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

Test Date	31/01/2024
Test Time	3:00 PM - 6:00 PM
Subject	B. Tech

Section : Mathe matics Se ction A

Q.1

The shortest distance, between lines L_1 and L_2, where $L_1 : \frac{x-1}{2} = \frac{y+1}{-3} = \frac{z+4}{2}$ and L_2 is the line, passing through the points A(–4, 4, 3) , B (–1, 6, 3) and perpendicular to the line $\frac{x-3}{-2} = \frac{y}{3} = \frac{z-1}{1}$, is

Options

1. $\frac{42}{\sqrt{117}}$
2. $\frac{121}{\sqrt{221}}$
3. $\frac{24}{\sqrt{117}}$
4. $\frac{141}{\sqrt{221}}$

Question Type : MCQ
Question ID : 4058591211
Option 1 ID : 4058593836
Option 2 ID : 4058593837
Option 3 ID : 4058593835
Option 4 ID : 4058593838
Status : Not Atte mpte d and Marke d For Revie w
Chosen Option : --

Q.2

Let $f : \to \mathbb{R} \to (0, \infty)$ be strictly increasing function such that $\lim_{x\to\infty} \frac{f(7x)}{f(x)} = 1$. Then, the value of $\lim_{x\to\infty}\left[\frac{f(5x)}{f(x)} - 1\right]$ is equal to

Options

1. 0
2. 4
3. 7/5
4. 1

Question Type : MCQ
Question ID : 4058591203
Option 1 ID : 4058593806
Option 2 ID : 4058593805
Option 3 ID : 4058593804
Option 4 ID : 4058593803
Status : Marke d For Revie w
Chosen Option : 2

Q.3 The number of solutions, of the equation $e^{\sin x} - 2e^{-\sin x} = 2$, is :

Options
1. 0
2. more than 2
3. 2
4. 1

Question Type : MCQ
Question ID : 4058591196
Option 1 ID : 4058593775
Option 2 ID : 4058593778
Option 3 ID : 4058593777
Option 4 ID : 4058593776
Status : Answe re d
Chosen Option : 4

Q.4 The area of the region enclosed by the parabolas $y = 4x - x^2$ and $3y = (x-4)^2$ is equal to

Options
1. 4
2. $\frac{14}{3}$
3. $\frac{32}{9}$
4. 6

Question Type : MCQ
Question ID : 4058591205
Option 1 ID : 4058593814
Option 2 ID : 4058593811
Option 3 ID : 4058593813
Option 4 ID : 4058593812
Status : Not Atte mpte d and Marke d For Revie w
Chosen Option : --

Q.5 Consider the function $f : (0, \infty) \to \mathbb{R}$ defined by $f(x) = e^{-|\log_e x|}$. If m and n be respectively the number of points at which f is **not** continuous and f is **not** differentiable, then $m + n$ is

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

Question Type : MCQ
Question ID : 4058591202
Option 1 ID : 4058593802
Option 2 ID : 4058593800
Option 3 ID : 4058593799
Option 4 ID : 4058593801
Status : Marke d For Revie w
Chosen Option : 2

Q.6 The number of ways in which 21 identical apples can be distributed among three children such that each child gets at least 2 apples, is

Options
1. 406
2. 136
3. 130
4. 142

Question Type : MCQ
Question ID : 4058591199
Option 1 ID : 4058593790
Option 2 ID : 4058593788
Option 3 ID : 4058593787
Option 4 ID : 4058593789
Status : Not Answe re d
Chosen Option : --

Q.7 Let a variable line passing through the centre of the circle $x^2 + y^2 - 16x - 4y = 0$, meet the positive co-ordinate axes at the points A and B. Then the minimum value of $OA + OB$, where O is the origin, is equal to

Options
1. 12
2. 24
3. 18
4. 20

Question Type : MCQ
Question ID : 4058591204
Option 1 ID : 4058593807
Option 2 ID : 4058593810
Option 3 ID : 4058593808
Option 4 ID : 4058593809
Status : Answe re d
Chosen Option : 1

Q.8 Let z_1 and z_2 be two complex numbers such that $z_1 + z_2 = 5$ and $z_1^3 + z_2^3 = 20 + 15i$. Then, $|z_1^4 + z_2^4|$ equals -

Options
1. $25\sqrt{3}$
2. 75
3. $15\sqrt{15}$
4. $30\sqrt{3}$

Question Type : MCQ
Question ID : 4058591197
Option 1 ID : 4058593781
Option 2 ID : 4058593782
Option 3 ID : 4058593780
Option 4 ID : 4058593779
Status : Not Answe re d
Chosen Option : --

Q.9 Let $f, g:(0,\infty)\to\mathbb{R}$ be two functions defined by $f(x)=\int_{-x}^{x}\left(|t|-t^2\right)e^{-t^2}dt$ and $g(x)=\int_0^{x^2} t^{1/2}\,e^{-t}dt$. Then, the value of $9\left(f\left(\sqrt{\log_e 9}\right)+g\left(\sqrt{\log_e 9}\right)\right)$ is equal to

Options
1. 9
2. 6
3. 10
4. 8

Question Type : MCQ
Question ID : 4058591206
Option 1 ID : 4058593817
Option 2 ID : 4058593816
Option 3 ID : 4058593818
Option 4 ID : 4058593815
Status : Marke d For Revie w
Chosen Option : 1

Q.10 Let A be a 3×3 real matrix such that

$$A\begin{pmatrix}1\\0\\1\end{pmatrix}=2\begin{pmatrix}1\\0\\1\end{pmatrix},\ A\begin{pmatrix}-1\\0\\1\end{pmatrix}=4\begin{pmatrix}-1\\0\\1\end{pmatrix},\ A\begin{pmatrix}0\\1\\0\end{pmatrix}=2\begin{pmatrix}0\\1\\0\end{pmatrix}.$$

Then, the system $(A-3I)\begin{pmatrix}x\\y\\z\end{pmatrix}=\begin{pmatrix}1\\2\\3\end{pmatrix}$ has

Options
1. no solution
2. infinitely many solutions
3. unique solution
4. exactly two solutions

Question Type : MCQ
Question ID : 4058591198
Option 1 ID : 4058593783
Option 2 ID : 4058593784
Option 3 ID : 4058593785
Option 4 ID : 4058593786
Status : Not Answe re d
Chosen Option : --

Q.11 Let 2^{nd}, 8^{th} and 44^{th} terms of a non-constant A. P. be respectively the 1^{st}, 2^{nd} and 3^{rd} terms of a G. P. If the first term of the A. P. is 1, then the sum of its first 20 terms is equal to -

Options
1. 970
2. 960
3. 980
4. 990

Question Type : MCQ
Question ID : 4058591201
Option 1 ID : 4058593796
Option 2 ID : 4058593795
Option 3 ID : 4058593797
Option 4 ID : 4058593798
Status : Not Answe re d
Chosen Option : --

Q.12 Let $A\,(a, b)$, $B\,(3, 4)$ and $C\,(-6, -8)$ respectively denote the centroid, circumcentre and orthocentre of a triangle. Then, the distance of the point $P\,(2a + 3, 7b + 5)$ from the line $2x + 3y - 4 = 0$ measured parallel to the line $x - 2y - 1 = 0$ is

Options
1. $\frac{\sqrt{5}}{17}$
2. $\frac{17\sqrt{5}}{7}$
3. $\frac{15\sqrt{5}}{7}$
4. $\frac{17\sqrt{5}}{6}$

Question Type : MCQ
Question ID : 4058591209
Option 1 ID : 4058593827
Option 2 ID : 4058593828
Option 3 ID : 4058593829
Option 4 ID : 4058593830
Status : Marke d For Revie w
Chosen Option : 3

Q.13 Let P be a parabola with vertex (2, 3) and directrix $2x + y = 6$. Let an ellipse $E: \frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$, of eccentricity $\frac{1}{\sqrt{2}}$ pass through the focus of the parabola P. Then, the square of the length of the latus rectum of E, is

Options

1. $\frac{347}{8}$
2. $\frac{656}{25}$
3. $\frac{385}{8}$
4. $\frac{512}{25}$

Question Type : MCQ
Question ID : 4058591208
Option 1 ID : 4058593826
Option 2 ID : 4058593825
Option 3 ID : 4058593824
Option 4 ID : 4058593823
Status : Not Answe re d
Chosen Option : --

Q.14 Let the mean and the variance of 6 observations a, b, 68, 44, 48, 60 be 55 and 194, respectively. If $a > b$, then $a + 3b$ is

Options

1. 190
2. 210
3. 180
4. 200

Question Type : MCQ
Question ID : 4058591212
Option 1 ID : 4058593840
Option 2 ID : 4058593842
Option 3 ID : 4058593839
Option 4 ID : 4058593841
Status : Marke d For Revie w
Chosen Option : 2

Q.15 The temperature $T(t)$ of a body at time $t = 0$ is 160° F and it decreases continuously as per the differential equation $\frac{dT}{dt} = -K(T - 80)$, where K is a positive constant. If $T(15) = 120°F$, then $T(45)$ is equal to

Options

1. 95° F
2. 80° F
3. 85° F
4. 90° F

Question Type : MCQ
Question ID : 4058591207
Option 1 ID : 4058593822
Option 2 ID : 4058593819
Option 3 ID : 4058593820
Option 4 ID : 4058593821
Status : Marke d For Revie w
Chosen Option : 2

Q.16 A coin is biased so that a head is twice as likely to occur as a tail. If the coin is tossed 3 times, then the probability of getting two tails and one head is

Options

1. $\frac{2}{9}$
2. $\frac{1}{9}$
3. $\frac{2}{27}$
4. $\frac{1}{27}$

Question Type : MCQ
Question ID : 4058591213
Option 1 ID : 4058593846
Option 2 ID : 4058593845
Option 3 ID : 4058593844
Option 4 ID : 4058593843
Status : Not Answe re d
Chosen Option : --

Q.17 If the function $f:(-\infty,-1]\to(a,b]$ defined by $f(x)=e^{x^3-3x+1}$ is one - one and onto, then the distance of the point $P(2b+4,\ a+2)$ from the line $x+e^{-3}y=4$ is :

Options

1. $2\sqrt{1+e^6}$
2. $\sqrt{1+e^6}$
3. $4\sqrt{1+e^6}$
4. $3\sqrt{1+e^6}$

Question Type : MCQ
Question ID : 4058591195
Option 1 ID : 4058593773
Option 2 ID : 4058593774
Option 3 ID : 4058593771
Option 4 ID : 4058593772
Status : Answe re d
Chosen Option : 3

Q.18 Let (α, β, γ) be the mirror image of the point $(2, 3, 5)$ in the line $\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-3}{4}$. Then, $2\alpha + 3\beta + 4\gamma$ is equal to

Options
1. 31
2. 34
3. 33
4. 32

Question Type : MCQ
Question ID : 4058591210
Option 1 ID : 4058593831
Option 2 ID : 4058593834
Option 3 ID : 4058593833
Option 4 ID : 4058593832
Status : Answe re d
Chosen Option : 3

Q.19 If $a=\sin^{-1}(\sin(5))$ and $b=\cos^{-1}(\cos(5))$, then a^2+b^2 is equal to

Options
1. $4\pi^2+25$
2. 25
3. $8\pi^2-40\pi+50$
4. $4\pi^2-20\pi+50$

Question Type : MCQ
Question ID : 4058591214
Option 1 ID : 4058593848
Option 2 ID : 4058593847
Option 3 ID : 4058593850
Option 4 ID : 4058593849
Status : Answe re d
Chosen Option : 1

Q.20 If for some m, n; ${}^6C_m+2\left({}^6C_{m+1}\right)+{}^6C_{m+2} > {}^8C_3$ and ${}^{n-1}P_3 : {}^nP_4 = 1 : 8$, then ${}^nP_{m+1} + {}^{n+1}C_m$ is equal to

Options
1. 376
2. 384
3. 372
4. 380

Question Type : MCQ
Question ID : 4058591200
Option 1 ID : 4058593792
Option 2 ID : 4058593794
Option 3 ID : 4058593791
Option 4 ID : 4058593793
Status : Answe re d
Chosen Option : 1

Section : Mathe matics Se ction B

Q.21 A line passes through A (4, –6, –2) and B (16, –2, 4). The point P (a, b, c), where a, b, c are non-negative integers, on the line AB lies at a distance of 21 units, from the point A. The distance between the points P (a, b, c) and Q (4, –12, 3) is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591223
Status : Not Atte mpte d and Marke d For Revie w

Q.22 $\left|\frac{120}{\pi^3}\int_0^{\pi}\frac{x^2\sin x\cos x}{\sin^4 x+\cos^4 x}\,dx\right|$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591220
Status : Not Answe re d

Q.23 Let A (–2, –1), B (1, 0), C (α, β) and D (γ, δ) be the vertices of a parallelogram $ABCD$. If the point C lies on $2x - y = 5$ and the point D lies on $3x - 2y = 6$, then the value of $|\alpha + \beta + \gamma + \delta|$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591222
Status : Not Atte mpte d and Marke d For Revie w

Q.24 If $\lim\limits_{x\to 0}\frac{ax^2e^x - b\log_e(1+x) + cxe^{-x}}{x^2\sin x} = 1$, then $16\,(a^2+b^2+c^2)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591219
Status : Not Answe re d

Q.25 Let $A=\{1, 2, 3, \ldots\ldots\ldots, 100\}$. Let R be a relation on A defined by $(x,y) \in R$ if and only if $2x = 3y$. Let R_1 be a symmetric relation on A such that $R \subset R_1$ and the number of elements in R_1 is n. Then, the minimum value of n is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591215
Status : Not Answe re d

Q.26 Let a, b, c be the lengths of three sides of a triangle satistying the condition $(a^2 + b^2)x^2 - 2b(a + c)x + (b^2 + c^2) = 0$. If the set of all possible values of x is the interval (α, β), then $12(\alpha^2 + \beta^2)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591218
Status : Not Atte mpte d and Marke d For Revie w

Q.27 Let $\vec{a} = 3\hat{i} + 2\hat{j} + \hat{k}$, $\vec{b} = 2\hat{i} - \hat{j} + 3\hat{k}$ and $\vec{c}$ be a vector such that $(\vec{a} + \vec{b}) \times \vec{c} = 2(\vec{a} \times \vec{b}) + 24\hat{j} - 6\hat{k}$ and $(\vec{a} - \vec{b} + \hat{i}) \cdot \vec{c} = -3$. Then $|\vec{c}|^2$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591224
Status : Not Answe re d

Q.28 Let $y = y(x)$ be the solution of the differential equation $\sec^2 x\,dx + \left(e^{2y}\tan^2 x + \tan x\right)dy = 0$, $0 < x < \frac{\pi}{2}$, $y\left(\frac{\pi}{4}\right) = 0$. If $y\left(\frac{\pi}{6}\right) = \alpha$, then $e^{8\alpha}$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591221
Status : Not Answe re d

Q.29 Let A be a 3×3 matrix and $\det(A) = 2$. If $n = \det\left(\underbrace{adj\left(adj\left(.....(adj\ A)\right)\right)}_{2024-times}\right)$, then the remainder when n is divided by 9 is equal to _____.

Given --
Answer :

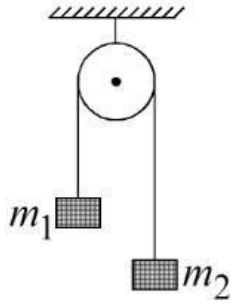
Question Type : SA
Question ID : 4058591216
Status : Not Atte mpte d and Marke d For Revie w

Q.30 Let the coefficient of x^r in the expansion of $(x+3)^{n-1} + (x+3)^{n-2}(x+2) + (x+3)^{n-3}(x+2)^2 + \ldots\ldots + (x+2)^{n-1}$ be α_r. If $\sum_{r=0}^{n} \alpha_r = \beta^n - \gamma^n$, $\beta, \gamma \in \mathbb{N}$, then the value of $\beta^2 + \gamma^2$ equals _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591217
Status : Not Answe re d

Q.31 A light string passing over a smooth light fixed pulley connects two blocks of masses m_1 and m_2 . If the acceleration of the system is $g/8$, then the ratio of masses is:



Options
1. $\frac{8}{1}$
2. $\frac{4}{3}$
3. $\frac{5}{3}$
4. $\frac{9}{7}$

Question Type : MCQ
Question ID : 4058591227
Option 1 ID : 4058593871
Option 2 ID : 4058593869
Option 3 ID : 4058593870
Option 4 ID : 4058593872
Status : Not Answe re d
Chosen Option : --

Q.32 A small spherical ball of radius r, falling through a viscous medium of negligible density has terminal velocity 'v'. Another ball of the same mass but of radius $2r$, falling through the same viscous medium will have terminal velocity:

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

Question Type : MCQ
Question ID : 4058591231
Option 1 ID : 4058593888
Option 2 ID : 4058593887
Option 3 ID : 4058593886
Option 4 ID : 4058593885
Status : Answe re d
Chosen Option : 1

Q.33 Force between two point charges q_1 and q_2 placed in vacuum at 'r' cm apart is F. Force between them when placed in a medium having dielectric constant K=5 at 'r/5' cm apart will be:

Options
1. $F/25$
2. $25F$
3. $5F$
4. $F/5$

Question Type : MCQ
Question ID : 4058591234
Option 1 ID : 4058593899
Option 2 ID : 4058593900
Option 3 ID : 4058593898
Option 4 ID : 4058593897
Status : Answe re d
Chosen Option : 3

Q.34 The speed of sound in oxygen at S.T.P. will be approximately:

(given, $R = 8.3\ JK^{-1}$, $\gamma = 1.4$)

Options
1. $341\ m/s$
2. $310\ m/s$
3. $333\ m/s$
4. $325\ m/s$

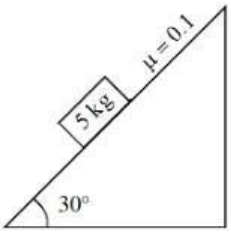
Question Type : MCQ
Question ID : 4058591232
Option 1 ID : 4058593889
Option 2 ID : 4058593892
Option 3 ID : 4058593890
Option 4 ID : 4058593891
Status : Answe re d
Chosen Option : 4

Q.35 A uniform magnetic field of $2 \times 10^{-3}\ T$ acts along positive Y-direction. A rectangular loop of sides 20 cm and 10 cm with current of 5 A is in Y–Z plane. The current is in anticlockwise sense with reference to negative X axis. Magnitude and direction of the torque is:

Options
1. 2×10^{-4} N-m along positive X-direction
2. 2×10^{-4} N-m along positive Z-direction
3. 2×10^{-4} N-m along negative Z-direction
4. 2×10^{-4} N-m along positive Y-direction

Question Type : MCQ
Question ID : 4058591236
Option 1 ID : 4058593908
Option 2 ID : 4058593905
Option 3 ID : 4058593906
Option 4 ID : 4058593907
Status : Marke d For Revie w
Chosen Option : 1

Q.36



A block of mass 5 kg is placed on a rough inclined surface as shown in the figure.

If $\vec{F_1}$ is the force required to just move the block up the inclined plane and $\vec{F_2}$ is the force required to just prevent the block from sliding down, then the value of $\left|\vec{F_1}\right| - \left|\vec{F_2}\right|$ is: [Use g = 10 m/s^2]

Options
1. $10\ N$
2. $\frac{5\sqrt{3}}{2} N$
3. $25\sqrt{3} N$
4. $50\sqrt{3} N$

Question Type : MCQ
Question ID : 4058591228
Option 1 ID : 4058593874
Option 2 ID : 4058593873
Option 3 ID : 4058593875
Option 4 ID : 4058593876
Status : Answe re d
Chosen Option : 2

Q.37 By what percentage will the illumination of the lamp decrease if the current drops by 20%?

Options
1. 46%
2. 56%
3. 36%
4. 26%

Question Type : MCQ
Question ID : 4058591235
Option 1 ID : 4058593902
Option 2 ID : 4058593903
Option 3 ID : 4058593901
Option 4 ID : 4058593904
Status : Answe re d
Chosen Option : 1

Q.38 The mass number of nucleus having radius equal to half of the radius of nucleus with mass number 192 is:

Options
1. 32
2. 40
3. 24
4. 20

Question Type : MCQ
Question ID : 4058591241
Option 1 ID : 4058593926
Option 2 ID : 4058593928
Option 3 ID : 4058593927
Option 4 ID : 4058593925
Status : Not Answe re d
Chosen Option : --

Q.39 A gas mixture consists of 8 moles of argon and 6 moles of oxygen at temperature T. Neglecting all vibrational modes, the total internal energy of the system is:

Options
1. 21 RT
2. 29 RT
3. 20 RT
4. 27 RT

Question Type : MCQ
Question ID : 4058591233
Option 1 ID : 4058593893
Option 2 ID : 4058593895
Option 3 ID : 4058593896
Option 4 ID : 4058593894
Status : Not Answe re d
Chosen Option : --

Q.40 The mass of the moon is $\frac{1}{144}$ times the mass of a planet and its diameter is $\frac{1}{16}$ times the diameter of a planet. If the escape velocity on the planet is v, the escape velocity on the moon will be :

Options
1. $\frac{v}{12}$
2. $\frac{v}{6}$
3. $\frac{v}{4}$
4. $\frac{v}{3}$

Question Type : MCQ
Question ID : 4058591230
Option 1 ID : 4058593881
Option 2 ID : 4058593883
Option 3 ID : 4058593882
Option 4 ID : 4058593884
Status : Not Atte mpte d and Marke d For Revie w
Chosen Option : --

Q.41 Given below are two statements:
Statement I: Electromagnetic waves carry energy as they travel through space and this energy is equally shared by the electric and magnetic fields.
Statement II: When electromagnetic waves strike a surface, a pressure is exerted on the surface.
In the light of the above statements, choose the ***most appropriate*** answer from the options given below:

Options
1. **Statement I** is correct but **Statement II** is incorrect.
2. Both **Statement I** and **Statement II** are correct.
3. **Statement I** is incorrect but **Statement II** is correct.
4. Both **Statement I** and **Statement II** are incorrect.

Question Type : MCQ
Question ID : 4058591238
Option 1 ID : 4058593915
Option 2 ID : 4058593913
Option 3 ID : 4058593916
Option 4 ID : 4058593914
Status : Answe re d
Chosen Option : 3

Q.42 When unpolarized light is incident at an angle of 60° on a transparent medium from air, the reflected ray is completely polarized. The angle of refraction in the medium is:

Options
1. 90°
2. 45°
3. 30°
4. 60°

Question Type : MCQ
Question ID : 4058591239
Option 1 ID : 4058593920
Option 2 ID : 4058593919
Option 3 ID : 4058593917
Option 4 ID : 4058593918
Status : Not Answe re d
Chosen Option : --

Q.43 The resistance per centimeter of a meter bridge wire is r, with $X\,\Omega$ resistance in left gap. Balancing length from left end is at 40 cm with 25 Ω resistance in right gap. Now the wire is replaced by another wire of $2r$ resistance per centimeter. The new balancing length for same settings will be at

Options
1. 20 cm
2. 80 cm
3. 10 cm
4. 40 cm

Question Type : MCQ
Question ID : 4058591243
Option 1 ID : 4058593934
Option 2 ID : 4058593933
Option 3 ID : 4058593935
Option 4 ID : 4058593936
Status : Answe re d
Chosen Option : 4

Q.44 The measured value of the length of a simple pendulum is 20 cm with 2 mm accuracy. The time for 50 oscillations was measured to be 40 seconds with 1 second resolution. From these measurements, the accuracy in the measurement of acceleration due to gravity is N%. The value of N is:

Options
1. 6
2. 4
3. 8
4. 5

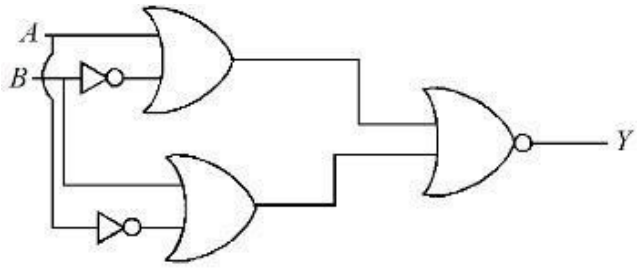
Question Type : MCQ
Question ID : 4058591244
Option 1 ID : 4058593937
Option 2 ID : 4058593938
Option 3 ID : 4058593939
Option 4 ID : 4058593940
Status : Answe re d
Chosen Option : 2

Q.45 Consider two physical quantities A and B related to each other as $E = \frac{B - x^2}{At}$ where E, x and t have dimensions of energy, length and time respectively. The dimension of AB is

Options
1. $L^2M^{-1}T^1$
2. $L^{-2}M^1T^0$
3. $L^0M^{-1}T^1$
4. $L^{-2}M^{-1}T^1$

Question Type : MCQ
Question ID : 4058591225
Option 1 ID : 4058593862
Option 2 ID : 4058593863
Option 3 ID : 4058593861
Option 4 ID : 4058593864
Status : Answe re d
Chosen Option : 1

Q.46



The output of the given circuit diagram is -

Options

1.

A	B	Y
0	0	0
1	0	0
0	1	0
1	1	0

2.

A	B	Y
0	0	0
1	0	1
0	1	1
1	1	0

3.

A	B	Y
0	0	0
1	0	0
0	1	1
1	1	0

4.

A	B	Y
0	0	0
1	0	0
0	1	0
1	1	1

Question Type : MCQ
Question ID : 4058591242
Option 1 ID : 4058593930
Option 2 ID : 4058593929
Option 3 ID : 4058593931
Option 4 ID : 4058593932
Status : Answe re d
Chosen Option : 4

Q.47 An AC voltage $V = 20 \sin 200\pi t$ is applied to a series LCR circuit which drives a current $I = 10 \sin\left(200\pi t + \frac{\pi}{3}\right)$. The average power dissipated is:

Options
1. 173.2 W
2. 50 W
3. 200 W
4. 21.6 W

Question Type : MCQ
Question ID : 4058591237
Option 1 ID : 4058593912
Option 2 ID : 4058593911
Option 3 ID : 4058593910
Option 4 ID : 4058593909
Status : Not Answe re d
Chosen Option : --

Q.48 In a photoelectric effect experiment a light of frequency 1.5 times the threshold frequency is made to fall on the surface of photosensitive material. Now if the frequency is halved and intensity is doubled, the number of photo electrons emitted will be:

Options
1. quadrupled
2. halved
3. Zero
4. doubled

Question Type : MCQ
Question ID : 4058591240
Option 1 ID : 4058593924
Option 2 ID : 4058593922
Option 3 ID : 4058593921
Option 4 ID : 4058593923
Status : Answe re d
Chosen Option : 3

Q.49 A body of mass 2 kg begins to move under the action of a time dependent force given by $\vec{F} = \left(6t\,\hat{i} + 6t^2\,\hat{j}\right) N$. The power developed by the force at the time t is given by:

Options
1. $(9t^3 + 6t^5)\ W$
2. $(9t^5 + 6t^3)\ W$
3. $(6t^4 + 9t^5)\ W$
4. $(3t^3 + 6t^5)\ W$

Question Type : MCQ
Question ID : 4058591229
Option 1 ID : 4058593880
Option 2 ID : 4058593878
Option 3 ID : 4058593877
Option 4 ID : 4058593879
Status : Marke d For Revie w
Chosen Option : 3

Q.50 If two vectors $\vec{A}$ and $\vec{B}$ having equal magnitude R are inclined at an angle θ, then

Options

1. $\left|\vec{A}+\vec{B}\right| = 2R\sin\left(\frac{\theta}{2}\right)$
2. $\left|\vec{A}+\vec{B}\right| = 2R\cos\left(\frac{\theta}{2}\right)$
3. $\left|\vec{A}-\vec{B}\right| = 2R\cos\left(\frac{\theta}{2}\right)$
4. $\left|\vec{A}-\vec{B}\right| = \sqrt{2}R\sin\left(\frac{\theta}{2}\right)$

Question Type : MCQ
Question ID : 4058591226
Option 1 ID : 4058593865
Option 2 ID : 4058593867
Option 3 ID : 4058593866
Option 4 ID : 4058593868
Status : Answe re d
Chosen Option : 2

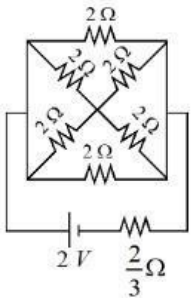
Section : Physics Se ction B

Q.51 A body of mass 'm' is projected with a speed 'u' making an angle of 45° with the ground. The angular momentum of the body about the point of projection, at the highest point is expressed as $\frac{\sqrt{2}mu^3}{Xg}$. The value of 'X' is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591245
Status : Not Answe re d

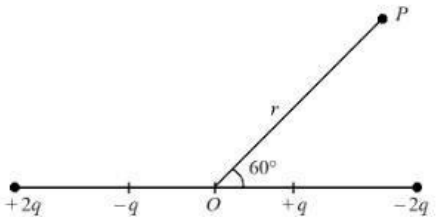
Q.52 In the following circuit, the battery has an emf of 2V and an internal resistance of $\frac{2}{3}\Omega$. The power consumption in the entire circuit is _____ W.



Given --
Answer :

Question Type : SA
Question ID : 4058591250
Status : Not Answe re d

Q.53 The distance between charges $+q$ and $-q$ is $2l$ and between $+2q$ and $-2q$ is $4l$. The electrostatic potential at point P at a distance r from center O is $-\alpha\left[\frac{ql}{r^2}\right]\times 10^9 V$, where the value of α is _____. (Use $\frac{1}{4\pi\varepsilon_0} = 9\times 10^9\ Nm^2C^{-2}$)



Given --
Answer :

Question Type : SA
Question ID : 4058591249
Status : Not Answe re d

Q.54 Light from a point source in air falls on a convex curved surface of radius 20 cm and refractive index 1.5. If the source is located at 100 cm from the convex surface, the image will be formed at _____ cm from the object.

Given --
Answer :

Question Type : SA
Question ID : 4058591253
Status : Not Answe re d

Q.55 Two identical spheres each of mass 2 kg and radius 50 cm are fixed at the ends of a light rod so that the separation between the centers is 150 cm. Then, moment of inertia of the system about an axis perpendicular to the rod and passing through its middle point is $\frac{x}{20}\ kg\ m^2$, where the value of x is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591246
Status : Not Answe re d

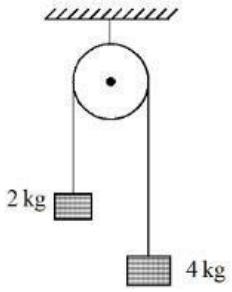
Q.56 Two circular coils P and Q of 100 turns each have same radius of π cm. The currents in P and R are $1A$ and $2A$ respectively. P and Q are placed with their planes mutually perpendicular with their centers coincide. The resultant magnetic field induction at the center of the coils is $\sqrt{x}\ mT$, where x = _____.

[Use $\mu_0 = 4\pi \times 10^{-7}\ TmA^{-1}$]

Given --
Answer :

Question Type : SA
Question ID : 4058591251
Status : Not Answe re d

Q.57 Two blocks of mass 2 kg and 4 kg are connected by a metal wire going over a smooth pulley as shown in figure. The radius of wire is 4.0×10^{-5} m and Young's modulus of the metal is 2.0×10^{11} N/m^2. The longitudinal strain developed in the wire is $\frac{1}{\alpha\pi}$. The value of α is _____. [Use $g = 10$ m/s^2]



Given --
Answer :

Question Type : SA
Question ID : 4058591247
Status : Not Answe re d

Q.58 The magnetic flux ϕ (in weber) linked with a closed circuit of resistance 8 Ω varies with time (in seconds) as $\phi = 5t^2 - 36t + 1$. The induced current in the circuit at $t = 2$ s is _____ A.

Given --
Answer :

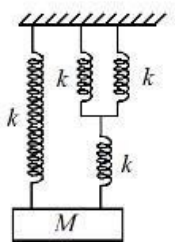
Question Type : SA
Question ID : 4058591252
Status : Not Answe re d

Q.59 A nucleus has mass number A_1 and volume V_1. Another nucleus has mass number A_2 and Volume V_2. If relation between mass number is $A_2 = 4A_1$, then $\frac{V_2}{V_1} =$ _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591254
Status : Not Answe re d

Q.60 The time period of simple harmonic motion of mass M in the given figure is $\pi\sqrt{\frac{\alpha M}{5k}}$, where the value of α is _____.



Given 12

Answer :

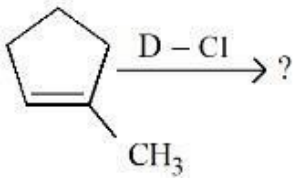
Question Type : SA

Question ID : 4058591248

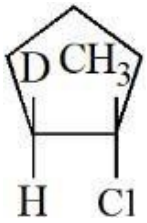
Status : Answe re d

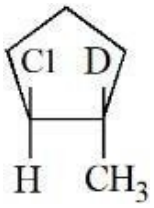
Section : Che mistry Se ction A

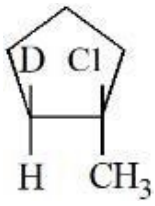
Q.61 Major product of the following reaction is -

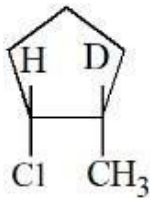


Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 4058591269
Option 1 ID : 4058594007
Option 2 ID : 4058594010
Option 3 ID : 4058594008
Option 4 ID : 4058594009
Status : Answe re d
Chosen Option : 3

Q.62 Given below are two statements :

Statement I : S_8 solid undergoes disproportionation reaction under alkaline conditions to form S^{2-} and $S_2O_3^{2-}$.

Statement II : ClO_4^- can undergo disproportionation reaction under acidic condition.

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

Options
1. Statement I is correct but statement II is incorrect
2. Both statement I and statement II are incorrect
3. Statement I is incorrect but statement II is correct
4. Both statement I and statement II are correct

Question Type : MCQ
Question ID : 4058591259
Option 1 ID : 4058593969
Option 2 ID : 4058593968
Option 3 ID : 4058593970
Option 4 ID : 4058593967
Status : Answe re d
Chosen Option : 1

Q.63 Consider the following elements.

Group ↓ A' B' → Period
C' D'

Which of the following is/are true about A', B', C' and D'?

A. Order of atomic radii: $B' < A' < D' < C'$
B. Order of metallic character: $B' < A' < D' < C'$
C. Size of the element: $D' < C' < B' < A'$
D. Order of ionic radii: $B'^{+} < A'^{+} < D'^{+} < C'^{+}$

Choose the correct answer from the options given below :

Options
1. B, C and D only
2. A and B only
3. A, B and D only
4. A only

Question Type : MCQ
Question ID : 4058591260
Option 1 ID : 4058593973
Option 2 ID : 4058593972
Option 3 ID : 4058593971
Option 4 ID : 4058593974
Status : Not Atte mpte d and Marke d For Revie w
Chosen Option : --

Q.64 Match List I with List II

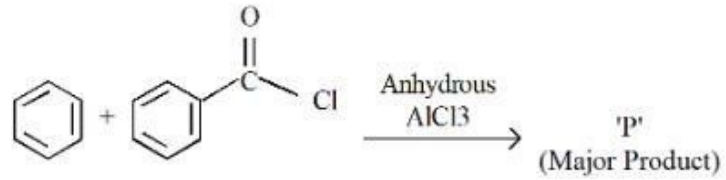
LIST I (Complex ion)		LIST II (Electronic Configuration)	
A.	$[Cr(H_2O)_6]^{3+}$	I.	$t_{2g}^2 e_g^0$
B.	$[Fe(H_2O)_6]^{3+}$	II.	$t_{2g}^3 e_g^0$
C.	$[Ni(H_2O)_6]^{2+}$	III.	$t_{2g}^3 e_g^2$
D.	$[V(H_2O)_6]^{3+}$	IV.	$t_{2g}^6 e_g^2$

Choose the correct answer from the options given below:

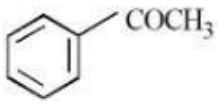
Options
1. A-IV, B-III, C-I, D-II
2. A-II, B-III, C-IV, D-I
3. A-III, B-II, C-IV, D-I
4. A-IV, B-I, C-II, D-III

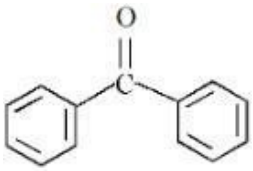
Question Type : MCQ
Question ID : 4058591265
Option 1 ID : 4058593994
Option 2 ID : 4058593991
Option 3 ID : 4058593992
Option 4 ID : 4058593993
Status : Answe re d
Chosen Option : 1

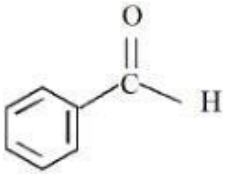
Q.65 Identify major product 'P' formed in the following reaction.

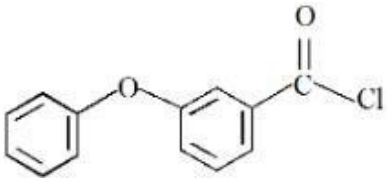


Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 4058591271
Option 1 ID : 4058594018
Option 2 ID : 4058594016
Option 3 ID : 4058594015
Option 4 ID : 4058594017
Status : Answe re d
Chosen Option : 3

Q.66 Choose the correct statements from the following

A. Mn_2O_7 is an oil at room temperature

B. V_2O_4 reacts with acid to give VO_2^{2+}

C. CrO is a basic oxide

D. V_2O_5 does not react with acid

Choose the correct answer from the options given below :

Options 1. A, B and D only

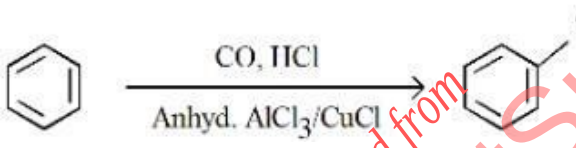
2. A and C only

3. A, B and C only

4. B and C only

Question Type : MCQ
Question ID : 4058591263
Option 1 ID : 4058593985
Option 2 ID : 4058593986
Option 3 ID : 4058593984
Option 4 ID : 4058593983
Status : Answe re d
Chosen Option : 2

Q.67 Identify the name reaction.



Options 1. Etard Reaction

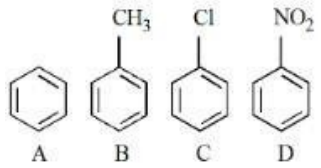
2. Stephen Reaction

3. Gatterman - Koch Reaction

4. Rosenmund Reduction

Question Type : MCQ
Question ID : 4058591272
Option 1 ID : 4058594019
Option 2 ID : 4058594020
Option 3 ID : 4058594021
Option 4 ID : 4058594022
Status : Answe re d
Chosen Option : 2

Q.68 The correct order of reactivity in electrophilic substitution reaction of the following compounds is :



Options
1. D > C > B > A
2. B > C > A > D
3. A > B > C > D
4. B > A > C > D

Question Type : MCQ
Question ID : 4058591267
Option 1 ID : 4058594000
Option 2 ID : 4058594001
Option 3 ID : 4058593999
Option 4 ID : 4058594002
Status : Answe re d
Chosen Option : 4

Q.69 A sample of $CaCO_3$ and $MgCO_3$ weighed 2.21 g is ignited to constant weight of 1.152 g. The composition of mixture is :

(Given molar mass in g mol^{-1} $CaCO_3$: 100, $MgCO_3$: 84)

Options
1. 1.023 g $CaCO_3$ + 1.023 g $MgCO_3$
2. 1.187 g $CaCO_3$ + 1.187 g $MgCO_3$
3. 1.023 g $CaCO_3$ + 1.187 g $MgCO_3$
4. 1.187 g $CaCO_3$ + 1.023 g $MgCO_3$

Question Type : MCQ
Question ID : 4058591255
Option 1 ID : 4058593953
Option 2 ID : 4058593954
Option 3 ID : 4058593951
Option 4 ID : 4058593952
Status : Answe re d
Chosen Option : 3

Q.70 The four quantum numbers for the electron in the outer most orbital of potassium (atomic no. 19) are

Options
1. $n = 4, l = 0, m = 0, s = +\frac{1}{2}$
2. $n = 2, l = 0, m = 0, s = +\frac{1}{2}$
3. $n = 4, l = 2, m = -1, s = +\frac{1}{2}$
4. $n = 3, l = 0, m = 1, s = +\frac{1}{2}$

Question Type : MCQ
Question ID : 4058591256
Option 1 ID : 4058593957
Option 2 ID : 4058593955
Option 3 ID : 4058593958
Option 4 ID : 4058593956
Status : Answe re d
Chosen Option : 2

Q.71 Select the option with correct property -

Options
1. $[Ni(CO)_4]$ and $[NiCl_4]^{2-}$ both Paramagnetic
2. $[Ni(CO)_4]$ and $[NiCl_4]^{2-}$ both Diamagnetic
3. $[Ni(CO)_4]$ Diamagnetic, $[NiCl_4]^{2-}$ Paramagnetic
4. $[NiCl_4]^{2-}$ Diamagnetic, $[Ni(CO)_4]$ Paramagnetic

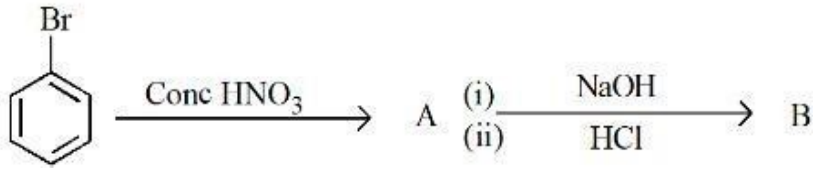
Question Type : MCQ
Question ID : 4058591264
Option 1 ID : 4058593990
Option 2 ID : 4058593989
Option 3 ID : 4058593988
Option 4 ID : 4058593987
Status : Answe re d
Chosen Option : 3

Q.72 The fragrance of flowers is due to the presence of some steam volatile organic compounds called essential oils. These are generally insoluble in water at room temperature but are miscible with water vapour in vapour phase. A suitable method for the extraction of these oils from the flowers is -

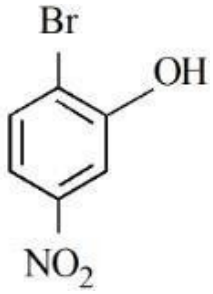
Options
1. distillation
2. crystallisation
3. steam distillation
4. distillation under reduced pressure

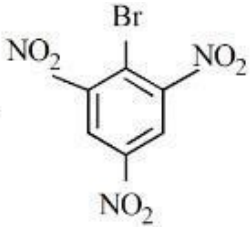
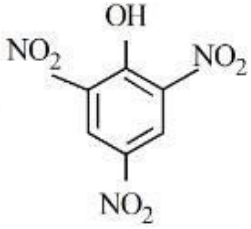
Question Type : MCQ
Question ID : 4058591266
Option 1 ID : 4058593995
Option 2 ID : 4058593996
Option 3 ID : 4058593998
Option 4 ID : 4058593997
Status : Answe re d
Chosen Option : 4

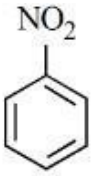
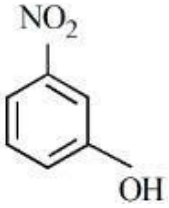
Q.73 Identify A and B in the following reaction sequence.

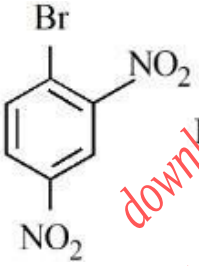
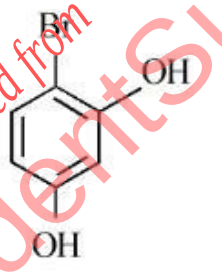


Options

1. A =  B = 

2. A =  B = 

3. A =  B = 

4. A =  B = 

Question Type : MCQ
Question ID : 4058591270
Option 1 ID : 4058594011
Option 2 ID : 4058594013
Option 3 ID : 4058594014
Option 4 ID : 4058594012
Status : Answe re d
Chosen Option : 3

Q.74 Choose the correct statements from the following

A. All group 16 elements form oxides of general formula EO_2 and EO_3, where E = S, Se, Te and Po. Both the types of oxides are acidic in nature.
B. TeO_2 is an oxidising agent while SO_2 is reducing in nature.
C. The reducing property decreases from H_2S to H_2Te down the group.
D. The ozone molecule contains five lone pairs of electrons.

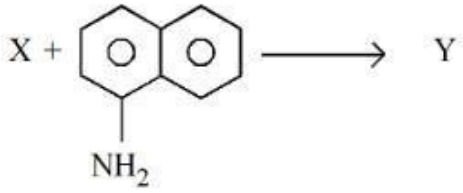
Choose the correct answer from the options given below:

Options
1. C and D only
2. A and B only
3. A and D only
4. B and C only

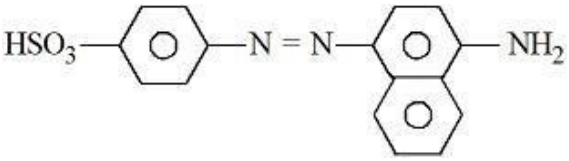
Question Type : MCQ
Question ID : 4058591262
Option 1 ID : 4058593982
Option 2 ID : 4058593980
Option 3 ID : 4058593981
Option 4 ID : 4058593979
Status : Answe re d
Chosen Option : 2

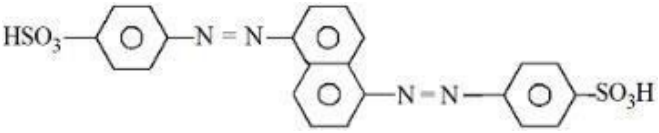
Q.75 The azo-dye (Y) formed in the following reactions is

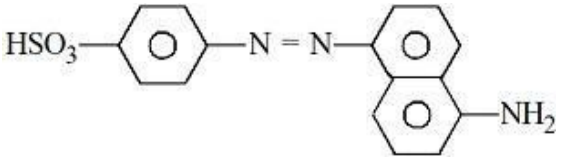
Sulphanilic acid + $NaNO_2$ + $CH_3COOH \rightarrow X$.

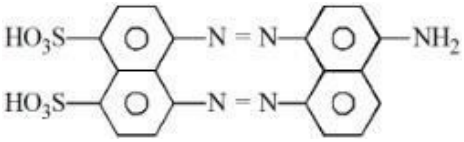


Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 4058591274
Option 1 ID : 4058594027
Option 2 ID : 4058594030
Option 3 ID : 4058594028
Option 4 ID : 4058594029
Status : Not Answe re d
Chosen Option : --

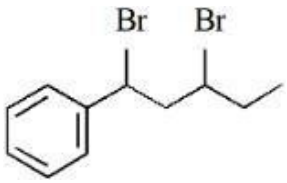
Q.76 Which of the following is least ionic?

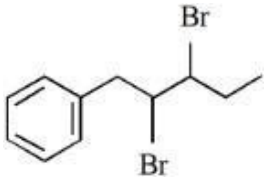
Options
1. $BaCl_2$
2. $AgCl$
3. KCl
4. $CoCl_2$

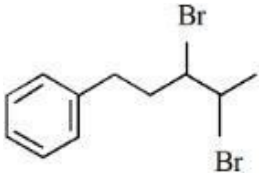
Question Type : MCQ
Question ID : 4058591257
Option 1 ID : 4058593961
Option 2 ID : 4058593960
Option 3 ID : 4058593959
Option 4 ID : 4058593962
Status : Answe re d
Chosen Option : 2

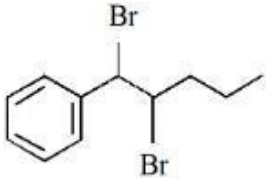
Q.77 Identify structure of 2,3–dibromo–1–phenylpentane.

Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 4058591268
Option 1 ID : 4058594006
Option 2 ID : 4058594005
Option 3 ID : 4058594003
Option 4 ID : 4058594004
Status : Answe re d
Chosen Option : 3

Q.78 Given below are two statements :

Statement I : Aniline reacts with con. H_2SO_4, followed by heating at 453 - 473 K gives p-aminobenzene sulphonic acid, which gives blood red colour in the 'Lassaigne's test'.

Statement II : In Friedel - Craft's alkylation and acylation reactions, aniline forms salt with the $AlCl_3$ catalyst. Due to this, nitrogen of aniline aquires a positive charge and acts as deactivating group.

In the light of the above statements, choose the ***correct 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 true but statement II is false
4. Statement I is false but statement II is true

Question Type : MCQ
Question ID : 4058591273
Option 1 ID : 4058594023
Option 2 ID : 4058594024
Option 3 ID : 4058594025
Option 4 ID : 4058594026
Status : Answe re d
Chosen Option : 3

Q.79 Given below are two statements :

Statement I : Group 13 trivalent halides get easily hydrolyzed by water due to their covalent nature.

Statement II : $AlCl_3$ upon hydrolysis in acidified aqueous solution forms octahedral $[Al(H_2O)_6]^{3+}$ ion.

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

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

Question Type : MCQ
Question ID : 4058591261
Option 1 ID : 4058593977
Option 2 ID : 4058593978
Option 3 ID : 4058593976
Option 4 ID : 4058593975
Status : Answe re d
Chosen Option : 1

Q.80 $A_{(g)} \rightleftharpoons B_{(g)} + \frac{C}{2}(g)$ The correct relationship between K_P, α and equilibrium pressure P is

Options

1. $K_P = \frac{\alpha^{1/2} P^{1/2}}{(2+\alpha)^{3/2}}$

2. $K_P = \frac{\alpha^{1/2} P^{3/2}}{(2+\alpha)^{3/2}}$

3. $K_P = \frac{\alpha^{3/2} P^{1/2}}{(2+\alpha)^{1/2}(1-\alpha)}$

4. $K_P = \frac{\alpha^{1/2} P^{1/2}}{(2+\alpha)^{1/2}}$

Question Type : MCQ
Question ID : 4058591258
Option 1 ID : 4058593965
Option 2 ID : 4058593966
Option 3 ID : 4058593963
Option 4 ID : 4058593964
Status : Answe re d
Chosen Option : 3

Section : Che mistry Se ction B

Q.81 If 5 moles of an ideal gas expands from 10 L to a volume of 100 L at 300 K under isothermal and reversible condition then work, w, is $-x$ J. The value of x is _____.

(Given R = 8.314 J K^{-1} mol^{-1})

Given --
Answer :

Question Type : SA
Question ID : 4058591276
Status : Not Atte mpte d and Marke d For Revie w

Q.82 A compound (x) with molar mass 108 g mol^{-1} undergoes acetylation to give product with molar mass 192 g mol^{-1}. The number of amino groups in the compund (x) is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591282
Status : Not Answe re d

Q.83 Number of moles of H^+ ions required by 1 mole of MnO_4^- to oxidise oxalate ion to CO_2 is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591280
Status : Not Answe re d

Q.84 A diatomic molecule has a dipole moment of 1.2 D. If the bond distance is 1A°, then fractional charge on each atom is _____ $\times 10^{-1}$ esu.

(Given 1 D = 10^{-18} esucm)

Given --
Answer :

Question Type : SA
Question ID : 4058591275
Status : Not Answe re d

Q.85 The molarity of 1 L orthophosphoric acid (H_3PO_4) having 70% purity by weight (specific gravity 1.54 g cm^{-3}) is _____ M.
(Molar mass of H_3PO_4 = 98 g mol^{-1})

Given --
Answer :

Question Type : SA
Question ID : 4058591277
Status : Not Answe re d

Q.86 The values of conductivity of some materials at 298.15 K in Sm^{-1} are 2.1×10^3, 1.0×10^{-16}, 1.2×10, 3.91, 1.5×10^{-2}, 1×10^{-7}, 1.0×10^3. The number of conductors among the materials is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591278
Status : Not Answe re d

Q.87 Number of isomeric products formed by monochlorination of 2-methylbutane in presence of sunlight is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591281
Status : Not Answe re d

Q.88 In the reaction of potassium dichromate, potassium chloride and sulfuric acid (conc.), the oxidation state of the chromium in the product is (+)_____.

Given --
Answer :

Question Type : SA
Question ID : 4058591284
Status : Not Answe re d

Q.89 r = k [A] for a reaction, 50% of A is decomposed in 120 minutes. The time taken for 90% decomposition of A is _____ minutes.

Given --
Answer :

Question Type : SA
Question ID : 4058591279
Status : Not Answe re d

Q.90 From the vitamins A, B_1, B_6, B_{12}, C, D, E and K, the number of vitamins that can be stored in our body is_____.

Given --
Answer :

Question Type : SA
Question ID : 4058591283
Status : Not Answe re d