Q.1

The value of a company is measured as the total value of its shares owned by different investors. Rakesh owns 2/15 of the shares of a company. He sells 1/3 of his shares for Rs. 75,000/-. What is the total value of the company at that time?

1. Rs. 15,75,800
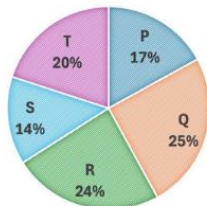2. Rs. 16,87,500
3. Rs. 17,75,800
4. Rs. 18,27,500

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

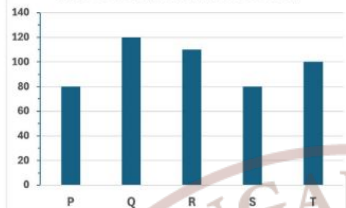**Q.2**

The market share (%) and annual production of scooters from five automobile companies P, Q, R, S, and T are shown in graphs.

If the profit of a company is directly proportional to the ratio of market share to production, then which of the following statements is/are CORRECT?
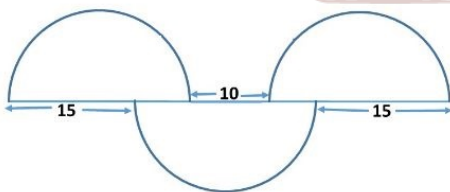
Statement X: Companies T and P have same profit
Statement Y: Company R has the maximum profit
Statement Z: Company S has the minimum profit

1. X and Y
2. X and Z
3. Y and Z
4. Only Z

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

Q.3

Three identical semi-circles are arranged as shown. What is the diameter of the semi-circles?

1. 5 π
2. 20
3. 15π /2
4. 25

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

Q.4

What will be the digit at the unit's place of $1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 + 7^3 + 8^3 + 9^3$?

1. 0
2. 5
3. 7
4. 9

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

Q.5

The following diagram represents the relationship between four categories.
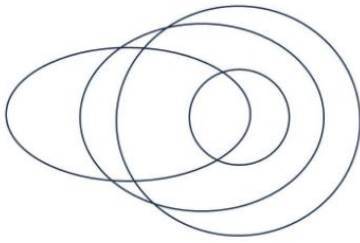
The categories could be

1. Rivers, water bodies, oceans, sources of evaporation
2. Parliamentarians, celebrities, elected persons, professional politicians
3. Monkeys, four-legged animals, pet animals, land animals
4. Furniture, chairs, seats, wooden objects

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

Q.6

The given Venn diagram shows numbers of players playing one or more than one sport.
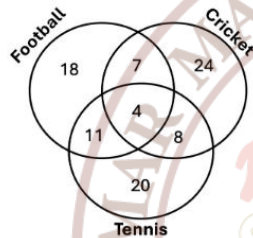
The percentage of players who play exactly two sports is closest to _____%.

1. 5
2. 14
3. 28
4. 32

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

Q.7

Rahul and his father started jogging on a circular track of radius 'r' (r >2). Rahul completed one round and stopped. His father got tired half way into the first round and returned to his starting point along a straight line. What is the ratio of the distances covered by Rahul and his father?

1. $\pi r / (\pi + 2)$
2. $2 \pi / (\pi + 2)$
3. 1
4. 2

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

Q.8

The initial monthly salaries of employees John, Riya, and Sunil were in the proportion 4:3:5. After an increase of Rs 10000 monthly to all, the new proportion becomes 6:5:7. What was the initial salary of Sunil?

1. Rs 20000
2. Rs 25000
3. Rs 30000
4. Rs 35000

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

Q.9

Consider the following statements:

Statement I: All Booklets are Manuals.
Statement II: All Manuals are Catalogues.

If Statements I and II are True, which one of the following conclusions can be conclusively drawn?

1. All Manuals are Booklets.
2. All Catalogues are Booklets.
3. All Booklets are Catalogues.
4. All Catalogues are Manuals.

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

Q.10

Three friends, Mr. Rahman, Mr. George and Mr. Vedant, met after a long time.

They were wearing red, green and violet colour shirts. Mr. Rahman and the person wearing violet shirt noticed that none of the three is wearing a colour that starts with same letter as his name. Which one of the following is the correct match of the persons with the colour of their shirts?

1. Rahman-Violet, George-Red, Vedant-Green
2. Rahman-Green, George-Violet, Vedant-Red
3. Rahman-Green, George-Red, Vedant-Violet
4. Rahman-Red, George-Violet, Vedant-Green

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

Q.11

Suresh asked Ramesh to identify the person in a photo that the latter is holding. Ramesh responds, "I have no brothers or sisters. However, that man's father is my father's son." Who is the person in the photo?

1. Suresh
2. Ramesh
3. Ramesh's son
4. Ramesh's cousin

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

Q.12

A number is mistakenly divided by 2 instead of being multiplied by 2. What is the change in the result caused by this mistake?

1. 25%
2. 50%
3. 75%
4. 100%

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

Q.13

A cylindrical container of radius 20 cm was filled with water up to 25 cm height. A solid spherical ball of radius 7 cm was then immersed in the water. What would be the approximate increase in water level in the container after the ball was fully immersed?

1. 1.14 cm
2. 2.28 cm
3. 5.50 cm
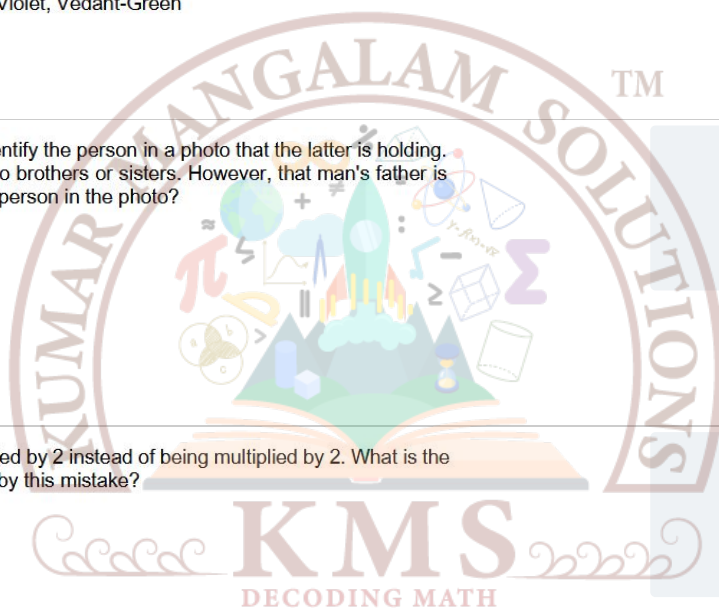4. 7.00 cm

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

Q.14

Numbers of Rose, Lotus, and Marigold plants in a garden are in the proportion 8:5:7. Later, 75%, 40% and 50% more plants of their respective categories were added. What will be the new proportion of plants, in the same order?
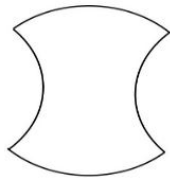
1. 5:3:4
2. 4:2:3
3. 5:4:3
4. 7:4:5

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

Q.15 A circle of radius 1 unit is divided into four quarters and rejoined as shown below.

What is the area of this shape?

1. π
2. 1
3. 2
4. 4

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

Q.16 Kavita starts from her house and walks 200 m northward, then turns 45° right and walks 70 m. After that, she turns 90° right and walks 70 m. Which of the following is the closest value of the shortest distance between Kavita's current location and her house?

1. 296 m
2. 240 m
3. 200 m
4. 223 m

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

Q.17 A stock market trader has lost two thirds of her investment on a day. Next day she recovered one third of the previous day's loss. What fraction of her initial investment is she left with?

1. $\frac{1}{3}$
2. $\frac{2}{3}$
3. $\frac{2}{9}$
4. $\frac{5}{9}$

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

Q.18 Sum of the digits of a two-digit number 'ab' is subtracted from the number and the result is divided by 9. Then the result of this will be

1. always a
2. always b
3. neither a nor b
4. either a or b depending on a+b

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

Q.19 In a code, the word DELTOID is written as 3152893. Then LOTION could be written as

1. 582986
2. 582981
3. 198396
4. 198392

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

Q.20

A car has wheels of diameter 36 cm. If it runs at a speed of 60 km/h, then the rotation per minute (RPM) will be closest to _____ .

1. 884
2. 898
3. 906
4. 986

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

Section : PART - B

Q.21

Let $f : \mathbb{C} \to \mathbb{C}$ be a polynomial map. For $R > 0$, let $\gamma_R : [0,1] \to \mathbb{C}$ be the map $t \mapsto Re^{2\pi i t}$. Suppose that there exists $c \in \mathbb{R}$ such that

$$\int_0^1 |(f \circ \gamma_R)(t)\gamma_R'(t)|\, dt \longrightarrow c \text{ as } R \longrightarrow \infty.$$

Which of the following statements is **FALSE**?

1. The function $zf(1/z) \longrightarrow 0$ as $|z| \longrightarrow \infty$.
2. The function f is constant.
3. $c = 0$.
4. $c > 0$.

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

Q.22

Let $X_1, X_2, \ldots, X_n$ be a random sample from a continuous distribution with the common probability density function

$$f(x|\theta) = \begin{cases} \dfrac{2^\theta \, \theta}{x^{\theta+1}}, & \text{if } x > 2, \\ 0, & \text{otherwise,} \end{cases}$$

where $\theta \, (> 0)$ is an unknown parameter. Suppose $P(Y > \chi^2_{m,\beta}) = \beta$, where $Y \sim \chi^2_m$. For testing $H_0 : \theta = 1$ against $H_1 : \theta > 1$, a uniformly most powerful test of size α, $0 < \alpha < 1$, will reject H_0 if

1. $\sum_{i=1}^n \ln X_i > \frac{1}{2}\chi^2_{2n,\alpha} + n \ln 2$
2. $\sum_{i=1}^n \ln X_i < \frac{1}{2}\chi^2_{2n,1-\alpha} + n \ln 2$
3. $\sum_{i=1}^n \ln X_i > \chi^2_{n,\alpha} + n \ln 2$
4. $\sum_{i=1}^n \ln X_i < \chi^2_{n,1-\alpha} + n \ln 2$

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

Q.23

A mobile manufacturing company uses two brands of batteries for its mobiles. The life (in years) of batteries of Brand I follows an exponential distribution with the probability density function

$$f(x) = \begin{cases} e^{-x}, & \text{if } x > 0, \\ 0, & \text{otherwise,} \end{cases}$$

and that of Brand II follows a gamma distribution with the probability density function

$$g(x) = \begin{cases} \frac{x}{4}e^{-x/2}, & \text{if } x > 0, \\ 0, & \text{otherwise.} \end{cases}$$

The company uses the batteries of Brands I and II in proportion of 20% and 80% respectively, in its mobiles. The probability that a randomly selected mobile has the battery life more that 2 years is

1. $\frac{13}{5}e^{-2}$
2. $\frac{1}{5}(e^{-2} + 2e^{-1})$
3. $\frac{1}{5}(e^{-2} + 8e^{-1})$
4. $\frac{1}{5}(4e^{-2} + 2e^{-1})$

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

Q.24

Question Type : MCQ
Question ID : 562954107
Option 1 ID : 562954425
Option 2 ID : 562954426
Option 3 ID : 562954427
Option 4 ID : 562954428
Status : Marked For Review
Chosen Option : 4

Let $V = \{ax^3 + bx^2 + cx \mid a, b, c \in \mathbb{R}\}$. For $f \in V$, define

$$Q(f) = \int_{-1}^{1} (f'(t))^2 \mathrm{d}t,$$

where f' denotes the derivative of f. Which of the following statements is **FALSE**?

1. Q is a positive definite quadratic form on V.
2. Q takes every positive real value.
3. $Q(x) = 2$.
4. For all $f, g \in V$, $Q(f + g) = Q(f) + Q(g)$.

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

Q.25

Question Type : MCQ
Question ID : 562954121
Option 1 ID : 562954481
Option 2 ID : 562954482
Option 3 ID : 562954483
Option 4 ID : 562954484
Status : Answered
Chosen Option : 2

Let $y(x)$ be the extremal of the functional

$$J[y] = \int_{0}^{\frac{\pi}{4}} \left((y')^2 - 4y^2 + 2xy \right) dx$$

subject to $y(0) = 0$, $y\left(\frac{\pi}{4}\right) = 1$. Then $y(x)$ is equal to

1. $\left(1 - \dfrac{\pi}{4}\right)\sin(2x) + x$
2. $\left(1 - \dfrac{\pi}{16}\right)\sin(2x) + \dfrac{x}{4}$
3. $\left(1 + \dfrac{\pi}{4}\right)\sin(2x) - x$
4. $\left(1 + \dfrac{\pi}{16}\right)\sin(2x) - \dfrac{x}{4}$

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

Q.26

Question Type : MCQ
Question ID : 562954133
Option 1 ID : 562954529
Option 2 ID : 562954530
Option 3 ID : 562954531
Option 4 ID : 562954532
Status : Not Answered
Chosen Option : --

Suppose $\begin{pmatrix} X_1 \\ X_2 \\ X_3 \end{pmatrix} \sim N_3 \left(\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \right)$ and $\begin{pmatrix} X \\ Y \\ Z \end{pmatrix} = \begin{pmatrix} 3 & 0 & 0 \\ 2 & 2 & 0 \\ 4 & 0 & 4 \end{pmatrix} \begin{pmatrix} X_1 \\ X_2 \\ X_3 \end{pmatrix}$. Then the partial correlation coefficient $\rho_{YZ.X}$ is

1. $\frac{1}{2}$
2. $\frac{2}{3}$
3. $\frac{3}{4}$
4. 0

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

Q.27

Question Type : MCQ
Question ID : 562954125
Option 1 ID : 562954497
Option 2 ID : 562954498
Option 3 ID : 562954499
Option 4 ID : 562954500
Status : Not Answered
Chosen Option : --

A biased six-faced die is tossed once. Suppose that the probability of any prime number showing up is twice that of any non-prime number showing up. Then, the probability that an odd number will show up is

1. $\frac{1}{3}$
2. $\frac{2}{3}$
3. $\frac{4}{9}$
4. $\frac{5}{9}$

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

Consider the multiple linear regression model $y_i = \beta_0 + \beta_1 x_{1i} + \cdots + \beta_8 x_{8i} + \epsilon_i$, $i = 1, 2, \ldots, 29$, where $\epsilon_1, \epsilon_2, \ldots, \epsilon_{29}$ are independent and identically normal distributed with mean 0 and variance σ^2. Suppose the model is fitted using the method of least squares. If the calculated value of the F-statistic for testing the significance of regression is 2.50, then the possible values of R^2 and Adjusted R^2 are respectively

1. 0.30 and 0.10

2. 0.50 and 0.30

3. 0.50 and 0.16

4. 0.30 and -0.10

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

Which of the following statements is true?

1. The ideal $2\mathbb{Z}[i]$ is maximal in $\mathbb{Z}[i]$.

2. The ideal $X\mathbb{C}[X, Y]$ is maximal in $\mathbb{C}[X, Y]$.

3. The set of all polynomials in $\mathbb{C}[X]$ whose coefficients add up to 0 is a maximal ideal in $\mathbb{C}[X]$.

4. The ideal $(\sqrt{2} - 1)\mathbb{Z}[\sqrt{2}]$ is maximal in $\mathbb{Z}[\sqrt{2}]$.

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

Let A, B be non-empty subsets of $\mathbb{N}$ with cardinality $|A| \geq 2$. Let

$$S_1 = \{f : A \to B \mid f \text{ is one-to-one}\} \quad \text{and} \quad S_2 = \{g : B \to A \mid g \text{ is onto}\}.$$

Which of the following statements is true?

1. If $A \subsetneq B$ and B is finite, then there is a one-to-one map from S_2 to S_1.

2. If $B = \mathbb{N}$, then there exists a one-to-one map from S_2 to B.

3. If $B = \mathbb{N}$ and A is finite, then there exists a one-to-one map from B to S_1.

4. If A is finite, then S_2 is finite for any B.

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

Let $(\lambda_n)_{n \in \mathbb{N}}$ be the sequence of eigenvalues of the Sturm-Liouville problem

$$\frac{d}{dx}\left(x \frac{dy}{dx}\right) + \frac{\lambda}{x} y = 0, \ 1 < x < e^{2\pi},$$

$$y(1) = 0, \ y\left(e^{2\pi}\right) = 0.$$

Then $\displaystyle\sum_{n=1}^{\infty} \frac{1}{\lambda_n}$ is equal to

1. $\dfrac{\pi^2}{12}$

2. $\dfrac{2\pi^2}{3}$

3. $\dfrac{\pi^2}{4}$

4. $\dfrac{\pi^2}{16}$

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

Let p, q be non-negative integers. Consider the following statements:

(A) There is an integer $k \geq 1$ such that

$$p + k = q.$$

(B) There is an integer $k \geq 1$ such that

$$q + k = p.$$

Which of the following statements is true?

1. There exist non-negative integers p, q such that both (A) and (B) are true.
2. Both (A) and (B) are false if and only if $p = q$.
3. For all non-negative integers p and q, (A) or (B) is true.
4. There exists $p \neq q$ such that both (A) and (B) are false.

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

Q.33

Suppose we want to estimate the population mean $\bar{Y}$ of a variable for a finite population of size 85, with 34 Statisticians and 51 Biologists. We consider the following sampling scheme:

A stratified random sample with 2 strata of Statisticians (Stratum-1) and Biologists (Stratum-2), where 12 Statisticians and 15 Biologists are drawn from Stratum-1 and Stratum-2, respectively, using SRSWOR scheme.

Denote $\bar{y}_S$, $\bar{y}_B$, and $\bar{y}$ as the mean of the variable among the Statistician sample, Biologist sample, and the combined sample, respectively. Which of the following is an unbiased estimator of $\bar{Y}$?

1. $\bar{y}$

2. $\dfrac{2\bar{y}_S + 3\bar{y}_B}{5}$

3. $\dfrac{4\bar{y}_S + 5\bar{y}_B}{9}$

4. $\dfrac{\frac{\bar{y}_S}{12} + \frac{\bar{y}_B}{15}}{\frac{1}{12} + \frac{1}{15}}$

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

Q.34

Which of the following statements is true?

1. There exists an entire function f such that $f^{(n)}(0) = \frac{n!}{n^n}$ for all positive integers n.
2. There exists an entire function f such that $f^{(n)}(0) = n!n^n$ for all positive integers n.
3. There exists an entire function f such that $f^{(n)}(0) = (n-1)!$ for all positive integers n.
4. There exists an entire function f such that $f^{(n)}(0) = n!n$ for all positive integers n.

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

Q.35

Consider the real matrix $A = \begin{pmatrix} 29 & 0 & 55 & 17 \\ 1 & 28 & 46 & 26 \\ 17 & 13 & 33 & 38 \\ 21 & 67 & 0 & 13 \end{pmatrix}$. What is the largest real eigenvalue of A?

1. 101
2. 67
3. 103
4. 113

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

Q.36

Let $u = u(x, t)$ be the solution of

$$\frac{\partial^2 u}{\partial t^2} - \frac{\partial^2 u}{\partial x^2} = 0, \ x \in \mathbb{R}, \ t > 0,$$

$$u(x, 0) = 1 + x^2, \ x \in \mathbb{R},$$

$$\frac{\partial u}{\partial t}(x, 0) = x + 1, \ x \in \mathbb{R}.$$

Then the value of $u(1, 1)$ is

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

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

Q.37

Which of the following polynomials is the characteristic polynomial of a real 2×2 matrix A such that $\text{trace}(A) = 7$ and $\text{trace}(A^2) = 29$?

1. $t^2 + 7t + 10$
2. $t^2 - 7t + 29$
3. $t^2 - 7t - 10$
4. $t^2 - 7t + 10$

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

Q.38

For each $n \geq 1$, let $f_n : [0, 1] \to \mathbb{R}$ be defined as

$$f_n(x) = \begin{cases} nx & \text{if } x \in \left[0, \frac{1}{n}\right], \\ 2 - nx & \text{if } x \in \left(\frac{1}{n}, \frac{2}{n}\right], \\ 0 & \text{if } x \in \left(\frac{2}{n}, 1\right]. \end{cases}$$

Which of the following statements is true?

1. $(f_n)_{n \geq 1}$ converges uniformly on $[0, 1]$ to a continuous function f.
2. $(f_n)_{n \geq 1}$ converges pointwise on $[0, 1]$ to a discontinuous function f.
3. $(f_n)_{n \geq 1}$ converges pointwise on $[0, 1]$ to a continuous function f.
4. $(f_n)_{n \geq 1}$ does not converge pointwise on $[0, 1]$.

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

Q.39

Let $Z_1, Z_2, \ldots$ be a sequence of independent and identically distributed random variables having discrete uniform distribution over $\{1, 2, \ldots, 2024\}$. Let $Y_n = \sum_{i=1}^{n} Z_i, \ n \geq 2$. Further, let X_n be the remainder when Y_n is divided by 2025. Then, which of the following statements is true?

1. $\lim_{n \to \infty} P(X_n = 0) = \frac{1}{2026}$
2. $\lim_{n \to \infty} P(X_n = 0) = \frac{1}{2025}$
3. $\lim_{n \to \infty} P(X_n = 0) = \frac{1}{2024}$
4. $\lim_{n \to \infty} P(X_n = 0) = \frac{1}{2023}$

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

Let A be a subring of the field of rationals $\mathbb{Q}$ such that for any nonzero rational $r \in \mathbb{Q}$, $r \in A$ or $1/r \in A$. Which of the following statements is **FALSE**?

1. The set $\left\{ a \in A : \dfrac{1}{a} \notin A \right\} \cup \{0\}$ is an additive subgroup of $\mathbb{Q}$.
2. A has at most one maximal ideal.
3. If $A \neq \mathbb{Q}$, then A has infinitely many prime ideals.
4. For any nonzero $a, b \in A$, a divides b or b divides a in A.

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

Let $C[0, \pi]$ be the real vector space of real-valued continuous functions on the closed interval $[0, \pi]$. For positive integers n, define $f_n \in C[0, \pi]$ by

$$f_n(x) = \begin{cases} \frac{\sin(nx)}{\sin x} & \text{if } x \in (0, \pi), \\ n & \text{if } x = 0, \\ (-1)^{n-1}n & \text{if } x = \pi. \end{cases}$$

Let V be the real subspace of $C[0, \pi]$ spanned by $\{f_1, f_2, f_3\}$. Consider the inner product on V given by

$$\langle f, g \rangle = \frac{2}{\pi} \int_0^{\pi} f(x)g(x) \sin^2 x \, dx.$$

Which of the following statements is true?

1. $f_4 \in V$
2. $\{f_1, f_2, f_3\}$ is an orthonormal basis of V.
3. The dimension of V is 2.
4. $\{f_1, f_2, f_3\}$ is an orthogonal set but not orthonormal.

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

Let X be a random sample of size 1 from the probability density function

$$f(x|\theta) = \begin{cases} \frac{3}{\theta^3}(\theta - x)^2, & \text{if } 0 < x < \theta, \\ 0, & \text{otherwise.} \end{cases}$$

If $\left(\dfrac{X}{1-\lambda_1}, \dfrac{X}{1-\lambda_2} \right)$ is a confidence interval for θ with confidence coefficient $1 - \alpha$, where $\lambda_i \in (0, 1)$, $i = 1, 2$, $\lambda_1 < \lambda_2$, and $\alpha \in (0, 1)$, then which of the following statements is true?

1. $\lambda_2^2 - \lambda_1^2 = 1 - \alpha$
2. $\lambda_2^3 - \lambda_1^3 = 1 - \alpha$
3. $\lambda_2^2 - \lambda_1^2 = 4(1 - \alpha)$
4. $\lambda_2^3 - \lambda_1^3 = 9(1 - \alpha)$

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

Consider a discrete random variable X with the probability mass function

$$P(X = 0) = \frac{\theta}{3}, \ P(X = 1) = 1 - \frac{\theta}{2}, \ P(X = 2) = \frac{\theta}{6},$$

where $\theta \in (0, 1)$ is an unknown parameter. In a random sample of size 90 from this distribution, the observed counts for $X = 0, 1$ and 2 are $20, 60$ and 10, respectively. Then, the maximum likelihood estimate of θ is

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

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

Suppose that we have a data set consisting of $2n + 1$ observations for some $n \in \mathbb{N}$. Value of each observation is either x or $x + r$, where $x \in \mathbb{N}$, $r \geq 0$. Then, which of the following statements is always true?

1. The mean and median of the data will be different if and only if $r > 0$
2. Variance of the data is positive if and only if $r > 0$
3. Mean and mode of the data will be same if and only if $r = 0$
4. Median and mode of the data will be same for all values of $r \geq 0$

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

Q.45

Let $f : \mathbb{R} \setminus \mathbb{Q} \to \mathbb{R} \setminus \mathbb{Q}$ be the function defined as

$$f(x) = \frac{3x + 2}{4x + 3}.$$

Let $x_1 \in \mathbb{R} \setminus \mathbb{Q}$. For $n \geq 1$, define $x_{n+1} = f(x_n)$. Suppose that the sequence $(x_n)_{n \geq 1}$ converges to a real number ℓ. Which of the following statements is true?

1. If ℓ is positive, then $\ell = \dfrac{\sqrt{3}}{2}$.

2. If ℓ is positive, then $\ell = \dfrac{1}{\sqrt{2}}$.

3. If ℓ is negative, then $\ell = -\dfrac{\sqrt{3}}{2}$.

4. If ℓ is negative, then $\ell = -\dfrac{1}{2}$.

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

Q.46

Let $S = \{1, 2, 3, 4, 5\}$ be equipped with the topology $\tau = \{\emptyset, \{1\}, S\}$. What is the number of homeomorphisms of S onto itself?

1. 25
2. 120
3. 24
4. 6

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

Q.47

Let f be an entire function such that $f(\mathbb{C}) \subset \{x + iy \mid y = x + 1\}$. Which of the following statements is true?

1. $|f(z)| \to \infty$ as $|z| \to \infty$.

2. $\dfrac{f(z)}{z} \to 0$ as $|z| \to \infty$.

3. $z f(z) \to 0$ as $|z| \to \infty$.

4. $f(z) \to 0$ as $|z| \to \infty$.

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

Q.48

Which of the following statements is true?

1. $p \nmid 1 + (p - 1)!$ for some odd prime p.

2. $p \mid (1234)^{p-1} - 1$ for all primes $p > 700$.

3. There exist $a \in \mathbb{Z}$ and a prime $p > 11$ such that $p \nmid a^p - a$.

4. $p \nmid \dfrac{(p^2)!}{(p!)^2}$ for some odd prime p.

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

Let X be the $\mathbb{R}$-vector space of all twice differentiable real valued functions on $[0, 1]$. Consider the linear map $\phi : X \to \mathbb{R}^3$ defined by $\phi(f) = (f(1), f'(1), f''(1))$. Which of the following statements is true?

1. The dimension of $X/\ker \phi$ is 3.

2. $\ker \phi$ is finite dimensional.

3. The dimension of $X/\ker \phi$ is 1.

4. X is finite dimensional.

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

If $\varphi(x) = x$ is a solution of the ordinary differential equation (ODE)

$$\frac{d^2 y}{dx^2} - \left(\frac{2}{x^2} + \frac{1}{x}\right)\left(x\frac{dy}{dx} - y\right) = 0, \ 0 < x < \infty,$$

then the general solution of the ODE is given by

1. $(a + be^{-2x})\, x, \ a, b \in \mathbb{R}$

2. $(a + be^{2x})\, x, \ a, b \in \mathbb{R}$

3. $ae^x + bx, \ a, b \in \mathbb{R}$

4. $(a + be^x)\, x, \ a, b \in \mathbb{R}$

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

Suppose the distribution of X given θ is normal with mean θ and variance 15. Further, let the prior (improper) distribution of θ be proportional to $1, -\infty < \theta < \infty$. If the observed value of X is 13, then which of the following statements is true?

1. Posterior mean $=$ Maximum likelihood estimate of θ, Posterior variance $= \text{Var}(X|\theta)$

2. Posterior mean $=$ Maximum likelihood estimate of θ, Posterior variance $< \text{Var}(X|\theta)$

3. Posterior mean $>$ Maximum likelihood estimate of θ, Posterior variance $= \text{Var}(X|\theta)$

4. Posterior mean $>$ Maximum likelihood estimate of θ, Posterior variance $< \text{Var}(X|\theta)$

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

If the function $s : [0, 4] \to \mathbb{R}$ defined by

$$s(x) = \begin{cases} a(x - 2)^2 + b(x - 1)^2, & 0 \leq x \leq 1, \\ (x - 2)^2, & 1 < x \leq 3, \\ 2c(x - 2)^2 + (x - 3)^3, & 3 < x \leq 4 \end{cases}$$

is a cubic spline, then the value of $2a + b + 2c$ is

1. 2

2. 3

3. 4

4. 5

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

Let

$$f(x) = x \log_e \left(1 + \frac{1}{x} \right)$$

for $x \in (0, \infty)$. Which of the following statements is true?

1. f is unbounded.
2. f is increasing.
3. $\lim_{x \to \infty} f(x) = 2$.
4. f is decreasing.

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

Suppose a dynamical system has the Lagrangian

$$L = (\dot{q}_1)^2 + (\dot{q}_2)^2 + (q_1)^2 + \dot{q}_1 \dot{q}_2$$

If p_1 and p_2 are momenta conjugate to q_1 and q_2, respectively, then which of the following statements is true?

1. $\dot{p}_1 = 2q_1, \dot{p}_2 = 0$
2. $\dot{p}_1 = -q_1, \dot{p}_2 = 0$
3. $\dot{p}_1 = -\frac{q_1}{2}, p_2 = q_2$
4. $\dot{p}_1 = q_1, p_2 = -q_2$

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

Let $u = u(x, y)$ be the solution to the Cauchy problem

$$(y + u) \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = x - y, \quad x \in \mathbb{R}, y > 0,$$
$$u(x, 1) = 1 + x, \qquad x \in \mathbb{R}.$$

Then which of the following statements is true?

1. $u(1, 1) = 2$
2. $u(2, 2) = 4$
3. $u(3, 3) = \frac{3}{2}$
4. $u(4, 4) = \frac{2}{3}$

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

Q.56

Let

$$A = \left\{ \frac{p}{q} \in (0,1) \ : \ p \in \mathbb{N}, \ q = 2^n \text{ for some } n \in \mathbb{N} \cup \{0\}, \ \gcd(p,q) = 1 \right\},$$

$$B = \left\{ \frac{p}{q} \in (0,1) \ : \ p \in \mathbb{N}, \ q = 2^n 5^m \text{ for some } n, m \in \mathbb{N} \cup \{0\}, \ \gcd(p,q) = 1 \right\},$$

$$C = \left\{ \frac{p}{q} \in (0,1) \ : \ \frac{p}{q} \text{ has terminating decimal expansion} \right\}$$

be subsets of $(0,1)$. Which of the following statements is true?

1. $A \subsetneq C$ and $B \subsetneq C$
2. $A \subsetneq C \subsetneq B$
3. $A \subsetneq B \subsetneq C$
4. $A \subsetneq B = C$

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

Q.57

Let X be the image of the interval $[0,1]$ under the Möbius transformation $f(z) = \dfrac{z-i}{z+i}$. Which of the following statements is true?

1. X is the line segment joining -1 and $-i$.
2. $X = \left\{ e^{i\theta} \mid \theta \in \left[\pi, \frac{3\pi}{2}\right] \right\}$.
3. X is the line segment joining -1 to 1.
4. $X = \left\{ e^{i\theta} \mid \theta \in \left[-\frac{\pi}{2}, \pi\right] \right\}$.

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

Q.58

Solve the following linear programming problem:

$$\text{maximize } z = x + y$$

$$\text{subject to}$$

$$5x + 3y \leq 30$$
$$2x + 6y \leq 25$$
$$2x - y \leq 8$$
$$x \geq 0, y \geq 0.$$

Then the optimal value of the objective function is

1. $\frac{45}{11}$
2. $\frac{74}{11}$
3. $\frac{85}{12}$
4. $\frac{25}{6}$

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

Q.59

Let $\mathbb{F}_5$ denote the field with 5 elements. How many 2×2 matrices with entries in $\mathbb{F}_5$ have rank one?

1. 125
2. 144
3. 145
4. 480

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

If $y(x)$ is the solution of the integral equation

$$y(x) = x^2 + 2\int_0^1 xty(t)\,dt,$$

then which of the following statements is true?

1. $y(0) + y(1) = \dfrac{1}{2}$

2. $y(-1) + y(1) = 1$

3. $y'(0) + y'(1) = \dfrac{3}{2}$

4. $y'(-1) + y'(1) = 3$

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

Section : PART - C

Q.61

Let the random vector $\begin{pmatrix} X_1 \\ X_2 \\ X_3 \end{pmatrix}$ have the positive definite dispersion matrix $\begin{pmatrix} 1 & \rho & \rho \\ \rho & 1 & \rho \\ \rho & \rho & 1 \end{pmatrix}$.

Then, which of the following statements are true?

1. ρ may be -0.47

2. The first principal component can only explain 32% of the total variation for some ρ

3. The second principal component can explain more than 32% of the total variation for any ρ

4. The variance of the first principal component is $1 + 2\rho$ for any ρ

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

Q.62

If the incidence matrix of a block design is given by $N = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}$, then which of

the following statements are true?

1. The design is incomplete

2. The design is connected

3. The design is balanced

4. The design is orthogonal

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

Q.63

Let f and K be such that the solution of the initial value problem

$$y'' - 3y' + 2y = 4\sin(x),\ y(0) = 1,\ y'(0) = -2$$

satisfies the Volterra integral equation

$$y(x) = f(x) + \int_0^x K(x,t)y(t)\,dt.$$

Then which of the following statements are true?

1. $f'(\pi) = 3$

2. $f(\pi) + f'(\pi) = 4 - \pi$

3. $f(\pi) + f'(\pi) = 2 - \pi$

4. $f(0) + f'(0) = -4$

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

Q.64

Consider a paired data (x_i, y_i); $i = 1, 2, 3, 4, 5$, where $(x_1, x_2, x_3, x_4, x_5) = (-2, -1, 0, 1, 2)$ and $y_i = x_i^2$ for all $i = 1, 2, 3, 4, 5$. On this data, a simple linear regression model with an intercept term and a simple linear regression model without an intercept term are fitted using the method of least squares. Which of the following statements are true ?

1. The two fitted lines have the same slope

2. The two fitted models have the same intercept

3. The model with intercept passes through at least one of the observed data points

4. The model without intercept passes through at lesast one of the observed data points

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

Q.65

Let G be a group, H a subgroup of G, and $T = \{gH \mid g \in G\}$, the set of all left cosets of H in G. Let S_T be the set of all permutations of T and $\pi : G \longrightarrow S_T$ be the map defined by $\pi(g)(g_1 H) = gg_1 H$. For a prime number p, let $\mathbb{F}_p$ denote the field with p elements. In which of the following cases is $\ker \pi$ trivial?

1. $G = \mathrm{GL}_2(\mathbb{F}_p)$ and H is a subgroup of order p.

2. $G = \mathrm{SL}_2(\mathbb{F}_p)$ and H is a subgroup of order p.

3. $p \equiv 3 \pmod 4$, $G = \mathrm{GL}_2(\mathbb{F}_p)/\mathrm{SL}_2(\mathbb{F}_p)$ and H is a subgroup of order 2.

4. $p \equiv 1 \pmod 4$, $G = \mathrm{GL}_2(\mathbb{F}_p)/\mathrm{SL}_2(\mathbb{F}_p)$ and H is a subgroup of order 2.

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

Q.66

For $\alpha \geq 0$, consider the functional

$$J_\alpha[y] = \int_1^2 \frac{(y')^2}{x^\alpha} \, dx$$

defined for all continuously differentiable functions defined on the interval $[1, 2]$ satisfying the conditions

$$y(1) = 1, \, y(2) = 2.$$

Then which of the following statements are true?

1. $y(x) = \dfrac{1}{15} \left(x^4 + 14\right)$ is an extremal for J_3

2. $y(x) = \dfrac{1}{3} \left(x^2 + 2\right)$ is an extremal for J_1

3. $y(x) = x$ is an extremal for J_0

4. $y(x) = \dfrac{1}{2} \left(x^2 - x + 2\right)$ is an extremal for J_1

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

Which of the following matrices are similar over $\mathbb{R}$ to the matrix

$$A = \begin{pmatrix} -1 & 1 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 \end{pmatrix} ?$$

1.
$$\begin{pmatrix} 0 & 0 & 0 & -1 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

2.
$$\begin{pmatrix} 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

3.
$$\begin{pmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

4.
$$\begin{pmatrix} 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{pmatrix}$$

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

Let μ denote the Lebesgue measure on $\mathbb{R}$. Suppose that f is a non-negative Lebesgue measurable function on $\mathbb{R}$. Let $0 = a_0 < a_1 < a_2 < \cdots$ be an unbounded sequence such that

$$a_{n+1} \le c a_n$$

for some real number c and for all $n \ge 1$. Let

$$A_k = \{x \in \mathbb{R} \mid a_k \le f(x) < a_{k+1}\}$$

for each $k \ge 0$. Which of the following statements are true?

1. If f is Lebesgue integrable on $\mathbb{R}$, then $\displaystyle\sum_{k \ge 0} a_k\, \mu\,(A_k)$ is finite.

2. If $\displaystyle\sum_{k \ge 0} a_k\, \mu\,(A_k)$ is finite, then f is Lebesgue integrable on $\mathbb{R}$.

3. If $\displaystyle\sum_{k \ge 0} a_k\, \mu\,(A_k)$ is finite, and $f(x) \ge a_1$ for all $x \in \mathbb{R}$, then f is Lebesgue integrable on $\mathbb{R}$.

4. If $\displaystyle\sum_{k \ge 0} a_k\, \mu(A_k)$ is finite and f is bounded, then f is Lebesgue integrable on $\mathbb{R}$.

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

Let X and Y be independent and identically distributed $N(0,1)$ random variables. Let $S = X^2 + Y^2$ and $T = e^{-(X^2+Y^2)/2}$. Then, which of the following statements are true?

1. The probability density function of S is

$$f_S(s) = \begin{cases} \frac{1}{2}e^{-s/2}, & \text{if } s > 0, \\ 0, & \text{otherwise.} \end{cases}$$

2. The probability density function of T is

$$f_T(t) = \begin{cases} 1, & \text{if } 0 < t < 1, \\ 0, & \text{otherwise.} \end{cases}$$

3. $\text{Var}(S) = 2$.

4. $E(T) = \frac{2}{3}$

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

Let $(X_1, Y_1), (X_2, Y_2), \ldots, (X_{10}, Y_{10})$ be a random sample from a bivariate normal distribution $\text{BVN}(\mu_1, \mu_2, \sigma_1^2, \sigma_2^2, \rho)$ with $\mu_1 = 5$, $\mu_2 = 6$, $\sigma_1^2 = 4$, $\sigma_2^2 = 9$ and $\rho = \frac{1}{2}$. Then, which of the following statements are true?

1. The distribution of $\frac{1}{\sqrt{7}} \sum_{i=1}^{10}(X_i - Y_i + 1)$ is $N(0, 10)$

2. The distribution of $\frac{1}{19} \sum_{i=1}^{10}(X_i + Y_i - 11)^2$ is χ^2-distribution with degrees of freedom 10

3. The distribution of $\dfrac{2\sqrt{2}(X_1 - 5)}{\sqrt{\sum_{i=3}^{10}(X_i - 5)^2}}$ is t-distribution with degrees of freedom 9

4. The distribution of $\dfrac{2\sum_{i=1}^{3}(Y_i - 6)^2}{\sum_{i=4}^{9}(Y_i - 6)^2}$ is F-distribution with degrees of freedom 3 and 6.

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

Let $X_1, X_2, \ldots, X_n$ ($n \geq 3$) be a random sample from the uniform distribution on the interval $(\theta_1 - \theta_2, \theta_1 + \theta_2)$, where $\theta_1 \in \mathbb{R}$ and $\theta_2 > 0$ are unknown parameters. Let $X_{(j)}$ be the jth order statistic, $j = 1, 2, \ldots, n$, and let $\bar{X} = \frac{1}{n}\sum_{i=1}^{n} X_i$. Here, $(X_{(1)}, X_{(n)})$ is a complete and sufficient statistic for (θ_1, θ_2). Then, which of the following statements are true?

1. $\bar{X}$ is an unbiased estimator of θ_1

2. $(\bar{X} - X_{(1)})$ is an unbiased estimator of θ_2

3. $\frac{X_{(1)}+X_{(n)}}{2}$ is the uniformly minimum variance unbiased estimator of θ_1

4. $\frac{(n+1)(X_{(n)}-X_{(1)})}{2(n-1)}$ is the uniformly minimum variance unbiased estimator of θ_2

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

Consider a Markov chain $\{X_n : n \geq 1\}$ on state space $\{1, 2, 3, 4, 5\}$ with the transition probability matrix

$$P = \begin{pmatrix} 0 & \frac{1}{2} & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & \frac{1}{3} & 0 & \frac{1}{3} & \frac{1}{3} \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}.$$

Then, which of the following statements are true?

1. Stationary distribution is $(0, 0, 0, 0, 1)$.

2. State 5 is absorbing and recurrent.

3. All states are aperiodic.

4. $\lim_{n \to \infty} p_{55}^{(n)} = 1$.

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

Let $T : \mathbb{C}^7 \to \mathbb{C}^7$ be a $\mathbb{C}$-linear operator with eigenvalues $2, 3$ and 5. Consider the subspace

$$W := \{v \in \mathbb{C}^7 : (T - 5I)^k v = 0 \text{ for some integer } k > 0\}$$

of $\mathbb{C}^7$. Suppose that $(T - 2I)^2(T - 3I)^2(T - 5I)^2 = 0$. Which of the following statements are necessarily true?

1. T has at least four linearly independent eigenvectors.

2. $\dim W \geq 2$.

3. $\ker\left((T - 2I)^{2025}\right) = \ker\left((T - 2I)^{2026}\right)$

4. $(T - 2I)(T - 3I)$ is a nilpotent operator.

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

Let f and g be real-valued Riemann integrable functions on $[a, b]$ such that $g([a, b]) \subseteq [a, b]$. Which of the following statements are necessarily true?

1. The composition $f \circ g$ is Riemann integrable.

2. If $g(x) \neq 0$ for each $x \in [a, b]$, then $\dfrac{f}{g}$ is Riemann integrable.

3. The positive square root $\sqrt{f^2 + g^2}$ is Riemann integrable.

4. The composition $f \circ g$ is Riemann integrable, if both f and g are continuous.

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

If $\alpha, \beta \in \mathbb{R}$ are such that the equation

$$\int_0^3 f(x)\,dx = \frac{3}{2}\big[f(\alpha) + f(\alpha + \beta)\big]$$

holds for all polynomials $f(x)$ of degree less than or equal to 2, then which of the following statements are true?

1. $(\alpha, \beta) = \left(\dfrac{3 - \sqrt{3}}{2}, \sqrt{3}\right)$ or $(\alpha, \beta) = \left(\dfrac{3 + \sqrt{3}}{2}, -\sqrt{3}\right)$

2. $(\alpha, \beta) = \left(\dfrac{3 - \sqrt{2}}{2}, \sqrt{2}\right)$ or $(\alpha, \beta) = \left(\dfrac{3 + \sqrt{2}}{2}, -\sqrt{2}\right)$

3. $(\alpha, \beta) = \left(\dfrac{3 - \sqrt{5}}{2}, \sqrt{5}\right)$ or $(\alpha, \beta) = \left(\dfrac{3 + \sqrt{5}}{2}, -\sqrt{5}\right)$

4. $(\alpha, \beta) = \left(\dfrac{3 - \sqrt{7}}{2}, \sqrt{7}\right)$ or $(\alpha, \beta) = \left(\dfrac{3 + \sqrt{7}}{2}, -\sqrt{7}\right)$

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

Let $\mathbb{D}^{\times} = \{z \in \mathbb{C} \; : \; 0 < |z| < 1\}$ be the punctured unit disk and f be a bijective holomorphic map of $\mathbb{D}^{\times}$ onto itself. Which of the following statements are true?

1. $\lim\limits_{z \to 0} f(z)$ does not exist.

2. $\lim\limits_{z \to 0} f(z)$ exists and has absolute value ≤ 1.

3. $\lim\limits_{z \to 0} f(z) = 0$

4. There exists $\theta \in \mathbb{R}$ such that $f(z) = e^{i\theta} z$ for all $z \in \mathbb{D}^{\times}$.

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

Let f be an entire function which is not a polynomial. Let

$$A = \{\alpha \in \mathbb{C} \mid f^{(n)}(\alpha) \neq 0 \text{ for all } n \geq 0\}.$$

Which of the following statements are true?

1. A is nonempty.

2. A is finite.

3. A is infinite.

4. A is uncountable.

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

For each $n \geq 1$, let $f_n : \mathbb{R} \to \mathbb{R}$ be a function defined by

$$f_n(x) = \frac{e^{-n^2 x^2}}{n}.$$

Which of the following statements are true?

1. $(f_n)_{n \geq 1}$ converges uniformly to 0 on $\mathbb{R}$, and $(f_n')_{n \geq 1}$ converges uniformly to 0 on the interval $(-M, M)$ for some positive real number M.

2. $(f_n)_{n \geq 1}$ converges uniformly to 0 on $\mathbb{R}$, and $(f_n')_{n \geq 1}$ converges pointwise to 0 on $\mathbb{R}$.

3. $(f_n)_{n \geq 1}$ converges uniformly to 0 on $\mathbb{R}$ and $(f_n')_{n \geq 1}$ does not converge pointwise to 0 on $\mathbb{R}$.

4. $(f_n)_{n \geq 1}$ converges pointwise to 0 on $\mathbb{R}$ but not uniformly on $\mathbb{R}$.

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

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Question List

SR No.	Question ID	Correct Options/Answers	Options/Answers for Challenge
1.	56295476	3	☐ 1 ☐ 2 ☑ 3 ☐ 4 ☐ None of these
2.	56295477	3	☐ 1 ☐ 2 ☑ 3 ☐ 4 ☐ None of these

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Question List

3.	56295478	2	☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ None of these
4.	56295479	1	☑ 1 ☐ 2 ☐ 3 ☐ 4 ☐ None of these
5.	56295480	1	☑ 1

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				these
5.	56295480	1		☑ 1
				☐ 2
				☐ 3
				☐ 4
				☐ None of these
6.	56295481	3		☐ 1
				☐ 2
				☑ 3
				☐ 4
				☐ None of these
7.	56295482	2		☐ 1

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7.	56295482	2	☐ 1
			▣ 2
			☐ 3
			☐ 4
			☐ None of these
8.	56295483	4	☐ 1
			☐ 2
			☐ 3
			▣ 4
			☐ None of these
9.	56295484	2	☐ 1
			▣ 2

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Question List

9.	56295484	2	☐ 1
			■ 2
			☐ 3
			☐ 4
			☐ None of these
10.	56295485	2	☐ 1
			■ 2
			☐ 3
			☐ 4
			☐ None of these
11.	56295486	2	☐ 1
			■ 2

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Question List

			these	
11.	56295486	2	☐	1
			☑	2
			☐	3
			☐	4
			☐	None of these
12.	56295487	3	☐	1
			☐	2
			☑	3
			☐	4
			☐	None of these
13.	56295488	2	☐	1

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13.	56295488	2	☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ None of these
14.	56295489	3	☐ 1 ☐ 2 ☑ 3 ☐ 4 ☐ None of these
15.	56295490	4	☐ 1

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				these
15.	56295490	4		☐ 1
				☐ 2
				☐ 3
				☑ 4
				☐ None of these
16.	56295491	1		☑ 1
				☐ 2
				☐ 3
				☐ 4
				☐ None of these
17.	56295492	1		☑ 1

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Question List

			от these
17.	56295492	1	☑ 1
			☐ 2
			☐ 3
			☐ 4
			☐ None of these
18.	56295493	3	☐ 1
			☐ 2
			☑ 3
			☐ 4
			☐ None of these

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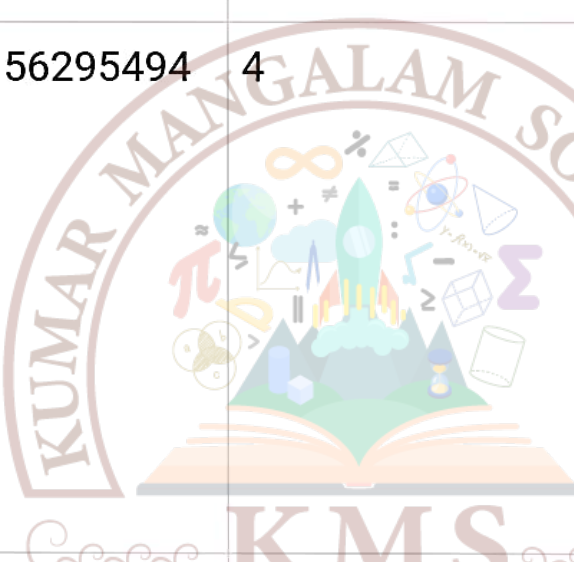
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Question List

19.	56295494	4		☐ 1
				☐ 2
				☐ 3
				☑ 4
				☐ None of these
20.	56295495	2		☐ 1
				☑ 2
				☐ 3
				☐ 4
				☐ None of these
21.	56295496	2		☐ 1

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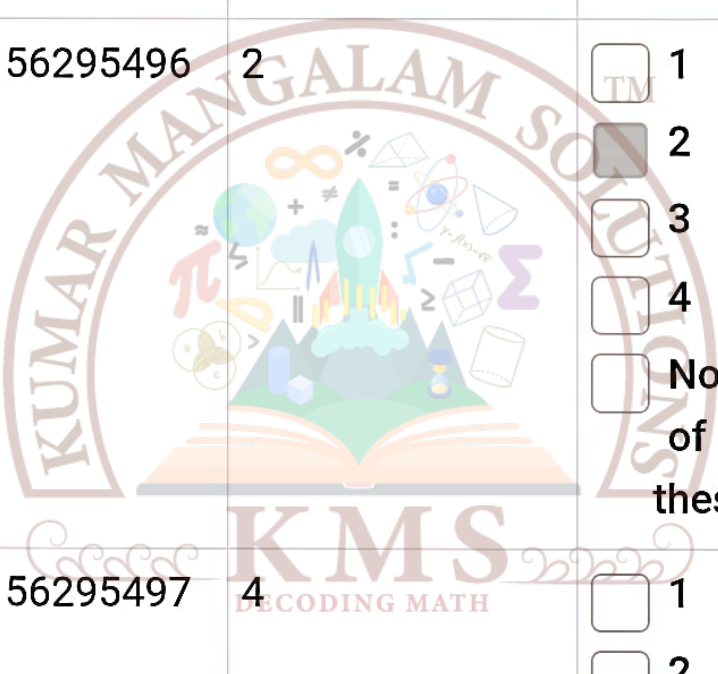
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Question List

21.	56295496	2	☐ 1
			☑ 2
			☐ 3
			☐ 4
			☐ None of these
22.	56295497	4	☐ 1
			☐ 2
			☐ 3
			☑ 4
			☐ None of these
23.	56295498	3	☐ 1

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23.	56295498	3	☐ 1
			☐ 2
			▣ 3
			☐ 4
			☐ None of these
24.	56295499	2	☐ 1
			▣ 2
			☐ 3
			☐ 4
			☐ None of these
25.	562954100	2	☐ 1

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Question List

				these
25.	562954100	2	☐	1
			☐ (filled)	2
			☐	3
			☐	4
			☐	None of these
26.	562954101	3	☐	1
			☐	2
			☐ (filled)	3
			☐	4
			☐	None of these
27.	562954102	4	☐	1

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Question List

				these
27.	562954102	4		☐ 1
				☐ 2
				☐ 3
				☑ 4
				☐ None of these
28.	562954103	2		☐ 1
				☑ 2
				☐ 3
				☐ 4
				☐ None of these
29	562954104	1		☑ 1

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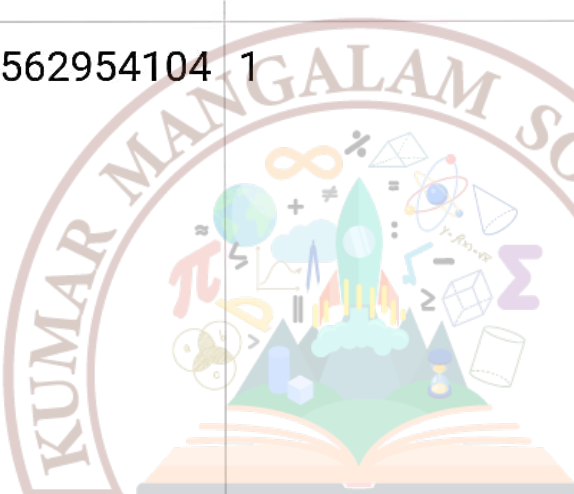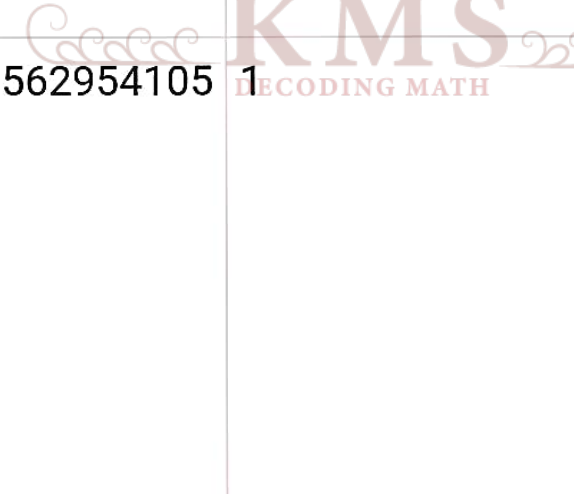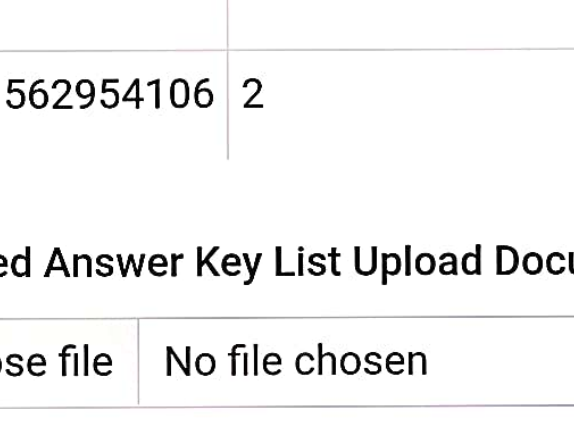
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29.	562954104	1	☑ 1
			☐ 2
			☐ 3
			☐ 4
			☐ None of these
30.	562954105	1	☑ 1
			☐ 2
			☐ 3
			☐ 4
			☐ None of these
31.	562954106	2	☐ 1

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Question List

			these
31.	562954106	2	☐ 1
			☑ 2
			☐ 3
			☐ 4
			☐ None of these
32.	562954107	4	☐ 1
			☐ 2
			☐ 3
			☑ 4
			☐ None of these
33.	562954108	4	☐ 1

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				these
33.	562954108	4	☐	1
			☐	2
			☐	3
			☑	4
			☐	None of these
34.	562954109	2	☐	1
			☑	2
			☐	3
			☐	4
			☐	None of these
35.	562954110	1	☑	1

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35.	562954110	1	1 ▣
			2 ☐
			3 ☐
			4 ☐
			None of these ☐
36.	562954111	2	1 ☐
			2 ▣
			3 ☐
			4 ☐
			None of these ☐
37.	562954112	2	1 ☐

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37.	562954112	2	☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ None of these
38.	562954113	3	☐ 1 ☐ 2 ☑ 3 ☐ 4 ☐ None of these
39.	562954114	3	☐ 1

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			these
39.	562954114	3	☐ 1
			☐ 2
			☑ 3
			☐ 4
			☐ None of these
40.	562954115	3	☐ 1
			☐ 2
			☑ 3
			☐ 4
			☐ None of these
41.	562954116	4	☐ 1

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41.	562954116	4	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ None of these
42.	562954117	2	☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ None of these
43.	562954118	1	☑ 1

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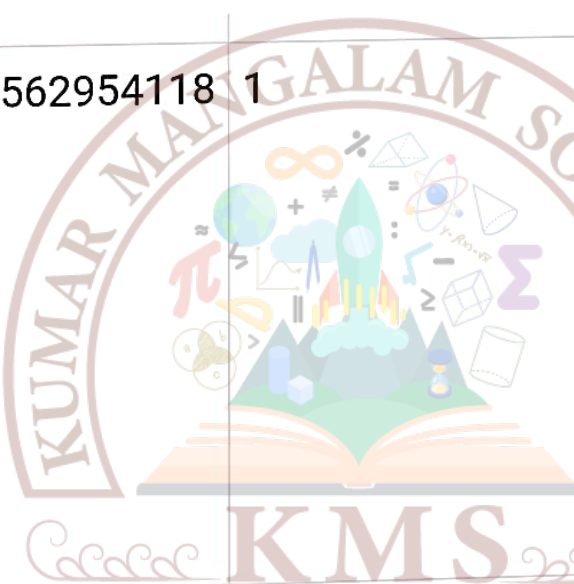
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43.	562954118	1	☑ 1
			☐ 2
			☐ 3
			☐ 4
			☐ None of these

44.	562954119	4	☐ 1
			☐ 2
			☐ 3
			☑ 4
			☐ None of these

| 45. | 562954120 | 2 | ☐ 1 |

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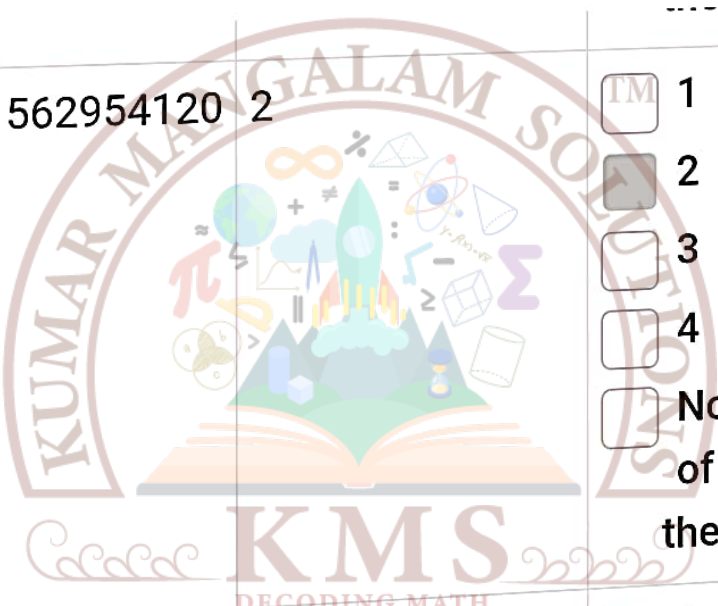
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45.	562954120	2	☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ None of these	
46.	562954121	2	☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ None of these	
47.	562954122	4	☐ 1	

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				these
47.	562954122	4	☐	1
			☐	2
			☐	3
			☑	4
			☐	None of these
48.	562954123	1	☑	1
			☐	2
			☐	3
			☐	4
			☐	None of these
49.	562954124	4	☐	1

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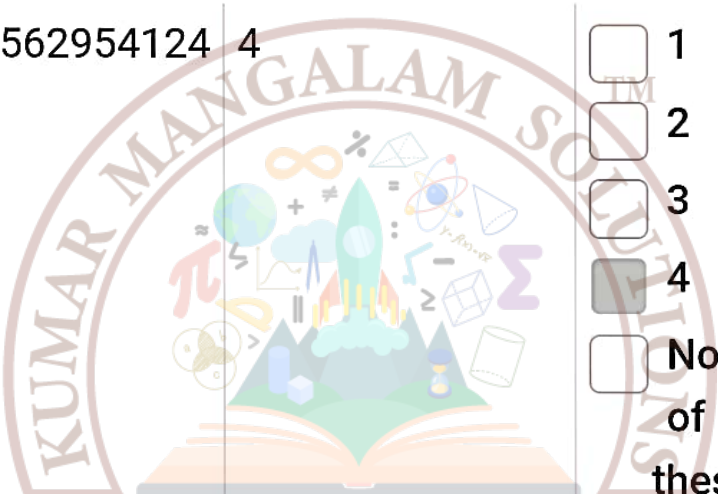| Choose file	No file chosen

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49.	562954124	4		☐ 1
				☐ 2
				☐ 3
				▣ 4
				☐ None of these
50.	562954125	4		☐ 1
				☐ 2
				☐ 3
				▣ 4
				☐ None of these
51.	562954126	2		☐ 1
				▣ 2

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				these
51.	562954126	2	☐	1
			☑	2
			☐	3
			☐	4
			☐	None of these
52.	562954127	3	☐	1
			☐	2
			☑	3
			☐	4
			☐	None of these
53.	562954128	3	☐	1

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				these
53.	562954128	3		☐ 1
				☐ 2
				☑ 3
				☐ 4
				☐ None of these
54.	562954129	2		☐ 1
				☑ 2
				☐ 3
				☐ 4
				☐ None of these
55.	562954130	2		☐ 1

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55.	562954130	2	☐ 1
			☑ 2
			☐ 3
			☐ 4
			☐ None of these
56.	562954131	1	☑ 1
			☐ 2
			☐ 3
			☐ 4
			☐ None of these
57.	562954132	2	☐ 1
			☑ 2

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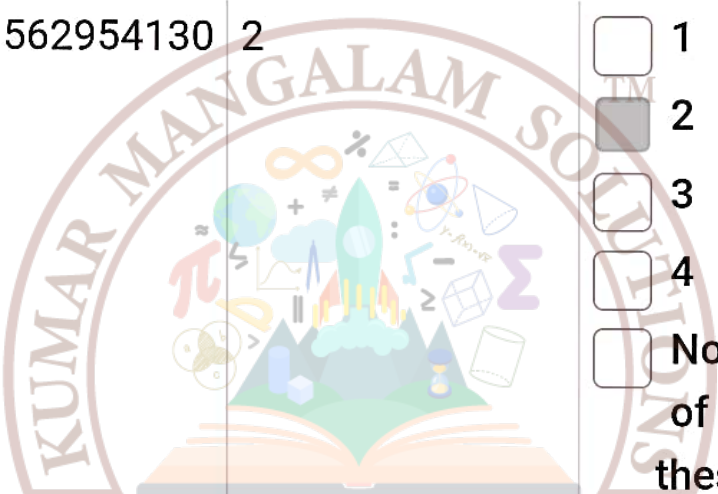
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57.	562954132	2		☐ 1
				◼ 2
				☐ 3
				☐ 4
				☐ None of these
58.	562954133	4		☐ 1
				☐ 2
				☐ 3
				◼ 4
				☐ None of these
59.	562954134	2		☐ 1
				◼ 2

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				these
59.	562954134	2	☐	1
			☑	2
			☐	3
			☐	4
			☐	None of these
60.	562954135	3	☐	1
			☐	2
			☑	3
			☐	4
			☐	None of these
61.	562954136	1,2	☑	1

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61.	562954136	1,2	☑ 1
			☑ 2
			☐ 3
			☐ 4
			☐ None of these
62.	562954137	2	☐ 1
			☑ 2
			☐ 3
			☐ 4
			☐ None of these
63.	562954138	1	☑ 1
			☐ 2

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63.	562954138	1	☑	1
			☐	2
			☐	3
			☐	4
			☐	None of these
64.	562954139	1,2,4	☑	1
			☑	2
			☐	3
			☑	4
			☐	None of these
65.	562954140	2	☐	1

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66.	562954141	3,4	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ None of these
67.	562954142	1,3	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ None of these
68.	562954143	2,3	☐ 1 ☐ 2

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69.	562954144	1,3	☑ 1
			☐ 2
			☑ 3
			☐ 4
			☐ None of these
70.	562954145	2,3	☐ 1
			☑ 2
			☑ 3
			☐ 4
			☐ None of these
71.	562954146	3,4	☐ 1
			☐ 2

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72.	562954147	1,2,3,4		
			☑	1
			☑	2
			☑	3
			☑	4
			☐	None of these
73.	562954148	1,2		
			☑	1
			☑	2
			☐	3
			☐	4
			☐	None of these
74.	562954149	1,2,4		
			☑	1
			☑	2

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75.	562954150	1,3	☑ 1
			☐ 2
			☑ 3
			☐ 4
			☐ None of these
76.	562954151	1,3	☑ 1
			☐ 2
			☑ 3
			☐ 4
			☐ None of these
77.	562954152	1,2,3,4	☑ 1
			☑ 2

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78.	562954153	2,4	☐ 1
			▣ 2
			☐ 3
			▣ 4
			☐ None of these
79.	562954154	1,3,4	▣ 1
			☐ 2
			▣ 3
			▣ 4
			☐ None of these
80.	562954155	2,3	☐ 1
			▣ 2

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81.	562954156	4	☐ 1 ☐ 2 ☐ 3 ☑ 4 ☐ None of these	
82.	562954157	2,3,4	☐ 1 ☑ 2 ☑ 3 ☑ 4 ☐ None of these	
83.	562954158	1,2	☑ 1 ☑ 2	

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84.	562954159	4	☐ 1
			☐ 2
			☐ 3
			☑ 4
			☐ None of these

85.	562954160	1,2	☑ 1
			☑ 2
			☐ 3
			☐ 4
			☐ None of these

| 86. | 562954161 | 1,2,3 | ☑ 1 |

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87.	562954162	2	☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ None of these

88.	562954163	2,3,4	☐ 1 ☑ 2 ☑ 3 ☑ 4 ☐ None of these

89.	562954164	1,4	☑ 1 ☐ 2

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90.	562954165	1,2	☑	1
			☑	2
			☐	3
			☐	4
			☐	None of these
91.	562954166	2,3	☐	1
			☑	2
			☑	3
			☐	4
			☐	None of these
92.	562954167	1,2,4	☑	1

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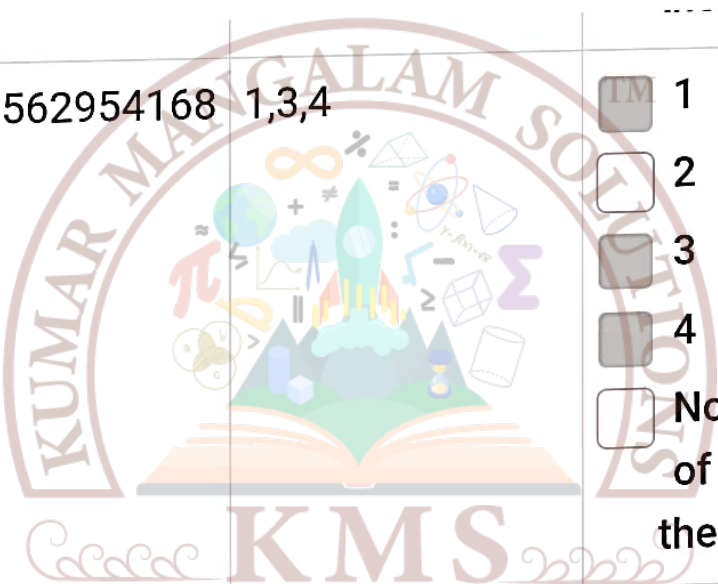
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93.	562954168	1,3,4	☑	1
			☐	2
			☑	3
			☑	4
			☐	None of these
94.	562954169	1	☑	1
			☐	2
			☐	3
			☐	4
			☐	None of these
95.	562954170	1,4	☑	1

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96.	562954171	2,3,4	☐ 1 ☑ 2 ☐ 3 ☑ 4 ☐ None of these
97.	562954172	1	☑ 1 ☐ 2 ☐ 3 ☐ 4 ☐ None of these
98.	562954173	1,2,3	☑ 1 ☑ 2

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99.	562954174	2,3,4	☐ 1
			☑ 2
			☑ 3
			☑ 4
			☐ None of these
100.	562954175	1,2,3	☑ 1
			☑ 2
			☑ 3
			☐ 4
			☐ None of these
101.	562954176	1,2,4	☑ 1
			☐ 2

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102.	562954177	1,2,3,4	☐ 1
			☐ 2
			☐ 3
			☐ 4
			☐ None of these

103.	562954178	2,3,4	☐ 1
			☐ 2
			☐ 3
			☐ 4
			☐ None of these

| 104. | 562954179 | 1,3 | ☐ 1 |

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105.	562954180	1,2,3,4		1
			☑	1
			☑	2
			☐	3
			☑	4
			☐	None of these

106.	562954181	1,3	☑	1
			☐	2
			☑	3
			☐	4
			☐	None of these

| 107. | 562954182 | 1,2 | ☑ | 1 |
| | | | ☑ | 2 |

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108.	562954183	1,2,4	☑	1
			☑	2
			☐	3
			☑	4
			☐	None of these
109.	562954184	3,4	☐	1
			☐	2
			☑	3
			☑	4
			☐	None of these
110.	562954185	1,3,4	☑	1
			☐	2

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111.	562954186	1,3	☑ 1
			☐ 2
			☑ 3
			☐ 4
			☐ None of these

112.	562954187	1,2,3	☑ 1
			☑ 2
			☑ 3
			☐ 4
			☐ None of these

| 113. | 562954188 | 4 | ☐ 1 |
| | | | ☐ 2 |

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114.	562954189	1,4	☑ 1
			☐ 2
			☐ 3
			☑ 4
			☐ None of these

115.	562954190	1,4	☑ 1
			☐ 2
			☐ 3
			☑ 4
			☐ None of these

| 116. | 562954191 | 1,3 | ☑ 1 |
| | | | ☐ 2 |

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				these
117.	562954192	1	☐	1
			☐	2
			☐	3
			☐	4
			☐	None of these
118.	562954193	1,2,3	☑	1
			☑	2
			☑	3
			☐	4
			☐	None of these
119.	562954194	1,3	☑	1

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Shift-2
Subject Name

:

Mathematical Sciences
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Question List

				these
119.	562954194	1,3	☑	1
			☐	2
			☑	3
			☐	4
			☐	None of these
120.	562954195	2,4	☐	1
			☑	2
			☐	3
			☑	4
			☐	None of these

Claimed Answer Key List Upload Document

Choose file	No file chosen

NATIONAL TESTING AGENCY

CSIR-UGC NET JUNE 2025
FINAL ANSWER KEY

Exam Date : 28.07.2025   **Exam Shift : 2**

Subject: (704) MATHEMATICAL SCIENCES

Question ID	Correct Option No.	Question ID	Correct Option No.	Question ID	Correct Option No.
56295476	3	562954126	2	562954176	1,2,4
56295477	3	562954127	3	562954177	1,2,3,4
56295478	2	562954128	3	562954178	2,3,4
56295479	1	562954129	2	562954179	1,3
56295480	1	562954130	2	562954180	1,2,3,4
56295481	3	562954131	1	562954181	1,3
56295482	2	562954132	2	562954182	1,2
56295483	4	562954133	4	562954183	1,2,4
56295484	2	562954134	2	562954184	3,4
56295485	2	562954135	3	562954185	1,3,4
56295486	2	562954136	1,2	562954186	1,3
56295487	3	562954137	2	562954187	1,2,3
56295488	2	562954138	1	562954188	4
56295489	3	562954139	1,2,4	562954189	1,4
56295490	4	562954140	2	562954190	1,4
56295491	1	562954141	3,4	562954191	1,3
56295492	1	562954142	1,3	562954192	1
56295493	3	562954143	2,3	562954193	1,2,3
56295494	4	562954144	1,3	562954194	1,3
56295495	2	562954145	2,3	562954195	2,4
56295496	2	562954146	3,4		
56295497	4	562954147	1,2,3,4		
56295498	3	562954148	1,2		
56295499	2	562954149	1,2,4		
562954100	2	562954150	1,3		
562954101	3	562954151	1,3		
562954102	4	562954152	1,2,3,4		
562954103	2	562954153	2,4		
562954104	1	562954154	1,3,4		
562954105	1	562954155	2,3		
562954106	2	562954156	4		
562954107	4	562954157	2,3,4		
562954108	4	562954158	1,2		
562954109	2	562954159	4		
562954110	1	562954160	1,2		
562954111	2	562954161	1,2,3		
562954112	2	562954162	2		
562954113	3	562954163	2,3,4		
562954114	3	562954164	1,4		
562954115	3	562954165	1,2		
562954116	4	562954166	2,3		
562954117	2	562954167	1,2,4		
562954118	1	562954168	1,3,4		
562954119	4	562954169	1		
562954120	2	562954170	1,4		
562954121	2	562954171	2,3,4		
562954122	4	562954172	1		
562954123	1	562954173	1,2,3		
562954124	4	562954174	1,2,3,4		
562954125	4	562954175	1,2,3		