

Questions

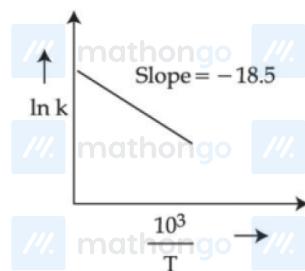
MathonGo

Q1 - 24 June - Shift 1

The rate constants for decomposition of acetaldehyde have been measured over the temperature range 700 – 1000 K. The data has been

analysed by plotting $\ln k$ vs $\frac{10^3}{T}$ graph. The value of activation energy for the reaction is ____ kJ mol⁻¹.

(Nearest integer) (Given: $R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$)



Q2 - 24 June - Shift 2

The correct order of bound orders of $\text{C}_2^{\cdot-}$, $\text{N}_2^{\cdot-}$ and $\text{O}_2^{\cdot-}$ is, respectively.

(A) $\text{C}_2^{\cdot-} < \text{N}_2^{\cdot-} < \text{O}_2^{\cdot-}$

(B) $\text{O}_2^{\cdot-} < \text{N}_2^{\cdot-} < \text{C}_2^{\cdot-}$

(C) $\text{C}_2^{\cdot-} < \text{O}_2^{\cdot-} < \text{N}_2^{\cdot-}$

(D) $\text{N}_2^{\cdot-} < \text{C}_2^{\cdot-} < \text{O}_2^{\cdot-}$

Q3 - 25 June - Shift 1

#MathBoleTohMathonGo

Questions

MathonGo

For a given chemical reaction

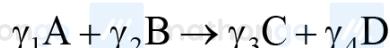
mathongo

mathongo

mathongo

mathongo

Space for your notes:



Concentration of C changes from 10 mmol dm⁻³ to 20 mmol dm⁻³ in 10 seconds. Rate of appearance of D is 1.5 times the rate of disappearance of B which is twice the rate of disappearance of A. The rate of appearance of D has been experimentally determined to be 9 mmol dm⁻³ s⁻¹. Therefore the rate of reaction is _____ mmol dm⁻³ s⁻¹. (Nearest Integer)

Q4 - 25 June - Shift 2

At 345 K, the half life for the decomposition of a sample of a gaseous compound initially at 55.5 kPa was 340 s. When the pressure was 27.8 kPa, the half life was found to be 170 s. The order of the reaction is _____. [integer answer]

mathongo

mathongo

mathongo

mathongo

mathongo

mathongo

Q5 - 26 June - Shift 1

A flask is filled with equal moles of A and B. The half lives of A and B are 100 s and 50 s respectively and are independent of the initial concentration. The time required for the concentration of A to be four times that of B is

s.

(Given : $\ln 2 = 0.693$)

#MathBoleTohMathonGo

Questions

MathonGo

Q6 - 26 June - Shift 2

Catalyst A reduces the activation energy for a reaction by 10 kJ mol^{-1} at 300 K . The ratio of rate

constants, $\frac{k_{\text{Catalysed}}}{k_{\text{Uncatalysed}}} = e^x$. The value of x is _____. [nearest integer]

[Assume that the pre-exponential factor is same in both the cases.]

Given $R = 8.31 \text{ J K}^{-1} \text{ mol}^{-1}$

Q7 - 27 June - Shift 1

The rate constant for a first order reaction is given by the following equation:

$$\ln k = 33.24 - \frac{2.0 \times 10^4 K}{T}$$

The Activation energy for the reaction is given by _____ kJ mol^{-1} . (In Nearest integer)

(Given: $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$)

Q8 - 27 June - Shift 2

It has been found that for a chemical reaction with rise in temperature by 9 K the rate constant gets doubled. Assuming a reaction to be occurring at 300 K , the value of activation energy is found to be _____ kJ mol^{-1} . [nearest integer]

(Given $\ln 10 = 2.3$, $R = 8.3 \text{ JK}^{-1} \text{ mol}^{-1}$, $\log 2 = 0.30$)

Space for your notes:

Questions

MathonGo

Q9 - 28 June - Shift 1

For a first order reaction $A \rightarrow B$, the rate constant, $k = 5.5 \times 10^{-14} \text{ s}^{-1}$. The time required for 67% completion of reaction is $x \times 10^{-1}$ times the half life of reaction. The value of x is _____.

(Nearest integer)

(Given : $\log 3 = 0.4771$)

Space for your notes:

Q10 - 28 June - Shift 2

A radioactive element has a half life of 200 days. The percentage of original activity remaining after 83 days is _____. (Nearest integer)

(Given : antilog 0.125 = 1.333, antilog 0.693 = 4.93)

Space for your notes:

Q11 - 29 June - Shift 1

The activation energy of one of the reactions in a biochemical process is $532611 \text{ J mol}^{-1}$. When the temperature falls from 310 K to 300 K, the change in rate constant observed is $k_{300} = x \times 10^{-3} k_{310}$. The value of x is _____.

[Given: $\ln 10 = 2.3$]

$$R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$$

Space for your notes:

Q12 - 29 June - Shift 2

#MathBoleTohMathonGo

Questions

MathonGo

The equation $k = (6.5 \times 10^{12} \text{ s}^{-1}) e^{-26000\text{K}/T}$ is followed for the decomposition of compound A. The activation energy for the reaction is _____ kJ mol⁻¹. [nearest integer]

Space for your notes:

(Given: R = 8.314 J K⁻¹ mol⁻¹)

#MathBoleTohMathonGo

Questions

MathonGo

Q1 - 25 July - Shift 1

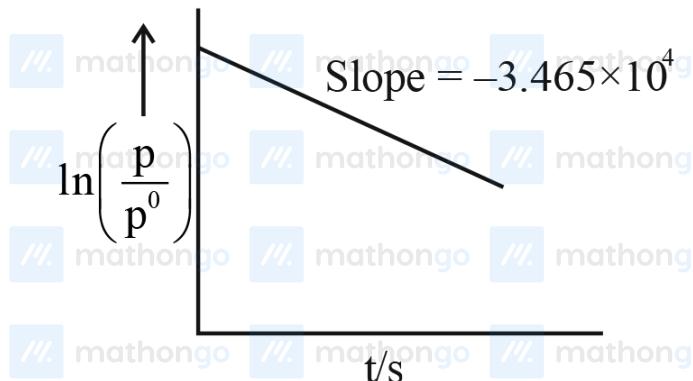
The half life for the decomposition of gaseous compound A is 240 s when the gaseous pressure was 500 Torr initially. When the pressure was 250 Torr, the half life was found to be 4.0 min. The order of the reaction is..... (Nearest integer)

Space for your notes:

Q2 - 25 July - Shift 2

For the decomposition of azomethane.

$\text{CH}_3\text{N}_2\text{CH}_3(\text{g}) \rightarrow \text{CH}_3\text{CH}_3(\text{g}) + \text{N}_2(\text{g})$ a first order reaction, the variation in partial pressure with time at 600 K is given as



The half life of the reaction is _____ $\times 10^{-5}$ s.
[Nearest integer]

Space for your notes:

Q3 - 26 July - Shift 1

For a reaction $\text{A} \rightarrow 2\text{B} + \text{C}$ the half lives are 100 s

and 50 s when the concentration of reactant A is

0.5 and 1.0 mol L⁻¹ respectively. The order of the reaction is _____. (Nearest Integer)

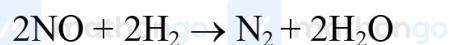
Space for your notes:

Q4 - 26 July - Shift 2

#MathBoleTohMathonGo

At 30°C, the half life for the decomposition of AB_2 is 200 s and is independent of the initial concentration of AB_2 . The time required for 80% of the AB_2 to decompose is (Given: $\log 2 = 0.30$;

O5 - 27 July - Shift 1



The above reaction has been studied at 800°C. The related data are given in the table below

Reaction serial number	Initial pressure of H ₂ / kPa	Initial Pressure of NO/ kPa	Initial rate $\left(\frac{-dp}{dt} \right) / (\text{kPa/s})$
1	65.6	40.0	0.135
2	65.6	20.1	0.033
3	38.6	65.6	0.214
4	19.2	65.6	0.106

The order of the reaction with respect to NO is

Q6 - 27 July - Shift 2

Questions

MathonGo

If formation of compound [B] follows the first order of kinetics and after 70 minutes the concentration of [A] was found to be half of its initial concentration. Then the rate constant of the reaction is $x \times 10^{-6} \text{ s}^{-1}$. The value of x is _____.
(Nearest Integer)

Q7 - 28 July - Shift 1 // mathongo
For the given first order reaction
 $A \rightarrow B$
the half life of the reaction is 0.3010 min. The ratio of the initial concentration of reactant to the concentration of reactant at time 2.0 min will be equal to _____. (Nearest integer)

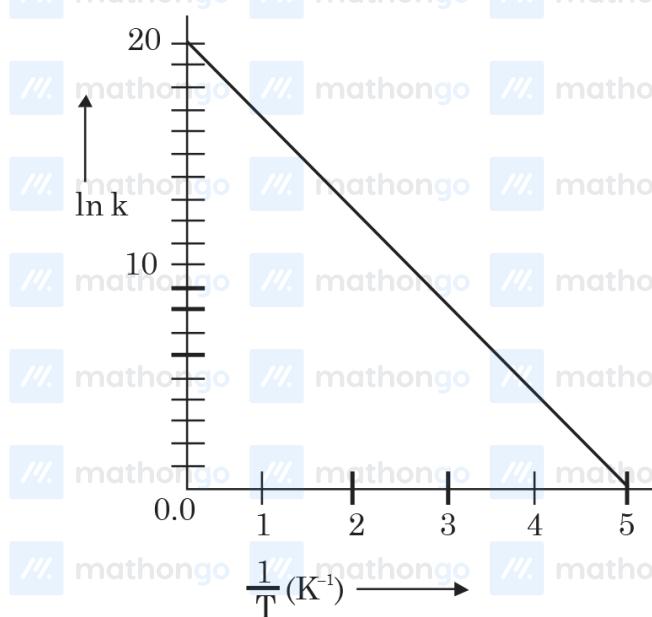
#MathBoleTohMathonGo

Questions

MathonGo

For a reaction given below is the graph of $\ln k$ vs $\frac{1}{T}$. The activation energy for the reaction is equal to _____ cal mol^{-1} . (Nearest integer).

(Given : $R = 2 \text{ cal K}^{-1} \text{ mol}^{-1}$)



Q9 - 29 July - Shift 1

The reaction between X and Y is first order with respect to X and zero order with respect to Y.

Experiment	$[X]$ mol L^{-1}	$[Y]$ mol L^{-1}	Initial rate $\text{mol L}^{-1} \text{ min}^{-1}$
I.	0.1	0.1	2×10^{-3}
II.	L	0.2	4×10^{-3}
III.	0.4	0.4	$M \times 10^{-3}$
IV.	0.1	0.2	2×10^{-3}

Examine the data of table and calculate ratio of numerical values of M and L. (Nearest Integer)

Q10 - 29 July - Shift 2

#MathBoleTohMathonGo

Questions

MathonGo

Assuming 1 μg of trace radioactive element X with a half life of 30 years is absorbed by a growing tree. The amount of X remaining in the tree after

100 years is $\underline{\quad} \times 10^{-1} \mu\text{g}$

[Given : $\ln 10 = 2.303$; $\log 2 = 0.30$]

#MathBoleTohMathonGo

Questions

MathonGo

Q1 - 25 July - Shift 1

A line, with the slope greater than one, passes through the point A(4, 3) and intersects the line $x - y - 2 = 0$ at the point B. If the length of the line segment AB is $\frac{\sqrt{29}}{3}$, then B also lies on the line :

- (A) $2x + y = 9$ (B) $3x - 2y = 7$
 (C) $x + 2y = 6$ (D) $2x - 3y = 3$

Space for your notes:

Q2 - 25 July - Shift 2

Let the point P (α, β) be at a unit distance from each of the two lines $L_1 : 3x - 4y + 12 = 0$, and $L_2 : 8x + 6y + 11 = 0$. If P lies below L_1 and above L_2 , then $100(\alpha + \beta)$ is equal to

- (A) -14 (B) 42
 (C) -22 (D) 14

Space for your notes:

Q3 - 26 July - Shift 1

A point P moves so that the sum of squares of its distances from the points (1, 2) and (-2, 1) is 14. Let $f(x, y) = 0$ be the locus of P, which intersects the x-axis at the points A, B and the y-axis at the point C, D. Then the area of the quadrilateral ACBD is equal to

- (A) $\frac{9}{2}$ (B) $\frac{3\sqrt{17}}{2}$
 (C) $\frac{3\sqrt{17}}{4}$ (D) 9

Space for your notes:

Q4 - 26 July - Shift 1

#MathBoleTohMathonGo

Questions

MathonGo

The equations of the sides AB , BC and CA of a triangle ABC are $2x + y = 0$, $x + py = 15$ and $x - y = 3$ respectively. If its orthocentre is $(2, a)$, $-\frac{1}{2} < a < 2$, then p is equal to

Q5 - 27 July - Shift 1

Let $A(1, 1)$, $B(-4, 3)$ $C(-2, -5)$ be vertices of a triangle ABC , P be a point on side BC , and Δ_1 and

Δ_2 be the areas of triangle APB and ABC .

Respectively.

If $\Delta_1 : \Delta_2 = 4 : 7$, then the area enclosed by the lines AP , AC and the x -axis is

- (A) $\frac{1}{4}$
- (B) $\frac{3}{4}$
- (C) $\frac{1}{2}$
- (D) 1

Q6 - 27 July - Shift 2

The equations of the sides AB , BC and CA of a triangle ABC are $2x + y = 0$, $x + py = 39$ and $x - y = 3$ respectively and $P(2, 3)$ is its circumcentre. Then which of the following is NOT

true :

- (A) $(AC)^2 = 9p$
- (B) $(AC)^2 + p^2 = 136$
- (C) $32 < \text{area } (\Delta ABC) < 36$
- (D) $34 < \text{area } (\Delta ABC) < 38$

#MathBoleTohMathonGo

Questions

MathonGo

Q7 - 28 July - Shift 1

For $t \in (0, 2\pi)$, if ABC is an equilateral triangle with vertices A($\sin t, -\cos t$), B($\cos t, \sin t$) and C(a, b) such that its orthocentre lies on a circle

Space for your notes:

with centre $\left(1, \frac{1}{3}\right)$, then $(a^2 - b^2)$ is equal to :

- (A) $\frac{8}{3}$ (B) 8
 (C) $\frac{77}{9}$ (D) $\frac{80}{9}$

Q8 - 29 July - Shift 1

Let the circumcentre of a triangle with vertices A(a, 3), B(b, 5) and C(a, b), $ab > 0$ be P(1, 1). If the line AP intersects the line BC at the point

Space for your notes:

$Q(k_1, k_2)$, then $k_1 + k_2$ is equal to :

- (A) 2 (B) $\frac{4}{7}$ (C) $\frac{2}{7}$ (D) 4

Q9 - 29 July - Shift 2

Let m_1, m_2 be the slopes of two adjacent sides of a square of side a such that $a^2 + 11a + 3(m_1^2 + m_2^2) = 220$. If one vertex of the square is $(10(\cos \alpha - \sin \alpha), 10(\sin \alpha + \cos \alpha))$, where $\alpha \in \left[0, \frac{\pi}{2}\right]$ and the equation of one diagonal is $(\cos \alpha - \sin \alpha)x + (\sin \alpha + \cos \alpha)y = 10$, then $72(\sin^4 \alpha + \cos^4 \alpha) + a^2 - 3a + 13$ is equal to:

Space for your notes:

- (A) 119 (B) 128

- (C) 145 (D) 155

#MathBoleTohMathonGo

Questions

MathonGo

Q10 - 29 July - Shift 2

Let $A(\alpha, -2)$, $B(\alpha, 6)$ and $C\left(\frac{\alpha}{4}, -2\right)$ be vertices

Space for your notes:

of a ΔABC . If $\left(5, \frac{\alpha}{4}\right)$ is the circumcentre of

ΔABC , then which of the following is NOT correct
about ΔABC :

(A) area is 24 (B) perimeter is 25

(C) circumradius is 5 (D) inradius is 2

#MathBoleTohMathonGo

Questions

MathonGo

Q1 - 24 June - Shift 1

Let $A\left(\frac{3}{\sqrt{a}}, \sqrt{a}\right)$, $a > 0$, be a fixed point in the xy-plane. The image of A in y-axis be B and the image of B in x-axis be C. If $D(3 \cos \theta, a \sin \theta)$ is a point in the fourth quadrant such that the maximum area of ΔACD is 12 square units, then a is equal to _____.

Space for your notes:

Q2 - 24 June - Shift 2

Let the area of the triangle with vertices $A(1, \alpha)$, $B(\alpha, 0)$ and $C(0, \alpha)$ be 4 sq. units. If the point $(\alpha, -\alpha)$, $(-\alpha, \alpha)$ and (α^2, β) are collinear, then β is equal to

- (A) 64 (B) -8 (C) -64 (D) 512

Q3 - 26 June - Shift 1

Let R be the point $(3, 7)$ and let P and Q be two points on the line $x + y = 5$ such that PQR is an equilateral triangle. Then the area of ΔPQR is :

- (A) $\frac{25}{4\sqrt{3}}$ (B) $\frac{25\sqrt{3}}{2}$ (C) $\frac{25}{\sqrt{3}}$ (D) $\frac{25}{2\sqrt{3}}$

Q4 - 27 June - Shift 1

Space for your notes:

#MathBoleTohMathonGo

Questions

MathonGo

In an isosceles triangle ABC, the vertex A is (6, 1) and the equation of the base BC is $2x + y = 4$. Let the point B lie on the line $x + 3y = 7$. If (α, β) is the centroid ΔABC , then $15(\alpha + \beta)$ is equal to :

- (A) 39 (B) 41 (C) 51 (D) 63

Space for your notes:

Q5 - 27 June - Shift 1

A rectangle R with end points of one of its dies as (1, 2) and (3, 6) is inscribed in a circle. If the equation of a diameter of the circle is $2x - y + 4 = 0$, then the area of R is _____.

Space for your notes:

Q6 - 28 June - Shift 1

A ray of light passing through the point P(2, 3) reflects on the x-axis at point A and the reflected ray passes through the point Q(5, 4). Let R be the point that divides the line segment AQ internally into the ratio 2 : 1. Let the co-ordinates of the foot of the perpendicular M from R on the bisector of the angle PAQ be (α, β) . Then, the value of $7\alpha + 3\beta$ is equal to _____.

Space for your notes:

Q7 - 28 June - Shift 2

#MathBoleTohMathonGo

Questions

MathonGo

Let a triangle be bounded by the lines $L_1: 2x + 5y = 10$,

$L_2: -4x + 3y = 12$ and the line L_3 , which passes through the point $P(2, 3)$, intersect L_2 at A and L_1 at

B. If the point P divides the line-segment AB , internally in the ratio $1 : 3$, then the area of the triangle is equal to

- (A) $\frac{110}{13}$ (B) $\frac{132}{13}$
 (C) $\frac{142}{13}$ (D) $\frac{151}{13}$

Q8 - 29 June - Shift 1

The distance between the two points A and A' , which lie on $y = 2$ such that both the line segments AB and $A'B$ (where B is the point $(2, 3)$) subtend angle $\frac{\pi}{4}$ at the origin, is equal to :

- (A) 10 (B) $\frac{48}{5}$
 (C) $\frac{52}{5}$ (D) 3

Q9 - 29 June - Shift 2

#MathBoleTohMathonGo

Questions

MathonGo

The distance of the origin from the centroid of the triangle whose two sides have the equations $x - 2y + 1 = 0$ and $2x - y - 1 = 0$ and whose orthocenter is $\left(\frac{7}{3}, \frac{7}{3}\right)$ is:

Space for your notes:

- (A) $\sqrt{2}$ (B) 2
(C) $2\sqrt{2}$ (D) 4

#MathBoleTohMathonGo