

NTA JEE Mains Apr 2026 Paper I

Section : Mathematics Section A

Q.1

Let $f(x) = \int \left(\frac{16x + 24}{x^2 + 2x - 15} \right) dx$. If $f(4) = 14 \log_e(3)$ and $f(7) = \log_e(2^\alpha \cdot 3^\beta)$, $\alpha, \beta \in \mathbb{N}$, then $\alpha + \beta$ is equal to :

Options

1. 31
2. 37
3. 41
4. 39

Question Type : **MCQ**

Question ID : **691121169**

Option 1 ID : **691121583**

Option 2 ID : **691121584**

Option 3 ID : **691121586**

Option 4 ID : **691121585**

Status : **Not Answered**

Chosen Option : --

Q.2

If the system of equations

$$x + 5y + 6z = 4,$$

$$2x + 3y + 4z = 7,$$

$$x + 6y + az = b$$

has infinitely many solutions, then the point (a, b) lies on the line

Options

1. $x - y = 3$

2. $y - x = 3$

3. $x + y = 11$

4. $x + y = 12$

Question Type : **MCQ**Question ID : **691121153**Option 1 ID : **691121520**Option 2 ID : **691121519**Option 3 ID : **691121521**Option 4 ID : **691121522**Status : **Answered**Chosen Option : **1**

Q.3

Let a_1, a_2, a_3, \dots be an A.P. and $g_1 = a_1, g_2, g_3, \dots$ be an increasing G.P. If $a_1 = a_2 + g_2 = 1$ and $a_3 + g_3 = 4$, then $a_{10} + g_5$ is equal to :

Options

1. **55**

2. **62**

3. **81**

4. **76**

Question Type : **MCQ**Question ID : **691121154**Option 1 ID : **691121526**Option 2 ID : **691121525**Option 3 ID : **691121523**Option 4 ID : **691121524**Status : **Answered**Chosen Option : **1**

Q.4 Let p_n denote the total number of triangles formed by joining the vertices of an n -side regular polygon. If $p_{n+1} - p_n = 66$, then the sum of all distinct prime divisors of n is :

Options

1. 7
2. 8
3. 5
4. 6

Question Type : **MCQ**

Question ID : **691121157**

Option 1 ID : **691121535**

Option 2 ID : **691121536**

Option 3 ID : **691121537**

Option 4 ID : **691121538**

Status : **Not Answered**

Chosen Option : --

Q.5 Let the vectors $\vec{a} = -\hat{i} + \hat{j} + 3\hat{k}$ and $\vec{b} = \hat{i} + 3\hat{j} + \hat{k}$. For some $\lambda, \mu \in \mathbf{R}$, let $\vec{c} = \lambda\vec{a} + \mu\vec{b}$.

If $\vec{c} \cdot (3\hat{i} - 6\hat{j} + 2\hat{k}) = 10$ and $\vec{c} \cdot (\hat{i} + \hat{j} + \hat{k}) = -2$, then $|\vec{c}|^2$ is equal to :

Options

1. 14
2. 12
3. 8
4. 15

Question Type : **MCQ**

Question ID : **691121164**

Option 1 ID : **691121565**

Option 2 ID : **691121564**

Option 3 ID : **691121563**

Option 4 ID : **691121566**

Status : **Answered**

Chosen Option : **3**

Q.6 A man throws a fair coin repeatedly. He gets 10 points for each head he throws and 5 points for each tail he throws. If the probability that he gets exactly 30 points is $\frac{m}{n}$, $\gcd(m, n) = 1$, then $m + n$ is equal to :

- Options**
1. 107
 2. 53
 3. 105
 4. 55

Question Type : **MCQ**

Question ID : **691121158**

Option 1 ID : **691121541**

Option 2 ID : **691121539**

Option 3 ID : **691121542**

Option 4 ID : **691121540**

Status : **Not Answered**

Chosen Option : --

Q.7 Let O be the origin, and P and Q be two points on the rectangular hyperbola $xy = 12$ such that the mid point of the line segment PQ is $(\frac{1}{2}, -\frac{1}{2})$. Then the area of the triangle OPQ equals :

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

Question Type : **MCQ**

Question ID : **691121161**

Option 1 ID : **691121551**

Option 2 ID : **691121554**

Option 3 ID : **691121552**

Option 4 ID : **691121553**

Status : **Answered**

Chosen Option : **1**

Q.8 Let the point A be the foot of perpendicular drawn from the point P(a, b, 0) on the line $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-\alpha}{3}$. If the midpoint of the line segment PA is $(0, \frac{3}{4}, \frac{-1}{4})$, then the value of $a^2 + b^2 + \alpha^2$ is equal to :

Options

1. 1
2. 2
3. 6
4. 9

Question Type : **MCQ**

Question ID : **691121165**

Option 1 ID : **691121567**

Option 2 ID : **691121568**

Option 3 ID : **691121569**

Option 4 ID : **691121570**

Status : **Answered**

Chosen Option : **1**

Q.9 Two adjacent sides of a parallelogram PQRS are given by $\vec{PQ} = \hat{j} + \hat{k}$ and $\vec{PS} = \hat{i} - \hat{j}$. If the side PS is rotated about the point P by an acute angle α in the plane of the parallelogram so that it becomes perpendicular to the side PQ, then $\sin^2\left(\frac{5\alpha}{2}\right) - \sin^2\left(\frac{\alpha}{2}\right)$ is equal to :

Options

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

Question Type : **MCQ**

Question ID : **691121166**

Option 1 ID : **691121573**

Option 2 ID : **691121574**

Option 3 ID : **691121571**

Option 4 ID : **691121572**

Status : **Answered**

Chosen Option : **4**

Q.10 Let the parabola $y = x^2 + px + q$ passing through the point $(1, -1)$ be such that the distance between its vertex and the x -axis is minimum. Then the value of $p^2 + q^2$ is:

Options

1. 2
2. 5
3. 8
4. 4

Question Type : **MCQ**

Question ID : **691121162**

Option 1 ID : **691121555**

Option 2 ID : **691121557**

Option 3 ID : **691121558**

Option 4 ID : **691121556**

Status : **Answered**

Chosen Option : **4**

Q.11 Let $f(x)$ be a polynomial of degree 5, and have extrema at $x = 1$ and $x = -1$. If $\lim_{x \rightarrow 0} \left(\frac{f(x)}{x^3} \right) = -5$, then $f(2) - f(-2)$ is equal to :

Options

1. 50
2. 0
3. 92
4. 112

Question Type : **MCQ**

Question ID : **691121168**

Option 1 ID : **691121580**

Option 2 ID : **691121579**

Option 3 ID : **691121581**

Option 4 ID : **691121582**

Status : **Answered**

Chosen Option : **4**

Q.12 If for $3 \leq r \leq 30$, $\binom{30}{30-r} + 3\binom{30}{31-r} + 3\binom{30}{32-r} + \binom{30}{33-r} = {}^m C_r$, then m equals :

Options

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

Question Type : **MCQ**

Question ID : **691121156**

Option 1 ID : **691121532**

Option 2 ID : **691121533**

Option 3 ID : **691121531**

Option 4 ID : **691121534**

Status : **Not Answered**

Chosen Option : --

Q.13 Let a circle pass through the origin and its centre be the point of intersection of two mutually perpendicular lines $x + (k-1)y + 3 = 0$ and $2x + k^2y - 4 = 0$. If the line $x - y + 2 = 0$ intersects the circle at the points A and B, then $(AB)^2$ is equal to :

Options

1. 10
2. 34
3. 27
4. 18

Question Type : **MCQ**

Question ID : **691121160**

Option 1 ID : **691121547**

Option 2 ID : **691121550**

Option 3 ID : **691121548**

Option 4 ID : **691121549**

Status : **Not Answered**

Chosen Option : --

Q.14 Let $P = \{\theta \in [0, 4\pi] : \tan^2\theta \neq 1\}$ and $S = \{a \in \mathbb{Z} : 2(\cos^8\theta - \sin^8\theta) \sec 2\theta = a^2, \theta \in P\}$. Then $n(S)$ is :

Options

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

Question Type : **MCQ**

Question ID : **691121163**

Option 1 ID : **691121560**

Option 2 ID : **691121562**

Option 3 ID : **691121561**

Option 4 ID : **691121559**

Status : **Not Answered**

Chosen Option : --

Q.15

The value of $\int_0^{20\pi} (\sin^4 x + \cos^4 x) dx$ is equal to :

Options

1. $\frac{15\pi}{2}$
2. $\frac{25\pi}{2}$
3. 15π
4. 25π

Question Type : **MCQ**

Question ID : **691121167**

Option 1 ID : **691121575**

Option 2 ID : **691121578**

Option 3 ID : **691121577**

Option 4 ID : **691121576**

Status : **Not Answered**

Chosen Option : --

Q.16 Let the circles $C_1: |z| = r$ and $C_2: |z - 3 - 4i| = 5$, $z \in \mathbb{C}$, be such that C_2 lies within C_1 . If z_1 moves on C_1 , z_2 moves on C_2 and $\min |z_1 - z_2| = 2$, then $\max |z_1 - z_2|$ is equal to :

Options

1. 17
2. 22
3. 12
4. 24

Question Type : **MCQ**

Question ID : **691121152**

Option 1 ID : **691121516**

Option 2 ID : **691121517**

Option 3 ID : **691121515**

Option 4 ID : **691121518**

Status : **Not Answered**

Chosen Option : --

Q.17 The mean and variance of n observations are 8 and 16, respectively. If the sum of the first $(n-1)$ observations is 48 and the sum of squares of the first $(n-1)$ observations is 496, then the value of n is :

Options

1. 13
2. 7
3. 21
4. 16

Question Type : **MCQ**

Question ID : **691121159**

Option 1 ID : **691121545**

Option 2 ID : **691121546**

Option 3 ID : **691121543**

Option 4 ID : **691121544**

Status : **Answered**

Chosen Option : 2

Q.18 Let α, β be the roots of the equation $x^2 - 3x + r = 0$, and $\frac{\alpha}{2}, 2\beta$ be the roots of the equation $x^2 + 3x + r = 0$.

If the roots of the equation $x^2 + 6x = m$ are $2\alpha + \beta + 2r$ and $\alpha - 2\beta - \frac{r}{2}$, then m is equal to :

Options

1. 567
2. -135
3. -567
4. 135

Question Type : **MCQ**

Question ID : **691121151**

Option 1 ID : **691121514**

Option 2 ID : **691121511**

Option 3 ID : **691121512**

Option 4 ID : **691121513**

Status : **Not Answered**

Chosen Option : --

Q.19 Let $x = x(y)$ be the solution of the differential equation $2y^2 \frac{dx}{dy} - 2xy + x^2 = 0$, $y > 1$, $x(e) = e$.

Then $x(e^2)$ is equal to :

Options

1. $\frac{2}{3}e^2$
2. $2e^2$
3. $\frac{3}{2}e^2$
4. e^2

Question Type : **MCQ**

Question ID : **691121170**

Option 1 ID : **691121588**

Option 2 ID : **691121590**

Option 3 ID : **691121587**

Option 4 ID : **691121589**

Status : **Not Answered**

Chosen Option : --

Q.20

The sum $\frac{1^3}{1} + \frac{1^3+2^3}{1+3} + \frac{1^3+2^3+3^3}{1+3+5} + \dots$ up to 8 terms, is :

Options

1. 70
2. 73
3. 71
4. 72

Question Type : **MCQ**Question ID : **691121155**Option 1 ID : **691121527**Option 2 ID : **691121530**Option 3 ID : **691121528**Option 4 ID : **691121529**Status : **Answered**Chosen Option : **3**Section : **Mathematics Section B**

Q.21

If the area of the region bounded by $16x^2 - 9y^2 = 144$ and $8x - 3y = 24$ is A, then $3(A + 6 \log_e(3))$ is equal to _____.

Given --

Answer :

Question Type : **SA**Question ID : **691121174**Status : **Not Answered**

Q.22

Let A be the point (3, 0) and circles with variable diameter AB touch the circle $x^2 + y^2 = 36$ internally. Let the curve C be the locus of the point B. If the eccentricity of C is e, then $72e^2$ is equal to _____.

Given --

Answer :

Question Type : **SA**Question ID : **691121173**Status : **Not Answered**

Q.23

The number of points in the interval $[2, 4]$, at which the function $f(x) = \left[x^2 - x - \frac{1}{2} \right]$, where $[\cdot]$ denotes the greatest integer function, is discontinuous, is _____.

Given --
Answer :

Question Type : SA
Question ID : 691121175
Status : Not Answered

Q.24

Let $A = \{2, 3, 4, 5, 6\}$. Let R be a relation on the set $A \times A$ given by $(x, y)R(z, w)$ if and only if x divides z and $y \leq w$. Then the number of elements in R is _____.

Given --
Answer :

Question Type : SA
Question ID : 691121171
Status : Not Answered

Q.25

Consider the matrices $A = \begin{bmatrix} 2 & -2 \\ 4 & -2 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 9 \\ 1 & 3 \end{bmatrix}$. If matrices P and Q are such that $PA = B$ and $AQ = B$, then the absolute value of the sum of the diagonal elements of $2(P + Q)$ is _____.

Given --
Answer :

Question Type : SA
Question ID : 691121172
Status : Not Answered

Section : Physics Section A

Q.26

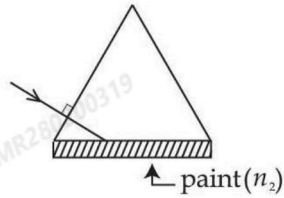
The equation of motion of a particle is given by $x = a \sin(50t + \pi/3)$ cm. The particle will come to rest at time t_1 and it will have zero acceleration at time t_2 . The t_1 and t_2 respectively are _____.

Options

1. $\frac{\pi}{75}$ s, $\frac{\pi}{300}$ s
2. $\frac{\pi}{300}$ s, $\frac{\pi}{25}$ s
3. $\frac{\pi}{50}$ s, $\frac{\pi}{100}$ s
4. $\frac{\pi}{300}$ s, $\frac{\pi}{75}$ s

Question Type : **MCQ**Question ID : **691121195**Option 1 ID : **691121673**Option 2 ID : **691121674**Option 3 ID : **691121675**Option 4 ID : **691121672**Status : **Answered**Chosen Option : **1**

- Q.27** One side of an equilateral prism is painted by a transparent material of refractive index n_2 . The refractive index of prism is 1.6. The minimum value of n_2 required for total internal reflection from painted face is _____.



Options

1. $\frac{3.2}{\sqrt{3}}$
2. $\sqrt{3}$
3. $\frac{4\sqrt{3}}{5}$
4. $\frac{3\sqrt{3}}{1.6}$

Question Type : **MCQ**

Question ID : **691121191**

Option 1 ID : **691121658**

Option 2 ID : **691121657**

Option 3 ID : **691121659**

Option 4 ID : **691121656**

Status : **Answered**

Chosen Option : **1**

- Q.28** A spherical ball of mass 2 kg falls from a height of 10 m and is brought to rest after penetrating 10 cm into sand. The average force exerted by sand on the ball is _____ N.
(Take $g = 10 \text{ m/s}^2$)

Options

1. 2000
2. 1980
3. 1000
4. 2020

Question Type : **MCQ**

Question ID : **691121186**

Option 1 ID : **691121638**

Option 2 ID : **691121636**

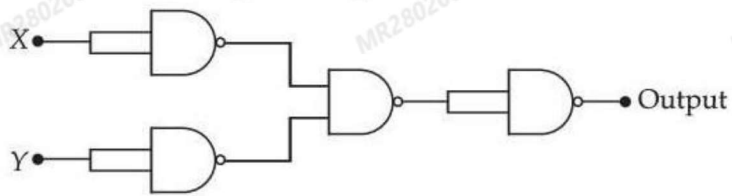
Option 3 ID : **691121639**

Option 4 ID : **691121637**

Status : **Answered**

Chosen Option : **2**

Q.29 If X and Y are the inputs, the given circuit works as _____.



Options

1. NOR gate
2. NAND gate
3. AND gate
4. OR gate

Question Type : MCQ

Question ID : 691121180

Option 1 ID : 691121615

Option 2 ID : 691121614

Option 3 ID : 691121613

Option 4 ID : 691121612

Status : Answered

Chosen Option : 2

Q.30 An electromagnetic wave travels in free space along the x -direction. At a particular point in space and time, $\vec{B} = 2 \times 10^{-7} \hat{j}$ T is associated with this wave. The value of corresponding electric field \vec{E} at this point is _____ V/m.

Options

1. $60 \hat{k}$
2. $-600 \hat{k}$
3. $30 \hat{k}$
4. $-60 \hat{k}$

Question Type : MCQ

Question ID : 691121187

Option 1 ID : 691121640

Option 2 ID : 691121643

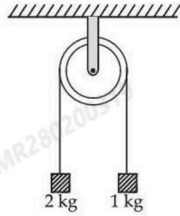
Option 3 ID : 691121642

Option 4 ID : 691121641

Status : Answered

Chosen Option : 1

- Q.31** Two blocks of masses 2 kg and 1 kg respectively, are tied to the ends of a string which passes over a light frictionless pulley as shown in the figure below. The masses are held at rest at the same horizontal level and then released. The distance traversed by the centre of mass in 2 s is _____ m. (Take $g = 10 \text{ m/s}^2$)



- Options**
1. 1.42
 2. 3.12
 3. 2.22
 4. 3.33

Question Type : **MCQ**

Question ID : **691121178**

Option 1 ID : **691121607**

Option 2 ID : **691121605**

Option 3 ID : **691121606**

Option 4 ID : **691121604**

Status : **Answered**

Chosen Option : **1**

- Q.32** If a body of mass 1 kg falls on the earth from infinity, it attains velocity (v) and kinetic energy (k) on reaching the surface of earth. The values of v and k respectively are _____ . (Take radius of earth to be 6400 km and $g = 9.8 \text{ m/s}^2$)

- Options**
1. 8.8 km/s; $12.54 \times 10^7 \text{ J}$
 2. 11.2 km/s; $12.54 \times 10^7 \text{ J}$
 3. 8.8 km/s; $6.27 \times 10^7 \text{ J}$
 4. 11.2 km/s; $6.27 \times 10^7 \text{ J}$

Question Type : **MCQ**

Question ID : **691121181**

Option 1 ID : **691121619**

Option 2 ID : **691121617**

Option 3 ID : **691121618**

Option 4 ID : **691121616**

Status : **Answered**

Chosen Option : **4**

Q.33 In a screw gauge the zero of main scale reference line coincides with the fifth division of the circular scale when two studs are in contact. There are 100 divisions in circular scale and pitch of screw gauge is 0.1 mm. When diameter of a sphere is measured, the reading of main scale is 5 mm and 50th division of circular scale coincides with the reference line of main scale. The diameter of sphere is _____ mm.

Options

1. 5.045
2. 5.450
3. 5.550
4. 5.055

Question Type : **MCQ**

Question ID : **691121182**

Option 1 ID : **691121620**

Option 2 ID : **691121622**

Option 3 ID : **691121623**

Option 4 ID : **691121621**

Status : **Answered**

Chosen Option : **2**

Q.34 A mixture of carbon dioxide and oxygen has volume 8310 cm³, temperature 300 K, pressure 100 kPa and mass 13.2 g. The number of moles of carbon dioxide and oxygen gases in the mixture respectively are _____.

(Assume both carbon dioxide and oxygen gases behave like ideal gases) [R = 8.31 J/mol.K]

Options

1. 0.13 and 0.20
2. 0.21 and 0.12
3. 0.25 and 0.08
4. 0.15 and 0.18

Question Type : **MCQ**

Question ID : **691121184**

Option 1 ID : **691121631**

Option 2 ID : **691121630**

Option 3 ID : **691121629**

Option 4 ID : **691121628**

Status : **Answered**

Chosen Option : **1**

Q.35 A 0.5 kg mass is in contact against the inner wall of a cylindrical drum of radius 4 m rotating about its vertical axis. The minimum rotational speed of the drum to enable the mass to remain stuck to the wall (without falling) is 5 rad/s. The coefficient of friction between the drum's inner wall surface and mass is _____. (Take $g = 10 \text{ m/s}^2$)

- Options**
1. 0.5
 2. 0.1
 3. 0.7
 4. 0.3

Question Type : **MCQ**

Question ID : **691121177**

Option 1 ID : **691121601**

Option 2 ID : **691121600**

Option 3 ID : **691121602**

Option 4 ID : **691121603**

Status : **Answered**

Chosen Option : **1**

Q.36 Two metal plates (A, B) are kept horizontally with separation of $\left(\frac{12}{\pi}\right)$ cm, with plate A on the top. An atomizer jet sprays oil (density 1.5 g/cm^3) droplets of radius 1 mm horizontally. All oil droplets carry a charge 5 nC . The potentials V_A and V_B are required on plates A and B respectively in order to ensure the droplets do not descend. The values of V_A and V_B are _____. (Neglect the air resistance to the droplets and take $g = 10 \text{ m/s}^2$)

- Options**
1. 0 V and -200 V
 2. 100 V and 580 V
 3. 580 V and 100 V
 4. 60 V and 400 V

Question Type : **MCQ**

Question ID : **691121189**

Option 1 ID : **691121651**

Option 2 ID : **691121648**

Option 3 ID : **691121649**

Option 4 ID : **691121650**

Status : **Not Answered**

Chosen Option : **--**

Q.37 Two resistors of $200\ \Omega$ and $400\ \Omega$ are connected in series with a battery of $100\ \text{V}$. A bulb rated at $200\ \text{V}$, $100\ \text{W}$ is connected across the $400\ \Omega$ resistance. The potential drop across the bulb is _____ V .

Options

1. 50
2. 66.6
3. 25
4. 100

Question Type : **MCQ**

Question ID : **691121188**

Option 1 ID : **691121645**

Option 2 ID : **691121646**

Option 3 ID : **691121644**

Option 4 ID : **691121647**

Status : **Answered**

Chosen Option : **1**

Q.38 The surface tension of a soap bubble is $0.03\ \text{N/m}$. The work done in increasing the diameter of bubble from $2\ \text{cm}$ to $6\ \text{cm}$ is $\alpha\pi \times 10^{-4}\ \text{J}$. The value of α is _____. (Take $\pi=3.14$)

Options

1. 0.64
2. 1.92
3. 0.86
4. 7.68

Question Type : **MCQ**

Question ID : **691121183**

Option 1 ID : **691121625**

Option 2 ID : **691121626**

Option 3 ID : **691121624**

Option 4 ID : **691121627**

Status : **Answered**

Chosen Option : **1**

Q.39 The binding energy per nucleon of ${}^{209}_{83}\text{Bi}$ is _____ MeV.

[Take $m({}^{209}_{83}\text{Bi}) = 208.980388 \text{ u}$, $m_p = 1.007825 \text{ u}$, $m_n = 1.008665 \text{ u}$, $1 \text{ u} = 931 \text{ MeV}/c^2$]

Options

1. 8.79
2. 6.94
3. 7.84
4. 7.48

Question Type : **MCQ**

Question ID : **691121194**

Option 1 ID : **691121670**

Option 2 ID : **691121671**

Option 3 ID : **691121669**

Option 4 ID : **691121668**

Status : **Answered**

Chosen Option : **1**

Q.40 Two point charges $8 \mu\text{C}$ and $-2 \mu\text{C}$ are located at $x = 2 \text{ cm}$ and $x = 4 \text{ cm}$, respectively on the x -axis. The ratio of electric flux due to these charges through two spheres of radii 3 cm and 5 cm with their centers at the origin is _____.

Options

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

Question Type : **MCQ**

Question ID : **691121190**

Option 1 ID : **691121654**

Option 2 ID : **691121655**

Option 3 ID : **691121653**

Option 4 ID : **691121652**

Status : **Answered**

Chosen Option : **4**

Q.41 Dimensions of universal gravitational constant (G) in terms of Planck's constant (h), distance (L), mass (M) and time (T) are _____.

Options

1. $[hTL^2M^{-2}]$
2. $[hT^{-1}LM^{-2}]$
3. $[hTL^2M^{-2}]$
4. $[h^{-1}T^{-1}LM^{-2}]$

Question Type : **MCQ**

Question ID : **691121176**

Option 1 ID : **691121596**

Option 2 ID : **691121597**

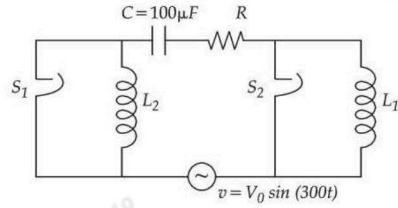
Option 3 ID : **691121598**

Option 4 ID : **691121599**

Status : **Answered**

Chosen Option : **4**

Q.42 The figure given below shows an LCR series circuit with two switches S_1 and S_2 . When switch S_1 is closed keeping S_2 open, the phase difference (ϕ) between the current and source voltage is 30° and phase difference is 60° when S_2 is closed keeping S_1 open. The value of $(3L_1 - L_2)$ is _____ H.



Options

1. $\frac{2}{9}$

2. 3

3. $\frac{9}{2}$

4. $\frac{1}{3}$

Question Type : **MCQ**

Question ID : **691121192**

Option 1 ID : **691121661**

Option 2 ID : **691121663**

Option 3 ID : **691121660**

Option 4 ID : **691121662**

Status : **Answered**

Chosen Option : **4**

Q.43 If an air bubble of diameter 2 mm rises steadily through a liquid of density 2000 kg/m^3 at a rate of 0.5 cm/s , then the coefficient of viscosity of liquid is _____ Poise. (Take $g = 10 \text{ m/s}^2$)

Options

1. 8.8
2. 0.088
3. 88.8
4. 0.88

Question Type : **MCQ**

Question ID : **691121185**

Option 1 ID : **691121633**

Option 2 ID : **691121635**

Option 3 ID : **691121634**

Option 4 ID : **691121632**

Status : **Answered**

Chosen Option : **4**

Q.44 A particle having charge 10^{-9} C moving in x - y plane in fields of $0.4 \hat{j} \text{ N/C}$ and $4 \times 10^{-3} \hat{k} \text{ T}$ experiences a force of $(4\hat{i} + 2\hat{j}) \times 10^{-10} \text{ N}$. The velocity of the particle at that instant is _____ m/s.

Options

1. $100\hat{i} + 50\hat{j}$
2. $50\hat{i} - 100\hat{j}$
3. $50\hat{i} + 100\hat{j}$
4. $-50\hat{i} + 100\hat{j}$

Question Type : **MCQ**

Question ID : **691121179**

Option 1 ID : **691121609**

Option 2 ID : **691121611**

Option 3 ID : **691121608**

Option 4 ID : **691121610**

Status : **Not Answered**

Chosen Option : **--**

Q.45 A circular current loop of radius R is placed inside square loop of side length L ($L \gg R$) such that they are co-planar and their centers coincide. The permeability of free space is μ_0 . The mutual inductance between circular loop and square loop is _____.

Options

1. $2\sqrt{2} \frac{\mu_0 R^2}{L}$

2. $\sqrt{2} \frac{\mu_0 L^2}{R}$

3. $\sqrt{2} \frac{\mu_0 R^2}{L}$

4. $2\sqrt{2} \frac{\mu_0 L^2}{R}$

Question Type : **MCQ**

Question ID : **691121193**

Option 1 ID : **691121667**

Option 2 ID : **691121665**

Option 3 ID : **691121666**

Option 4 ID : **691121664**

Status : **Not Answered**

Chosen Option : --

Section : **Physics Section B**

Q.46 If sunlight is focused on a paper using convex lens, it starts burning the paper in shortest time when the lens is kept at 30 cm above the paper. If the radius of curvature of the lens is 60 cm then the refractive index of the lens material is $\frac{\alpha}{10}$. The value of α is _____.

Given --

Answer :

Question Type : **SA**

Question ID : **691121199**

Status : **Not Answered**

Q.47

In a Young's double slit experiment, the intensity at some point on the screen is found to be $\frac{3}{4}$ times of the maximum of the interference pattern. The path difference between the interfering waves at this point is $\frac{\lambda}{x}$ where λ is wavelength of the incident light. The value of x is _____.

Given --

Answer :

Question Type : SA

Question ID : 691121196

Status : Not Answered

Q.48

Using Bohr's model, calculate the ratio of the magnetic fields generated due to the motion of the electrons in the 2nd and 4th orbits of hydrogen atom _____.

Given --

Answer :

Question Type : SA

Question ID : 691121197

Status : Not Answered

Q.49

5 moles of unknown gas is heated at constant volume from 10 °C to 20 °C. The molar specific heat of this gas at constant pressure $c_p = 8$ cal/mol. °C and $R = 8.36$ J/mol. °C. The change in the internal energy of the gas is _____ calorie.

Given --

Answer :

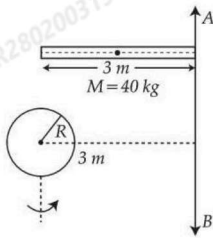
Question Type : SA

Question ID : 691121198

Status : Not Answered

Q.50

Moment of inertia about an axis AB for a rod of mass 40 kg and length 3 m is same as that of a solid sphere of mass of 10 kg and radius R about an axis parallel to AB axis with separation of 3 m as shown in figure below. The value of R is given as $\sqrt{\frac{\alpha}{2}}$. The value of α is _____.



Given --

Answer :

Question Type : SA

Question ID : 691121200

Status : Not Answered

Section : Chemistry Section A

Q.51 At 25°C, 20.0 mL of 0.2 M weak monoprotic acid HX is titrated against 0.2 M NaOH. The pH of the solution (a) at the start of the titration (when NaOH has not been added) and (b) when 10 mL of NaOH is added respectively, are :

Given : $K_a = 5 \times 10^{-4}$
 $pK_a = 3.3$
 $\alpha < < 1$

(a) (b)

Options

1. 1.1 2.2
2. 3.0 2.2
3. 2.0 3.3
4. 0.7 2.0

Question Type : **MCQ**

Question ID : **691121206**

Option 1 ID : **691121703**

Option 2 ID : **691121704**

Option 3 ID : **691121702**

Option 4 ID : **691121701**

Status : **Not Answered**

Chosen Option : --

Q.52 The first and second ionization constants of a weak dibasic acid H_2A are 8.1×10^{-8} and 1.0×10^{-13} respectively. 0.1 mol of H_2A was dissolved in 1L of 0.1 M HCl solution. The concentration of HA^- in the resultant solution is :

Options

1. 0.1 M
2. 8.1×10^{-8} M
3. 9.53×10^{-6} M
4. 1.0×10^{-13} M

Question Type : **MCQ**

Question ID : **691121202**

Option 1 ID : **691121685**

Option 2 ID : **691121687**

Option 3 ID : **691121686**

Option 4 ID : **691121688**

Status : **Answered**

Chosen Option : **1**

Q.53 Among Fe^{2+} , Fe^{3+} , Cr^{2+} and Zn^{2+} , the ion that shows positive borax bead test and with highest ionisation enthalpy is :

Options

1. Cr^{2+}
2. Zn^{2+}
3. Fe^{2+}
4. Fe^{3+}

Question Type : **MCQ**

Question ID : **691121220**

Option 1 ID : **691121759**

Option 2 ID : **691121758**

Option 3 ID : **691121757**

Option 4 ID : **691121760**

Status : **Answered**

Chosen Option : **1**

Q.54 Solution A is prepared by dissolving 1 g of a protein (molar mass = 50000 g mol^{-1}) in 0.5 L of water at 300 K. Its osmotic pressure is x bar. Solution B is made by dissolving 2 g of same protein in 1 L of water at 300 K. Osmotic pressure of solution B is y bar. Entire solution of A is mixed with entire solution of B at same temperature. The osmotic pressure of resultant solution is z bar. x , y and z respectively are :

($R = 0.083 \text{ L bar mol}^{-1} \text{ K}^{-1}$)

Options

1. 9.96×10^{-4} ; 9.96×10^{-4} ; 19.92×10^{-4}
2. 9.96×10^{-4} ; 9.96×10^{-4} ; 9.96×10^{-4}
3. 4.98×10^{-4} ; 4.98×10^{-4} ; 4.98×10^{-4}
4. 4.98×10^{-4} ; 4.98×10^{-4} ; 9.96×10^{-4}

Question Type : **MCQ**

Question ID : **691121205**

Option 1 ID : **691121698**

Option 2 ID : **691121697**

Option 3 ID : **691121700**

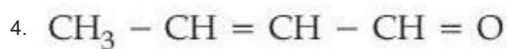
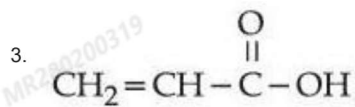
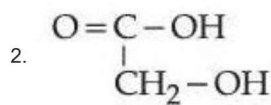
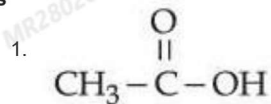
Option 4 ID : **691121699**

Status : **Not Answered**

Chosen Option : **--**

Q.55 An organic compound "x" where molar ratio of C, O and H are equal, on treatment with 50% KOH under reflux followed by acidification produced "y". The most likely structure of "y" is:
[Molar mass of 'x' is 58 g mol^{-1}]

Options



Question Type : **MCQ**

Question ID : **691121216**

Option 1 ID : **691121744**

Option 2 ID : **691121743**

Option 3 ID : **691121741**

Option 4 ID : **691121742**

Status : **Answered**

Chosen Option : **3**

Q.56 Which of the following complexes will show coordination isomerism ?

- A. $[\text{Ag}(\text{NH}_3)_2][\text{Ag}(\text{CN})_2]$
- B. $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$
- C. $[\text{Co}(\text{NH}_3)_6][\text{Co}(\text{CN})_6]$
- D. $[\text{Fe}(\text{NH}_3)_6][\text{Co}(\text{CN})_6]$
- E. $[\text{Co}(\text{NH}_3)_6][\text{Fe}(\text{CN})_6]$

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

Options

1. B, C and D Only
2. B, D and E Only
3. A, C and D Only
4. C, D and E Only

Question Type : **MCQ**

Question ID : **691121211**

Option 1 ID : **691121721**

Option 2 ID : **691121722**

Option 3 ID : **691121723**

Option 4 ID : **691121724**

Status : **Answered**

Chosen Option : **3**

Q.57

SF₄ is isostructural with :

- A. BrF₄[⊖]
- B. CH₄
- C. IF₄[⊕]
- D. XeF₄
- E. XeO₂F₂

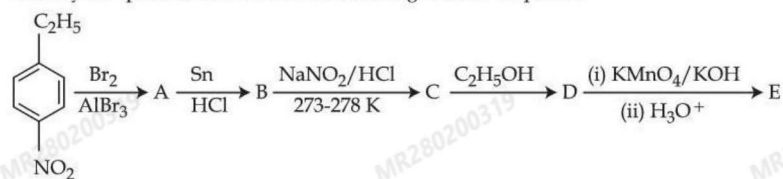
Choose the **correct** answer from the options given below :

Options

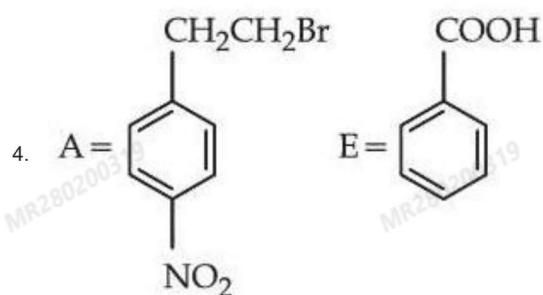
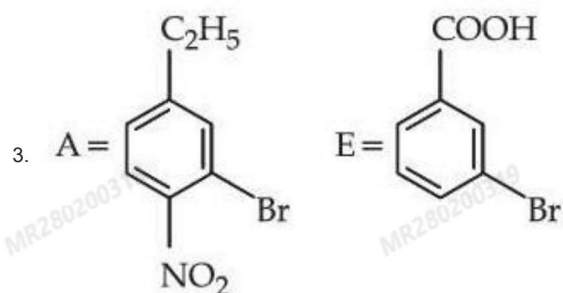
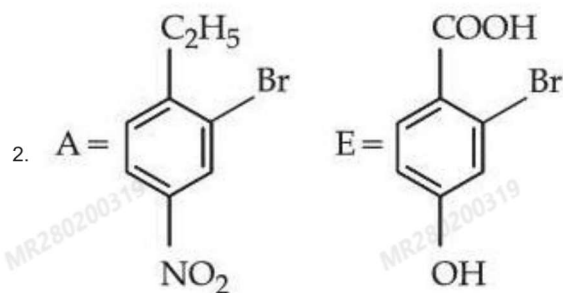
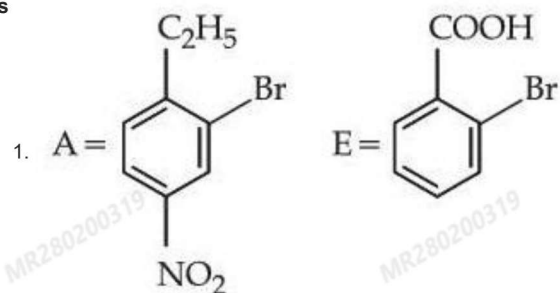
- 1. C Only
- 2. B and E Only
- 3. A and D Only
- 4. C and E Only

Question Type : **MCQ**Question ID : **691121203**Option 1 ID : **691121689**Option 2 ID : **691121692**Option 3 ID : **691121691**Option 4 ID : **691121690**Status : **Answered**Chosen Option : **1**

Q.60 Identify compounds A and E in the following reaction sequence.



Options



Question Type : **MCQ**

Question ID : **691121218**

Option 1 ID : **691121750**

Option 2 ID : **691121752**
Option 3 ID : **691121749**
Option 4 ID : **691121751**
Status : **Answered**
Chosen Option : **3**

Q.61 Given below are two statements :

Statement I : Among Zn, Mn, Sc and Cu, the energy required to remove the third valence electron is highest for Zn and lowest for Sc.

Statement II : The correct order of the following complexes in terms of CFSE is $[\text{Co}(\text{H}_2\text{O})_6]^{2+} < [\text{Co}(\text{H}_2\text{O})_6]^{3+} < [\text{Co}(\text{en})_3]^{3+}$.

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 : **691121210**
Option 1 ID : **691121718**
Option 2 ID : **691121717**
Option 3 ID : **691121719**
Option 4 ID : **691121720**
Status : **Not Answered**
Chosen Option : --

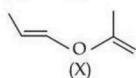
Q.62 The ratio of mass percentage (w/w) of C : H in a hydrocarbon is 12 : 1. It has two carbon atoms. The weight (in g) of $\text{CO}_2(\text{g})$ formed when 3.38 g of this hydrocarbon is completely burnt in oxygen is : (Given : Molar mass in g mol^{-1} C : 12, H : 1, O : 16)

Options

1. **22.74**
2. **17.05**
3. **5.68**
4. **11.44**

Question Type : **MCQ**
Question ID : **691121201**
Option 1 ID : **691121683**
Option 2 ID : **691121684**
Option 3 ID : **691121681**
Option 4 ID : **691121682**
Status : **Answered**
Chosen Option : **1**

Q.63 A molecule (X) with following structure under mild acidic condition is hydrolysed to produce (Y) and (Z). Identify the correct statements about (Y) and (Z).



- A. Both (Y) and (Z) have same molar mass.
 B. (Y) and (Z) can be distinguished from each other by NaHCO_3 .
 C. (Y) and (Z) react with HCN with same rates.
 D. (Y) and (Z) undergo addition reaction with 2,4-DNP.

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

Options

1. C and D Only
2. A and D Only
3. B and C Only
4. A, B and C Only

Question Type : **MCQ**

Question ID : **691121217**

Option 1 ID : **691121747**

Option 2 ID : **691121748**

Option 3 ID : **691121746**

Option 4 ID : **691121745**

Status : **Answered**

Chosen Option : **2**

Q.64 Complete combustion of X g of an organic compound gave 0.25 g of CO_2 and 0.12 g of H_2O . If the % of carbon is 25% and of hydrogen is 4.89%, then $X = \text{---} \times 10^{-3}$ g. (Nearest integer)
 (Molar mass of C, H and O are 12, 1 and 16 g mol^{-1} respectively.)

Options

1. 273
2. 227
3. 2730
4. 27

Question Type : **MCQ**

Question ID : **691121212**

Option 1 ID : **691121725**

Option 2 ID : **691121728**

Option 3 ID : **691121727**

Option 4 ID : **691121726**

Status : **Not Answered**

Chosen Option : **--**

Q.65 Given below are two statements :

Statement I : In $\text{O}_2\text{N}-\text{C}_6\text{H}_4-\overset{\oplus}{\text{C}}\text{H}-\text{C}_6\text{H}_4-\text{OCH}_3$, the carbocation is stabilised by +R effect of $-\text{OCH}_3$ group.

Statement II : In $\text{O}_2\text{N}-\text{C}_6\text{H}_4-\overset{\ominus}{\text{C}}\text{H}-\text{C}_6\text{H}_4-\text{OCH}_3$, the carbanion is stabilised by $-R$ effect of $-\text{NO}_2$ group.

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

Options

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

Question Type : **MCQ**

Question ID : **691121213**

Option 1 ID : **691121732**

Option 2 ID : **691121731**

Option 3 ID : **691121730**

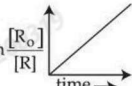
Option 4 ID : **691121729**

Status : **Not Answered**

Chosen Option : --

Q.66 Consider the reaction $aX \rightarrow bY$, for which the rate constant at 30°C is $1 \times 10^{-3} \text{ mol}^{-1} \text{ L s}^{-1}$. Which of the following statements are true ?

- A. When concentration of 'X' is increased to four times, the rate of reaction becomes 16 times.
- B. The reaction is a second order reaction.
- C. The half-life period is independent of the concentration of X.
- D. Decomposition of N_2O_5 is an example of the above reaction.

E.  is valid for the above reaction.

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

Options

- 1. A and B Only
- 2. A, B and C Only
- 3. C and D Only
- 4. A, B, D and E Only

Question Type : **MCQ**

Question ID : **691121207**

Option 1 ID : **691121705**

Option 2 ID : **691121706**

Option 3 ID : **691121708**

Option 4 ID : **691121707**

Status : **Marked For Review**

Chosen Option : **4**

Q.67 Gas 'A' undergoes change from state 'X' to state 'Y'. In this process, the heat absorbed and work done by the gas is 10 J and 18 J respectively. Now gas is brought back to state 'X' by another process during which 6 J of heat is evolved. In the reverse process of 'Y' to 'X',

Options 1.

- 14 J of the work is done on the gas 'A' by the surrounding.
- 18 J of the work is done by the gas 'A'.
- 12 J of the work is done on the gas 'A' by the surrounding.
- 2 J of the work is done by the gas 'A'.

Question Type : **MCQ**

Question ID : **691121204**

Option 1 ID : **691121696**

Option 2 ID : **691121693**

Option 3 ID : **691121695**

Option 4 ID : **691121694**

Status : **Marked For Review**

Chosen Option : **4**

Q.68 Given below are two statements :

Statement I : The second ionization enthalpy of B, Al and Ga is in the order of $B > Al > Ga$.

Statement II : The correct order in terms of first ionization enthalpy is $Si < Ge < Pb < Sn$.

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

Options

- Both **Statement I** and **Statement II** are false
- Both **Statement I** and **Statement II** are true
- Statement I** is false but **Statement II** is true
- Statement I** is true but **Statement II** is false

Question Type : **MCQ**

Question ID : **691121209**

Option 1 ID : **691121714**

Option 2 ID : **691121713**

Option 3 ID : **691121716**

Option 4 ID : **691121715**

Status : **Answered**

Chosen Option : **4**

Q.69 The correct set that contains all kinds (basic, acidic, amphoteric and neutral) of oxides is :

Options

1. Al_2O_3 , As_2O_3 , CO and NO
2. Na_2O , K_2O , Al_2O_3 and As_2O_3
3. K_2O , Cl_2O_7 , As_2O_3 and NO
4. Na_2O , N_2O , Al_2O_3 and CO

Question Type : **MCQ**

Question ID : **691121208**

Option 1 ID : **691121710**

Option 2 ID : **691121709**

Option 3 ID : **691121711**

Option 4 ID : **691121712**

Status : **Marked For Review**

Chosen Option : 2

Q.70 Correct statements regarding alkyl halides (R-X) among the following are :

- A. Alcohol being less polar solvent as compared to water, alcoholic KOH favours elimination reaction with R-X .
- B. Order of reactivity towards S_N^1 mechanism is $\text{C}_6\text{H}_5-\text{CH}_2-\text{Cl} > \text{C}_6\text{H}_5-\text{CHCl}-\text{C}_6\text{H}_5$.
- C. Non substituted aryl halides exhibit properties similar to alkyl halides.
- D. Vinyl chloride is an example of haloalkene and allyl chloride is an example of haloalkyne.
- E. R-Cl can be prepared by reacting R-OH with SOCl_2 but Ar-Cl cannot be prepared by reacting Ar-OH with SOCl_2 .

Choose the correct answer from the options given below :

Options

1. B and D Only
2. D and E Only
3. A and E Only
4. A, B and C Only

Question Type : **MCQ**

Question ID : **691121215**

Option 1 ID : **691121738**

Option 2 ID : **691121740**

Option 3 ID : **691121739**

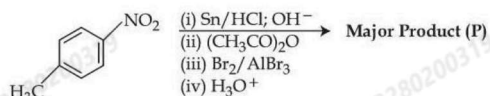
Option 4 ID : **691121737**

Status : **Marked For Review**

Chosen Option : 3

Section : Chemistry Section B

Q.71 Consider the following reactions sequence

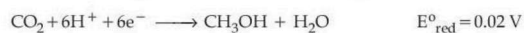


When the product (P) is subjected to Carius analysis using AgNO_3 , 1.0 g of the product (P) will produce _____ g of the precipitate of AgBr. (Nearest Integer)
(Given : molar mass in g mol^{-1} C : 12, H : 1, O : 16, N : 14, Br : 80, Ag : 108)

Given --
Answer :

Question Type : SA
Question ID : 691121225
Status : Not Answered

Q.72 Consider the following two half-cell reactions along with the standard reduction potential given :



A fuel cell was set up using the above two reactions such that the cell operates under the standard condition of 1 bar pressure and 298 K temperature. The fuel cell works with 80% efficiency. If the work derived from the cell using 1 mol of CH_3OH is used to compress an ideal gas isothermally against a constant pressure of 1 kPa, then the change in the volume of the gas,

$$\Delta V = \text{_____ m}^3. \text{ (nearest integer)}$$

Given : $F = 96500 \text{ C mol}^{-1}$

Given --
Answer :

Question Type : SA
Question ID : 691121223
Status : Not Answered

Q.73 Number of paramagnetic ions among the following d- and f-block metal ions is _____.

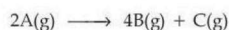
$\text{Mn}^{2+}, \text{Cu}^{2+}, \text{Zn}^{2+}, \text{Yb}^{2+}, \text{Sc}^{3+}, \text{La}^{3+}, \text{Gd}^{3+}, \text{Lu}^{3+}, \text{Ti}^{4+}, \text{Ce}^{4+}$

(Atomic number of Mn = 25, Cu = 29, Zn = 30, Yb = 70, Sc = 21, La = 57, Gd = 64, Lu = 71, Ti = 22, Ce = 58)

Given --
Answer :

Question Type : SA
Question ID : 691121224
Status : Not Answered

Q.74 Consider the following gas phase reaction being carried out in a closed vessel at 25°C.



time (min)	total pressure of the system (mm Hg)
30	300
∞	600

The pressure of C(g) at 30 minutes time interval would be _____ mm Hg. (nearest integer)

Given --
Answer :

Question Type : SA
Question ID : 691121222
Status : Not Answered

Q.75 The surface of sodium metal is irradiated with radiation of wavelength x nm. The kinetic energy of ejected electrons is 2.8×10^{-20} J. The work function of sodium is 2.3 eV. The value of x is _____ $\times 10^2$ nm. (Nearest integer)

(Given : $h = 6.6 \times 10^{-34}$ J s ; $1 \text{ eV} = 1.6 \times 10^{-19}$ J ; $c = 3.0 \times 10^8$ m s $^{-1}$)

Given --
Answer :

Question Type : SA
Question ID : 691121221
Status : Not Answered

Exam Summary

B. Tech

Section Name	No. of Questions	Answered	Not Answered	Marked for Review	Answered & Marked for Review	Not Visited
Mathematics Section A	20	10	10	0	0	0
Mathematics Section B	5	0	1	0	0	4
Physics Section A	20	17	3	0	0	0
Physics Section B	5	0	5	0	0	0
Chemistry Section A	20	10	6	0	4	0
Chemistry Section B	5	0	2	0	0	3