

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

Test Date	29/01/2024
Test Time	9:00 AM - 12:00 PM
Subject	B. Tech

Section : Mathematics Section A

Q.1 If $z = \frac{1}{2} - 2i$ is such that $|z+1| = \alpha z + \beta(1+i)$, $i = \sqrt{-1}$ and $\alpha, \beta \in \mathbb{R}$, then $\alpha + \beta$ is equal to

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

Question Type : MCQ

Question ID : 405859837

Option 1 ID : 4058592699

Option 2 ID : 4058592702

Option 3 ID : 4058592701

Option 4 ID : 4058592700

Status : Not Answered

Chosen Option : --

Q.2 A function $y = f(x)$ satisfies $f(x) \sin 2x + \sin x - (1 + \cos^2 x) f'(x) = 0$ with condition $f(0) = 0$. Then $f\left(\frac{\pi}{2}\right)$ is equal to

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

Question Type : MCQ

Question ID : 405859847

Option 1 ID : 4058592742

Option 2 ID : 4058592739

Option 3 ID : 4058592740

Option 4 ID : 4058592741

Status : Answered

Chosen Option : 3

Q.3 Let PQR be a triangle with R (-1, 4, 2). Suppose M (2, 1, 2) is the mid point of PQ. The distance of the centroid of ΔPQR from the point of intersection of the lines $\frac{x-2}{0} = \frac{y}{2} = \frac{z+3}{-1}$ and $\frac{x-1}{1} = \frac{y+3}{-3} = \frac{z+1}{1}$ is

- Options
1. $\sqrt{69}$
 2. 69
 3. $\sqrt{99}$
 4. 9

Question Type : MCQ

Question ID : 405859850

Option 1 ID : 4058592752

Option 2 ID : 4058592753

Option 3 ID : 4058592754

Option 4 ID : 4058592751

Status : Answered

Chosen Option : 1

Q.4 If $\alpha, -\frac{\pi}{2} < \alpha < \frac{\pi}{2}$ is the solution of $4 \cos\theta + 5 \sin\theta = 1$, then the value of $\tan \alpha$ is

- Options
1. $\frac{\sqrt{10}-10}{12}$
 2. $\frac{10-\sqrt{10}}{6}$
 3. $\frac{\sqrt{10}-10}{6}$
 4. $\frac{10-\sqrt{10}}{12}$

Question Type : MCQ

Question ID : 405859854

Option 1 ID : 4058592769

Option 2 ID : 4058592768

Option 3 ID : 4058592767

Option 4 ID : 4058592770

Status : Answered

Chosen Option : 1

Q.5

Let $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \alpha & \beta \\ 0 & \beta & \alpha \end{bmatrix}$ and $|2A|^3 = 2^{21}$ where $\alpha, \beta \in \mathbb{Z}$, Then a value of α is

- Options
1. 5
 2. 9
 3. 17
 4. 3

Question Type : MCQ

Question ID : 405859839

Option 1 ID : 4058592708

Option 2 ID : 4058592709

Option 3 ID : 4058592710

Option 4 ID : 4058592707

Status : Answered

Chosen Option : 2

Q.6

Let A be a square matrix such that $AA^T = I$. Then $\frac{1}{2}A \left[(A + A^T)^2 + (A - A^T)^2 \right]$ is equal to

- Options
1. $A^2 + A^T$
 2. $A^2 + I$
 3. $A^3 + I$
 4. $A^3 + A^T$

Question Type : MCQ

Question ID : 405859838

Option 1 ID : 4058592703

Option 2 ID : 4058592705

Option 3 ID : 4058592706

Option 4 ID : 4058592704

Status : Answered

Chosen Option : 4

Q.7 Let R be a relation on $\mathbb{Z} \times \mathbb{Z}$ defined by $(a, b) R (c, d)$ if and only if $ad - bc$ is divisible by 5. Then R is

- Options
1. Reflexive but neither symmetric nor transitive
 2. Reflexive, symmetric and transitive
 3. Reflexive and transitive but not symmetric
 4. Reflexive and symmetric but not transitive

Question Type : MCQ

Question ID : 405859836

Option 1 ID : 4058592698

Option 2 ID : 4058592697

Option 3 ID : 4058592695

Option 4 ID : 4058592696

Status : Marked For Review

Chosen Option : 3

Q.8

If the value of the integral $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \left(\frac{x^2 \cos x}{1 + \pi^x} + \frac{1 + \sin^2 x}{1 + e^{\sin x}} \right) dx = \frac{\pi}{4}(\pi + a) - 2$, then

the value of a is

Options 1. 2

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

3. 3

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

Question Type : MCQ

Question ID : 405859845

Option 1 ID : 4058592731

Option 2 ID : 4058592732

Option 3 ID : 4058592734

Option 4 ID : 4058592733

Status : Not Answered

Chosen Option : --

Q.9

Consider the function $f : \left[\frac{1}{2}, 1 \right] \rightarrow \mathbb{R}$ defined by $f(x) = 4\sqrt{2}x^3 - 3\sqrt{2}x - 1$.

Consider the statements

(I) The curve $y = f(x)$ intersects the x -axis exactly at one point.

(II) The curve $y = f(x)$ intersects the x -axis at $x = \cos \frac{\pi}{12}$.

Then

Options 1. Both (I) and (II) are incorrect.

2. Only (I) is correct.

3. Both (I) and (II) are correct.

4. Only (II) is correct.

Question Type : MCQ

Question ID : 405859844

Option 1 ID : 4058592728

Option 2 ID : 4058592729

Option 3 ID : 4058592727

Option 4 ID : 4058592730

Status : Answered

Chosen Option : 3

Q.10 In a ΔABC , suppose $y = x$ is the equation of the bisector of the angle B and the equation of the side AC is $2x - y = 2$. If $2AB = BC$ and the points A and B are respectively $(4, 6)$ and (α, β) , then $\alpha + 2\beta$ is equal to

- Options
1. 39
 2. 42
 3. 48
 4. 45

Question Type : MCQ

Question ID : 405859849

Option 1 ID : 4058592747

Option 2 ID : 4058592748

Option 3 ID : 4058592750

Option 4 ID : 4058592749

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.11 Let O be the origin and the position vectors of A and B be $2\hat{i} + 2\hat{j} + \hat{k}$ and $2\hat{i} + 4\hat{j} + 4\hat{k}$ respectively. If the internal bisector of $\angle AOB$ meets the line AB at C , then the length of OC is

- Options
1. $\frac{2}{3}\sqrt{31}$
 2. $\frac{3}{2}\sqrt{34}$
 3. $\frac{2}{3}\sqrt{34}$
 4. $\frac{3}{2}\sqrt{31}$

Question Type : MCQ

Question ID : 405859852

Option 1 ID : 4058592761

Option 2 ID : 4058592760

Option 3 ID : 4058592759

Option 4 ID : 4058592762

Status : Not Attempted and
Marked For Review

Chosen Option : --

Q.12 Let \vec{a} , \vec{b} and \vec{c} be three non-zero vectors such that \vec{b} and \vec{c} are non-collinear. If

$\vec{a} + 5\vec{b}$ is collinear with \vec{c} , $\vec{b} + 6\vec{c}$ is collinear with \vec{a} and $\vec{a} + \alpha\vec{b} + \beta\vec{c} = \vec{0}$,
then $\alpha + \beta$ is equal to

- Options
1. 35
 2. -30
 3. 30
 4. -25

Question Type : MCQ

Question ID : 405859851

Option 1 ID : 4058592758

Option 2 ID : 4058592756

Option 3 ID : 4058592757

Option 4 ID : 4058592755

Status : Not Answered

Chosen Option : --

Q.13 If in a G.P. of 64 terms, the sum of all the terms is 7 times the sum of the odd terms of the G.P, then the common ratio of the G.P. is equal to

- Options
1. 7
 2. 4
 3. 5
 4. 6

Question Type : MCQ

Question ID : 405859841

Option 1 ID : 4058592718

Option 2 ID : 4058592715

Option 3 ID : 4058592716

Option 4 ID : 4058592717

Status : Answered

Chosen Option : 4

Q.14 Let $\left(5, \frac{a}{4}\right)$ be the circumcenter of a triangle with vertices A(a, -2), B(a, 6) and

$C\left(\frac{a}{4}, -2\right)$. Let α denote the circumradius, β denote the area and γ denote the perimeter of the triangle. Then $\alpha + \beta + \gamma$ is

- Options
1. 62
 2. 60
 3. 30
 4. 53

Question Type : MCQ

Question ID : 405859848

Option 1 ID : 4058592745

Option 2 ID : 4058592744

Option 3 ID : 4058592743

Option 4 ID : 4058592746

Status : Not Answered

Chosen Option : --

Q.15

Suppose $f(x) = \frac{(2^x + 2^{-x}) \tan x \sqrt{\tan^{-1}(x^2 - x + 1)}}{(7x^2 + 3x + 1)^3}$. Then the value of $f'(0)$ is

equal to

Options 1. π

2. $\frac{\pi}{2}$

3. 0

4. $\sqrt{\pi}$

Question Type : MCQ

Question ID : 405859843

Option 1 ID : 4058592725

Option 2 ID : 4058592726

Option 3 ID : 4058592723

Option 4 ID : 4058592724

Status : Answered

Chosen Option : 4

Q.16 In an A.P., the sixth term $a_6 = 2$. If the product $a_1 a_4 a_5$ is the greatest, then the common difference of the A.P. is equal to

Options 1. $\frac{8}{5}$

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

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

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

Question Type : MCQ

Question ID : 405859840

Option 1 ID : 4058592712

Option 2 ID : 4058592711

Option 3 ID : 4058592714

Option 4 ID : 4058592713

Status : Marked For Review

Chosen Option : 4

Q.17 If $f(x) = \begin{cases} 2+2x, & -1 \leq x < 0 \\ 1-\frac{x}{3}, & 0 \leq x \leq 3 \end{cases}$; $g(x) = \begin{cases} -x, & -3 \leq x \leq 0 \\ x, & 0 < x \leq 1 \end{cases}$, then range of $(f \circ g)(x)$ is

- Options
1. $[0,1)$
 2. $[0,3)$
 3. $(0,1]$
 4. $[0,1]$

Question Type : MCQ

Question ID : 405859835

Option 1 ID : 4058592693

Option 2 ID : 4058592691

Option 3 ID : 4058592694

Option 4 ID : 4058592692

Status : Not Answered

Chosen Option : --

Q.18 For $x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$, if $y(x) = \int \frac{\operatorname{cosec} x + \sin x}{\operatorname{cosec} x \sec x + \tan x \sin^2 x} dx$, and $\lim_{x \rightarrow \left(\frac{\pi}{2}\right)^-} y(x) = 0$

then $y\left(\frac{\pi}{4}\right)$ is equal to

- Options
1. $-\frac{1}{\sqrt{2}} \tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$
 2. $\tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$
 3. $\frac{1}{2} \tan^{-1}\left(\frac{1}{\sqrt{2}}\right)$
 4. $\frac{1}{\sqrt{2}} \tan^{-1}\left(-\frac{1}{2}\right)$

Question Type : MCQ

Question ID : 405859846

Option 1 ID : 4058592737

Option 2 ID : 4058592735

Option 3 ID : 4058592738

Option 4 ID : 4058592736

Status : Not Answered

Chosen Option : --

Q.19 A fair die is thrown until 2 appears. Then the probability, that 2 appears in even number of throws, is

- Options
1. $\frac{1}{6}$
 2. $\frac{6}{11}$
 3. $\frac{5}{6}$
 4. $\frac{5}{11}$

Question Type : MCQ

Question ID : 405859853

Option 1 ID : 4058592763

Option 2 ID : 4058592765

Option 3 ID : 4058592764

Option 4 ID : 4058592766

Status : Not Answered

Chosen Option : --

Q.20

$$\lim_{x \rightarrow \frac{\pi}{2}} \left(\frac{1}{\left(x - \frac{\pi}{2}\right)^2} \int_{x^3}^{\left(\frac{\pi}{2}\right)^3} \cos\left(t^{\frac{1}{3}}\right) dt \right) \text{ is equal to}$$

- Options
1. $\frac{3\pi^2}{4}$
 2. $\frac{3\pi^2}{8}$
 3. $\frac{3\pi}{8}$
 4. $\frac{3\pi}{4}$

Question Type : MCQ

Question ID : 405859842

Option 1 ID : 4058592721

Option 2 ID : 4058592722

Option 3 ID : 4058592720

Option 4 ID : 4058592719

Status : Answered

Chosen Option : 2

Section : Mathematics Section B

Q.21 If $\frac{{}^{11}C_1}{2} + \frac{{}^{11}C_2}{3} + \dots + \frac{{}^{11}C_9}{10} = \frac{n}{m}$ with $\gcd(n,m) = 1$, then $n + m$ is equal to _____.

Given --
Answer :

Question Type : SA
Question ID : 405859857
Status : Not Answered

Q.22 All the letters of the word "GTWENTY" are written in all possible ways with or without meaning and these words are written as in a dictionary. The serial number of the word "GTWENTY" is _____.

Given 387
Answer :

Question Type : SA
Question ID : 405859856
Status : Answered

Q.23 If the points of intersection of two distinct conics $x^2 + y^2 = 4b$ and $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ lie on the curve $y^2 = 3x^2$, then $3\sqrt{3}$ times the area of the rectangle formed by the intersection points is _____.

Given --
Answer :

Question Type : SA
Question ID : 405859862
Status : Not Answered

Q.24 If the mean and variance of the data 65, 68, 58, 44, 48, 45, 60, α , β , 60 where $\alpha > \beta$, are 56 and 66.2 respectively, then $\alpha^2 + \beta^2$ is equal to _____.

Given 6344
Answer :

Question Type : SA
Question ID : 405859864
Status : Answered

Q.25 A line with direction ratios 2, 1, 2 meets the lines $x = y + 2 = z$ and $x + 2 = 2y = 2z$ respectively at the points P and Q. If the length of the perpendicular from the point (1, 2, 12) to the line PQ is l , then l^2 is _____.

Given --
Answer :

Question Type : SA
Question ID : 405859863
Status : Not Answered

Q.26 If the solution curve $y = y(x)$ of the differential equation $(1 + y^2)(1 + \log_e x) dx + x$

$dy = 0, x > 0$ passes through the point $(1, 1)$ and $y(e) = \frac{\alpha - \tan\left(\frac{3}{2}\right)}{\beta + \tan\left(\frac{3}{2}\right)}$, then $\alpha + 2\beta$ is

_____.

Given --

Answer :

Question Type : SA

Question ID : 405859860

Status : Not Answered

Q.27 Let α, β be the roots of the equation $x^2 - x + 2 = 0$ with $Im(\alpha) > Im(\beta)$.

Then $\alpha^6 + \alpha^4 + \beta^4 - 5\alpha^2$ is equal to _____.

Given --

Answer :

Question Type : SA

Question ID : 405859855

Status : Not Answered

Q.28 Let $f(x) = 2^x - x^2, x \in \mathbb{R}$. If m and n are respectively the number of points at which the curves $y = f(x)$ and $y = f'(x)$ intersect the x -axis, then the value of $m + n$ is

_____.

Given --

Answer :

Question Type : SA

Question ID : 405859858

Status : Not Answered

Q.29 The area (in sq. units) of the part of the circle $x^2 + y^2 = 169$ which is below the line

$5x - y = 13$ is $\frac{\pi\alpha}{2\beta} - \frac{65}{2} + \frac{\alpha}{\beta} \sin^{-1}\left(\frac{12}{13}\right)$, where α, β are coprime numbers. Then $\alpha + \beta$

is equal to _____.

Given --

Answer :

Question Type : SA

Question ID : 405859859

Status : Not Answered

Q.30 Equations of two diameters of a circle are $2x - 3y = 5$ and $3x - 4y = 7$. The line

joining the points $\left(-\frac{22}{7}, -4\right)$ and $\left(-\frac{1}{7}, 3\right)$ intersects the circle at only one point

$P(\alpha, \beta)$. Then, $17\beta - \alpha$ is equal to _____.

Given --

Answer :

Question Type : SA

Question ID : 405859861

Status : Not Answered

Q.31 The deflection in moving coil galvanometer falls from 25 divisions to 5 division when a shunt of 24Ω is applied. The resistance of galvanometer coil will be :

- Options
1. $96\ \Omega$
 2. $12\ \Omega$
 3. $100\ \Omega$
 4. $48\ \Omega$

Question Type : MCQ

Question ID : 405859884

Option 1 ID : 4058592858

Option 2 ID : 4058592857

Option 3 ID : 4058592859

Option 4 ID : 4058592860

Status : Answered

Chosen Option : 1

Q.32 If the radius of curvature of the path of two particles of same mass are in the ratio 3:4, then in order to have constant centripetal force, their velocities will be in the ratio of :

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

Question Type : MCQ

Question ID : 405859867

Option 1 ID : 4058592789

Option 2 ID : 4058592790

Option 3 ID : 4058592792

Option 4 ID : 4058592791

Status : Answered

Chosen Option : 4

Q.33 A galvanometer having coil resistance 10Ω shows a full scale deflection for a current of 3mA . For it to measure a current of 8A , the value of the shunt should be:

- Options
1. $4.85 \times 10^{-3}\ \Omega$
 2. $3.75 \times 10^{-3}\ \Omega$
 3. $2.75 \times 10^{-3}\ \Omega$
 4. $3 \times 10^{-3}\ \Omega$

Question Type : MCQ

Question ID : 405859876

Option 1 ID : 4058592826

Option 2 ID : 4058592827

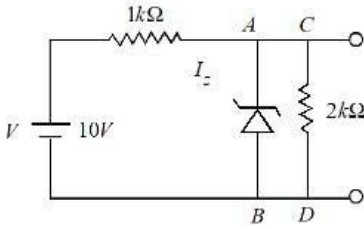
Option 3 ID : 4058592828

Option 4 ID : 4058592825

Status : Answered

Chosen Option : 2

Q.34 In the given circuit, the breakdown voltage of the Zener diode is 3.0 V. What is the value of I_z ?



- Options
1. 10 mA
 2. 7 mA
 3. 5.5 mA
 4. 3.3 mA

Question Type : MCQ

Question ID : 405859882

Option 1 ID : 4058592850

Option 2 ID : 4058592851

Option 3 ID : 4058592852

Option 4 ID : 4058592849

Status : Marked For Review

Chosen Option : 3

Q.35 Two charges of $5Q$ and $-2Q$ are situated at the points $(3a, 0)$ and $(-5a, 0)$ respectively. The electric flux through a sphere of radius ' $4a$ ' having center at origin is :

- Options
1. $\frac{2Q}{\epsilon_0}$
 2. $\frac{7Q}{\epsilon_0}$
 3. $\frac{5Q}{\epsilon_0}$
 4. $\frac{3Q}{\epsilon_0}$

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Question Type : MCQ

Question ID : 405859874

Option 1 ID : 4058592820

Option 2 ID : 4058592818

Option 3 ID : 4058592819

Option 4 ID : 4058592817

Status : Answered

Chosen Option : 3

Q.36 A capacitor of capacitance $100 \mu\text{F}$ is charged to a potential of 12 V and connected to a 6.4 mH inductor to produce oscillations. The maximum current in the circuit would be :

- Options
1. 3.2 A
 2. 1.5 A
 3. 1.2 A
 4. 2.0 A

Question Type : MCQ

Question ID : 405859877

Option 1 ID : 4058592830

Option 2 ID : 4058592831

Option 3 ID : 4058592829

Option 4 ID : 4058592832

Status : Not Answered

Chosen Option : --

Q.37 The resistance $R = \frac{V}{I}$ where $V = (200 \pm 5) \text{ V}$ and $I = (20 \pm 0.2) \text{ A}$, the percentage error in the measurement of R is :

- Options
1. 5.5%
 2. 7%
 3. 3%
 4. 3.5%

Question Type : MCQ

Question ID : 405859865

Option 1 ID : 4058592784

Option 2 ID : 4058592781

Option 3 ID : 4058592782

Option 4 ID : 4058592783

Status : Not Answered

Chosen Option : --

Q.38 A block of mass 100 kg slides over a distance of 10 m on a horizontal surface. If the co-efficient of friction between the surfaces is 0.4 , then the work done against friction (in J) is :

- Options
1. 4200
 2. 4000
 3. 4500
 4. 3900

Question Type : MCQ

Question ID : 405859868

Option 1 ID : 4058592795

Option 2 ID : 4058592793

Option 3 ID : 4058592794

Option 4 ID : 4058592796

Status : Answered

Chosen Option : 2

Q.39 The electric current through a wire varies with time as $I = I_0 + \beta t$, where $I_0 = 20 \text{ A}$ and $\beta = 3 \text{ A/s}$. The amount of electric charge crossed through a section of the wire in 20 s is :

- Options
1. 1000 C
 2. 800 C
 3. 80 C
 4. 1600 C

Question Type : MCQ

Question ID : 405859875

Option 1 ID : 4058592821

Option 2 ID : 4058592823

Option 3 ID : 4058592824

Option 4 ID : 4058592822

Status : Not Answered

Chosen Option : --

Q.40 Two vessels A and B are of the same size and are at same temperature. A contains 1g of hydrogen and B contains 1g of oxygen. P_A and P_B are the pressures of the gases in A and B respectively, then $\frac{P_A}{P_B}$ is :

- Options
1. 32
 2. 16
 3. 4
 4. 8

Question Type : MCQ

Question ID : 405859873

Option 1 ID : 4058592815

Option 2 ID : 4058592814

Option 3 ID : 4058592813

Option 4 ID : 4058592816

Status : Answered

Chosen Option : 4

Q.41 Given below are two statements:

Statement I : If a capillary tube is immersed first in cold water and then in hot water, the height of capillary rise will be smaller in hot water.

Statement II : If a capillary tube is immersed first in cold water and then in hot water, the height of capillary rise will be smaller in cold water.

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

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

Question Type : MCQ

Question ID : 405859871

Option 1 ID : 4058592806

Option 2 ID : 4058592807

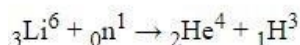
Option 3 ID : 4058592805

Option 4 ID : 4058592808

Status : Not Answered

Chosen Option : --

Q.42 The explosive in a Hydrogen bomb is a mixture of ${}_1\text{H}^2$, ${}_1\text{H}^3$ and ${}_3\text{Li}^6$ in some condensed form. The chain reaction is given by



During the explosion the energy released is approximately

[Given : $M(\text{Li}) = 6.01690$ amu, $M({}_1\text{H}^2) = 2.01471$ amu, $M({}_2\text{He}^4) = 4.00388$ amu, and $1 \text{ amu} = 931.5 \text{ MeV}$]

- Options
1. 28.12 MeV
 2. 22.22 MeV
 3. 12.64 MeV
 4. 16.48 MeV

Question Type : MCQ

Question ID : 405859881

Option 1 ID : 4058592848

Option 2 ID : 4058592847

Option 3 ID : 4058592845

Option 4 ID : 4058592846

Status : Answered

Chosen Option : 2

Q.43 A convex mirror of radius of curvature 30 cm forms an image that is half the size of the object. The object distance is :

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

Question Type : MCQ

Question ID : 405859883

Option 1 ID : 4058592854

Option 2 ID : 4058592855

Option 3 ID : 4058592856

Option 4 ID : 4058592853

Status : Marked For Review

Chosen Option : 3

Q.44 A biconvex lens of refractive index 1.5 has a focal length of 20 cm in air. Its focal length when immersed in a liquid of refractive index 1.6 will be:

- Options
1. + 16 cm
 2. - 160 cm
 3. + 160 cm
 4. - 16 cm

Question Type : MCQ

Question ID : 405859879

Option 1 ID : 4058592840

Option 2 ID : 4058592837

Option 3 ID : 4058592838

Option 4 ID : 4058592839

Status : Answered

Chosen Option : 2

Q.45 The potential energy function (U in J) of a particle in a region of space is given as $U = (2x^2 + 3y^3 + 2z)$. Here x , y and z are in meter. The magnitude of x - component of force (in N) acting on the particle at point $P(1, 2, 3)$ m is :

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

Question Type : MCQ

Question ID : 405859869

Option 1 ID : 4058592800

Option 2 ID : 4058592798

Option 3 ID : 4058592799

Option 4 ID : 4058592797

Status : Answered

Chosen Option : 2

Q.46 Match List I with List II

LIST I		LIST II	
A.	$\oint \vec{B} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \epsilon_0 \frac{d\phi_E}{dt}$	I.	Gauss' law for electricity
B.	$\oint \vec{E} \cdot d\vec{l} = \frac{d\phi_B}{dt}$	II.	Gauss' law for magnetism
C.	$\oint \vec{E} \cdot d\vec{A} = \frac{Q}{\epsilon_0}$	III.	Faraday law
D.	$\oint \vec{B} \cdot d\vec{A} = 0$	IV.	Ampere - Maxwell law

Choose the correct answer from the options given below:

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

Question Type : MCQ

Question ID : 405859878

Option 1 ID : 4058592836

Option 2 ID : 4058592833

Option 3 ID : 4058592834

Option 4 ID : 4058592835

Status : Answered

Chosen Option : 3

Q.47 A body starts moving from rest with constant acceleration covers displacement S_1 in first $(p-1)$ seconds and S_2 in first p seconds. The displacement $S_1 + S_2$ will be made in time :

- Options
1. $(2p+1) s$
 2. $(2p^2 - 2p + 1) s$
 3. $\sqrt{(2p^2 - 2p + 1)} s$
 4. $(2p-1) s$

Question Type : MCQ

Question ID : 405859866

Option 1 ID : 4058592787

Option 2 ID : 4058592788

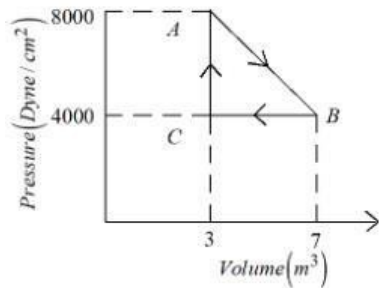
Option 3 ID : 4058592785

Option 4 ID : 4058592786

Status : Answered

Chosen Option : 3

Q.48 A thermodynamic system is taken from an original state A to an intermediate state B by a linear process as shown in the figure. It's volume is then reduced to the original value from B to C by an isobaric process. The total work done by the gas from A to B and B to C would be :



- Options
1. 1200 J
 2. 600 J
 3. 2200 J
 4. 33800 J

Question Type : MCQ

Question ID : 405859872

Option 1 ID : 4058592810

Option 2 ID : 4058592809

Option 3 ID : 4058592811

Option 4 ID : 4058592812

Status : Not Answered

Chosen Option : --

Q.49 The de-Broglie wavelength of an electron is the same as that of a photon. If velocity of electron is 25% of the velocity of light, then the ratio of K.E. of electron and K.E. of photon will be:

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

Question Type : MCQ

Question ID : 405859880

Option 1 ID : 4058592841

Option 2 ID : 4058592843

Option 3 ID : 4058592842

Option 4 ID : 4058592844

Status : Not Answered

Chosen Option : --

Q.50 At what distance above and below the surface of the earth a body will have same weight. (take radius of earth as R .)

- Options
1. $\frac{R}{2}$
 2. $\frac{\sqrt{5} R - R}{2}$
 3. $\frac{\sqrt{3} R - R}{2}$
 4. $\frac{\sqrt{5} R - R}{2}$

Question Type : MCQ

Question ID : 405859870

Option 1 ID : 4058592801

Option 2 ID : 4058592802

Option 3 ID : 4058592804

Option 4 ID : 4058592803

Status : Answered

Chosen Option : 1

Section : Physics Section B

Q.51 A ball rolls off the top of a stairway with horizontal velocity u . The steps are 0.1 m high and 0.1 m wide. The minimum velocity u with which that ball just hits the step 5 of the stairway will be $\sqrt{x} \text{ ms}^{-1}$ where $x = \underline{\hspace{2cm}}$ [use $g = 10 \text{ m/s}^2$].

Given --
Answer :

Question Type : SA

Question ID : 405859885

Status : Not Answered

Q.52 The magnetic potential due to a magnetic dipole at a point on its axis situated at a distance of 20 cm from its center is $1.5 \times 10^{-5} \text{ T m}$. The magnetic moment of the dipole is $\underline{\hspace{2cm}} \text{ A m}^2$. (Given : $\frac{\mu_0}{4\pi} = 10^{-7} \text{ T m A}^{-1}$)

Given 1
Answer :

Question Type : SA

Question ID : 405859891

Status : Answered

Q.53 In a test experiment on a model aeroplane in wind tunnel, the flow speeds on the upper and lower surfaces of the wings are 70 ms^{-1} and 65 ms^{-1} respectively. If the wing area is 2 m^2 , the lift of the wing is $\underline{\hspace{2cm}} \text{ N}$.

(Given density of air = 1.2 kg m^{-3})

Given --
Answer :

Question Type : SA

Question ID : 405859887

Status : Not Answered

Q.54 A square loop of side 10 cm and resistance 0.7Ω is placed vertically in east-west plane. A uniform magnetic field of $0.20 T$ is set up across the plane in north east direction. The magnetic field is decreased to zero in 1 s at a steady rate. Then, magnitude of induced emf is $\sqrt{x} \times 10^{-3} V$. The value of x is _____.

Given --
Answer :

Question Type : SA
Question ID : 405859892
Status : Not Answered

Q.55 A 16Ω wire is bend to form a square loop. A $9V$ battery with internal resistance 1Ω is connected across one of its sides. If a $4\mu F$ capacitor is connected across one of its diagonals, the energy stored by the capacitor will be $\frac{x}{2} \mu J$, where $x =$ _____.

Given --
Answer :

Question Type : SA
Question ID : 405859890
Status : Not Answered

Q.56 When the displacement of a simple harmonic oscillator is one third of its amplitude, the ratio of total energy to the kinetic energy is $\frac{x}{8}$, where $x =$ _____.

Given 9
Answer :

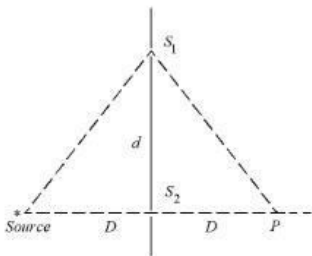
Question Type : SA
Question ID : 405859888
Status : Answered

Q.57 A cylinder is rolling down on an inclined plane of inclination 60° . It's acceleration during rolling down will be $\frac{x}{\sqrt{3}} m/s^2$, where $x =$ _____ (use $g = 10 m/s^2$).

Given 15
Answer :

Question Type : SA
Question ID : 405859886
Status : Answered

Q.58 In a double slit experiment shown in figure, when light of wavelength 400 nm is used, dark fringe is observed at P . If $D=0.2$ m, the minimum distance between the slits S_1 and S_2 is _____ mm.



Given --
Answer :

Question Type : SA
Question ID : 405859893
Status : Not Answered

Q.59 An electron is moving under the influence of the electric field of a uniformly charged infinite plane sheet S having surface charge density $+\sigma$. The electron at $t=0$ is at a distance of 1 m from S and has a speed of 1 m/s. The maximum value of σ if the electron strikes S at $t=1$ s is $\alpha \left[\frac{m \epsilon_0}{e} \right] \frac{C}{m^2}$, the value of α is _____.

Given --
Answer :

Question Type : SA
Question ID : 405859889
Status : Not Answered

Q.60 When a hydrogen atom going from $n=2$ to $n=1$ emits a photon, its recoil speed is $\frac{x}{5} \text{ m/s}$. Where $x =$ _____ (Use, mass of hydrogen atom = $1.6 \times 10^{-27} \text{ kg}$)

Given --
Answer :

Question Type : SA
Question ID : 405859894
Status : Not Answered

Section : Chemistry Section A

Q.61 The correct set of four quantum numbers for the valence electron of rubidium atom ($Z = 37$) is :

Options

1. $5, 1, 0, +\frac{1}{2}$
2. $5, 0, 1, +\frac{1}{2}$
3. $5, 0, 0, +\frac{1}{2}$
4. $5, 1, 1, +\frac{1}{2}$

Question Type : MCQ

Question ID : 405859895

Option 1 ID : 4058592872

Option 2 ID : 4058592874

Option 3 ID : 4058592871

Option 4 ID : 4058592873

Status : Marked For Review

Chosen Option : 3

Q.62 KMnO_4 decomposes on heating at 513K to form O_2 along with

Options

1. K_2MnO_4 & MnO_2
2. Mn & KO_2
3. MnO_2 & K_2O_2
4. K_2MnO_4 & Mn

Question Type : MCQ

Question ID : 405859901

Option 1 ID : 4058592896

Option 2 ID : 4058592897

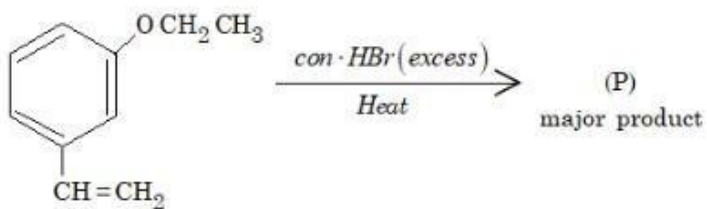
Option 3 ID : 4058592895

Option 4 ID : 4058592898

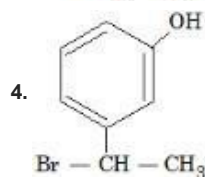
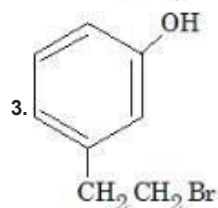
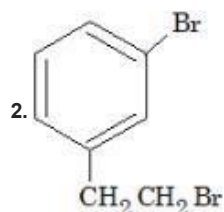
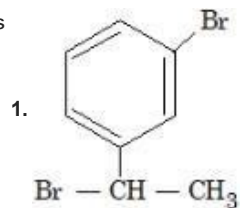
Status : Answered

Chosen Option : 1

Q.63 The major product(P) in the following reaction is



Options



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Question Type : MCQ

Question ID : 405859911

Option 1 ID : 4058592938

Option 2 ID : 4058592935

Option 3 ID : 4058592936

Option 4 ID : 4058592937

Status : Not Answered

Chosen Option : --

Q.64 Chlorine undergoes disproportionation in alkaline medium as shown below :



The values of a, b, c and d in a balanced redox reaction are respectively :

- Options
- 1, 2, 1 and 1
 - 2, 4, 1 and 3
 - 3, 4, 4 and 2
 - 2, 2, 1 and 3

Question Type : MCQ

Question ID : 405859897

Option 1 ID : 4058592881

Option 2 ID : 4058592879

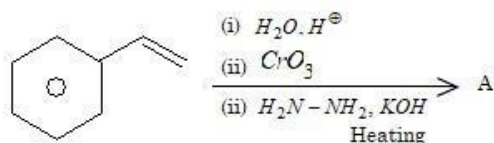
Option 3 ID : 4058592882

Option 4 ID : 4058592880

Status : Answered

Chosen Option : 1

Q.65 The final product A formed in the following multistep reaction sequence is



Options

-
-
-
-

Question Type : MCQ

Question ID : 405859910

Option 1 ID : 4058592933

Option 2 ID : 4058592931

Option 3 ID : 4058592934

Option 4 ID : 4058592932

Status : Marked For Review

Chosen Option : 1

Q.66 The difference in energy between the actual structure and the lowest energy resonance structure for the given compound is

- Options
1. ionization energy
 2. electromeric energy
 3. hyperconjugation energy
 4. resonance energy

Question Type : MCQ

Question ID : 405859907

Option 1 ID : 4058592920

Option 2 ID : 4058592922

Option 3 ID : 4058592921

Option 4 ID : 4058592919

Status : Answered

Chosen Option : 4

Q.67 In chromyl chloride test for confirmation of Cl^- ion, a yellow solution is obtained. Acidification of the solution and addition of amyl alcohol and 10% H_2O_2 turns organic layer blue indicating formation of chromium pentoxide. The oxidation state of chromium in that is

- Options
1. +5
 2. +10
 3. +3
 4. +6

Question Type : MCQ

Question ID : 405859913

Option 1 ID : 4058592946

Option 2 ID : 4058592943

Option 3 ID : 4058592945

Option 4 ID : 4058592944

Status : Answered

Chosen Option : 1

Q.68 Which of the following is **not** correct?

- Options
1. ΔG is positive for a spontaneous reaction
 2. ΔG is zero for a reversible reaction
 3. ΔG is positive for a non-spontaneous reaction
 4. ΔG is negative for a spontaneous reaction

Question Type : MCQ

Question ID : 405859896

Option 1 ID : 4058592876

Option 2 ID : 4058592875

Option 3 ID : 4058592878

Option 4 ID : 4058592877

Status : Answered

Chosen Option : 1

Q.69 Given below are two statements :

Statement I : The electronegativity of group 14 elements from Si to Pb, gradually decreases.

Statement II : Group 14 contains non-metallic, metallic, as well as metalloid elements.

In the light of the above statements, choose the *most appropriate* 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 : 405859900

Option 1 ID : 4058592893

Option 2 ID : 4058592891

Option 3 ID : 4058592892

Option 4 ID : 4058592894

Status : Answered

Chosen Option : 4

Q.70 In which one of the following metal carbonyls, CO forms a bridge between metal atoms?

- Options
1. $[\text{Ru}_3(\text{CO})_{12}]$
 2. $[\text{Mn}_2(\text{CO})_{10}]$
 3. $[\text{Co}_2(\text{CO})_8]$
 4. $[\text{Os}_3(\text{CO})_{12}]$

Question Type : MCQ

Question ID : 405859903

Option 1 ID : 4058592906

Option 2 ID : 4058592903

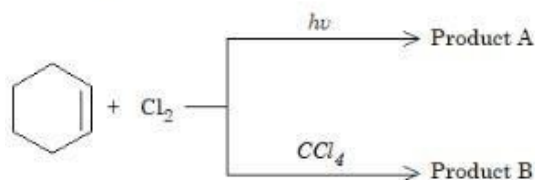
Option 3 ID : 4058592904

Option 4 ID : 4058592905

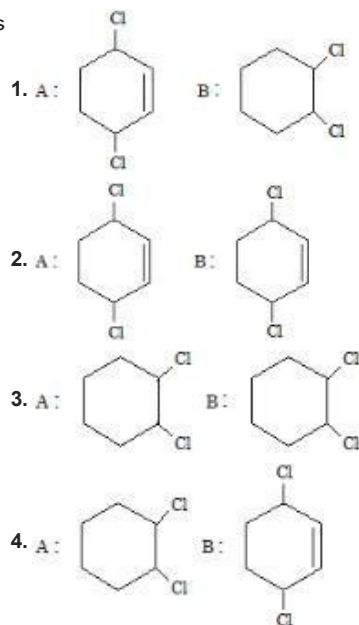
Status : Answered

Chosen Option : 2

Q.71 Identify product A and product B :



Options



Question Type : MCQ

Question ID : 405859908

Option 1 ID : 4058592923

Option 2 ID : 4058592924

Option 3 ID : 4058592925

Option 4 ID : 4058592926

Status : Answered

Chosen Option : 3

Q.72 Appearance of blood red colour, on treatment of the sodium fusion extract of an organic compound with FeSO_4 in presence of concentrated H_2SO_4 indicates the presence of element/s

- Options
1. N
 2. Br
 3. S
 4. N and S

Question Type : MCQ

Question ID : 405859905

Option 1 ID : 4058592911

Option 2 ID : 4058592914

Option 3 ID : 4058592912

Option 4 ID : 4058592913

Status : Answered

Chosen Option : 4

Q.73 In alkaline medium, MnO_4^- oxidises I^- to

- Options
1. IO_3^-
 2. I_2
 3. IO_4^-
 4. IO^-

Question Type : MCQ

Question ID : 405859902

Option 1 ID : 4058592899

Option 2 ID : 4058592900

Option 3 ID : 4058592902

Option 4 ID : 4058592901

Status : Marked For Review

Chosen Option : 2

Q.74 Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R** :

Assertion A : The first ionisation enthalpy decreases across a period.

Reason R : The increasing nuclear charge outweighs the shielding across the period.

In the light of the above statements, choose the *most appropriate* 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. Both **A** and **R** are true but **R** is NOT the correct explanation of **A**
 4. **A** is false but **R** is true

Question Type : MCQ

Question ID : 405859898

Option 1 ID : 4058592883

Option 2 ID : 4058592885

Option 3 ID : 4058592884

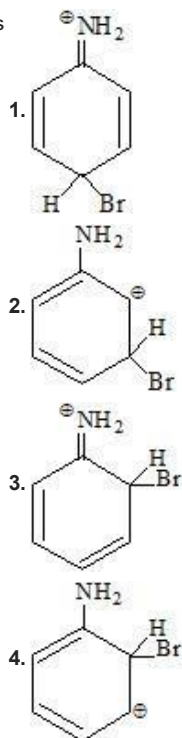
Option 4 ID : 4058592886

Status : Not Answered

Chosen Option : --

Q.75 The arenium ion which is not involved in the bromination of Aniline is _____.

Options



Question Type : MCQ

Question ID : 405859914

Option 1 ID : 4058592948

Option 2 ID : 4058592949

Option 3 ID : 4058592947

Option 4 ID : 4058592950

Status : Not Answered

Chosen Option : --

Q.76 Identify the incorrect pair from the following :

Options

1. Cryolite – Na_3AlF_6
2. Fluoroapatite – $3 \text{Ca}_3(\text{PO}_4)_2 \cdot \text{CaF}_2$
3. Fluorspar – BF_3
4. Carnallite – $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$

Question Type : MCQ

Question ID : 405859899

Option 1 ID : 4058592887

Option 2 ID : 4058592890

Option 3 ID : 4058592889

Option 4 ID : 4058592888

Status : Marked For Review

Chosen Option : 2

Q.77 Match List I with List II

LIST I (Substances)		LIST II (Element Present)	
A.	Ziegler catalyst	I.	Rhodium
B.	Blood Pigment	II.	Cobalt
C.	Wilkinson catalyst	III.	Iron
D.	Vitamin B ₁₂	IV.	Titanium

Choose the correct answer from the options given below:

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

Question Type : MCQ

Question ID : 405859904

Option 1 ID : 4058592907

Option 2 ID : 4058592909

Option 3 ID : 4058592908

Option 4 ID : 4058592910

Status : Answered

Chosen Option : 1

Q.78 The interaction between π bond and lone pair of electrons present on an adjacent atom is responsible for

- Options
1. Inductive effect
 2. Hyperconjugation
 3. Resonance effect
 4. Electromeric effect

Question Type : MCQ

Question ID : 405859906

Option 1 ID : 4058592918

Option 2 ID : 4058592917

Option 3 ID : 4058592916

Option 4 ID : 4058592915

Status : Answered

Chosen Option : 3

Q.79 Type of amino acids obtained by hydrolysis of proteins is :

- Options
1. γ
 2. β
 3. δ
 4. α

Question Type : MCQ

Question ID : 405859912

Option 1 ID : 4058592941

Option 2 ID : 4058592940

Option 3 ID : 4058592942

Option 4 ID : 4058592939

Status : Not Answered

Chosen Option : --

Q.80 Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R** :

Assertion A : Aryl halides cannot be prepared by replacement of hydroxyl group of phenol by halogen atom.

Reason R : Phenols react with halogen acids violently.

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

- Options
1. Both **A** and **R** are true but **R** is NOT the correct explanation of **A**
 2. **A** is false but **R** is true
 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 : 405859909

Option 1 ID : 4058592928

Option 2 ID : 4058592930

Option 3 ID : 4058592927

Option 4 ID : 4058592929

Status : Not Answered

Chosen Option : --

Section : Chemistry Section B

Q.81 A solution of H_2SO_4 is 31.4% H_2SO_4 by mass and has a density of 1.25g/mL.

The molarity of the H_2SO_4 solution is _____ M (nearest integer)

[Given molar mass of $\text{H}_2\text{SO}_4 = 98\text{g mol}^{-1}$]

Given --

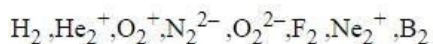
Answer :

Question Type : SA

Question ID : 405859915

Status : Not Answered

Q.82 The number of species from the following which are paramagnetic and with bond order equal to one is _____.



Given --
Answer :

Question Type : SA
Question ID : 405859916
Status : Not Answered

Q.83 Number of compounds among the following which contain sulphur as heteroatom is _____.

Furan, Thiophene, Pyridine, Pyrrole, Cysteine, Tyrosine

Given --
Answer :

Question Type : SA
Question ID : 405859922
Status : Not Answered

Q.84 The mass of zinc produced by the electrolysis of zinc sulphate solution with a steady current of 0.015 A for 15 minutes is _____ $\times 10^{-4}$ g.

(Atomic mass of zinc = 65.4 amu)

Given --
Answer :

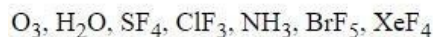
Question Type : SA
Question ID : 405859920
Status : Not Answered

Q.85 The osmotic pressure of a dilute solution is 7×10^5 Pa at 273K. Osmotic pressure of the same solution at 283K is _____ $\times 10^4$ Nm⁻².

Given 72
Answer :

Question Type : SA
Question ID : 405859918
Status : Answered

Q.86 Number of compounds with one lone pair of electrons on central atom amongst following is _____



Given 4
Answer :

Question Type : SA
Question ID : 405859917
Status : Answered

Q.87 For the reaction $N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$, $K_p = 0.492 \text{ atm}$ at 300K. K_c for the reaction at same temperature is _____ $\times 10^{-2}$.

(Given : $R = 0.082 \text{ L atm mol}^{-1} \text{ K}^{-1}$)

Given 1210

Answer :

Question Type : SA

Question ID : 405859919

Status : Answered

Q.88 From the compounds given below, number of compounds which give positive Fehling's test is _____.

Benzaldehyde, Acetaldehyde, Acetone, Acetophenone, Methanal, 4-nitrobenzaldehyde, cyclohexane carbaldehyde.

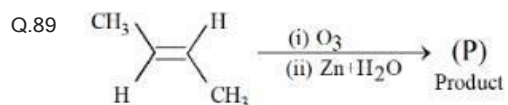
Given --

Answer :

Question Type : SA

Question ID : 405859924

Status : Not Answered



Consider the given reaction. The total number of oxygen atom/s present per molecule of the product (P) is _____

Given 1

Answer :

Question Type : SA

Question ID : 405859923

Status : Answered

Q.90 For a reaction taking place in three steps at same temperature, overall rate constant $K = \frac{K_1 K_2}{K_3}$. If E_{a1} , E_{a2} and E_{a3} are 40, 50 and 60 kJ/mol respectively, the overall E_a is _____ kJ/mol.

Given 30

Answer :

Question Type : SA

Question ID : 405859921

Status : Answered