. $\frac{1}{2} \frac{v^2}{g}$
4. $\frac{2}{3} \frac{v^2}{g}$

Question Type : MCQ

Question ID : 9561771250

Option 1 ID : 9561772657

Option 2 ID : 9561772660

Option 3 ID : 9561772658

Option 4 ID : 9561772659

Status : Answered

Chosen Option : 3

Q.46 If the root mean square velocity of hydrogen molecule at a given temperature and pressure is 2 km/s, the root mean square velocity of oxygen at the same condition in km/s is :

Options

1. 1.5
2. 0.5
3. 2.0
4. 1.0

Question Type : MCQ

Question ID : 9561771254

Option 1 ID : 9561772675

Option 2 ID : 9561772673

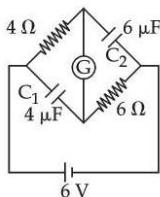
Option 3 ID : 9561772676

Option 4 ID : 9561772674

Status : Answered

Chosen Option : 2

Q.47 A galvanometer (G) of 2Ω resistance is connected in the given circuit. The ratio of charge stored in C_1 and C_2 is :



Options

1. $\frac{1}{2}$
2. $\frac{2}{3}$
3. $\frac{3}{2}$
4. 1

Question Type : MCQ

Question ID : 9561771256

Option 1 ID : 9561772682

Option 2 ID : 9561772681

Option 3 ID : 9561772683

Option 4 ID : 9561772684

Status : Answered

Chosen Option : 2

Q.48 In an ammeter, 5% of the main current passes through the galvanometer. If resistance of the galvanometer is G, the resistance of ammeter will be :

Options

1. $\frac{G}{199}$
2. $\frac{G}{200}$
3. $200 G$
4. $199 G$

Question Type : MCQ

Question ID : 9561771257

Option 1 ID : 9561772685

Option 2 ID : 9561772686

Option 3 ID : 9561772687

Option 4 ID : 9561772688

Status : Not Answered

Chosen Option : --

Q.49 From the statements given below :

- (A) The angular momentum of an electron in nth orbit is an integral multiple of \hbar .
- (B) Nuclear forces do not obey inverse square law.
- (C) Nuclear forces are spin dependent.
- (D) Nuclear forces are central and charge independent.
- (E) Stability of nucleus is inversely proportional to the value of packing fraction.

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

Options

1. (A), (B), (C), (E) only
2. (A), (C), (D), (E) only
3. (B), (C), (D), (E) only
4. (A), (B), (C), (D) only

Question Type : MCQ

Question ID : 9561771262

Option 1 ID : 9561772708

Option 2 ID : 9561772706

Option 3 ID : 9561772707

Option 4 ID : 9561772705

Status : Answered

Chosen Option : 3

Q.50 A microwave of wavelength 2.0 cm falls normally on a slit of width 4.0 cm. The angular spread of the central maxima of the diffraction pattern obtained on a screen 1.5 m away from the slit, will be :

- Options
1. 30°
 2. 15°
 3. 60°
 4. 45°

Question Type : MCQ

Question ID : 9561771260

Option 1 ID : 9561772697

Option 2 ID : 9561772699

Option 3 ID : 9561772698

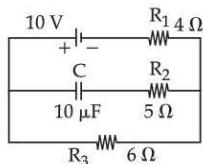
Option 4 ID : 9561772700

Status : Not Answered

Chosen Option : --

Section : Physics Section B

Q.51 In an electrical circuit drawn below the amount of charge stored in the capacitor is _____ μC .



Given --

Answer :

Question Type : SA

Question ID : 9561771271

Status : Not Answered

Q.52 In Young's double slit experiment, monochromatic light of wavelength 5000 \AA is used. The slits are 1.0 mm apart and screen is placed at 1.0 m away from slits. The distance from the centre of the screen where intensity becomes half of the maximum intensity for the first time is _____ $\times 10^{-6}$ m.

Given --

Answer :

Question Type : SA

Question ID : 9561771274

Status : Not Answered

Q.53 A particular hydrogen-like ion emits the radiation of frequency $3 \times 10^{15} \text{ Hz}$ when it makes transition from $n=2$ to $n=1$. The frequency of radiation emitted in transition from $n=3$ to $n=1$ is

$$\frac{x}{9} \times 10^{15} \text{ Hz}, \text{ when } x = \text{_____}.$$

Given 32

Answer :

Question Type : SA

Question ID : 9561771275

Status : Answered

- Q.54** A uniform rod AB of mass 2 kg and length 30 cm at rest on a smooth horizontal surface. An impulse of force 0.2 Ns is applied to end B. The time taken by the rod to turn through at right angles will be $\frac{\pi}{x}$ s, where $x = \text{_____}$.

Given .67
Answer :

Question Type : SA
Question ID : 9561771267
Status : Answered

- Q.55** Suppose a uniformly charged wall provides a uniform electric field of 2×10^4 N/C normally. A charged particle of mass 2 g being suspended through a silk thread of length 20 cm and remain stayed at a distance of 10 cm from the wall. Then the charge on the particle will be $\frac{1}{\sqrt{x}}$ μC where $x = \text{_____}$. [use $g = 10 \text{ m/s}^2$]

Given --
Answer :

Question Type : SA
Question ID : 9561771270
Status : Not Answered

- Q.56** A particle initially at rest starts moving from reference point $x = 0$ along x -axis, with velocity v that varies as $v = 4\sqrt{x}$ m/s. The acceleration of the particle is _____ ms^{-2} .

Given 8
Answer :

Question Type : SA
Question ID : 9561771266
Status : Answered

- Q.57** A mass m is suspended from a spring of negligible mass and the system oscillates with a frequency f_1 . The frequency of oscillations if a mass $9m$ is suspended from the same spring is f_2 . The value of $\frac{f_1}{f_2}$ is _____ .

Given --
Answer :

Question Type : SA
Question ID : 9561771269
Status : Not Answered

- Q.58** A moving coil galvanometer has 100 turns and each turn has an area of 2.0 cm^2 . The magnetic field produced by the magnet is 0.01 T and the deflection in the coil is 0.05 radian when a current of 10 mA is passed through it. The torsional constant of the suspension wire is $x \times 10^{-5} \text{ N-m/rad}$. The value of x is _____ .

Given --
Answer :

Question Type : SA
Question ID : 9561771272
Status : Not Answered

- Q.59** A coil of 200 turns and area 0.20 m^2 is rotated at half a revolution per second and is placed in uniform magnetic field of 0.01 T perpendicular to axis of rotation of the coil. The maximum voltage generated in the coil is $\frac{2\pi}{\beta}$ volt. The value of β is _____.

Given --
Answer :

Question Type : SA
Question ID : 9561771273
Status : Not Answered

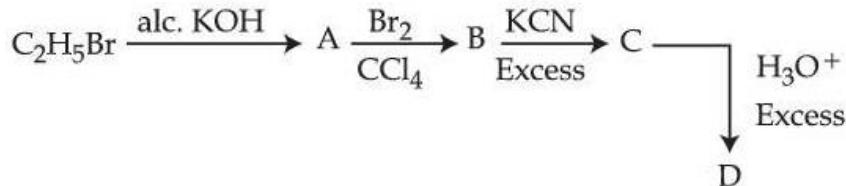
- Q.60** One end of a metal wire is fixed to a ceiling and a load of 2 kg hangs from the other end. A similar wire is attached to the bottom of the load and another load of 1 kg hangs from this lower wire. Then the ratio of longitudinal strain of upper wire to that of the lower wire will be _____. [Area of cross section of wire = 0.005 cm^2 , $Y = 2 \times 10^{11} \text{ N m}^{-2}$ and $g = 10 \text{ ms}^{-2}$]

Given 3
Answer :

Question Type : SA
Question ID : 9561771268
Status : Answered

Section : Chemistry Section A

Q.61



Acid D formed in above reaction is :

Options

1. Succinic acid
2. Gluconic acid
3. Oxalic acid
4. Malonic acid

Question Type : MCQ
Question ID : 9561771293
Option 1 ID : 9561772802
Option 2 ID : 9561772801
Option 3 ID : 9561772799
Option 4 ID : 9561772800
Status : Not Answered
Chosen Option : --

Q.62

$[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{CoF}_6]^{3-}$ are respectively known as :

Options

1. Spin paired Complex, Spin free Complex
2. Inner orbital Complex, Spin paired Complex
3. Outer orbital Complex, Inner orbital Complex
4. Spin free Complex, Spin paired Complex

Question Type : **MCQ**Question ID : **9561771285**Option 1 ID : **9561772767**Option 2 ID : **9561772770**Option 3 ID : **9561772769**Option 4 ID : **9561772768**Status : **Not Answered**

Chosen Option : --

Q.63

Match List - I with List - II.

List - I**Compound**

- | | |
|--------------------------|---|
| (A) Carbon tetrachloride | (I) Paint remover |
| (B) Methylene chloride | (II) Refrigerators and air conditioners |
| (C) DDT | (III) Fire extinguisher |
| (D) Freons | (IV) Non Biodegradable insecticide |

Choose the correct answer from the options given below :

Options

1. (A)-(IV), (B)-(III), (C)-(II), (D)-(I)
2. (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
3. (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
4. (A)-(I), (B)-(II), (C)-(III), (D)-(IV)

Question Type : **MCQ**Question ID : **9561771291**Option 1 ID : **9561772792**Option 2 ID : **9561772794**Option 3 ID : **9561772791**Option 4 ID : **9561772793**Status : **Answered**Chosen Option : **2**

Q.64 The set of meta directing functional groups from the following sets is :

Options

1. $-\text{NO}_2$, $-\text{CHO}$, $-\text{SO}_3\text{H}$, $-\text{COR}$
2. $-\text{CN}$, $-\text{CHO}$, $-\text{NHCOCH}_3$, $-\text{COOR}$
3. $-\text{NO}_2$, $-\text{NH}_2$, $-\text{COOH}$, $-\text{COOR}$
4. $-\text{CN}$, $-\text{NH}_2$, $-\text{NHR}$, $-\text{OCH}_3$

Question Type : **MCQ**

Question ID : **9561771289**

Option 1 ID : **9561772784**

Option 2 ID : **9561772785**

Option 3 ID : **9561772783**

Option 4 ID : **9561772786**

Status : **Not Answered**

Chosen Option : --

Q.65 Lassaigne's test is used for detection of :

Options

1. Nitrogen and Sulphur only
2. Phosphorous and halogens only
3. Nitrogen, Sulphur and Phosphorous only
4. Nitrogen, Sulphur, phosphorous and halogens

Question Type : **MCQ**

Question ID : **9561771287**

Option 1 ID : **9561772775**

Option 2 ID : **9561772776**

Option 3 ID : **9561772777**

Option 4 ID : **9561772778**

Status : **Not Answered**

Chosen Option : --

Q.66 Given below are two statements :

Statement (I) : SiO_2 and GeO_2 are acidic while SnO and PbO are amphoteric in nature.

Statement (II) : Allotropic forms of carbon are due to property of catenation and $p\pi-d\pi$ bond formation.

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

Options

1. Both **Statement I** and **Statement II** are true
2. **Statement I** is false but **Statement II** is true
3. **Statement I** is true but **Statement II** is false
4. Both **Statement I** and **Statement II** are false

Question Type : MCQ

Question ID : 9561771282

Option 1 ID : 9561772755

Option 2 ID : 9561772758

Option 3 ID : 9561772757

Option 4 ID : 9561772756

Status : Not Answered

Chosen Option : --

Q.67

The number of radial node/s for 3p orbital is :

Options

1. 1
2. 4
3. 3
4. 2

Question Type : MCQ

Question ID : 9561771276

Option 1 ID : 9561772734

Option 2 ID : 9561772732

Option 3 ID : 9561772731

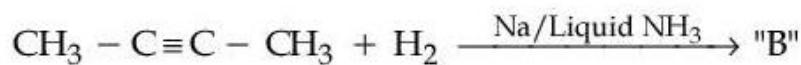
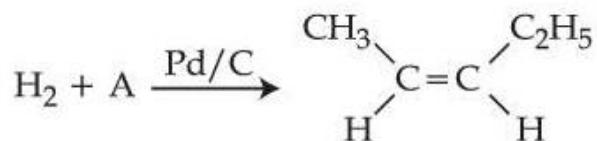
Option 4 ID : 9561772733

Status : Answered

Chosen Option : 3

Q.68

In the given reactions identify A and B



Options

- | | |
|------------------|--------------------|
| 1. A : n-Pentane | B : trans-2-butene |
| 2. A : 2-Pentyne | B : Cis-2-butene |
| 3. A : 2-Pentyne | B : trans-2-butene |
| 4. A : n-Pentane | B : Cis-2-butene |

Question Type : MCQ

Question ID : 9561771290

Option 1 ID : 9561772789

Option 2 ID : 9561772790

Option 3 ID : 9561772788

Option 4 ID : 9561772787

Status : Not Answered

Chosen Option : --

Q.69

Match List - I with List - II.

List - I**Reactants**

- | | |
|---|---------------------|
| (A) Phenol, Zn/ Δ | (I) Salicylaldehyde |
| (B) Phenol, CHCl_3 , NaOH, HCl | (II) Salicylic acid |
| (C) Phenol, CO_2 , NaOH, HCl | (III) Benzene |
| (D) Phenol, Conc. HNO_3 | (IV) Picric acid |

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

Options

- | |
|---|
| 1. (A)-(III), (B)-(I), (C)-(II), (D)-(IV) |
| 2. (A)-(IV), (B)-(II), (C)-(I), (D)-(III) |
| 3. (A)-(IV), (B)-(I), (C)-(II), (D)-(III) |
| 4. (A)-(III), (B)-(IV), (C)-(I), (D)-(II) |

Question Type : MCQ

Question ID : 9561771292

Option 1 ID : 9561772795

Option 2 ID : 9561772797

Option 3 ID : 9561772796

Option 4 ID : 9561772798

Status : Answered

Chosen Option : 1

Q.70 The functional group that shows negative resonance effect is :

Options

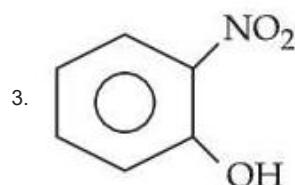
1. $-\text{COOH}$
2. $-\text{OR}$
3. $-\text{NH}_2$
4. $-\text{OH}$

Question Type : MCQ
Question ID : 9561771288
Option 1 ID : 9561772781
Option 2 ID : 9561772779
Option 3 ID : 9561772782
Option 4 ID : 9561772780
Status : Not Answered
Chosen Option : --

Q.71 Select the compound from the following that will show intramolecular hydrogen bonding.

Options

1. NH_3
2. $\text{C}_2\text{H}_5\text{OH}$



4. H_2O

Question Type : MCQ
Question ID : 9561771278
Option 1 ID : 9561772739
Option 2 ID : 9561772740
Option 3 ID : 9561772741
Option 4 ID : 9561772742
Status : Answered
Chosen Option : 3

Q.72 Given below are two statements :

Statement (I) : A π bonding MO has lower electron density above and below the inter-nuclear axis.

Statement (II) : The π^* antibonding MO has a node between the nuclei.

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

Options

1. **Statement I** is true but **Statement II** is false
2. Both **Statement I** and **Statement II** are true
3. Both **Statement I** and **Statement II** are false
4. **Statement I** is false but **Statement II** is true

Question Type : MCQ

Question ID : 9561771277

Option 1 ID : 9561772737

Option 2 ID : 9561772735

Option 3 ID : 9561772736

Option 4 ID : 9561772738

Status : Not Answered

Chosen Option : --

Q.73 Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : In aqueous solutions Cr^{2+} is reducing while Mn^{3+} is oxidising in nature.

Reason (R) : Extra stability to half filled electronic configuration is observed than incompletely filled electronic configuration.

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

Options 1.

- Both **(A)** and **(R)** are true but **(R)** is **not** the correct explanation of **(A)**
- 2.
- Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**
3. **(A)** is false but **(R)** is true
4. **(A)** is true but **(R)** is false

Question Type : MCQ

Question ID : 9561771284

Option 1 ID : 9561772764

Option 2 ID : 9561772763

Option 3 ID : 9561772766

Option 4 ID : 9561772765

Status : Not Answered

Chosen Option : --

Q.74

The strongest reducing agent among the following is :

Options

1. NH_3
2. SbH_3
3. PH_3
4. BiH_3

Question Type : **MCQ**Question ID : **9561771281**Option 1 ID : **9561772753**Option 2 ID : **9561772754**Option 3 ID : **9561772751**Option 4 ID : **9561772752**Status : **Not Answered**

Chosen Option : --

Q.75

Solubility of calcium phosphate (molecular mass, M) in water is W_g per 100 mL at 25 °C. Its solubility product at 25 °C will be approximately.

Options

1. $10^7 \left(\frac{W}{M} \right)^3$
2. $10^3 \left(\frac{W}{M} \right)^5$
3. $10^5 \left(\frac{W}{M} \right)^5$
4. $10^7 \left(\frac{W}{M} \right)^5$

Question Type : **MCQ**Question ID : **9561771279**Option 1 ID : **9561772743**Option 2 ID : **9561772746**Option 3 ID : **9561772745**Option 4 ID : **9561772744**Status : **Not Answered**

Chosen Option : --

Q.76 Which of the following compounds show colour due to d-d transition ?

Options

1. $\text{K}_2\text{Cr}_2\text{O}_7$
2. K_2CrO_4
3. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
4. KMnO_4

Question Type : MCQ

Question ID : 9561771286

Option 1 ID : 9561772772

Option 2 ID : 9561772773

Option 3 ID : 9561772774

Option 4 ID : 9561772771

Status : Answered

Chosen Option : 4

Q.77 Given below are two statements :

Statement (I) : Dimethyl glyoxime forms a six-membered covalent chelate when treated with NiCl_2 solution in presence of NH_4OH .

Statement (II) : Prussian blue precipitate contains iron both in (+2) and (+3) oxidation states.

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

Options

1. Both **Statement I** and **Statement II** are true
2. Both **Statement I** and **Statement II** are false
3. **Statement I** is false but **Statement II** is true
4. **Statement I** is true but **Statement II** is false

Question Type : MCQ

Question ID : 9561771295

Option 1 ID : 9561772807

Option 2 ID : 9561772808

Option 3 ID : 9561772810

Option 4 ID : 9561772809

Status : Not Answered

Chosen Option : --

Q.78 Given below are two statements :

Statement (I) : Both metals and non-metals exist in p and d-block elements.

Statement (II) : Non-metals have higher ionisation enthalpy and higher electronegativity than the metals.

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

Options

1. Both **Statement I** and **Statement II** are false
2. Both **Statement I** and **Statement II** are true
3. **Statement I** is true but **Statement II** is false
4. **Statement I** is false but **Statement II** is true

Question Type : MCQ

Question ID : 9561771280

Option 1 ID : 9561772748

Option 2 ID : 9561772747

Option 3 ID : 9561772749

Option 4 ID : 9561772750

Status : Answered

Chosen Option : 1

Q.79

The transition metal having highest 3rd ionisation enthalpy is :

Options

1. Cr
2. Mn
3. Fe
4. V

Question Type : MCQ

Question ID : 9561771283

Option 1 ID : 9561772760

Option 2 ID : 9561772761

Option 3 ID : 9561772762

Option 4 ID : 9561772759

Status : Answered

Chosen Option : 2

Q.80

Which among the following has highest boiling point ?

Options

1. $\text{H}_5\text{C}_2 - \text{O} - \text{C}_2\text{H}_5$
2. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$
3. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2 - \text{OH}$
4. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

Question Type : **MCQ**Question ID : **9561771294**Option 1 ID : **9561772804**Option 2 ID : **9561772805**Option 3 ID : **9561772806**Option 4 ID : **9561772803**Status : **Not Answered**

Chosen Option : --

Section : Chemistry Section B

Q.81 Total number of isomeric compounds (including stereoisomers) formed by monochlorination of 2-methylbutane is _____.

Given --

Answer :

Question Type : **SA**Question ID : **9561771303**Status : **Not Answered**

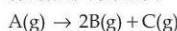
Q.82 Following Kjeldahl's method, 1g of organic compound released ammonia, that neutralised 10 mL of 2M H_2SO_4 . The percentage of nitrogen in the compound is _____ %.

Given --

Answer :

Question Type : **SA**Question ID : **9561771302**Status : **Not Answered**

Q.83 The following data were obtained during the first order thermal decomposition of a gas A at constant volume :



S.No.	Time/s	Total pressure/(atm)
1.	0	0.1
2.	115	0.28

The rate constant of the reaction is _____ $\times 10^{-2} \text{ s}^{-1}$ (nearest integer)

Given 1.9

Answer :

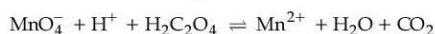
Question Type : **SA**Question ID : **9561771301**Status : **Answered**

- Q.84** 10 mL of gaseous hydrocarbon on combustion gives 40 mL of $\text{CO}_2(\text{g})$ and 50 mL of water vapour.
Total number of carbon and hydrogen atoms in the hydrocarbon is _____.

Given --
Answer :

Question Type : **SA**
Question ID : **9561771296**
Status : **Not Answered**

- Q.85** Consider the following redox reaction :



The standard reduction potentials are given as below (E_{red}°) :

$$E_{\text{MnO}_4^-/\text{Mn}^{2+}}^\circ = + 1.51 \text{ V}$$

$$E_{\text{CO}_2/\text{H}_2\text{C}_2\text{O}_4}^\circ = - 0.49 \text{ V}$$

If the equilibrium constant of the above reaction is given as $K_{\text{eq}} = 10^x$, then the value of $x =$ _____
(nearest integer)

Given --
Answer :

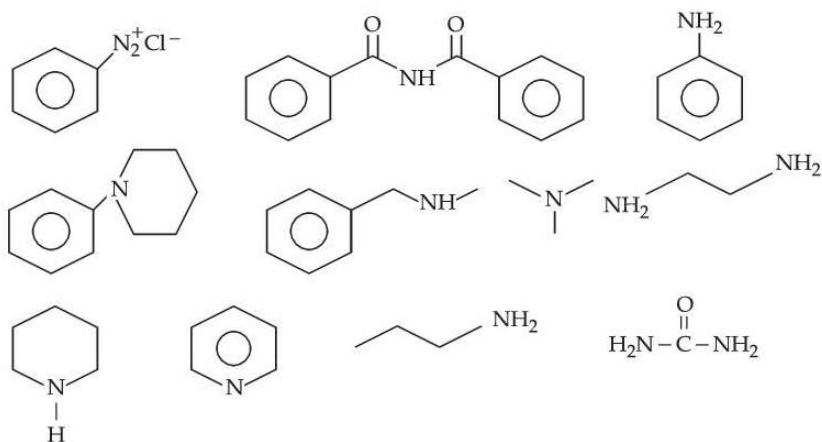
Question Type : **SA**
Question ID : **9561771300**
Status : **Not Answered**

- Q.86** The amount of electricity in Coulomb required for the oxidation of 1 mol of H_2O to O_2 is
_____ $\times 10^5 \text{ C}$.

Given **1.93**
Answer :

Question Type : **SA**
Question ID : **9561771299**
Status : **Answered**

- Q.87** Number of compounds which give reaction with Hinsberg's reagent is _____.



Given --
Answer :

Question Type : **SA**
Question ID : **9561771304**
Status : **Not Answered**

Q.88 For a certain reaction at 300K, $K = 10$, then ΔG° for the same reaction is $- \text{_____} \times 10^{-1} \text{ kJ mol}^{-1}$. (Given $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$)

Given --
Answer :

Question Type : **SA**
Question ID : **9561771297**
Status : **Not Answered**

Q.89 The number of tripeptides formed by three different amino acids using each amino acid once is _____ .

Given --
Answer :

Question Type : **SA**
Question ID : **9561771305**
Status : **Not Answered**

Q.90 Mass of ethylene glycol (antifreeze) to be added to 18.6 kg of water to protect the freezing point at -24°C is _____ kg (Molar mass in g mol^{-1} for ethylene glycol 62, K_f of water = $1.86 \text{ K kg mol}^{-1}$)

Given --
Answer :

Question Type : **SA**
Question ID : **9561771298**
Status : **Not Answered**