

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

Application No	
Candidate Name	
Roll No.	
Test Date	31/01/2024
Test Time	9:00 AM - 12:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1

Let $g(x)$ be a linear function and $f(x) = \begin{cases} g(x) & , x \leq 0 \\ \left(\frac{1+x}{2+x}\right)^{\frac{1}{x}} & , x > 0 \end{cases}$, is continuous at $x = 0$.

If $f'(1) = f'(-1)$, then the value $g(3)$ is

Options

1. $\frac{1}{3} \log_e \left(\frac{4}{9} \right) + 1$
2. $\log_e \left(\frac{4}{9} \right) - 1$
3. $\frac{1}{3} \log_e \left(\frac{4}{9e^{1/3}} \right)$
4. $\log_e \left(\frac{4}{9e^{1/3}} \right)$

Question Type : MCQ

Question ID : 4058591113

Option 1 ID : 4058593535

Option 2 ID : 4058593536

Option 3 ID : 4058593533

Option 4 ID : 4058593534

Status : Not Answered

Chosen Option : --

Q.2 Let S be the set of positive integral values of a for which

$$\frac{ax^2 + 2(a+1)x + 9a + 4}{x^2 - 8x + 32} < 0, \forall x \in \mathbb{R}. \text{ Then, the number of elements in S is :}$$

Options

1. ∞
2. 1
3. 3
4. 0

Question Type : MCQ

Question ID : 4058591106

Option 1 ID : 4058593508

Option 2 ID : 4058593505

Option 3 ID : 4058593506

Option 4 ID : 4058593507

Status : Answered

Chosen Option : 1

Q.3 Three rotten apples are accidentally mixed with fifteen good apples. Assuming the random variable x to be the number of rotten apples in a draw of two apples, the variance of x is

Options

1. $\frac{57}{153}$
2. $\frac{37}{153}$
3. $\frac{40}{153}$
4. $\frac{47}{153}$

Question Type : MCQ

Question ID : 4058591121

Option 1 ID : 4058593568

Option 2 ID : 4058593565

Option 3 ID : 4058593566

Option 4 ID : 4058593567

Status : Not Answered

Chosen Option : --

Q.4 For $\alpha, \beta, \gamma \neq 0$, if $\sin^{-1} \alpha + \sin^{-1} \beta + \sin^{-1} \gamma = \pi$ and $(\alpha + \beta + \gamma)(\alpha - \gamma + \beta) = 3\alpha\beta$, then γ equals

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

Question Type : MCQ

Question ID : 4058591124

Option 1 ID : 4058593580

Option 2 ID : 4058593578

Option 3 ID : 4058593577

Option 4 ID : 4058593579

Status : Not Answered

Chosen Option : --

Q.5 $\lim_{x \rightarrow 0} \frac{e^{2|\sin x|} - 2|\sin x| - 1}{x^2}$

- Options
1. is equal to 1
 2. is equal to -1
 3. does not exist
 4. is equal to 2

Question Type : MCQ

Question ID : 4058591110

Option 1 ID : 4058593522

Option 2 ID : 4058593523

Option 3 ID : 4058593524

Option 4 ID : 4058593521

Status : Not Answered

Chosen Option : --

Q.6

The area of the region $\left\{ (x, y) : y^2 \leq 4x, x < 4, \frac{xy(x-1)(x-2)}{(x-3)(x-4)} > 0, x \neq 3 \right\}$ is

- Options
1. $\frac{32}{3}$
 2. $\frac{64}{3}$
 3. $\frac{16}{3}$
 4. $\frac{8}{3}$

Question Type : MCQ

Question ID : 4058591114

Option 1 ID : 4058593539

Option 2 ID : 4058593540

Option 3 ID : 4058593538

Option 4 ID : 4058593537

Status : Answered

Chosen Option : 1

Q.7

If $f(x) = \frac{4x+3}{6x-4}, x \neq \frac{2}{3}$ and $(f \circ f)(x) = g(x)$, where $g: \mathbb{R} - \left\{ \frac{2}{3} \right\} \rightarrow \mathbb{R} - \left\{ \frac{2}{3} \right\}$, then

$(g \circ g \circ g)(4)$ is equal to

- Options
1. -4
 2. $-\frac{19}{20}$
 3. 4
 4. $\frac{19}{20}$

Question Type : MCQ

Question ID : 4058591105

Option 1 ID : 4058593504

Option 2 ID : 4058593503

Option 3 ID : 4058593502

Option 4 ID : 4058593501

Status : Answered

Chosen Option : 3

Q.8 The sum of the series $\frac{1}{1-3 \cdot 1^2+1^4} + \frac{2}{1-3 \cdot 2^2+2^4} + \frac{3}{1-3 \cdot 3^2+3^4} + \dots$ up to 10-terms is

- Options
1. $\frac{55}{109}$
 2. $-\frac{55}{109}$
 3. $\frac{45}{109}$
 4. $-\frac{45}{109}$

Question Type : MCQ

Question ID : 4058591109

Option 1 ID : 4058593518

Option 2 ID : 4058593519

Option 3 ID : 4058593517

Option 4 ID : 4058593520

Status : Not Answered

Chosen Option : --

Q.9 Two marbles are drawn in succession from a box containing 10 red, 30 white, 20 blue and 15 orange marbles, with replacement being made after each drawing. Then the probability, that first drawn marble is red and second drawn marble is white, is

- Options
1. $\frac{2}{3}$
 2. $\frac{2}{25}$
 3. $\frac{4}{25}$
 4. $\frac{4}{75}$

Question Type : MCQ

Question ID : 4058591123

Option 1 ID : 4058593576

Option 2 ID : 4058593574

Option 3 ID : 4058593573

Option 4 ID : 4058593575

Status : Answered

Chosen Option : 3

Q.10 If the system of linear equations

$$x - 2y + z = -4$$

$$2x + \alpha y + 3z = 5$$

$$3x - y + \beta z = 3$$

has infinitely many solutions, then $12\alpha + 13\beta$ is equal to

Options

1. 64
2. 60
3. 54
4. 58

Question Type : MCQ

Question ID : 4058591108

Option 1 ID : 4058593516

Option 2 ID : 4058593515

Option 3 ID : 4058593513

Option 4 ID : 4058593514

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.11

If the foci of a hyperbola are same as that of the ellipse $\frac{x^2}{9} + \frac{y^2}{25} = 1$ and the

eccentricity of the hyperbola is $\frac{15}{8}$ times the eccentricity of the ellipse, then the

smaller focal distance of the point $\left(\sqrt{2}, \frac{14}{3}\sqrt{\frac{2}{5}}\right)$ on the hyperbola, is equal to

Options

1. $7\sqrt{\frac{2}{5}} - \frac{8}{3}$
2. $14\sqrt{\frac{2}{5}} - \frac{16}{3}$
3. $7\sqrt{\frac{2}{5}} + \frac{8}{3}$
4. $14\sqrt{\frac{2}{5}} - \frac{4}{3}$

Question Type : MCQ

Question ID : 4058591120

Option 1 ID : 4058593563

Option 2 ID : 4058593564

Option 3 ID : 4058593561

Option 4 ID : 4058593562

Status : Not Answered

Chosen Option : --

Q.12 Let a be the sum of all coefficients in the expansion of

$$(1-2x+2x^2)^{2023} (3-4x^2+2x^3)^{2024} \text{ and } b = \lim_{x \rightarrow 0} \left(\frac{\int_0^x \frac{\log(1+t)}{t^{2024} + 1} dt}{x^2} \right).$$

If the equations $cx^2 + dx + e = 0$ and $2bx^2 + ax + 4 = 0$ have a common root, where $c, d, e \in \mathbb{R}$, then $d : c : e$ equals

- Options
1. 4 : 1 : 4
 2. 2 : 1 : 4
 3. 1 : 1 : 4
 4. 1 : 2 : 4

Question Type : MCQ

Question ID : 4058591111

Option 1 ID : 4058593527

Option 2 ID : 4058593525

Option 3 ID : 4058593526

Option 4 ID : 4058593528

Status : Not Answered

Chosen Option : --

Q.13 Let $\alpha, \beta, \gamma, \delta \in \mathbb{Z}$ and let $A(\alpha, \beta)$, $B(1, 0)$, $C(\gamma, \delta)$ and $D(1, 2)$ be the vertices of a parallelogram ABCD. If $AB = \sqrt{10}$ and the points A and C lie on the line $3y = 2x + 1$, then $2(\alpha + \beta + \gamma + \delta)$ is equal to

- Options
1. 10
 2. 5
 3. 8
 4. 12

Question Type : MCQ

Question ID : 4058591118

Option 1 ID : 4058593555

Option 2 ID : 4058593553

Option 3 ID : 4058593554

Option 4 ID : 4058593556

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.14 The distance of the point $Q(0,2,-2)$ from the line passing through the point $P(5, -4, 3)$ and perpendicular to the lines $\vec{r} = (-3\hat{i} + 2\hat{k}) + \lambda(2\hat{i} + 3\hat{j} + 5\hat{k}), \lambda \in \mathbb{R}$ and $\vec{r} = (\hat{i} - 2\hat{j} + \hat{k}) + \mu(-\hat{i} + 3\hat{j} + 2\hat{k}), \mu \in \mathbb{R}$ is :

- Options
1. $\sqrt{74}$
 2. $\sqrt{86}$
 3. $\sqrt{54}$
 4. $\sqrt{20}$

Question Type : MCQ

Question ID : 4058591119

Option 1 ID : 4058593558

Option 2 ID : 4058593557

Option 3 ID : 4058593559

Option 4 ID : 4058593560

Status : Not Answered

Chosen Option : --

Q.15 If $f(x) = \begin{vmatrix} x^3 & 2x^2+1 & 1+3x \\ 3x^2+2 & 2x & x^3+6 \\ x^3-x & 4 & x^2-2 \end{vmatrix}$ for all $x \in \mathbb{R}$, then $2f(0) + f'(0)$ is equal to

- Options
1. 48
 2. 24
 3. 42
 4. 18

Question Type : MCQ

Question ID : 4058591107

Option 1 ID : 4058593512

Option 2 ID : 4058593509

Option 3 ID : 4058593511

Option 4 ID : 4058593510

Status : Answered

Chosen Option : 3

Q.16 The solution curve of the differential equation

$$y \frac{dx}{dy} = x(\log_e x - \log_e y + 1), x > 0, y > 0 \text{ passing through the point } (e, 1) \text{ is}$$

Options

1. $\left| \log_e \frac{y}{x} \right| = x$

2. $2 \left| \log_e \frac{x}{y} \right| = y + 1$

3. $\left| \log_e \frac{y}{x} \right| = y^2$

4. $\left| \log_e \frac{x}{y} \right| = y$

Question Type : MCQ

Question ID : 4058591116

Option 1 ID : 4058593547

Option 2 ID : 4058593545

Option 3 ID : 4058593546

Option 4 ID : 4058593548

Status : Not Answered

Chosen Option : --

Q.17 Let $y = y(x)$ be the solution of the differential equation

$$\frac{dy}{dx} = \frac{(\tan x) + y}{\sin x (\sec x - \sin x \tan x)}, x \in \left(\frac{\pi}{2}, \frac{3\pi}{2} \right) \text{ satisfying the condition } y\left(\frac{\pi}{4}\right) = 2.$$

Then, $y\left(\frac{\pi}{3}\right)$ is

Options

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

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

3. $\sqrt{3}(2 + \log_e \sqrt{3})$

4. $\sqrt{3}(1 + 2 \log_e 3)$

Question Type : MCQ

Question ID : 4058591115

Option 1 ID : 4058593541

Option 2 ID : 4058593542

Option 3 ID : 4058593543

Option 4 ID : 4058593544

Status : Not Answered

Chosen Option : --

Q.18 Let $\vec{a} = 3\hat{i} + \hat{j} - 2\hat{k}$, $\vec{b} = 4\hat{i} + \hat{j} + 7\hat{k}$ and $\vec{c} = \hat{i} - 3\hat{j} + 4\hat{k}$ be three vectors. If a vector \vec{p} satisfies $\vec{p} \times \vec{b} = \vec{c} \times \vec{b}$ and $\vec{p} \cdot \vec{a} = 0$, then $\vec{p} \cdot (\hat{i} - \hat{j} - \hat{k})$ is equal to

- Options
1. 36
 2. 32
 3. 24
 4. 28

Question Type : MCQ

Question ID : 4058591122

Option 1 ID : 4058593571

Option 2 ID : 4058593572

Option 3 ID : 4058593570

Option 4 ID : 4058593569

Status : Answered

Chosen Option : 2

Q.19 For $0 < c < b < a$, let $(a + b - 2c)x^2 + (b + c - 2a)x + (c + a - 2b) = 0$ and $a \neq 1$ be one of its root. Then, among the two statements

(I) If $a \in (-1, 0)$, then b cannot be the geometric mean of a and c

(II) If $a \in (0, 1)$, then b may be the geometric mean of a and c

Options

1. only (II) is true

2. Both (I) and (II) are true
3. only (I) is true
4. Neither (I) nor (II) is true

Question Type : MCQ

Question ID : 4058591112

Option 1 ID : 4058593530

Option 2 ID : 4058593531

Option 3 ID : 4058593529

Option 4 ID : 4058593532

Status : Not Answered

Chosen Option : --

Q.20 If one of the diameters of the circle $x^2 + y^2 - 10x + 4y + 13 = 0$ is a chord of another circle C, whose center is the point of intersection of the lines $2x + 3y = 12$ and $3x - 2y = 5$, then the radius of the circle C is :

- Options 1. 4
2. 6
3. $\sqrt{20}$
4. $3\sqrt{2}$

Question Type : MCQ

Question ID : 4058591117

Option 1 ID : 4058593552

Option 2 ID : 4058593550

Option 3 ID : 4058593549

Option 4 ID : 4058593551

Status : Answered

Chosen Option : 4

Section : Mathematics Section B

Q.21 Let $A = \{1, 2, 3, 4\}$ and $R = \{(1, 2), (2, 3), (1, 4)\}$ be a relation on A. Let S be the equivalence relation on A such that $R \subset S$ and the number of elements in S is n. Then, the minimum value of n is _____

Given--
Answer :

Question Type : SA

Question ID : 4058591125

Status : Not Answered

Q.22 The total number of words (with or without meaning) that can be formed out of the letters of the word 'DISTRIBUTION' taken four at a time, is equal to _____

Given--
Answer :

Question Type : SA

Question ID : 4058591127

Status : Not Answered

Q.23 Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be a function defined by $f(x) = \frac{4^x}{4^x + 2}$ and
 $M = \int_{f(a)}^{f(1-a)} x \sin^4(x(1-x)) dx$, $N = \int_{f(a)}^{f(1-a)} \sin^4(x(1-x)) dx$; $a \neq \frac{1}{2}$. If
 $\alpha M = \beta N$, $\alpha, \beta \in \mathbb{N}$, then the least value of $\alpha^2 + \beta^2$ is equal to _____

Given--
Answer :

Question Type : SA

Question ID : 4058591130

Status : Not Answered

Q.24

In the expansion of $(1+x)(1-x^2)\left(1+\frac{3}{x}+\frac{3}{x^2}+\frac{1}{x^3}\right)^5$, $x \neq 0$, the sum of the coefficients of x^3 and x^{-13} is equal to _____

Given 37

Answer :

Question Type : SA

Question ID : 4058591128

Status : Answered

Q.25

If the integral $525 \int_0^{\frac{\pi}{2}} \sin 2x \cos^{\frac{11}{2}} x \left(1 + \cos^{\frac{5}{2}} x\right)^{\frac{1}{2}} dx$ is equal to $(n\sqrt{2} - 64)$, then n is equal to _____

Given --

Answer :

Question Type : SA

Question ID : 4058591131

Status : Not Answered

Q.26

Let $S = (-1, \infty)$ and $f : S \rightarrow \mathbb{R}$ be defined as

$$f(x) = \int_{-1}^x (e^t - 1)^{11} (2t - 1)^5 (t - 2)^7 (t - 3)^{12} (2t - 10)^{61} dt,$$

Let p = Sum of squares of the values of x , where $f(x)$ attains local maxima on S , and q = Sum of the values of x , where $f(x)$ attains local minima on S . Then, the value of $p^2 + 2q$ is _____

Given --

Answer :

Question Type : SA

Question ID : 4058591129

Status : Not Answered

Q.27

If α denotes the number of solutions of $|1 - i|^x = 2^x$ and $\beta = \left(\frac{|z|}{\arg(z)}\right)$, where

$$z = \frac{\pi}{4}(1+i)^4 \left[\frac{1 - \sqrt{\pi}i}{\sqrt{\pi} + i} + \frac{\sqrt{\pi} - i}{1 + \sqrt{\pi}i} \right], i = \sqrt{-1}, \text{ then the distance of the point}$$

(α, β) from the line $4x - 3y = 7$ is _____

Given --

Answer :

Question Type : SA

Question ID : 4058591126

Status : Not Answered

Q.28 Let \vec{a} and \vec{b} be two vectors such that $|\vec{a}| = 1, |\vec{b}| = 4$, and $\vec{a} \cdot \vec{b} = 2$. If $\vec{c} = (2\vec{a} \times \vec{b}) - 3\vec{b}$ and the angle between \vec{b} and \vec{c} is α , then $192 \sin^2 \alpha$ is equal to _____

Given --
Answer :

Question Type : SA
Question ID : 4058591134
Status : Not Answered

Q.29 Let Q and R be the feet of perpendiculars from the point $P(a, a, a)$ on the lines $x = y, z = 1$ and $x = -y, z = -1$ respectively. If $\angle QPR$ is a right angle, then $12 a^2$ is equal to _____

Given --
Answer :

Question Type : SA
Question ID : 4058591133
Status : Not Answered

Q.30 Let the foci and length of the latus rectum of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$ be $(\pm 5, 0)$ and $\sqrt{50}$, respectively. Then, the square of the eccentricity of the hyperbola $\frac{x^2}{b^2} - \frac{y^2}{a^2 b^2} = 1$ equals _____

Given --
Answer :

Question Type : SA
Question ID : 4058591132
Status : Not Answered

Section : Physics Section A

Q.31 Two conductors have the same resistances at 0°C but their temperature coefficients of resistance are α_1 and α_2 . The respective temperature coefficients for their series and parallel combinations are :

- Options
1. $\frac{\alpha_1 + \alpha_2}{2}, \alpha_1 + \alpha_2$
 2. $\alpha_1 + \alpha_2, \frac{\alpha_1 + \alpha_2}{2}$
 3. $\frac{\alpha_1 + \alpha_2}{2}, \frac{\alpha_1 + \alpha_2}{2}$
 4. $\alpha_1 + \alpha_2, \frac{\alpha_1 \alpha_2}{\alpha_1 + \alpha_2}$

Question Type : MCQ

Question ID : 4058591145

Option 1 ID : 4058593632

Option 2 ID : 4058593633

Option 3 ID : 4058593631

Option 4 ID : 4058593634

Status : Answered

Chosen Option : 2

Q.32 The parameter that remains the same for molecules of all gases at a given temperature is :

- Options
1. speed
 2. mass
 3. kinetic energy
 4. momentum

Question Type : MCQ

Question ID : 4058591143

Option 1 ID : 4058593624

Option 2 ID : 4058593623

Option 3 ID : 4058593626

Option 4 ID : 4058593625

Status : Answered

Chosen Option : 4

Q.33 In a plane EM wave, the electric field oscillates sinusoidally at a frequency of 5×10^{10} Hz and an amplitude of 50 Vm^{-1} . The total average energy density of the electromagnetic field of the wave is : [Use $\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 / \text{Nm}^2$]

- Options
1. $2.212 \times 10^{-8} \text{ Jm}^{-3}$
 2. $4.425 \times 10^{-8} \text{ Jm}^{-3}$
 3. $1.106 \times 10^{-8} \text{ Jm}^{-3}$
 4. $2.212 \times 10^{-10} \text{ Jm}^{-3}$

Question Type : MCQ

Question ID : 4058591148

Option 1 ID : 4058593645

Option 2 ID : 4058593646

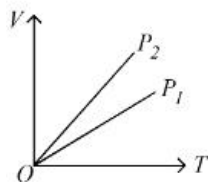
Option 3 ID : 4058593643

Option 4 ID : 4058593644

Status : Answered

Chosen Option : 3

Q.34 The given figure represents two isobaric processes for the same mass of an ideal gas, then



- Options
1. $P_1 = P_2$
 2. $P_1 > P_2$
 3. $P_2 > P_1$
 4. $P_2 \geq P_1$

Question Type : MCQ

Question ID : 4058591142

Option 1 ID : 4058593621

Option 2 ID : 4058593619

Option 3 ID : 4058593620

Option 4 ID : 4058593622

Status : Answered

Chosen Option : 2

Q.35 The relation between time 't' and distance 'x' is $t = \alpha x^2 + \beta x$, where α and β are constants. The relation between acceleration (a) and velocity (v) is :

- Options
1. $a = -3\alpha v^2$
 2. $a = -2\alpha v^3$
 3. $a = -5\alpha v^5$
 4. $a = -4\alpha v^4$

Question Type : MCQ

Question ID : 4058591136

Option 1 ID : 4058593596

Option 2 ID : 4058593595

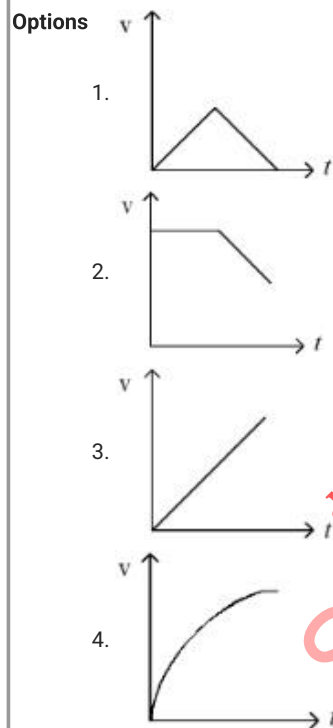
Option 3 ID : 4058593598

Option 4 ID : 4058593597

Status : Answered

Chosen Option : 2

Q.36 A small steel ball is dropped into a long cylinder containing glycerine. Which one of the following is the correct representation of the velocity time graph for the transit of the ball?



Question Type : MCQ

Question ID : 4058591141

Option 1 ID : 4058593616

Option 2 ID : 4058593618

Option 3 ID : 4058593615

Option 4 ID : 4058593617

Status : Answered

Chosen Option : 1

Q.37 If the percentage errors in measuring the length and the diameter of a wire are 0.1% each. The percentage error in measuring its resistance will be:

- Options
1. 0.144%
 2. 0.3%
 3. 0.2%
 4. 0.1%

Question Type : MCQ

Question ID : 4058591154

Option 1 ID : 4058593670

Option 2 ID : 4058593669

Option 3 ID : 4058593668

Option 4 ID : 4058593667

Status : Answered

Chosen Option : 2

Q.38 A coin is placed on a disc. The coefficient of friction between the coin and the disc is μ . If the distance of the coin from the center of the disc is r , the maximum angular velocity which can be given to the disc, so that the coin does not slip away, is :

- Options
1. $\frac{\mu g}{r}$
 2. $\sqrt{\frac{\mu g}{r}}$
 3. $\sqrt{\frac{r}{\mu g}}$
 4. $\frac{\mu}{\sqrt{rg}}$

Question Type : MCQ

Question ID : 4058591137

Option 1 ID : 4058593599

Option 2 ID : 4058593600

Option 3 ID : 4058593601

Option 4 ID : 4058593602

Status : Answered

Chosen Option : 2

Q.39 When a metal surface is illuminated by light of wavelength λ , the stopping potential is 8V. When the same surface is illuminated by light of wavelength 3λ , stopping potential is 2V. The threshold wavelength for this surface is:

- Options
1. 5λ
 2. 3λ
 3. 4.5λ
 4. 9λ

Question Type : MCQ

Question ID : 4058591150

Option 1 ID : 4058593653

Option 2 ID : 4058593652

Option 3 ID : 4058593651

Option 4 ID : 4058593654

Status : Answered

Chosen Option : 4

Q.40

A force is represented by $F = ax^2 + bt^{\frac{1}{2}}$

where x = distance and t = time. The dimensions of b^2/a are:

- Options
1. $[ML^{-1}T^{-1}]$
 2. $[ML^2T^{-3}]$
 3. $[ML^3T^{-3}]$
 4. $[MLT^{-2}]$

Question Type : MCQ

Question ID : 4058591135

Option 1 ID : 4058593592

Option 2 ID : 4058593593

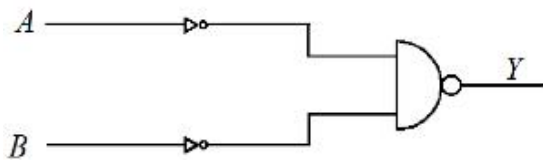
Option 3 ID : 4058593594

Option 4 ID : 4058593591

Status : Answered

Chosen Option : 3

Q.41 Identify the logic operation performed by the given circuit.



- Options
1. NOR
 2. NAND
 3. OR
 4. AND

Question Type : MCQ

Question ID : 4058591152

Option 1 ID : 4058593662

Option 2 ID : 4058593661

Option 3 ID : 4058593660

Option 4 ID : 4058593659

Status : Answered

Chosen Option : 4

Q.42 The fundamental frequency of a closed organ pipe is equal to the first overtone frequency of an open organ pipe. If length of the open pipe is 60 cm, the length of the closed pipe will be:

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

Question Type : MCQ

Question ID : 4058591153

Option 1 ID : 4058593665

Option 2 ID : 4058593663

Option 3 ID : 4058593664

Option 4 ID : 4058593666

Status : Answered

Chosen Option : 4

Q.43 If the wavelength of the first member of Lyman series of hydrogen is λ . The wavelength of the second member will be

- Options
1. $\frac{27}{5}\lambda$
 2. $\frac{27}{32}\lambda$
 3. $\frac{5}{27}\lambda$
 4. $\frac{32}{27}\lambda$

Question Type : MCQ

Question ID : 4058591151

Option 1 ID : 4058593657

Option 2 ID : 4058593655

Option 3 ID : 4058593658

Option 4 ID : 4058593656

Status : Answered

Chosen Option : 2

Q.44 Four identical particles of mass m are kept at the four corners of a square. If the gravitational force exerted on one of the masses by the other masses is

$\left(\frac{2\sqrt{2}+1}{32}\right)\frac{Gm^2}{L^2}$, the length of the sides of the square is

Options 1. $2L$

2. $\frac{L}{2}$

3. $3L$

4. $4L$

Question Type : MCQ

Question ID : 4058591140

Option 1 ID : 4058593613

Option 2 ID : 4058593611

Option 3 ID : 4058593614

Option 4 ID : 4058593612

Status : Answered

Chosen Option : 4

Q.45 Two charges q and $3q$ are separated by a distance ' r ' in air. At a distance x from charge q , the resultant electric field is zero. The value of x is :

Options 1. $r(1+\sqrt{3})$

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

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

4. $\frac{r}{3(1+\sqrt{3})}$

Question Type : MCQ

Question ID : 4058591144

Option 1 ID : 4058593627

Option 2 ID : 4058593628

Option 3 ID : 4058593629

Option 4 ID : 4058593630

Status : Answered

Chosen Option : 3

Q.46 A coil is placed perpendicular to a magnetic field of 5000 T. When the field is changed to 3000 T in 2 s, an induced emf of 22 V is produced in the coil. If the diameter of the coil is 0.02 m, then the number of turns in the coil is:

- Options
1. 140
 2. 35
 3. 70
 4. 7

Question Type : MCQ

Question ID : 4058591147

Option 1 ID : 4058593640

Option 2 ID : 4058593641

Option 3 ID : 4058593642

Option 4 ID : 4058593639

Status : Answered

Chosen Option : 3

Q.47 The refractive index of a prism with apex angle A is $\cot A/2$. The angle of minimum deviation is :

- Options
1. $\delta_m = 180^\circ - 2A$
 2. $\delta_m = 180^\circ - 3A$
 3. $\delta_m = 180^\circ - A$
 4. $\delta_m = 180^\circ - 4A$

Question Type : MCQ

Question ID : 4058591149

Option 1 ID : 4058593647

Option 2 ID : 4058593648

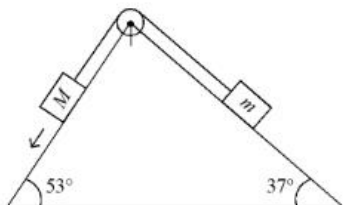
Option 3 ID : 4058593650

Option 4 ID : 4058593649

Status : Answered

Chosen Option : 3

- Q.48** In the given arrangement of a doubly inclined plane two blocks of masses M and m are placed. The blocks are connected by a light string passing over an ideal pulley as shown. The coefficient of friction between the surface of the plane and the blocks is 0.25. The value of m , for which $M = 10 \text{ kg}$ will move down with an acceleration of 2 m/s^2 , is: (take $g = 10 \text{ m/s}^2$ and $\tan 37^\circ = 3/4$)



- Options**
1. 2.25 kg
 2. 6.5 kg
 3. 9 kg
 4. 4.5 kg

Question Type : MCQ

Question ID : 4058591138

Option 1 ID : 4058593605

Option 2 ID : 4058593606

Option 3 ID : 4058593604

Option 4 ID : 4058593603

Status : Answered

Chosen Option : 4

- Q.49** An artillery piece of mass M_1 fires a shell of mass M_2 horizontally. Instantaneously after the firing, the ratio of kinetic energy of the artillery and that of the shell is:

- Options**
1. $M_2 / (M_1 + M_2)$
 2. $\frac{M_1}{M_2}$
 3. $\frac{M_2}{M_1}$
 4. $M_1 / (M_1 + M_2)$

Question Type : MCQ

Question ID : 4058591139

Option 1 ID : 4058593610

Option 2 ID : 4058593607

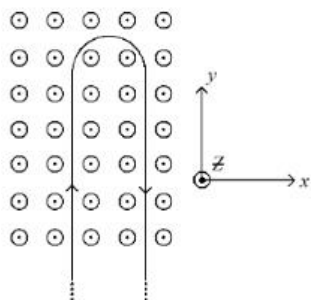
Option 3 ID : 4058593608

Option 4 ID : 4058593609

Status : Answered

Chosen Option : 2

- Q.50** A rigid wire consists of a semicircular portion of radius R and two straight sections. The wire is partially immersed in a perpendicular magnetic field $B = B_0 \hat{j}$ as shown in figure. The magnetic force on the wire if it has a current i is:



- Options
1. $2iBR \hat{j}$
 2. $-2iBR \hat{j}$
 3. $-iBR \hat{j}$
 4. $iBR \hat{j}$

Question Type : MCQ

Question ID : 4058591146

Option 1 ID : 4058593635

Option 2 ID : 4058593636

Option 3 ID : 4058593638

Option 4 ID : 4058593637

Status : Answered

Chosen Option : 2

Section : Physics Section B

- Q.51** The mass defect in a particular reaction is 0.4g. The amount of energy liberated is $n \times 10^7$ kWh, where $n =$ _____.

(speed of light = 3×10^8 m/s)

Given 1

Answer :

Question Type : SA

Question ID : 4058591164

Status : Answered

- Q.52** The depth below the surface of sea to which a rubber ball be taken so as to decrease its volume by 0.02% is _____ m.

(Take density of sea water = 10^3 kgm^{-3} , Bulk modulus of rubber = $9 \times 10^8 \text{ Nm}^{-2}$, and $g = 10 \text{ ms}^{-2}$)

Given --

Answer :

Question Type : SA

Question ID : 4058591157

Status : Not Answered

Q.53 A solid circular disc of mass 50 kg rolls along a horizontal floor so that its center of mass has a speed of 0.4 m/s. The absolute value of work done on the disc to stop it is _____ J.

Given --
Answer :

Question Type : SA
Question ID : 4058591156
Status : Not Answered

Q.54 A body starts falling freely from height H hits an inclined plane in its path at height h . As a result of this perfectly elastic impact, the direction of the velocity of the body becomes horizontal. The value of $\frac{H}{h}$ for which the body will take the maximum time to reach the ground is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591155
Status : Not Answered

Q.55 A small square loop of wire of side l is placed inside a large square loop of wire of side L ($L = l^2$). The loops are coplanar and their centers coincide. The value of the mutual inductance of the system is $\sqrt{x} \times 10^{-7} H$, where $x =$ _____.

Given --
Answer :

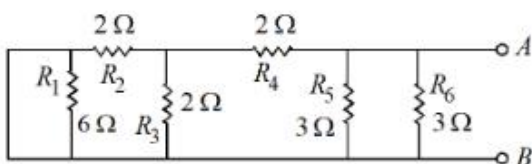
Question Type : SA
Question ID : 4058591162
Status : Not Answered

Q.56 A particle performs simple harmonic motion with amplitude A . Its speed is increased to three times at an instant when its displacement is $\frac{2A}{3}$. The new amplitude of motion is $\frac{nA}{3}$. The value of n is _____.

Given --
Answer :

Question Type : SA
Question ID : 4058591158
Status : Not Answered

Q.57 Equivalent resistance of the following network is _____ Ω .



Given 1
Answer :

Question Type : SA
Question ID : 4058591160
Status : Answered

Q.58 An electron moves through a uniform magnetic field $\vec{B} = B_0 \hat{i} + 2B_0 \hat{j} T$. At a particular instant of time, the velocity of electron is $\vec{u} = 3\hat{i} + 5\hat{j} m/s$. If the magnetic force acting on electron is $\vec{F} = 5e\hat{k} N$, where e is the charge of electron, then the value of B_0 is _____ T .

Given 5
Answer :

Question Type : SA
Question ID : 4058591161
Status : Answered

Q.59 Two waves of intensity ratio 1:9 cross each other at a point. The resultant intensities at that point, when (a) Waves are incoherent is I_1 (b) Waves are coherent is I_2 and differ in phase by 60° . If $\frac{I_1}{I_2} = \frac{x}{10}$ then $x =$ _____.

Given 13
Answer :

Question Type : SA
Question ID : 4058591163
Status : Answered

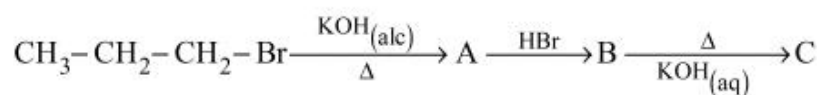
Q.60 A parallel plate capacitor with plate separation 5 mm is charged up by a battery. It is found that on introducing a dielectric sheet of thickness 2 mm, while keeping the battery connections intact, the capacitor draws 25% more charge from the battery than before. The dielectric constant of the sheet is _____.

Given 1.25
Answer :

Question Type : SA
Question ID : 4058591159
Status : Answered

Section : Chemistry Section A

Q.61 The product (C) in the below mentioned reaction is :



- Options
1. Propyne
 2. Propan-2-ol
 3. Propan-1-ol
 4. Propene

Question Type : MCQ

Question ID : 4058591180

Option 1 ID : 4058593742

Option 2 ID : 4058593744

Option 3 ID : 4058593743

Option 4 ID : 4058593741

Status : Answered

Chosen Option : 2

Q.62 Integrated rate law equation for a first order gas phase reaction is given by

(where P_i is initial pressure and P_t is total pressure at time t)

Options

1. $k = \frac{2.303}{t} \times \log \frac{(2P_i - P_t)}{P_i}$

2. $k = \frac{2.303}{t} \times \log \frac{P_i}{(2P_i - P_t)}$

3. $k = \frac{2.303}{t} \times \log \frac{2P_i}{(2P_i - P_t)}$

4. $k = \frac{2.303}{t} \times \frac{P_i}{(2P_i - P_t)}$

Question Type : MCQ

Question ID : 4058591169

Option 1 ID : 4058593697

Option 2 ID : 4058593698

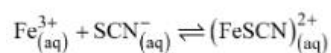
Option 3 ID : 4058593699

Option 4 ID : 4058593700

Status : Not Answered

Chosen Option : --

Q.63 For the given reaction, choose the correct expression of K_C from the following :-



Options

1. $K_C = \frac{[\text{FeSCN}^{2+}]^2}{[\text{Fe}^{3+}][\text{SCN}^{-}]}$

2. $K_C = \frac{[\text{FeSCN}^{2+}]}{[\text{Fe}^{3+}][\text{SCN}^{-}]}$

3. $K_C = \frac{[\text{Fe}^{3+}][\text{SCN}^{-}]}{[\text{FeSCN}^{2+}]}$

4. $K_C = \frac{[\text{FeSCN}^{2+}]}{[\text{Fe}^{3+}]^2[\text{SCN}^{-}]^2}$

Question Type : MCQ

Question ID : 4058591167

Option 1 ID : 4058593689

Option 2 ID : 4058593691

Option 3 ID : 4058593692

Option 4 ID : 4058593690

Status : Answered

Chosen Option : 2

Q.64 Consider the oxides of group 14 elements

SiO_2 , GeO_2 , SnO_2 , PbO_2 , CO and GeO . The amphoteric oxides are

Options 1. SnO_2 , PbO_2

2. GeO , GeO_2

3. SiO_2 , GeO_2

4. SnO_2 , CO

Question Type : MCQ

Question ID : 4058591171

Option 1 ID : 4058593708

Option 2 ID : 4058593707

Option 3 ID : 4058593705

Option 4 ID : 4058593706

Status : Answered

Chosen Option : 3

Q.65 Match List I with List II

LIST I		LIST II	
A.	Glucose/ NaHCO_3/Δ	I.	Gluconic acid
B.	Glucose/ HNO_3	II.	No reaction
C.	Glucose/ HI/Δ	III.	n-hexane
D.	Glucose/Bromine water	IV.	Saccharic acid

Choose the correct answer from the options given below:

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

Question Type : MCQ

Question ID : 4058591183

Option 1 ID : 4058593755

Option 2 ID : 4058593756

Option 3 ID : 4058593754

Option 4 ID : 4058593753

Status : Answered

Chosen Option : 4

Q.66 The compound that is white in color is

- Options
1. ammonium arsinomolybdate
 2. ammonium sulphide
 3. lead sulphate
 4. lead iodide

Question Type : MCQ

Question ID : 4058591184

Option 1 ID : 4058593757

Option 2 ID : 4058593760

Option 3 ID : 4058593759

Option 4 ID : 4058593758

Status : Answered

Chosen Option : 4

Q.67 Given below are two statements: One is labelled as **Assertion A** and the other is labelled as **Reason R**:

Assertion A: pK_a value of phenol is 10.0 while that of ethanol is 15.9.

Reason R: Ethanol is stronger acid than phenol.

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

- Options
1. A is false but R is true.
 2. Both A and R are true but R is NOT the correct explanation of A.
 3. Both A and R are true and R is the correct explanation of A.
 4. A is true but R is false.

Question Type : MCQ

Question ID : 4058591181

Option 1 ID : 4058593748

Option 2 ID : 4058593746

Option 3 ID : 4058593745

Option 4 ID : 4058593747

Status : Answered

Chosen Option : 1

Q.68 The metals that are employed in the battery industries are

- A. Fe
- B. Mn
- C. Ni
- D. Cr
- E. Cd

Choose the correct answer from the options given below:

Options

1. B, C and E only

2. A, B, C, D and E

3. A, B, C and D only

4. B, D and E only

Question Type : MCQ

Question ID : 4058591173

Option 1 ID : 4058593716

Option 2 ID : 4058593713

Option 3 ID : 4058593714

Option 4 ID : 4058593715

Status : Answered

Chosen Option : 1

Q.69 Given below are two statements: One is labelled as **Assertion A** and the other is labelled as **Reason R**:

Assertion A: Alcohols react both as nucleophiles and electrophiles.

Reason R: Alcohols react with active metals such as sodium, potassium and aluminum to yield corresponding alkoxides and liberate hydrogen.

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

- Options
1. Both A and R are true and R is the correct explanation of A.
 2. A is true but R is false.
 3. A is false but R is true.
 4. Both A and R are true but R is NOT the correct explanation of A.

Question Type : MCQ

Question ID : 4058591182

Option 1 ID : 4058593749

Option 2 ID : 4058593751

Option 3 ID : 4058593752

Option 4 ID : 4058593750

Status : Answered

Chosen Option : 4

Q.70 Identify correct statements from below:

- A. The chromate ion is square planar.
- B. Dichromates are generally prepared from chromates.
- C. The green manganate ion is diamagnetic.
- D. Dark green coloured K_2MnO_4 disproportionates in a neutral or acidic medium to give permanganate.
- E. With increasing oxidation number of transition metal, ionic character of the oxides decreases.

Choose the correct answer from the options given below:

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

Question Type : MCQ

Question ID : 4058591172

Option 1 ID : 4058593709

Option 2 ID : 4058593710

Option 3 ID : 4058593712

Option 4 ID : 4058593711

Status : Not Answered

Chosen Option : --

Q.71 The correct sequence of electron gain enthalpy of the elements listed below is

- A. Ar
- B. Br
- C. F
- D. S

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

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

Question Type : MCQ

Question ID : 4058591170

Option 1 ID : 4058593702

Option 2 ID : 4058593703

Option 3 ID : 4058593701

Option 4 ID : 4058593704

Status : Answered

Chosen Option : 3

Q.72 Match List I with List II

LIST I (Technique)		LIST II (Application)	
A.	Distillation	I.	Separation of glycerol from spent-lye
B.	Fractional distillation	II.	Aniline - Water mixture
C.	Steam distillation	III.	Separation of crude oil fractions
D.	Distillation under reduced pressure	IV.	Chloroform - Aniline

Choose the correct answer from the options given below:

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

Question Type : MCQ

Question ID : 4058591176

Option 1 ID : 4058593727

Option 2 ID : 4058593726

Option 3 ID : 4058593728

Option 4 ID : 4058593725

Status : Not Answered

Chosen Option : --

Q.73 A species having carbon with sextet of electrons and can act as electrophile is called

- Options
1. carbon free radical
 2. carbocation
 3. pentavalent carbon
 4. carbanion

Question Type : MCQ

Question ID : 4058591178

Option 1 ID : 4058593734

Option 2 ID : 4058593736

Option 3 ID : 4058593733

Option 4 ID : 4058593735

Status : Answered

Chosen Option : 2

Q.74 'Adsorption' principle is used for which of the following purification method?

- Options
1. Distillation
 2. Sublimation
 3. Extraction
 4. Chromatography

Question Type : MCQ

Question ID : 4058591175

Option 1 ID : 4058593722

Option 2 ID : 4058593724

Option 3 ID : 4058593723

Option 4 ID : 4058593721

Status : Answered

Chosen Option : 4

Q.75 Identify the mixture that shows positive deviations from Raoult's Law

- Options
1. $(\text{CH}_3)_2\text{CO} + \text{CS}_2$
 2. $(\text{CH}_3)_2\text{CO} + \text{C}_6\text{H}_5\text{NH}_2$
 3. $\text{CHCl}_3 + \text{C}_6\text{H}_6$
 4. $\text{CHCl}_3 + (\text{CH}_3)_2\text{CO}$

Question Type : MCQ

Question ID : 4058591166

Option 1 ID : 4058593688

Option 2 ID : 4058593686

Option 3 ID : 4058593687

Option 4 ID : 4058593685

Status : Answered

Chosen Option : 4

Q.76 The linear combination of atomic orbitals to form molecular orbitals takes place only when the combining atomic orbitals

- A. have the same energy
- B. have the minimum overlap
- C. have same symmetry about the molecular axis
- D. have different symmetry about the molecular axis

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

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

Question Type : MCQ

Question ID : 4058591165

Option 1 ID : 4058593684

Option 2 ID : 4058593683

Option 3 ID : 4058593681

Option 4 ID : 4058593682

Status : Not Answered

Chosen Option : --

Q.77 Given below are two statements:

Statement I: IUPAC name of $\text{HO} - \text{CH}_2 - (\text{CH}_2)_3 - \text{CH}_2 - \text{COCH}_3$ is 7-hydroxyheptan-2-one.

Statement II: 2-oxoheptan-7-ol is the correct IUPAC name for above compound.

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 incorrect.
 - 2. Statement I is correct but Statement II is 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 : 4058591179

Option 1 ID : 4058593738

Option 2 ID : 4058593739

Option 3 ID : 4058593737

Option 4 ID : 4058593740

Status : Answered

Chosen Option : 2

Q.78 The correct statements from following are:

- A. The strength of anionic ligands can be explained by crystal field theory.
- B. Valence bond theory does not give a quantitative interpretation of kinetic stability of coordination compounds.
- C. The hybridization involved in formation of $[\text{Ni}(\text{CN})_4]^{2-}$ complex is dsp^2 .
- D. The number of possible isomer(s) of $\text{cis-}[\text{PtCl}_2(\text{en})_2]^{2+}$ is one

Choose the correct answer from the options given below:

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

Question Type : MCQ

Question ID : 4058591174

Option 1 ID : 4058593717

Option 2 ID : 4058593719

Option 3 ID : 4058593718

Option 4 ID : 4058593720

Status : Answered

Chosen Option : 1

Q.79 Identify the factor from the following that *does not* affect electrolytic conductance of a solution.

- Options
- 1. The nature of the electrolyte added.
 - 2. Concentration of the electrolyte.
 - 3. The nature of the electrode used.
 - 4. The nature of solvent used.

Question Type : MCQ

Question ID : 4058591168

Option 1 ID : 4058593693

Option 2 ID : 4058593696

Option 3 ID : 4058593694

Option 4 ID : 4058593695

Status : Answered

Chosen Option : 2

Q.80 Give below are two statements:

Statement - I: Noble gases have very high boiling points.

Statement - II: Noble gases are monoatomic gases. They are held together by strong dispersion forces. Because of this they are liquefied at very low temperature. Hence, they have very high boiling points.

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 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 : 4058591177

Option 1 ID : 4058593730

Option 2 ID : 4058593729

Option 3 ID : 4058593731

Option 4 ID : 4058593732

Status : Answered

Chosen Option : 1

Section : Chemistry Section B

Q.81 Number of alkanes obtained on electrolysis of a mixture of CH_3COONa and $\text{C}_2\text{H}_5\text{COONa}$ is _____.

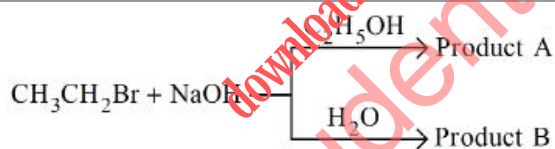
Given 5
Answer :

Question Type : SA

Question ID : 4058591191

Status : Answered

Q.82



The total number of hydrogen atoms in product A and product B is _____.

Given 9
Answer :

Question Type : SA

Question ID : 4058591192

Status : Answered

Q.83 The 'Spin only' Magnetic moment for $[\text{Ni}(\text{NH}_3)_6]^{2+}$ is _____ $\times 10^{-1}$ BM.
(given = Atomic number of Ni : 28)

Given 26
Answer :

Question Type : SA

Question ID : 4058591190

Status : Answered

Q.84 Consider the following reaction at 298 K. $\frac{3}{2}\text{O}_{2(g)} \rightleftharpoons \text{O}_{3(g)}$. $K_p = 2.47 \times 10^{-29}$.

$\Delta_r G^\ominus$ for the reaction is _____ kJ. (Given $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)

Given--

Answer :

Question Type : SA

Question ID : 4058591188

Status : Not Answered

Q.85 Number of moles of methane required to produce 22g $\text{CO}_{2(g)}$ after combustion is $x \times 10^{-2}$ moles. The value of x is _____.

Given 50

Answer :

Question Type : SA

Question ID : 4058591185

Status : Answered

Q.86 The number of species from the following in which the central atom uses sp^3 hybrid orbitals in its bonding is _____.

NH_3 , SO_2 , SiO_2 , BeCl_2 , CO_2 , H_2O , CH_4 , BF_3

Given 2

Answer :

Question Type : SA

Question ID : 4058591187

Status : Answered

Q.87 The ionization energy of sodium in kJ mol^{-1} , if electromagnetic radiation of wavelength 242 nm is just sufficient to ionize sodium atom is _____.

Given--

Answer :

Question Type : SA

Question ID : 4058591186

Status : Not Answered

Q.88 One Faraday of electricity liberates $x \times 10^{-1}$ gram atom of copper from copper sulphate. x is _____.

Given--

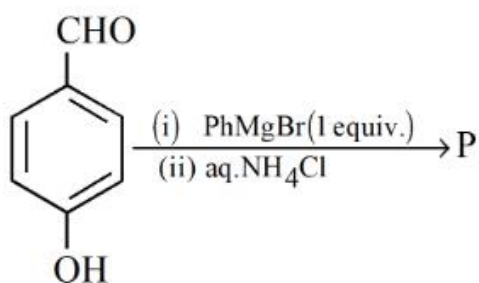
Answer :

Question Type : SA

Question ID : 4058591189

Status : Not Answered

Q.89 The product of the following reaction is P.



The number of hydroxyl groups present in the product P is _____.

Given--
Answer :

Question Type : SA
Question ID : 4058591193
Status : Not Answered

Q.90 Molar mass of the salt from NaBr , NaNO_3 , KI and CaF_2 which does not evolve coloured vapours on heating with concentrated H_2SO_4 is _____ g mol^{-1} .

(Molar mass in g mol^{-1} : Na : 23, N : 14, K : 39, O : 16, Br : 80, I : 127, F : 19, Ca : 40)

Given--
Answer :

Question Type : SA
Question ID : 4058591194
Status : Not Answered