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

Test Date	27/01/2024
Test Time	9:00 AM - 12:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1 If (a, b) be the orthocentre of the triangle whose vertices are (1, 2), (2, 3) and (3, 1), and $I_1 = \int_a^b x \sin(4x - x^2)\,dx$, $I_2 = \int_a^b \sin(4x - x^2)\,dx$, then $36\frac{I_1}{I_2}$ is equal to :

Options

1. 80
2. 88
3. 66
4. 72

Question Type : MCQ
Question ID : 533543388
Option 1 ID : 5335431406
Option 2 ID : 5335431407
Option 3 ID : 5335431408
Option 4 ID : 5335431405
Status : Not Answered
Chosen Option : --

Q.2 If $S = \{z \in C : |z - i| = |z + i| = |z - 1|\}$, then, n(S) is :

Options

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

Question Type : MCQ
Question ID : 533543379
Option 1 ID : 5335431372
Option 2 ID : 5335431369
Option 3 ID : 5335431371
Option 4 ID : 5335431370
Status : Not Answered
Chosen Option : --

Q.3 Let $S = \{1, 2, 3, \ldots, 10\}$. Suppose M is the set of all the subsets of S, then the relation $R = \{(A, B) : A \cap B \neq \phi; A, B \in M\}$ is :

Options

1. symmetric and reflexive only
2. symmetric and transitive only
3. reflexive only
4. symmetric only

Question Type : MCQ
Question ID : 533543377
Option 1 ID : 5335431362
Option 2 ID : 5335431361
Option 3 ID : 5335431364
Option 4 ID : 5335431363
Status : Not Answered
Chosen Option : --

Q.4 Let $x = x(t)$ and $y = y(t)$ be solutions of the differential equations $\frac{dx}{dt} + ax = 0$ and $\frac{dy}{dt} + by = 0$ respectively, $a, b \in \mathbf{R}$. Given that $x(0) = 2$; $y(0) = 1$ and $3y(1) = 2x(1)$, the value of t, for which $x(t) = y(t)$, is :

Options

1. $\log_{\frac{2}{3}} 2$
2. $\log_4 3$
3. $\log_{\frac{4}{3}} 2$
4. $\log_3 4$

Question Type : MCQ
Question ID : 533543389
Option 1 ID : 5335431409
Option 2 ID : 5335431410
Option 3 ID : 5335431411
Option 4 ID : 5335431412
Status : Not Answered
Chosen Option : --

Q.5 Let $a_1, a_2, \ldots a_{10}$ be 10 observations such that $\sum_{k=1}^{10} a_k = 50$ and $\sum_{\forall k<j} a_k \cdot a_j = 1100$. Then the standard deviation of $a_1, a_2, \ldots, a_{10}$ is equal to :

Options

1. 10
2. $\sqrt{115}$
3. $\sqrt{5}$
4. 5

Question Type : MCQ
Question ID : 533543396
Option 1 ID : 5335431438
Option 2 ID : 5335431440
Option 3 ID : 5335431439
Option 4 ID : 5335431437
Status : Not Answered
Chosen Option : --

Q.6 Four distinct points (2k, 3k), (1, 0), (0, 1) and (0, 0) lie on a circle for k equal to :

Options

1. $\frac{3}{13}$
2. $\frac{1}{13}$
3. $\frac{2}{13}$
4. $\frac{5}{13}$

Question Type : MCQ
Question ID : 533543390
Option 1 ID : 5335431415
Option 2 ID : 5335431413
Option 3 ID : 5335431414
Option 4 ID : 5335431416
Status : Not Answered
Chosen Option : --

Q.7 Let $\vec{a} = \hat{i} + 2\hat{j} + \hat{k}$, $\vec{b} = 3(\hat{i} - \hat{j} + \hat{k})$. Let $\vec{c}$ be the vector such that $\vec{a} \times \vec{c} = \vec{b}$ and $\vec{a} \cdot \vec{c} = 3$. Then $\vec{a} \cdot \left((\vec{c} \times \vec{b}) - \vec{b} - \vec{c}\right)$ is equal to :

Options

1. 20
2. 36
3. 24
4. 32

Question Type : MCQ
Question ID : 533543395
Option 1 ID : 5335431433
Option 2 ID : 5335431435
Option 3 ID : 5335431434
Option 4 ID : 5335431436
Status : Not Answered
Chosen Option : --

Q.8 The function $f : \mathbf{N} - \{1\} \to \mathbf{N}$; defined by $f(n)$ = the highest prime factor of n, is :

Options

1. one-one only
2. onto only
3. both one-one and onto
4. neither one-one nor onto

Question Type : MCQ
Question ID : 533543378
Option 1 ID : 5335431365
Option 2 ID : 5335431366
Option 3 ID : 5335431367
Option 4 ID : 5335431368
Status : Not Answered
Chosen Option : --

Q.9

Consider the matrix $f(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$.

Given below are two statements :

Statement I : $f(-x)$ is the inverse of the matrix $f(x)$.

Statement II : $f(x)\, f(y) = f(x+y)$.

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. 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 : 533543380
Option 1 ID : 5335431375
Option 2 ID : 5335431373
Option 3 ID : 5335431374
Option 4 ID : 5335431376
Status : Not Answered
Chosen Option : --

Q.10

The distance, of the point $(7, -2, 11)$ from the line $\frac{x-6}{1} = \frac{y-4}{0} = \frac{z-8}{3}$ along the line $\frac{x-5}{2} = \frac{y-1}{-3} = \frac{z-5}{6}$, is :

Options

1. 21
2. 18
3. 12
4. 14

Question Type : MCQ
Question ID : 533543393
Option 1 ID : 5335431428
Option 2 ID : 5335431427
Option 3 ID : 5335431425
Option 4 ID : 5335431426
Status : Not Answered
Chosen Option : --

Q.11 The portion of the line $4x+5y=20$ in the first quadrant is trisected by the lines L_1 and L_2 passing through the origin. The tangent of an angle between the lines L_1 and L_2 is :

Options

1. $\frac{30}{41}$

2. $\frac{25}{41}$

3. $\frac{8}{5}$

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

Question Type : MCQ
Question ID : 533543391
Option 1 ID : 5335431420
Option 2 ID : 5335431419
Option 3 ID : 5335431418
Option 4 ID : 5335431417
Status : Not Answered
Chosen Option : --

Q.12 If $a=\lim\limits_{x\to 0}\frac{\sqrt{1+\sqrt{1+x^4}}-\sqrt{2}}{x^4}$ and $b=\lim\limits_{x\to 0}\frac{\sin^2 x}{\sqrt{2}-\sqrt{1+\cos x}}$, then the value of ab^3 is :

Options

1. 25

2. 32

3. 36

4. 30

Question Type : MCQ
Question ID : 533543385
Option 1 ID : 5335431393
Option 2 ID : 5335431396
Option 3 ID : 5335431395
Option 4 ID : 5335431394
Status : Not Answered
Chosen Option : --

Q.13 The number of common terms in the progressions 4, 9, 14, 19, ... , up to 25^{th} term and 3, 6, 9, 12, ... , up to 37^{th} term is :

Options

1. 5
2. 7
3. 9
4. 8

Question Type : MCQ
Question ID : 533543383
Option 1 ID : 5335431385
Option 2 ID : 5335431386
Option 3 ID : 5335431388
Option 4 ID : 5335431387
Status : Not Answered
Chosen Option : --

Q.14 If A denotes the sum of all the coefficients in the expansion of $(1-3x+10x^2)^n$ and B denotes the sum of all the coefficients in the expansion of $(1+x^2)^n$, then :

Options

1. $A=B^3$
2. $A=3B$
3. $B=A^3$
4. $3A=B$

Question Type : MCQ
Question ID : 533543382
Option 1 ID : 5335431382
Option 2 ID : 5335431381
Option 3 ID : 5335431383
Option 4 ID : 5335431384
Status : Not Answered
Chosen Option : --

Q.15

If the shortest distance between the lines $\frac{x-4}{1}=\frac{y+1}{2}=\frac{z}{-3}$ and $\frac{x-\lambda}{2}=\frac{y+1}{4}=\frac{z-2}{-5}$ is $\frac{6}{\sqrt{5}}$, then the sum of all possible values of λ is :

Options

1. 5
2. 8
3. 10
4. 7

Question Type : MCQ
Question ID : 533543394
Option 1 ID : 5335431429
Option 2 ID : 5335431431
Option 3 ID : 5335431432
Option 4 ID : 5335431430
Status : Answered
Chosen Option : 2

Q.16

$^{n-1}C_r=(k^2-8)\ ^nC_{r+1}$ if and only if :

Options

1. $2\sqrt{3}<k\leq 3\sqrt{2}$
2. $2\sqrt{2}<k<2\sqrt{3}$
3. $2\sqrt{3}<k<3\sqrt{3}$
4. $2\sqrt{2}<k\leq 3$

Question Type : MCQ
Question ID : 533543381
Option 1 ID : 5335431378
Option 2 ID : 5335431379
Option 3 ID : 5335431380
Option 4 ID : 5335431377
Status : Not Answered
Chosen Option : --

Q.17 Consider the function.

$$f(x)=\begin{cases}\dfrac{a(7x-12-x^2)}{b|x^2-7x+12|} & , \quad x<3 \\ 2^{\frac{\sin(x-3)}{x-[x]}} & , \quad x>3 \\ b & , \quad x=3\end{cases},$$

where $[x]$ denotes the greatest integer less than or equal to x. If S denotes the set of all ordered pairs (a, b) such that $f(x)$ is continuous at $x=3$, then the number of elements in S is :

Options

1. 4
2. 1
3. 2
4. Infinitely many

Question Type : MCQ
Question ID : 533543384
Option 1 ID : 5335431389
Option 2 ID : 5335431391
Option 3 ID : 5335431392
Option 4 ID : 5335431390
Status : Not Answered
Chosen Option : --

Q.18 If the shortest distance of the parabola $y^2=4x$ from the centre of the circle $x^2+y^2-4x-16y+64=0$ is d, then d^2 is equal to :

Options

1. 36
2. 24
3. 20
4. 16

Question Type : MCQ
Question ID : 533543386
Option 1 ID : 5335431400
Option 2 ID : 5335431399
Option 3 ID : 5335431398
Option 4 ID : 5335431397
Status : Not Answered
Chosen Option : --

Q.19 If $\int_0^1 \frac{1}{\sqrt{3+x}+\sqrt{1+x}}\,dx = a + b\sqrt{2} + c\sqrt{3}$, where a, b, c are rational numbers, then $2a+3b-4c$ is equal to :

Options

1. 8
2. 7
3. 4
4. 10

Question Type : MCQ
Question ID : 533543387
Option 1 ID : 5335431403
Option 2 ID : 5335431402
Option 3 ID : 5335431401
Option 4 ID : 5335431404
Status : Not Answered
Chosen Option : --

Q.20 The length of the chord of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$, whose mid point is $\left(1, \frac{2}{5}\right)$, is equal to :

Options

1. $\frac{\sqrt{2009}}{5}$
2. $\frac{\sqrt{1541}}{5}$
3. $\frac{\sqrt{1691}}{5}$
4. $\frac{\sqrt{1741}}{5}$

Question Type : MCQ
Question ID : 533543392
Option 1 ID : 5335431421
Option 2 ID : 5335431424
Option 3 ID : 5335431423
Option 4 ID : 5335431422
Status : Not Answered
Chosen Option : --

Section : Mathematics Section B

Q.21

Let $A=\begin{bmatrix}2&0&1\\1&1&0\\1&0&1\end{bmatrix}$, $B=[B_1, B_2, B_3]$, where B_1, B_2, B_3 are column matrics, and

$AB_1=\begin{bmatrix}1\\0\\0\end{bmatrix}$, $AB_2=\begin{bmatrix}2\\3\\0\end{bmatrix}$, $AB_3=\begin{bmatrix}3\\2\\1\end{bmatrix}$

If $\alpha=|B|$ and β is the sum of all the diagonal elements of B, then $\alpha^3+\beta^3$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543398
Status : Not Answered

Q.22

Let $f(x)=x^3+x^2f'(1)+xf''(2)+f'''(3)$, $x \in \mathbf{R}$. Then $f'(10)$ is equal to _____.

Given 249
Answer :

Question Type : SA
Question ID : 533543401
Status : Answered

Q.23

Let the set of all $a \in \mathbf{R}$ such that the equation $\cos 2x+a\sin x=2a-7$ has a solution be [p, q] and $r=\tan 9^\circ-\tan 27^\circ-\frac{1}{\cot 63^\circ}+\tan 81^\circ$, then pqr is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543406
Status : Not Answered

Q.24

If α satisfies the equation $x^2+x+1=0$ and $(1+\alpha)^7=A+B\alpha+C\alpha^2$, A, B, C $\geq$ 0, then $5(3A-2B-C)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543397
Status : Not Answered

Q.25

If the solution of the differential equation $(2x+3y-2)\,dx+(4x+6y-7)\,dy=0$, $y(0)=3$, is $\alpha x+\beta y+3\log_e|2x+3y-\gamma|=6$, then $\alpha+2\beta+3\gamma$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543403
Status : Not Answered

Q.26

Let for a differentiable function $f:(0,\infty)\to\mathbf{R}$, $f(x)-f(y)\geq \log_e\left(\frac{x}{y}\right)+x-y, \forall\, x, y\in(0,\infty)$.

Then $\sum_{n=1}^{20} f'\left(\frac{1}{n^2}\right)$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543399
Status : Not Answered

Q.27

Let the area of the region $\{(x, y): x-2y+4\geq 0, x+2y^2\geq 0, x+4y^2\leq 8, y\geq 0\}$ be $\frac{m}{n}$, where m and n are coprime numbers. Then m+n is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543402
Status : Not Answered

Q.28

A fair die is tossed repeatedly until a six is obtained. Let X denote the number of tosses required and let $a=P(X=3)$, $b=P(X\geq 3)$ and $c=P(X\geq 6|X>3)$. Then $\frac{b+c}{a}$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 533543405
Status : Not Answered

Q.29

If $8=3+\frac{1}{4}(3+p)+\frac{1}{4^2}(3+2p)+\frac{1}{4^3}(3+3p)+\cdots\cdots\infty$, then the value of p is _____.

Given --
Answer :

Question Type : SA
Question ID : 533543400
Status : Not Answered

Q.30

The least positive integral value of α, for which the angle between the vectors $\alpha\hat{i}-2\hat{j}+2\hat{k}$ and $\alpha\hat{i}+2\alpha\hat{j}-2\hat{k}$ is acute, is _____.

Given --
Answer :

Question Type : SA
Question ID : 533543404
Status : Not Answered

Section : Physics Section A

Q.31 A body of mass 1000 kg is moving horizontally with a velocity 6 m/s. If 200 kg extra mass is added, the final velocity (in m/s) is :

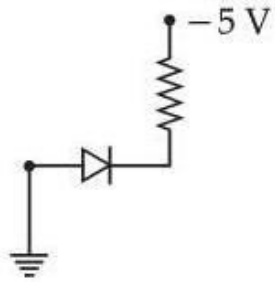
Options

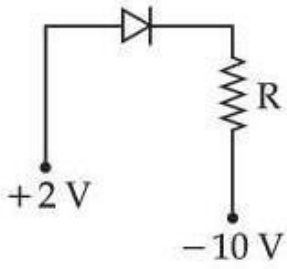
1. 2
2. 5
3. 6
4. 3

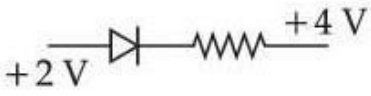
Question Type : MCQ
Question ID : 533543409
Option 1 ID : 5335431462
Option 2 ID : 5335431460
Option 3 ID : 5335431459
Option 4 ID : 5335431461
Status : Answered
Chosen Option : 2

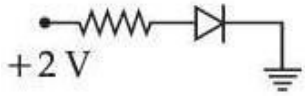
Q.32 Which of the following circuits is reverse - biased ?

Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 533543424
Option 1 ID : 5335431519
Option 2 ID : 5335431521
Option 3 ID : 5335431522
Option 4 ID : 5335431520
Status : Answered
Chosen Option : 3

Q.33 A proton moving with a constant velocity passes through a region of space without any change in its velocity. If $\vec{E}$ and $\vec{B}$ represent the electric and magnetic fields respectively, then the region of space may have :

(A) $E=0, B=0$

(B) $E=0, B \neq 0$

(C) $E \neq 0, B=0$

(D) $E \neq 0, B \neq 0$

Choose the **most appropriate** answer from the options given below :

Options

1. (A), (C) and (D) only

2. (B), (C) and (D) only

3. (A), (B) and (D) only

4. (A), (B) and (C) only

Question Type : MCQ
Question ID : 533543418
Option 1 ID : 5335431496
Option 2 ID : 5335431498
Option 3 ID : 5335431497
Option 4 ID : 5335431495
Status : Answered
Chosen Option : 3

Q.34 A rectangular loop of length 2.5 m and width 2 m is placed at 60° to a magnetic field of 4 T. The loop is removed from the field in 10 s. The average emf induced in the loop during this time is :

Options

1. $+1$ V

2. -2 V

3. $+2$ V

4. -1 V

Question Type : MCQ
Question ID : 533543419
Option 1 ID : 5335431500
Option 2 ID : 5335431501
Option 3 ID : 5335431502
Option 4 ID : 5335431499
Status : Answered
Chosen Option : 1

Q.35 Position of an ant (S in metres) moving in Y-Z plane is given by $S = 2t^2\hat{j} + 5\hat{k}$ (where t is in second). The magnitude and direction of velocity of the ant at t = 1 s will be :

Options

1. 16 m/s in y-direction
2. 9 m/s in z-direction
3. 4 m/s in y-direction
4. 4 m/s in x-direction

Question Type : MCQ
Question ID : 533543408
Option 1 ID : 5335431456
Option 2 ID : 5335431458
Option 3 ID : 5335431457
Option 4 ID : 5335431455
Status : Answered
Chosen Option : 3

Q.36 Identify the physical quantity that cannot be measured using spherometer :

Options

1. Specific rotation of liquids
2. Radius of curvature of concave surface
3. Thickness of thin plates
4. Radius of curvature of convex surface

Question Type : MCQ
Question ID : 533543425
Option 1 ID : 5335431525
Option 2 ID : 5335431526
Option 3 ID : 5335431524
Option 4 ID : 5335431523
Status : Not Answered
Chosen Option : --

Q.37 A convex lens of focal length 40 cm forms an image of an extended source of light on a photo-electric cell. A current I is produced. The lens is replaced by another convex lens having the same diameter but focal length 20 cm. The photoelectric current now is :

Options

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

Question Type : MCQ
Question ID : 533543422
Option 1 ID : 5335431512
Option 2 ID : 5335431513
Option 3 ID : 5335431514
Option 4 ID : 5335431511
Status : Not Answered
Chosen Option : --

Q.38 An electric charge 10^{-6} μC is placed at origin (0, 0)m of X−Y co-ordinate system. Two points P and Q are situated at $(\sqrt{3}, \sqrt{3})$ m and $(\sqrt{6}, 0)$ m respectively. The potential difference between the points P and Q will be :

Options

1. 0 V
2. $\sqrt{3}$ V
3. $\sqrt{6}$ V
4. 3 V

Question Type : MCQ
Question ID : 533543416
Option 1 ID : 5335431489
Option 2 ID : 5335431488
Option 3 ID : 5335431487
Option 4 ID : 5335431490
Status : Answered
Chosen Option : 1

Q.39 Given below are two statements :

Statement (I) : Planck's constant and angular momentum have same dimensions.

Statement (II) : Linear momentum and moment of force have same dimensions.

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

Question Type : MCQ
Question ID : 533543407
Option 1 ID : 5335431451
Option 2 ID : 5335431454
Option 3 ID : 5335431452
Option 4 ID : 5335431453
Status : Answered
Chosen Option : 4

Q.40 The radius of third stationary orbit of electron for Bohr's atom is R. The radius of fourth stationary orbit will be :

Options

1. $\frac{4}{3}$ R
2. $\frac{9}{16}$ R
3. $\frac{16}{9}$ R
4. $\frac{3}{4}$ R

Question Type : MCQ
Question ID : 533543423
Option 1 ID : 5335431517
Option 2 ID : 5335431515
Option 3 ID : 5335431516
Option 4 ID : 5335431518
Status : Answered
Chosen Option : 3

Q.41 0.08 kg air is heated at constant volume through 5°C. The specific heat of air at constant volume is 0.17 kcal/kg°C and J = 4.18 joule/cal. The change in its internal energy is approximately.

Options

1. 284 J
2. 142 J
3. 298 J
4. 318 J

Question Type : MCQ
Question ID : 533543414
Option 1 ID : 5335431480
Option 2 ID : 5335431479
Option 3 ID : 5335431481
Option 4 ID : 5335431482
Status : Not Answered
Chosen Option : --

Q.42 The average kinetic energy of a monoatomic molecule is 0.414 eV at temperature :
(Use $K_B = 1.38 \times 10^{-23}$ J/mol-K)

Options

1. 3000 K
2. 1600 K
3. 1500 K
4. 3200 K

Question Type : MCQ
Question ID : 533543415
Option 1 ID : 5335431485
Option 2 ID : 5335431484
Option 3 ID : 5335431483
Option 4 ID : 5335431486
Status : Answered
Chosen Option : 4

Q.43 A plane electromagnetic wave propagating in x-direction is described by $E_y = (200\ Vm^{-1})\ \sin[1.5 \times 10^7 t - 0.05\ x]$; The intensity of the wave is :
(Use $\epsilon_0 = 8.85 \times 10^{-12}\ C^2N^{-1}m^{-2}$)

Options

1. $53.1\ Wm^{-2}$
2. $26.6\ Wm^{-2}$
3. $35.4\ Wm^{-2}$
4. $106.2\ Wm^{-2}$

Question Type : MCQ
Question ID : 533543420
Option 1 ID : 5335431503
Option 2 ID : 5335431505
Option 3 ID : 5335431506
Option 4 ID : 5335431504
Status : Answered
Chosen Option : 1

Q.44 Given below are two statements :
Statement (I) : Viscosity of gases is greater than that of liquids.
Statement (II) : Surface tension of a liquid decreases due to the presence of insoluble impurities.
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 : 533543413
Option 1 ID : 5335431477
Option 2 ID : 5335431476
Option 3 ID : 5335431478
Option 4 ID : 5335431475
Status : Not Answered
Chosen Option : --

Q.45 A wire of resistance R and length L is cut into 5 equal parts. If these parts are joined parallely, then resultant resistance will be :

Options

1. $25\ R$
2. $5\ R$
3. $\frac{1}{25}\ R$
4. $\frac{1}{5}\ R$

Question Type : MCQ
Question ID : 533543417
Option 1 ID : 5335431494
Option 2 ID : 5335431493
Option 3 ID : 5335431492
Option 4 ID : 5335431491
Status : Answered
Chosen Option : 3

Q.46 A train is moving with a speed of 12 m/s on rails which are 1.5 m apart. To negotiate a curve of radius 400 m, the height by which the outer rail should be raised with respect to the inner rail is (Given, $g = 10\ m/s^2$) :

Options

1. 4.8 cm
2. 5.4 cm
3. 4.2 cm
4. 6.0 cm

Question Type : MCQ
Question ID : 533543410
Option 1 ID : 5335431464
Option 2 ID : 5335431465
Option 3 ID : 5335431463
Option 4 ID : 5335431466
Status : Not Answered
Chosen Option : --

Q.47 The acceleration due to gravity on the surface of earth is g. If the diameter of earth reduces to half of its original value and mass remains constant, then acceleration due to gravity on the surface of earth would be :

Options

1. $\frac{g}{4}$

2. $2\,g$

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

4. $4\,g$

Question Type : MCQ
Question ID : 533543412
Option 1 ID : 5335431472
Option 2 ID : 5335431474
Option 3 ID : 5335431473
Option 4 ID : 5335431471
Status : Answered
Chosen Option : 4

Q.48 If the refractive index of the material of a prism is $\cot\left(\frac{A}{2}\right)$, where A is the angle of prism then the angle of minimum deviation will be :

Options

1. $\frac{\pi}{2} - 2A$

2. $\pi - 2A$

3. $\frac{\pi}{2} - A$

4. $\pi - A$

Question Type : MCQ
Question ID : 533543421
Option 1 ID : 5335431509
Option 2 ID : 5335431507
Option 3 ID : 5335431510
Option 4 ID : 5335431508
Status : Not Answered
Chosen Option : --

Q.49 A wire of length 10 cm and radius $\sqrt{7} \times 10^{-4}$ m is connected across the right gap of a meter bridge. When a resistance of 4.5 Ω is connected on the left gap by using a resistance box, the balance length is found to be at 60 cm from the left end. If the resistivity of the wire is $R \times 10^{-7}$ Ωm, then value of R is :

Options

1. 70
2. 63
3. 35
4. 66

Question Type : MCQ
Question ID : 533543426
Option 1 ID : 5335431530
Option 2 ID : 5335431528
Option 3 ID : 5335431527
Option 4 ID : 5335431529
Status : Not Answered
Chosen Option : --

Q.50 Two bodies of mass 4 g and 25 g are moving with equal kinetic energies. The ratio of magnitude of their linear momentum is :

Options

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

Question Type : MCQ
Question ID : 533543411
Option 1 ID : 5335431467
Option 2 ID : 5335431468
Option 3 ID : 5335431469
Option 4 ID : 5335431470
Status : Answered
Chosen Option : 1

Section : Physics Section B

Q.51 In a nuclear fission process, a high mass nuclide (A ≈ 236) with binding energy 7.6 MeV/Nucleon dissociated into middle mass nuclides (A ≈ 118), having binding energy of 8.6 MeV/Nucleon. The energy released in the process would be _____ MeV.

Given --
Answer :

Question Type : SA
Question ID : 533543436
Status : Not Answered

Q.52 Four particles each of mass 1 kg are placed at four corners of a square of side 2 m. Moment of inertia of system about an axis perpendicular to its plane and passing through one of its vertex is _____ kgm^2.

Given --
Answer :

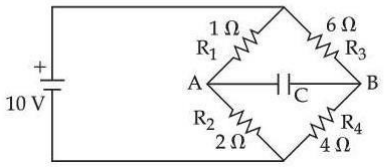
Question Type : SA
Question ID : 533543428
Status : Not Answered

Q.53 Two coils have mutual inductance 0.002 H. The current changes in the first coil according to the relation $i=i_0 \sin\omega t$, where $i_0=5A$ and $\omega=50\pi$ rad/s. The maximum value of emf in the second coil is $\frac{\pi}{\alpha}$ V. The value of α is _____.

Given 2
Answer :

Question Type : SA
Question ID : 533543434
Status : Answered

Q.54 The charge accumulated on the capacitor connected in the following circuit is _____ μC.
(Given C=150 μF)



Given --
Answer :

Question Type : SA
Question ID : 533543432
Status : Not Answered

Q.55 A particle starts from origin at t=0 with a velocity $5\hat{i}$ m/s and moves in x-y plane under action of a force which produces a constant acceleration of $\left(3\hat{i}+2\hat{j}\right)$ m/s^2. If the x-coordinate of the particle at that instant is 84 m, then the speed of the particle at this time is $\sqrt{\alpha}$ m/s. The value of α is _____.

Given --
Answer :

Question Type : SA
Question ID : 533543427
Status : Not Answered

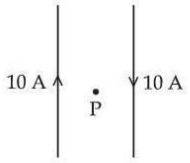
Q.56 A thin metallic wire having cross sectional area of 10^{-4} m^2 is used to make a ring of radius 30 cm. A positive charge of 2π C is uniformly distributed over the ring, while another positive charge of 30 pC is kept at the centre of the ring. The tension in the ring is _____ N; provided that the ring does not get deformed (neglect the influence of gravity).

$\left(\text{given, } \frac{1}{4\pi\epsilon_0} = 9 \times 10^9 \text{ SI units}\right)$

Given --
Answer :

Question Type : SA
Question ID : 533543431
Status : Not Answered

Q.57 Two long, straight wires carry equal currents in opposite directions as shown in figure. The separation between the wires is 5.0 cm. The magnitude of the magnetic field at a point P midway between the wires is _____ μT. (Given : $\mu_0 = 4\pi \times 10^{-7}$ TmA^{-1})



Given 160
Answer :

Question Type : SA
Question ID : 533543433
Status : Answered

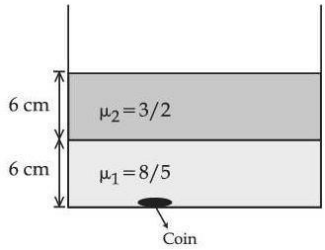
Q.58 If average depth of an ocean is 4000 m and the bulk modulus of water is 2×10^9 Nm^{-2}, then fractional compression $\frac{\Delta V}{V}$ of water at the bottom of ocean is $\alpha \times 10^{-2}$. The value of α is _____. (Given, $g = 10$ ms^{-2}, $\rho = 1000$ $kg\ m^{-3}$)

Given 2
Answer :

Question Type : SA
Question ID : 533543429
Status : Answered

Q.59

Two immiscible liquids of refractive indices $\frac{8}{5}$ and $\frac{3}{2}$ respectively are put in a beaker as shown in the figure. The height of each column is 6 cm. A coin is placed at the bottom of the beaker. For near normal vision, the apparent depth of the coin is $\frac{\alpha}{4}$ cm. The value of α is _____.



Given --
Answer :

Question Type : SA
Question ID : 533543435
Status : Not Answered

Q.60

A particle executes simple harmonic motion with an amplitude of 4 cm. At the mean position, velocity of the particle is 10 cm/s. The distance of the particle from the mean position when its speed becomes 5 cm/s is $\sqrt{\alpha}$ cm, where α=_____.

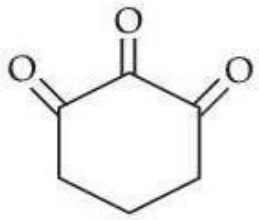
Given 12
Answer :

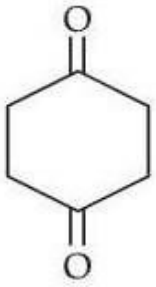
Question Type : SA
Question ID : 533543430
Status : Answered

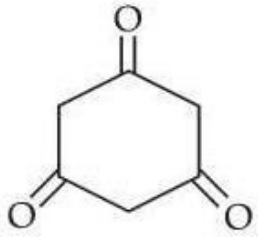
Section : Chemistry Section A

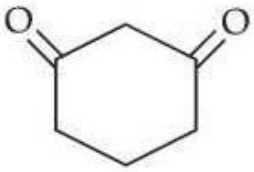
Q.61 Highest enol content will be shown by :

Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 533543452
Option 1 ID : 5335431601
Option 2 ID : 5335431602
Option 3 ID : 5335431603
Option 4 ID : 5335431604
Status : Answered
Chosen Option : 3

Q.62 Two nucleotides are joined together by a linkage known as :

Options

1. Glycosidic linkage
2. Peptide linkage
3. Disulphide linkage
4. Phosphodiester linkage

Question Type : MCQ
Question ID : 533543454
Option 1 ID : 5335431610
Option 2 ID : 5335431612
Option 3 ID : 5335431609
Option 4 ID : 5335431611
Status : Answered
Chosen Option : 4

Q.63 The correct statement regarding nucleophilic substitution reaction in a chiral alkyl halide is :

Options 1.

Racemisation occurs in S_N1 reaction and inversion occurs in S_N2 reaction.

2.

Racemisation occurs in S_N1 reaction and retention occurs in S_N2 reaction.

3.

Racemisation occurs in both S_N1 and S_N2 reactions.

4.

Retention occurs in S_N1 reaction and inversion occurs in S_N2 reaction.

Question Type : MCQ
Question ID : 533543449
Option 1 ID : 5335431592
Option 2 ID : 5335431591
Option 3 ID : 5335431589
Option 4 ID : 5335431590
Status : Answered
Chosen Option : 1

Q.64 Consider the following complex ions

$P = [FeF_6]^{3-}$

$Q = [V(H_2O)_6]^{2+}$

$R = [Fe(H_2O)_6]^{2+}$

The correct order of the complex ions, according to their spin only magnetic moment values (in B.M.) is :

Options

1. $R < Q < P$
2. $R < P < Q$
3. $Q < P < R$
4. $Q < R < P$

Question Type : MCQ
Question ID : 533543445
Option 1 ID : 5335431573
Option 2 ID : 5335431576
Option 3 ID : 5335431575
Option 4 ID : 5335431574
Status : Answered
Chosen Option : 4

Q.65 Element not showing variable oxidation state is :

Options

1. Chlorine
2. Fluorine
3. Bromine
4. Iodine

Question Type : MCQ
Question ID : 533543441
Option 1 ID : 5335431558
Option 2 ID : 5335431557
Option 3 ID : 5335431559
Option 4 ID : 5335431560
Status : Answered
Chosen Option : 2

Q.66

Cyclohexene  is _____ type of an organic compound.

Options

1. Acyclic
2. Alicyclic
3. Benzenoid aromatic
4. Benzenoid non-aromatic

Question Type : MCQ
Question ID : 533543447
Option 1 ID : 5335431581
Option 2 ID : 5335431582
Option 3 ID : 5335431583
Option 4 ID : 5335431584
Status : Answered
Chosen Option : 2

Q.67

The electronic configuration for Neodymium is :
[Atomic Number for Neodymium 60]

Options

1. [Xe] $4f^4\ 6s^2$
2. [Xe] $4f^6\ 6s^2$
3. [Xe] $5f^7\ 7s^2$
4. [Xe] $4f^1\ 5d^1\ 6s^2$

Question Type : MCQ
Question ID : 533543444
Option 1 ID : 5335431570
Option 2 ID : 5335431571
Option 3 ID : 5335431572
Option 4 ID : 5335431569
Status : Not Answered
Chosen Option : --

Q.68 Given below are two statements : one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : Melting point of Boron (2453 K) is unusually high in group 13 elements.

Reason (R) : Solid Boron has very strong crystalline lattice.

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

Options 1.

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

2.

Both **(A)** and **(R)** are correct but **(R)** is **not** 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 : 533543442
Option 1 ID : 5335431561
Option 2 ID : 5335431562
Option 3 ID : 5335431564
Option 4 ID : 5335431563
Status : Not Answered
Chosen Option : --

Q.69 Which of the following electronic configuration would be associated with the highest magnetic moment ?

Options

1. $[Ar]\ 3d^3$

2. $[Ar]\ 3d^6$

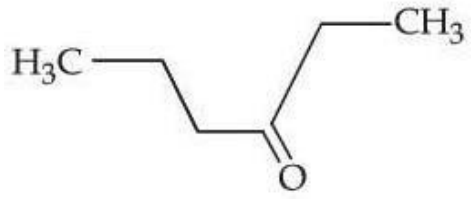
3. $[Ar]\ 3d^7$

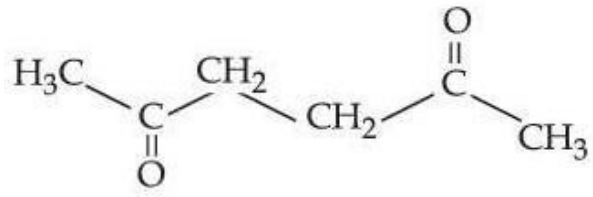
4. $[Ar]\ 3d^8$

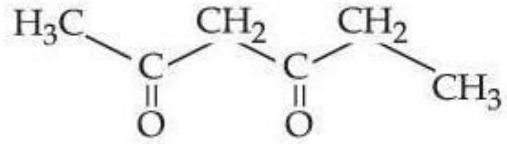
Question Type : MCQ
Question ID : 533543443
Option 1 ID : 5335431567
Option 2 ID : 5335431566
Option 3 ID : 5335431568
Option 4 ID : 5335431565
Status : Answered
Chosen Option : 2

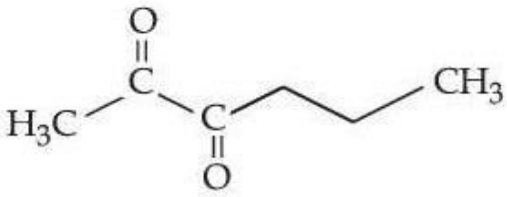
Q.70 Which of the following has highly acidic hydrogen ?

Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 533543448
Option 1 ID : 5335431585
Option 2 ID : 5335431587
Option 3 ID : 5335431586
Option 4 ID : 5335431588
Status : Answered
Chosen Option : 4

Q.71 Given below are two statements :

Statement (I) : p-nitrophenol is more acidic than m-nitrophenol and o-nitrophenol.

Statement (II) : Ethanol will give immediate turbidity with Lucas reagent.

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

Options

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

Question Type : MCQ
Question ID : 533543450
Option 1 ID : 5335431596
Option 2 ID : 5335431593
Option 3 ID : 5335431594
Option 4 ID : 5335431595
Status : Answered
Chosen Option : 4

Q.72 Choose the polar molecule from the following :

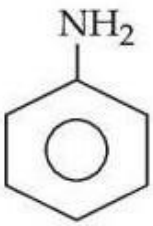
Options

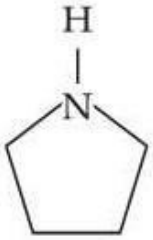
1. $CH_2=CH_2$
2. $CHCl_3$
3. CCl_4
4. CO_2

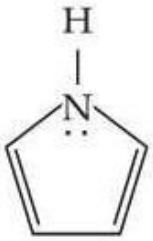
Question Type : MCQ
Question ID : 533543437
Option 1 ID : 5335431544
Option 2 ID : 5335431543
Option 3 ID : 5335431541
Option 4 ID : 5335431542
Status : Answered
Chosen Option : 3

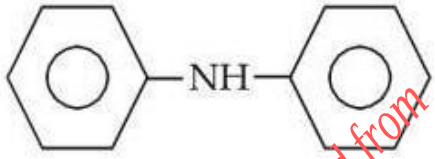
Q.73 Which of the following is strongest Bronsted base ?

Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 533543453
Option 1 ID : 5335431605
Option 2 ID : 5335431607
Option 3 ID : 5335431608
Option 4 ID : 5335431606
Status : Answered
Chosen Option : 3

Q.74 NaCl reacts with conc. H_2SO_4 and $K_2Cr_2O_7$ to give reddish fumes (B), which react with NaOH to give yellow solution (C). (B) and (C) respectively are :

Options

1. CrO_2Cl_2, Na_2CrO_4
2. CrO_2Cl_2, $Na_2Cr_2O_7$
3. Na_2CrO_4, CrO_2Cl_2
4. CrO_2Cl_2, $KHSO_4$

Question Type : MCQ
Question ID : 533543456
Option 1 ID : 5335431618
Option 2 ID : 5335431619
Option 3 ID : 5335431620
Option 4 ID : 5335431617
Status : Answered
Chosen Option : 1

Q.75 Given below are two statements :

Statement (I) : The 4*f* and 5*f* - series of elements are placed separately in the Periodic table to preserve the principle of classification.

Statement (II) : s-block elements can be found in pure form in nature.

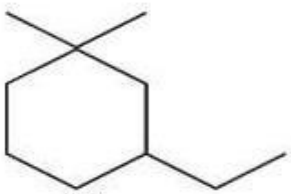
In the light of the above statements, choose the **most appropriate** answer from the options given below :

Options

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

Question Type : MCQ
Question ID : 533543440
Option 1 ID : 5335431554
Option 2 ID : 5335431553
Option 3 ID : 5335431556
Option 4 ID : 5335431555
Status : Not Answered
Chosen Option : --

Q.76 IUPAC name of following compound (P) is :



(P)

Options

1. 3-Ethyl-1,1-dimethylcyclohexane
2. 1-Ethyl-5,5-dimethylcyclohexane
3. 1,1-Dimethyl-3-ethylcyclohexane
4. 1-Ethyl-3,3-dimethylcyclohexane

Question Type : MCQ
Question ID : 533543446
Option 1 ID : 5335431580
Option 2 ID : 5335431578
Option 3 ID : 5335431577
Option 4 ID : 5335431579
Status : Answered
Chosen Option : 4

Q.77 A solution of two miscible liquids showing negative deviation from Raoult's law will have :

Options

1. decreased vapour pressure, increased boiling point
2. decreased vapour pressure, decreased boiling point
3. increased vapour pressure, increased boiling point
4. increased vapour pressure, decreased boiling point

Question Type : MCQ
Question ID : 533543438
Option 1 ID : 5335431545
Option 2 ID : 5335431547
Option 3 ID : 5335431546
Option 4 ID : 5335431548
Status : Not Answered
Chosen Option : --

Q.78 Yellow compound of lead chromate gets dissolved on treatment with hot NaOH solution. The product of lead formed is a :

Options

1. Neutral complex with coordination number four

2. Tetraanionic complex with coordination number six

3. Dianionic complex with coordination number four

4. Dianionic complex with coordination number six

Question Type : MCQ
Question ID : 533543455
Option 1 ID : 5335431616
Option 2 ID : 5335431613
Option 3 ID : 5335431614
Option 4 ID : 5335431615
Status : Not Answered
Chosen Option : --

Q.79 Given below are two statements :

Statement (I) : Aqueous solution of ammonium carbonate is basic.

Statement (II) : Acidic/basic nature of salt solution of a salt of weak acid and weak base depends on K_a and K_b value of acid and the base forming it.

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

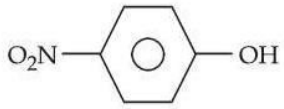
3. Both **Statement I** and **Statement II** are correct

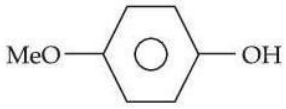
4. **Statement I** is incorrect but **Statement II** is correct

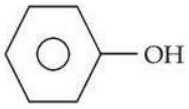
Question Type : MCQ
Question ID : 533543439
Option 1 ID : 5335431551
Option 2 ID : 5335431550
Option 3 ID : 5335431549
Option 4 ID : 5335431552
Status : Not Answered
Chosen Option : --

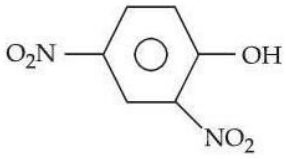
Q.80 The ascending order of acidity of $-OH$ group in the following compounds is :

(A) $Bu-OH$

(B) 

(C) 

(D) 

(E) 

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

Options

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

Question Type : MCQ
Question ID : 533543451
Option 1 ID : 5335431597
Option 2 ID : 5335431598
Option 3 ID : 5335431600
Option 4 ID : 5335431599
Status : Answered
Chosen Option : 4

Section : Chemistry Section B

Q.81 3-Methylhex-2-ene on reaction with HBr in presence of peroxide forms an addition product (A).
The number of possible stereoisomers for 'A' is _____.

Given --
Answer :

Question Type : SA
Question ID : 533543466
Status : Not Answered

Q.82 Consider the following data for the given reaction

$2\,HI_{(g)} \rightarrow H_{2(g)} + I_{2(g)}$

	1	2	3
HI (mol L^{-1})	0.005	0.01	0.02
Rate (mol $L^{-1}s^{-1}$)	7.5×10^{-4}	3.0×10^{-3}	1.2×10^{-2}

The order of the reaction is _____.

Given --
Answer :

Question Type : SA
Question ID : 533543463
Status : Not Answered

Q.83 Mass of methane required to produce 22 g of CO_2 after complete combustion is _____ g.
(Given Molar mass in g mol^{-1} C = 12.0
H = 1.0
O = 16.0)

Given 8
Answer :

Question Type : SA
Question ID : 533543457
Status : Answered

Q.84 The mass of silver (Molar mass of Ag : 108 $gmol^{-1}$) displaced by a quantity of electricity which displaces 5600 mL of O_2 at S.T.P. will be _____ g.

Given --
Answer :

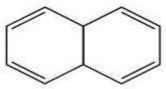
Question Type : SA
Question ID : 533543462
Status : Not Answered

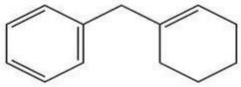
Q.85 The number of electrons present in all the completely filled subshells having n = 4 and $s = +\frac{1}{2}$ is _____.
(Where n = principal quantum number and
s = spin quantum number)

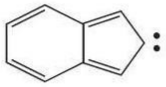
Given 18
Answer :

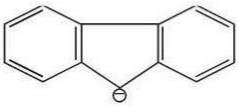
Question Type : SA
Question ID : 533543458
Status : Answered

Q.86 Among the given organic compounds, the total number of aromatic compounds is _____.

(A) 

(B) 

(C) 

(D) 

Given 2
Answer :

Question Type : SA
Question ID : 533543465
Status : Answered

Q.87 Sum of bond order of CO and NO^+ is _____.

Given 6
Answer :

Question Type : SA
Question ID : 533543459
Status : Answered

Q.88 From the given list, the number of compounds with +4 oxidation state of Sulphur is _____.
SO_3, H_2SO_3, $SOCl_2$, SF_4, $BaSO_4$, $H_2S_2O_7$

Given 4
Answer :

Question Type : SA
Question ID : 533543461
Status : Answered

Q.89 If three moles of an ideal gas at 300 K expand isothermally from 30 dm^3 to 45 dm^3 against a constant opposing pressure of 80 kPa, then the amount of heat transferred is _____ J.

Given --
Answer :

Question Type : SA
Question ID : 533543460
Status : Not Answered

Q.90 Among the following, total number of meta directing functional groups is _____.
(Integer based)
$-OCH_3$, $-NO_2$, $-CN$, $-CH_3$, $-NHCOCH_3$, $-COR$, $-OH$, $-COOH$, $-Cl$

Given --
Answer :

Question Type : SA
Question ID : 533543464
Status : Not Answered