

Opened at 5:26 pm for evaluation

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(CPG-EE-2019)

Subject : Math.

Sr. No. 10357

Code

A

SET-"Z"

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Date of Examination : _____

(Signature of the candidate)

(Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. All questions are compulsory and carry equal marks. The candidates are required to attempt all questions.
2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which in case of use of unfair-means / mis-behaviour will be registered against him / her in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
5. The candidate **MUST NOT** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers **MUST NOT** be ticked in the Question book-let.
6. Use only **Black or Blue BALL POINT PEN** of good quality in the OMR Answer-Sheet.
7. There will be Negative marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
8. **BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.**



Handwritten signatures and marks at the bottom of the page.

Question No.	Questions
1.	If $A^2 - A + I = 0$, then the inverse of A is (1) $A - I$ (2) $A + I$ (3) A (4) $I - A$
2.	If A and B are invertible matrices of the same order, such that $AB = BA$ then A and B are (1) Similar (2) dissimilar (3) have different eigen values (4) none of these
3.	The nature of quadratic form $2xy + 2yz + 2zx$ is (1) Indefinite (2) Definite (3) Positive definite (4) Negative definite
4.	For what real value of 'k' the following equations have non-zero solution : $x + 2y + 3z = kx, \quad 3x + y + 2z = ky, \quad 2x + 3y + z = kz$ (1) -3 (2) 4 (3) 5 (4) 6
5.	If α, β, γ are the roots of the equation $x^3 + 3x - 3 = 0$, then the value of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$ is : (1) $\frac{3}{4}$ (2) 0 (3) $\frac{4}{3}$ (4) $\frac{1}{4}$

Question No.	Questions
6.	<p>The vertical and horizontal asymptotes of $y = \frac{x}{x-2}$ are</p> <p>(1) $x = 2, y = 1$ (2) $x = 2, y = -1$</p> <p>(3) $x = -2, y = -1$ (4) $x = 2, y = 2$</p>
7.	<p>The radius of curvature at the origin for the curve $x^3 + y^3 = 3axy$ is equal to</p> <p>(1) $2a$ (2) $2a/3$</p> <p>(3) 1 (4) $3a/2$</p>
8.	<p>The point of inflexion of the curve $y^2 = x(x+1)^2$ is</p> <p>(1) $\left(\frac{1}{3}, \frac{4}{3\sqrt{3}}\right)$ (2) $\left(\frac{2}{3}, -\frac{4}{3\sqrt{3}}\right)$</p> <p>(3) $\left(\frac{2}{3}, \left(\frac{5\sqrt{2}}{3\sqrt{3}}\right)\right)$ (4) None of these</p>
9.	<p>The area bounded by the curve $x^2 = 4y$ and the straight line $x = 4y - 2$ is equal to</p> <p>(1) $5/8$ (2) $9/8$</p> <p>(3) $1/3$ (4) $8/3$</p>
10.	<p>The volume of the solid generated by the revolution of $r = 2a \cos \theta$ about the initial line is equal to :</p> <p>(1) $\frac{2\pi a^3}{3}$ (2) $\frac{4\pi a^3}{3}$</p> <p>(3) $\frac{8\pi a^3}{3}$ (4) None of these</p>

Question No.	Questions
21.	<p>The value of $\hat{i} \times (\hat{j} \times \hat{k})$ is equal to</p> <p>(1) -1 (2) 1 (3) 0 (4) ± 1</p>
22.	<p>The value of curl (grad f), where $f = 2x^2 - 3y^2 + 4z^2$ is</p> <p>(1) $4x - 6y + 8z$ (2) $4x\hat{i} - 6y\hat{j} + 8z\hat{k}$ (3) 3 (4) 0</p>
23.	<p>The value of $\int \text{grad}(x + y - z) \cdot \overline{dr}$ from $(0, 1, -1)$ to $(1, 2, 0)$ is</p> <p>(1) 0 (2) 3 (3) -1 (4) not obtainable</p>
24.	<p>The magnitude of the vector drawn perpendicular to the surface $x^2 + 2y^2 + z^2 = 7$ at the point $(1, -1, 2)$ is</p> <p>(1) $2/3$ (2) $3/2$ (3) 3 (4) 6</p>
25.	<p>The value of λ so that the vector $(x + 3y)\hat{i} + (y - 2z)\hat{j} + (x + \lambda z)\hat{k}$ is a solenoidal vector is</p> <p>(1) -2 (2) 3 (3) 1 (4) None of these</p>

Question No.	Questions
56.	Laplace transform of $t^2 e^{-3t}$ is (1) $\frac{1}{(s+3)^3}$ (2) $\frac{2}{(s+3)^2}$ (3) $\frac{3}{(s+3)^3}$ (4) $\frac{2}{(s+3)^3}$
57.	$\int_0^{\infty} \frac{dx}{(x^2+1)^2} =$ (1) $\frac{\pi}{2}$ (2) $\pi/4$ (3) 1 (4) 0
58.	If $f(x) = x + 1$, $x \in [1, 3]$ and $P = \{1, 2, 3\}$ be a partition of P , then $L(f, P)$ and $U(f, P)$ are respectively : (1) 3, 6 (2) 6, 3 (3) 7, 5 (4) 5, 7
59.	If f is Riemann integrable on $[a, b]$, then (1) $ \int_a^b f(x) dx \leq \int_a^b f(x) dx$ (2) $ \int_a^b f(x) dx \geq \int_a^b f(x) dx$ (3) $ \int_a^b f(x) dx = \int_a^b f(x) dx$ (4) None of these
60.	$\int_a^{\infty} \frac{\sin x}{\sqrt{x}} dx$, where $a > 0$ is : (1) convergent (2) divergent (3) oscillatory (4) proper

Question No.	Questions
61.	<p>Which of the following statements is not correct ?</p> <p>(1) The real line is a complete metric space</p> <p>(2) The complex plane with the usual metric is complete.</p> <p>(3) The space of continuous functions on $[a, b]$ is complete.</p> <p>(4) The space of rational numbers with the usual metric is complete.</p>
62.	<p>Let A and B be any two sets of a metric space. Then</p> <p>(1) $(A \cap B)^\circ = A^\circ \cap B^\circ$ (2) $(A \cup B)^\circ = A^\circ \cup B^\circ$</p> <p>(3) $\overline{A \cap B} = \overline{A} \cap \overline{B}$ (4) $(A \cap B)' = A' \cap B'$</p>
63.	<p>Any totally bounded metric space is</p> <p>(1) separable (2) not bounded</p> <p>(3) not complete (4) not separable</p>
64.	<p>Every convergent sequence is :</p> <p>(1) bounded and Cauchy (2) bounded but not Cauchy</p> <p>(3) not bounded but Cauchy (4) none of the above</p>
65.	<p>Which of the following sets of Vectors in \mathbb{R}^3 (\mathbb{R}) is linearly independent over \mathbb{R}</p> <p>(1) $\{(1, -2, 1), (2, 1, -1), (7, -4, 1)\}$</p> <p>(2) $\{(1, 1, 1), (0, 4, 1), (3, 0, 1)\}$</p> <p>(3) $\{(2, 3, 1), (-1, 4, -2), (1, 18, -4)\}$</p> <p>(4) $\{(0, 2, -4), (1, -2, -1), (1, -4, 3)\}$</p>

Question No.	Questions
91.	Function declaration statement identifies a function with its (1) name (2) arguments (3) data type of return value (4) all of these
92.	Which is invalid C constant ? (1) 0.5 (2) '1052' (3) 0515 (4) 'a'
93.	What will be the output of the following program <pre>main() { Int i=4, z=12; If (i=5 && z>5) printf("\nLet us C"); else printf("\nWish C was free!"); }</pre> (1) Let us C (2) Wish C was free! (3) Error in the program (4) None of these
94.	An array is a collection of (1) different data types scattered throughout memory (2) the same data type scattered throughout the memory (3) the same data type placed next to each other in memory (4) different data type placed next to each other in memory
95.	What will be the tangential acceleration at $t = 3$ when the particle moves along the curve $x = 4t$, $y = 6t - t^2$? (1) 0 (2) 2 unit/sec ² (3) - 2 unit/sec ² (4) None of these

Question No.	Questions
96.	<p>The acceleration of a particle, moving with S.H.M. is 44 m/sec^2 when its distance from the mean position is $1/4 \text{ m}$. The time of an oscillation is :</p> <p>(1) $\pi \text{ sec}$ (2) $\pi/2 \text{ sec}$ (3) $\pi/4 \text{ sec}$ (4) None of these</p>
97.	<p>A body of mass 50 kg is acted upon by a force of 5 N. How long will it take to attain a velocity of 30 m/sec.</p> <p>(1) 5 min (2) 3 min (3) 10 min (4) 6 min</p>
98.	<p>The work done in stretching an elastic string of natural length ℓ_0 and of modulus of elasticity λ to a length ℓ is :</p> <p>(1) $\frac{\lambda \ell}{\ell_0}$ (2) $\frac{\lambda (\ell - \ell_0)^2}{2 \ell_0}$ (3) $\frac{\lambda (\ell + \ell_0)^2}{2 \ell_0}$ (4) $\frac{\lambda \ell_0}{2 \ell}$</p>
99.	<p>If the time of flight of a bullet over a horizontal range R is T seconds, then the inclination of the direction of projection to the horizontal is :</p> <p>(1) $\tan^{-1} \left(\frac{T^2}{2R} \right)$ (2) $\tan^{-1} \left(\frac{T^2}{2gR} \right)$ (3) $\tan^{-1} \left(\frac{T^2 g}{2R} \right)$ (4) $\tan^{-1} \left(\frac{T^2 g}{R} \right)$</p>
100.	<p>If a particle describes the equiangular spiral $r = a e^{\theta \cot \alpha}$ under a force F to the pole, then the law of force is :</p> <p>(1) $F \propto r$ (2) $F \propto \frac{1}{r^2}$ (3) $F \propto \frac{1}{r^3}$ (4) $F \propto \frac{1}{r^5}$</p>

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(CPG-EE-2019)

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Sr. No. 10358

Code

B

SET-“Z”

Time : 1½ Hours

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Isi

Ektar

Suman

Mehar

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11.	Function declaration statement identifies a function with its (1) name (2) arguments (3) data type of return value (4) all of these
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14.	An array is a collection of (1) different data types scattered throughout memory (2) the same data type scattered throughout the memory (3) the same data type placed next to each other in memory (4) different data type placed next to each other in memory
15.	What will be the tangential acceleration at $t = 3$ when the particle moves along the curve $x = 4t$, $y = 6t - t^2$? (1) 0 (2) 2 unit/sec ² (3) -2 unit/sec ² (4) None of these

Question No.	Questions
16.	<p>The acceleration of a particle, moving with S.H.M. is 44 m/sec^2 when its distance from the mean position is $1/4 \text{ m}$. The time of an oscillation is :</p> <p>(1) $\pi \text{ sec}$ (2) $\pi/2 \text{ sec}$ (3) $\pi/4 \text{ sec}$ (4) None of these</p>
17.	<p>A body of mass 50 kg is acted upon by a force of 5 N. How long will it take to attain a velocity of 30 m/sec.</p> <p>(1) 5 min (2) 3 min (3) 10 min (4) 6 min</p>
18.	<p>The work done in stretching an elastic string of natural length ℓ_0 and of modulus of elasticity λ to a length ℓ is :</p> <p>(1) $\frac{\lambda \ell}{\ell_0}$ (2) $\frac{\lambda (\ell - \ell_0)^2}{2 \ell_0}$ (3) $\frac{\lambda (\ell + \ell_0)^2}{2 \ell_0}$ (4) $\frac{\lambda \ell_0}{2 \ell}$</p>
19.	<p>If the time of flight of a bullet over a horizontal range R is T seconds, then the inclination of the direction of projection to the horizontal is :</p> <p>(1) $\tan^{-1}\left(\frac{T^2}{2R}\right)$ (2) $\tan^{-1}\left(\frac{T^2}{2gR}\right)$ (3) $\tan^{-1}\left(\frac{T^2 g}{2R}\right)$ (4) $\tan^{-1}\left(\frac{T^2 g}{R}\right)$</p>
20.	<p>If a particle describes the equiangular spiral $r = a e^{\theta \cot \alpha}$ under a force F to the pole, then the law of force is :</p> <p>(1) $F \propto r$ (2) $F \propto \frac{1}{r^2}$ (3) $F \propto \frac{1}{r^3}$ (4) $F \propto \frac{1}{r^5}$</p>

Question No.	Questions
31.	<p>If R is an Euclidean ring and $a, b \in R$. If $b \neq 0$ is not a unit in R, then</p> <p>(1) $d(a) < d(ab)$ (2) $d(a) > d(ab)$ (3) $d(a) = d(ab)$ (4) None of these</p>
32.	<p>If integral domain I is of finite characteristic, then</p> <p>(1) I is finite only (2) I is infinite only (3) I is finite or infinite (4) None of these</p>
33.	<p>If $J_n(x)$ is the Bessel function of first kind, then $\int_0^\pi [J_{-2}(x) - J_2(x)] dx =$</p> <p>(1) 2 (2) -2 (3) 0 (4) 1</p>
34.	<p>The polynomial $2x^2 + x + 3$ in terms of Legendre polynomials is</p> <p>(1) $\frac{1}{3}(4P_2 - 3P_1 + 11P_0)$ (2) $\frac{1}{3}(4P_2 + 3P_1 - 11P_0)$ (3) $\frac{1}{3}(4P_2 + 3P_1 + 11P_0)$ (4) $\frac{1}{3}(4P_2 - 3P_1 - 11P_0)$</p>
35.	<p>$L^{-1}(1/s^n)$ is possible only when 'n' is</p> <p>(1) zero (2) negative integer (3) positive integer (4) negative rational</p>

Question No.	Questions
36.	Laplace transform of $t^2 e^{-3t}$ is (1) $\frac{1}{(s+3)^3}$ (2) $\frac{2}{(s+3)^2}$ (3) $\frac{3}{(s+3)^3}$ (4) $\frac{2}{(s+3)^3}$
37.	$\int_0^{\infty} \frac{dx}{(x^2+1)^2} =$ (1) $\frac{\pi}{2}$ (2) $\pi/4$ (3) 1 (4) 0
38.	If $f(x) = x + 1$, $x \in [1, 3]$ and $P = \{1, 2, 3\}$ be a partition of P , then $L(f, P)$ and $U(f, P)$ are respectively : (1) 3, 6 (2) 6, 3 (3) 7, 5 (4) 5, 7
39.	If f is Riemann integrable on $[a, b]$, then (1) $ \int_a^b f(x) dx \leq \int_a^b f(x) dx$ (2) $ \int_a^b f(x) dx \geq \int_a^b f(x) dx$ (3) $ \int_a^b f(x) dx = \int_a^b f(x) dx$ (4) None of these
40.	$\int_a^{\infty} \frac{\sin x}{\sqrt{x}} dx$, where $a > 0$ is : (1) convergent (2) divergent (3) oscillatory (4) proper

Question No.	Questions
56.	What conic does the equation $6x^2 - 5xy - 6y^2 + 14x + 5y + 4 = 0$ represent ? (1) an ellipse (2) circle (3) pair of straight lines (4) hyperbola
57.	Section of a sphere by a plane is (1) parabola (2) ellipse (3) circle (4) none of these
58.	The equation $2(x^2 + y^2 + z^2) - 2xy + 2yz + 2zx = 3a^2$ represents a (1) cone (2) right-circular cylinder (3) sphere (4) pair of planes
59.	The radius of the great circle of a sphere is (1) greater than the radius of the sphere (2) less than the radius of the sphere (3) equal to the radius of the sphere (4) none of these
60.	The nature of the section of the central conicoid $ax^2 + by^2 + cz^2 = 1$ by the plane $lx + my + nz = p$ is a hyperbola if : (1) $bc\ell^2 + cam^2 + abn^2 < 0$ (2) $bal^2 + cbm^2 + acn^2 < 0$ (3) $bcm^2 + can^2 + abl^2 < 0$ (4) $bcl^2 + cam^2 + abn^2 > 0$

Question No.	Questions
61.	<p>What is the angle between two equal forces P and P, when the square of their resultant is equal to $(2 - \sqrt{3})$ times their product ?</p> <p>(1) 130° (2) 140° (3) 145° (4) 150°</p>
62.	<p>What is the resolved part of a force equal to 60 kg wt. in a direction making an angle equal to $\tan^{-1} 3/4$ with its direction ?</p> <p>(1) 48 kg wt. (2) 40 kg wt. (3) 52 kg wt. (4) None of these</p>
63.	<p>Forces forming a couple are each 4 N and its arm is 1 m. What will be the arm of an equivalent couple each of whose force is 3N ?</p> <p>(1) 1 m (2) $4/3$ m (3) $3/4$ m (4) None of these</p>
64.	<p>At what point of a tree must one end of a rope of given length 'ℓ' be attached so that a man pulling at the other end with a given force may have the greatest tendency to pull it over ?</p> <p>(1) $\ell/2$ (2) $\sqrt{\ell}/2$ (3) $\ell/\sqrt{2}$ (4) ℓ</p>
65.	<p>Six equal rods AB, BC, CD, DE EF and FA are each of weight W and are freely joined so as to form a hexagon. The rod AB is fixed in a horizontal position and the middle point of AB and DE are joined by a string. The tension in the string is :</p> <p>(1) 3W (2) $W/\sqrt{3}$ (3) $3\sqrt{3} W$ (4) $\sqrt{3} W/2$</p>

Question No.	Questions
71.	<p>Which of the following statements is not correct ?</p> <p>(1) The real line is a complete metric space</p> <p>(2) The complex plane with the usual metric is complete.</p> <p>(3) The space of continuous functions on $[a, b]$ is complete.</p> <p>(4) The space of rational numbers with the usual metric is complete.</p>
72.	<p>Let A and B be any two sets of a metric space. Then</p> <p>(1) $(A \cap B)^\circ = A^\circ \cap B^\circ$ (2) $(A \cup B)^\circ = A^\circ \cup B^\circ$</p> <p>(3) $\overline{A \cap B} = \overline{A} \cap \overline{B}$ (4) $(A \cap B)' = A' \cap B'$</p>
73.	<p>Any totally bounded metric space is</p> <p>(1) separable (2) not bounded</p> <p>(3) not complete (4) not separable</p>
74.	<p>Every convergent sequence is :</p> <p>(1) bounded and Cauchy (2) bounded but not Cauchy</p> <p>(3) not bounded but Cauchy (4) none of the above</p>
75.	<p>Which of the following sets of Vectors in \mathbb{R}^3 (\mathbb{R}) is linearly independent over \mathbb{R}</p> <p>(1) $\{(1, -2, 1), (2, 1, -1), (7, -4, 1)\}$</p> <p>(2) $\{(1, 1, 1), (0, 4, 1), (3, 0, 1)\}$</p> <p>(3) $\{(2, 3, 1), (-1, 4, -2), (1, 18, -4)\}$</p> <p>(4) $\{(0, 2, -4), (1, -2, -1), (1, -4, 3)\}$</p>

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76.	<p>Let W_1 and W_2 be finite dimensional subspaces of a vector space V. If $\dim W_1 = 2$, $\dim W_2 = 2$, $\dim (W_1 + W_2) = 3$, then $\dim (W_1 \cup W_2)$ is</p> <p>(1) 1 (2) 2 (3) 3 (4) 4</p>
77.	<p>If x, y, z are in AP with common difference 'd' and the rank of the matrix</p> $\begin{bmatrix} 4 & 5 & x \\ 5 & 6 & y \\ 6 & k & z \end{bmatrix}$ <p>is 2, then the value of 'd' and 'k' are</p> <p>(1) $d = x/2$; k is arbitrary (2) d an arbitrary number ; $k = 7$ (3) $d = k$; $k = 5$ (4) $d = x/2$; $k = 6$</p>
78.	<p>Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^3$ be a linear transformation given by $T(x_1, x_2) = (x_1 + x_2, x_1 - x_2, x_2)$ then, rank T is</p> <p>(1) 0 (2) 1 (3) 2 (4) 3</p>
79.	<p>Let U and V be two vector spaces over the field F. If $T_1 : U \rightarrow V$ and $T_2 : U \rightarrow V$ be two linear transformations, then</p> <p>(1) $\rho(T_1 + T_2) \leq \rho(T_1) + \rho(T_2)$ (2) $\rho(T_1 + T_2) \geq \rho(T_1) + \rho(T_2)$ (3) $\rho(T_1 + T_2) \neq \rho(T_1) + \rho(T_2)$ (4) None of these</p>
80.	<p>If $A = \begin{bmatrix} -3 & 2 \\ -1 & 0 \end{bmatrix}$, then A^9 is equal to</p> <p>(1) $511A + 510I$ (2) $309A + 105I$ (3) $154A + 510I$ (4) None of these</p>

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81.	If $A^2 - A + I = 0$, then the inverse of A is (1) $A - I$ (2) $A + I$ (3) A (4) $I - A$
82.	If A and B are invertible matrices of the same order, such that $AB = BA$ then A and B are (1) Similar (2) dissimilar (3) have different eigen values (4) none of these
83.	The nature of quadratic form $2xy + 2yz + 2zx$ is (1) Indefinite (2) Definite (3) Positive definite (4) Negative definite
84.	For what real value of 'k' the following equations have non-zero solution : $x + 2y + 3z = kx, \quad 3x + y + 2z = ky, \quad 2x + 3y + z = kz$ (1) -3 (2) 4 (3) 5 (4) 6
85.	If α, β, γ are the roots of the equation $x^3 + 3x - 3 = 0$, then the value of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$ is : (1) $\frac{3}{4}$ (2) 0 (3) $\frac{4}{3}$ (4) $\frac{1}{4}$

Question No.	Questions
86.	<p>The vertical and horizontal asymptotes of $y = \frac{x}{x-2}$ are</p> <p>(1) $x = 2, y = 1$ (2) $x = 2, y = -1$ (3) $x = -2, y = -1$ (4) $x = 2, y = 2$</p>
87.	<p>The radius of curvature at the origin for the curve $x^3 + y^3 = 3axy$ is equal to</p> <p>(1) $2a$ (2) $2a/3$ (3) 1 (4) $3a/2$</p>
88.	<p>The point of inflexion of the curve $y^2 = x(x+1)^2$ is</p> <p>(1) $\left(\frac{1}{3}, \frac{4}{3\sqrt{3}}\right)$ (2) $\left(\frac{2}{3}, -\frac{4}{3\sqrt{3}}\right)$ (3) $\left(\frac{2}{3}, \left(\frac{5\sqrt{2}}{3\sqrt{3}}\right)\right)$ (4) None of these</p>
89.	<p>The area bounded by the curve $x^2 = 4y$ and the straight line $x = 4y - 2$ is equal to</p> <p>(1) $5/8$ (2) $9/8$ (3) $1/3$ (4) $8/3$</p>
90.	<p>The volume of the solid generated by the revolution of $r = 2a \cos \theta$ about the initial line is equal to :</p> <p>(1) $\frac{2\pi a^3}{3}$ (2) $\frac{4\pi a^3}{3}$ (3) $\frac{8\pi a^3}{3}$ (4) None of these</p>

Question No.	Questions
96.	<p>The value of $\frac{\Delta^2}{E}(x^3)$ is</p> <p>(1) $6x$ (2) $3x$ (3) $2x$ (4) 0</p>
97.	<p>Consider the series $x_{n+1} = \frac{x_n}{2} + \frac{9}{8x_n}$ with $x_0 = 0.5$ obtained from the Newton-Raphson method. The series converges to</p> <p>(1) 1.4 (2) 1.5 (3) 1.6 (4) $\sqrt{2}$</p>
98.	<p>In binomial distribution the variance σ^2 and mean μ are related by</p> <p>(1) $\sigma^2 = \mu q$ (2) $\sigma^2 = \mu / q$ (3) $q^2 \sigma^2 = \mu$ (4) None of these</p>
99.	<p>In a Poisson distribution if $2P(x=1) = P(x=2)$, then the variance is</p> <p>(1) 0 (2) -1 (3) 4 (4) 2</p>
100.	<p>Which of the following shows the correct hierarchy of arithmetic operations in C</p> <p>(1) $(), **, * \text{ or } /, + \text{ or } -$ (2) $(), **, *, /, +, -$ (3) $(), **, /, * +, -$ (4) $(), / \text{ or } *, - \text{ or } +$</p>

Opened at 5:25 pm for evaluation.

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(CPG-EE-2019)

Subject : Math.

Sr. No. 10359

Code

C

SET-"Z"

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Date of Birth: _____

Father's Name : _____ Mother's Name: _____

Date of Examination : _____

SAMPLE

(Signature of the candidate)

(Signature of the Invigilator)

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4. Question Booklet along-with answer key of all the A,B,C and D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case will be considered.
5. The candidate **MUST NOT** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers **MUST NOT** be ticked in the Question book-let.
6. Use only **Black or Blue BALL POINT PEN** of good quality in the OMR Answer-Sheet.
7. There will be Negative marking. Each correct answer will be awarded one full mark and each incorrect answer will be negatively marked for which the candidate will get ¼ discredit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
8. **BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.**



Isqb - gkhsj Smeelr Mucant

Question No.	Questions
11.	The value of $\hat{i} \times (\hat{j} \times \hat{k})$ is equal to (1) -1 (2) 1 (3) 0 (4) ± 1
12.	The value of curl (grad f), where $f = 2x^2 - 3y^2 + 4z^2$ is (1) $4x - 6y + 8z$ (2) $4x\hat{i} - 6y\hat{j} + 8z\hat{k}$ (3) 3 (4) 0
13.	The value of $\int \text{grad}(x + y - z) \cdot \vec{dr}$ from (0, 1, -1) to (1, 2, 0) is (1) 0 (2) 3 (3) -1 (4) not obtainable
14.	The magnitude of the vector drawn perpendicular to the surface $x^2 + 2y^2 + z^2 = 7$ at the point (1, -1, 2) is (1) $2/3$ (2) $3/2$ (3) 3 (4) 6
15.	The value of λ so that the vector $(x + 3y)\hat{i} + (y - 2z)\hat{j} + (x + \lambda z)\hat{k}$ is a solenoidal vector is (1) -2 (2) 3 (3) 1 (4) None of these

Question No.	Questions
21.	If $A^2 - A + I = 0$, then the inverse of A is (1) $A - I$ (2) $A + I$ (3) A (4) $I - A$
22.	If A and B are invertible matrices of the same order, such that $AB = BA$ then A and B are (1) Similar (2) dissimilar (3) have different eigen values (4) none of these
23.	The nature of quadratic form $2xy + 2yz + 2zx$ is (1) Indefinite (2) Definite (3) Positive definite (4) Negative definite
24.	For what real value of 'k' the following equations have non-zero solution : $x + 2y + 3z = kx, \quad 3x + y + 2z = ky, \quad 2x + 3y + z = kz$ (1) -3 (2) 4 (3) 5 (4) 6
25.	If α, β, γ are the roots of the equation $x^3 + 3x - 3 = 0$, then the value of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$ is : (1) $\frac{3}{4}$ (2) 0 (3) $\frac{4}{3}$ (4) $\frac{1}{4}$

Question No.	Questions
31.	Function declaration statement identifies a function with its (1) name (2) arguments (3) data type of return value (4) all of these
32.	Which is invalid C constant ? (1) 0.5 (2) '1052' (3) 0515 (4) 'a'
33.	What will be the output of the following program <pre>main() { Int i=4, z=12; If (i=5 && z>5) printf("\nLet us C"); else printf("\nWish C was free!"); }</pre> (1) Let us C (2) Wish C was free! (3) Error in the program (4) None of these
34.	An array is a collection of (1) different data types scattered throughout memory (2) the same data type scattered throughout the memory (3) the same data type placed next to each other in memory (4) different data type placed next to each other in memory
35.	What will be the tangential acceleration at $t = 3$ when the particle moves along the curve $x = 4t$, $y = 6t - t^2$? (1) 0 (2) 2 unit/sec ² (3) - 2 unit/sec ² (4) None of these

Question No.	Questions
36.	<p>The acceleration of a particle, moving with S.H.M. is 44 m/sec^2 when its distance from the mean position is $1/4 \text{ m}$. The time of an oscillation is :</p> <p>(1) $\pi \text{ sec}$ (2) $\pi/2 \text{ sec}$ (3) $\pi/4 \text{ sec}$ (4) None of these</p>
37.	<p>A body of mass 50 kg is acted upon by a force of 5 N. How long will it take to attain a velocity of 30 m/sec.</p> <p>(1) 5 min (2) 3 min (3) 10 min (4) 6 min</p>
38.	<p>The work done in stretching an elastic string of natural length ℓ_0 and of modulus of elasticity λ to a length ℓ is :</p> <p>(1) $\frac{\lambda \ell}{\ell_0}$ (2) $\frac{\lambda (\ell - \ell_0)^2}{2 \ell_0}$ (3) $\frac{\lambda (\ell + \ell_0)^2}{2 \ell_0}$ (4) $\frac{\lambda \ell_0}{2 \ell}$</p>
39.	<p>If the time of flight of a bullet over a horizontal range R is T seconds, then the inclination of the direction of projection to the horizontal is :</p> <p>(1) $\tan^{-1} \left(\frac{T^2}{2R} \right)$ (2) $\tan^{-1} \left(\frac{T^2}{2gR} \right)$ (3) $\tan^{-1} \left(\frac{T^2 g}{2R} \right)$ (4) $\tan^{-1} \left(\frac{T^2 g}{R} \right)$</p>
40.	<p>If a particle describes the equiangular spiral $r = a e^{\theta \cot \alpha}$ under a force F to the pole, then the law of force is :</p> <p>(1) $F \propto r$ (2) $F \propto \frac{1}{r^2}$ (3) $F \propto \frac{1}{r^3}$ (4) $F \propto \frac{1}{r^5}$</p>

Question No.	Questions
41.	<p>Which of the following statements is not correct ?</p> <p>(1) The real line is a complete metric space</p> <p>(2) The complex plane with the usual metric is complete.</p> <p>(3) The space of continuous functions on $[a, b]$ is complete.</p> <p>(4) The space of rational numbers with the usual metric is complete.</p>
42.	<p>Let A and B be any two sets of a metric space. Then</p> <p>(1) $(A \cap B)^\circ = A^\circ \cap B^\circ$ (2) $(A \cup B)^\circ = A^\circ \cup B^\circ$</p> <p>(3) $\overline{A \cap B} = \overline{A} \cap \overline{B}$ (4) $(A \cap B)' = A' \cap B'$</p>
43.	<p>Any totally bounded metric space is</p> <p>(1) separable (2) not bounded</p> <p>(3) not complete (4) not separable</p>
44.	<p>Every convergent sequence is :</p> <p>(1) bounded and Cauchy (2) bounded but not Cauchy</p> <p>(3) not bounded but Cauchy (4) none of the above</p>
45.	<p>Which of the following sets of Vectors in \mathbb{R}^3 (\mathbb{R}) is linearly independent over \mathbb{R}</p> <p>(1) $\{(1, -2, 1), (2, 1, -1), (7, -4, 1)\}$</p> <p>(2) $\{(1, 1, 1), (0, 4, 1), (3, 0, 1)\}$</p> <p>(3) $\{(2, 3, 1), (-1, 4, -2), (1, 18, -4)\}$</p> <p>(4) $\{(0, 2, -4), (1, -2, -1), (1, -4, 3)\}$</p>

Question No.	Questions
76.	<p>The value of $\frac{\Delta^2}{E}(x^3)$ is</p> <p>(1) $6x$ (2) $3x$ (3) $2x$ (4) 0</p>
77.	<p>Consider the series $x_{n+1} = \frac{x_n}{2} + \frac{9}{8x_n}$ with $x_0 = 0.5$ obtained from the Newton-Raphson method. The series converges to</p> <p>(1) 1.4 (2) 1.5 (3) 1.6 (4) $\sqrt{2}$</p>
78.	<p>In binomial distribution the variance σ^2 and mean μ are related by</p> <p>(1) $\sigma^2 = \mu q$ (2) $\sigma^2 = \mu / q$ (3) $q^2 \sigma^2 = \mu$ (4) None of these</p>
79.	<p>In a Poisson distribution if $2P(x=1) = P(x=2)$, then the variance is</p> <p>(1) 0 (2) -1 (3) 4 (4) 2</p>
80.	<p>Which of the following shows the correct hierarchy of arithmetic operations in C</p> <p>(1) $()$, $**$, $*$ or $/$, $+$ or $-$ (2) $()$, $**$, $*$, $/$, $+$, $-$ (3) $()$, $**$, $/$, $*$, $+$, $-$ (4) $()$, $/$ or $*$, $-$ or $+$</p>

Question No.	Questions
91.	<p>If R is an Euclidean ring and $a, b \in R$. If $b \neq 0$ is not a unit in R, then</p> <p>(1) $d(a) < d(ab)$ (2) $d(a) > d(ab)$ (3) $d(a) = d(ab)$ (4) None of these</p>
92.	<p>If integral domain I is of finite characteristic, then</p> <p>(1) I is finite only (2) I is infinite only (3) I is finite or infinite (4) None of these</p>
93.	<p>If $J_n(x)$ is the Bessel function of first kind, then $\int_0^\pi [J_{-2}(x) - J_2(x)] dx =$</p> <p>(1) 2 (2) -2 (3) 0 (4) 1</p>
94.	<p>The polynomial $2x^2 + x + 3$ in terms of Legendre polynomials is</p> <p>(1) $\frac{1}{3}(4P_2 - 3P_1 + 11P_0)$ (2) $\frac{1}{3}(4P_2 + 3P_1 - 11P_0)$ (3) $\frac{1}{3}(4P_2 + 3P_1 + 11P_0)$ (4) $\frac{1}{3}(4P_2 - 3P_1 - 11P_0)$</p>
95.	<p>$L^{-1}(1/s^n)$ is possible only when 'n' is</p> <p>(1) zero (2) negative integer (3) positive integer (4) negative rational</p>

Question No.	Questions
96.	Laplace transform of $t^2 e^{-3t}$ is (1) $\frac{1}{(s+3)^3}$ (2) $\frac{2}{(s+3)^2}$ (3) $\frac{3}{(s+3)^3}$ (4) $\frac{2}{(s+3)^3}$
97.	$\int_0^{\infty} \frac{dx}{(x^2+1)^2} =$ (1) $\frac{\pi}{2}$ (2) $\pi/4$ (3) 1 (4) 0
98.	If $f(x) = x + 1$, $x \in [1, 3]$ and $P = \{1, 2, 3\}$ be a partition of P , then $L(f, P)$ and $U(f, P)$ are respectively : (1) 3, 6 (2) 6, 3 (3) 7, 5 (4) 5, 7
99.	If f is Riemann integrable on $[a, b]$, then (1) $ \int_a^b f(x) dx \leq \int_a^b f(x) dx$ (2) $ \int_a^b f(x) dx \geq \int_a^b f(x) dx$ (3) $ \int_a^b f(x) dx = \int_a^b f(x) dx$ (4) None of these
100.	$\int_a^{\infty} \frac{\sin x}{\sqrt{x}} dx$, where $a > 0$ is : (1) convergent (2) divergent (3) oscillatory (4) proper

Opened for evaluation at 5:26 pm

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(CPG-EE-2019)

Subject : Math.

10360

Code

D

Sr. No. _____

SET-"Z"

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Date of Examination : _____

(Signature of the candidate)

(Signature of the Invigilator)

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Isqab *Muhammad* *Ehtasham Saad*

Question No.	Questions
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13.	<p>If $J_n(x)$ is the Bessel function of first kind, then $\int_0^\pi [J_{-2}(x) - J_2(x)] dx =$</p> <p>(1) 2 (2) -2 (3) 0 (4) 1</p>
14.	<p>The polynomial $2x^2 + x + 3$ in terms of Legendre polynomials is</p> <p>(1) $\frac{1}{3}(4P_2 - 3P_1 + 11P_0)$ (2) $\frac{1}{3}(4P_2 + 3P_1 - 11P_0)$ (3) $\frac{1}{3}(4P_2 + 3P_1 + 11P_0)$ (4) $\frac{1}{3}(4P_2 - 3P_1 - 11P_0)$</p>
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Question No.	Questions
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17.	$\int_0^{\infty} \frac{dx}{(x^2+1)^2} =$ (1) $\frac{\pi}{2}$ (2) $\pi/4$ (3) 1 (4) 0
18.	If $f(x) = x + 1$, $x \in [1, 3]$ and $P = \{1, 2, 3\}$ be a partition of P , then $L(f, P)$ and $U(f, P)$ are respectively : (1) 3, 6 (2) 6, 3 (3) 7, 5 (4) 5, 7
19.	If f is Riemann integrable on $[a, b]$, then (1) $ \int_a^b f(x) dx \leq \int_a^b f(x) dx$ (2) $ \int_a^b f(x) dx \geq \int_a^b f(x) dx$ (3) $ \int_a^b f(x) dx = \int_a^b f(x) dx$ (4) None of these
20.	$\int_a^{\infty} \frac{\sin x}{\sqrt{x}} dx$, where $a > 0$ is : (1) convergent (2) divergent (3) oscillatory (4) proper

Question No.	Questions
31.	<p>The value of $\phi(462)$, where ϕ is an Euler's function, is equal to</p> <p>(1) 120 (2) 160 (3) 32 (4) 480</p>
32.	<p>The value of $d(p^2 q^3) = \dots\dots\dots$, where $d(n)$ is divisor function of n and p, q are distinct primes.</p> <p>(1) 241 (2) 16 (3) 12 (4) None of these</p>
33.	<p>The statement "If p is a prime number, then $(p - 1)! + 1 \equiv 0 \pmod{p}$" is known as :</p> <p>(1) Wilson's Theorem (2) Fermat's Theorem (3) Chinese Remainder Theorem (4) None of these</p>
34.	<p>The value of $\cosh(x + iy) =$</p> <p>(1) $\cos x \cosh y - i \sin x \sinh y$ (2) $\sin x \cosh y + i \cos x \sinh y$ (3) $\cosh x \cos y + i \sinh x \sin y$ (4) $\sinh x \cos y + i \cosh x \sin y$</p>
35.	<p>$\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right) =$</p> <p>(1) $\frac{\pi}{3}$ (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{4}$ (4) None of these</p>

Question No.	Questions
41.	Function declaration statement identifies a function with its (1) name (2) arguments (3) data type of return value (4) all of these
42.	Which is invalid C constant ? (1) 0.5 (2) '1052' (3) 0515 (4) 'a'
43.	What will be the output of the following program <pre>main() { Int i=4, z=12; If (i=5 && z>5) printf("\nLet us C"); else printf("\nWish C was free!"); }</pre> (1) Let us C (2) Wish C was free! (3) Error in the program (4) None of these
44.	An array is a collection of (1) different data types scattered throughout memory (2) the same data type scattered throughout the memory (3) the same data type placed next to each other in memory (4) different data type placed next to each other in memory
45.	What will be the tangential acceleration at $t = 3$ when the particle moves along the curve $x = 4t$, $y = 6t - t^2$? (1) 0 (2) 2 unit/sec ² (3) - 2 unit/sec ² (4) None of these

Question No.	Questions
46.	<p>The acceleration of a particle, moving with S.H.M. is 44 m/sec^2 when its distance from the mean position is $1/4 \text{ m}$. The time of an oscillation is :</p> <p>(1) $\pi \text{ sec}$ (2) $\pi/2 \text{ sec}$ (3) $\pi/4 \text{ sec}$ (4) None of these</p>
47.	<p>A body of mass 50 kg is acted upon by a force of 5 N. How long will it take to attain a velocity of 30 m/sec.</p> <p>(1) 5 min (2) 3 min (3) 10 min (4) 6 min</p>
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50.	<p>If a particle describes the equiangular spiral $r = a e^{\theta \cot \alpha}$ under a force F to the pole, then the law of force is :</p> <p>(1) $F \propto r$ (2) $F \propto \frac{1}{r^2}$ (3) $F \propto \frac{1}{r^3}$ (4) $F \propto \frac{1}{r^5}$</p>

Question No.	Questions
51.	Which of the following statements is not correct ? (1) The real line is a complete metric space (2) The complex plane with the usual metric is complete. (3) The space of continuous functions on $[a, b]$ is complete. (4) The space of rational numbers with the usual metric is complete.
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53.	Any totally bounded metric space is (1) separable (2) not bounded (3) not complete (4) not separable
54.	Every convergent sequence is : (1) bounded and Cauchy (2) bounded but not Cauchy (3) not bounded but Cauchy (4) none of the above
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Question No.	Questions
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68.	<p>In binomial distribution the variance σ^2 and mean μ are related by</p> <p>(1) $\sigma^2 = \mu q$ (2) $\sigma^2 = \mu / q$ (3) $q^2 \sigma^2 = \mu$ (4) None of these</p>
69.	<p>In a Poisson distribution if $2P(x=1) = P(x=2)$, then the variance is</p> <p>(1) 0 (2) -1 (3) 4 (4) 2</p>
70.	<p>Which of the following shows the correct hierarchy of arithmetic operations in C</p> <p>(1) $()$, $**$, $*$ or $/$, $+$ or $-$ (2) $()$, $**$, $*$, $/$, $+$, $-$ (3) $()$, $**$, $/$, $*$, $+$, $-$ (4) $()$, $/$ or $*$, $-$ or $+$</p>

Question No.	Questions
81.	<p>The value of $\hat{i} \times (\hat{j} \times \hat{k})$ is equal to</p> <p>(1) -1 (2) 1 (3) 0 (4) ± 1</p>
82.	<p>The value of $\text{curl}(\text{grad } f)$, where $f = 2x^2 - 3y^2 + 4z^2$ is</p> <p>(1) $4x - 6y + 8z$ (2) $4x\hat{i} - 6y\hat{j} + 8z\hat{k}$ (3) 3 (4) 0</p>
83.	<p>The value of $\int \text{grad}(x + y - z) \cdot \overline{dr}$ from $(0, 1, -1)$ to $(1, 2, 0)$ is</p> <p>(1) 0 (2) 3 (3) -1 (4) not obtainable</p>
84.	<p>The magnitude of the vector drawn perpendicular to the surface $x^2 + 2y^2 + z^2 = 7$ at the point $(1, -1, 2)$ is</p> <p>(1) $2/3$ (2) $3/2$ (3) 3 (4) 6</p>
85.	<p>The value of λ so that the vector $(x + 3y)\hat{i} + (y - 2z)\hat{j} + (x + \lambda z)\hat{k}$ is a solenoidal vector is</p> <p>(1) -2 (2) 3 (3) 1 (4) None of these</p>

Question No.	Questions
96.	<p>The vertical and horizontal asymptotes of $y = \frac{x}{x-2}$ are</p> <p>(1) $x = 2, y = 1$ (2) $x = 2, y = -1$</p> <p>(3) $x = -2, y = -1$ (4) $x = 2, y = 2$</p>
97.	<p>The radius of curvature at the origin for the curve $x^3 + y^3 = 3axy$ is equal to</p> <p>(1) $2a$ (2) $2a/3$</p> <p>(3) 1 (4) $3a/2$</p>
98.	<p>The point of inflexion of the curve $y^2 = x(x+1)^2$ is</p> <p>(1) $\left(\frac{1}{3}, \frac{4}{3\sqrt{3}}\right)$ (2) $\left(\frac{2}{3}, -\frac{4}{3\sqrt{3}}\right)$</p> <p>(3) $\left(\frac{2}{3}, \left(\frac{5\sqrt{2}}{3\sqrt{3}}\right)\right)$ (4) None of these</p>
99.	<p>The area bounded by the curve $x^2 = 4y$ and the straight line $x = 4y - 2$ is equal to</p> <p>(1) $5/8$ (2) $9/8$</p> <p>(3) $1/3$ (4) $8/3$</p>
100.	<p>The volume of the solid generated by the revolution of $r = 2a \cos \theta$ about the initial line is equal to :</p> <p>(1) $\frac{2\pi a^3}{3}$ (2) $\frac{4\pi a^3}{3}$</p> <p>(3) $\frac{8\pi a^3}{3}$ (4) None of these</p>

Answer key of Mathematics (Centralized Entrance Exam 2019)

Question No.	A	B	C	D ✓
1 ✓	D	A	D	B ✓
2	A	C	A	D ✓
3	A	A	B	B ✓
4	D	C	C	A ✓
5	C	C	A	B ✓
6	A	C	B	C ✓
7	D	B	C	A ✓
8	A	B	B	C ✓
9	B	C	A	D ✓
10	B	D	A	B ✓
11 ✓	A	D	C	A ✓
12	C	B	D	C ✓
13	A	A	B	C ✓
14	C	C	D	C ✓
15	C	A	A	C ✓
16	C	B	C	D ✓
17	B	A	C	B ✓
18	B	B	B	D ✓
19	C	C	C	A ✓
20	D	C	A	A ✓
21 ✓	C	B	D	B ✓
22	D	D	A	B ✓
23	B	B	A	A ✓
24	D	A	D	B ✓
25	A	B	C	C ✓
26	C	C	A	C ✓
27	C	A	D	B ✓
28	B	C	A	A ✓
29	C	D	B	D ✓
30	A	B	B	C ✓
31 ✓	B	A	D	A ✓
32	B	C	B	C ✓
33	A	C	A	A ✓
34	B	C	C	C ✓
35	C	C	A	C ✓
36	C	D	B	C ✓
37	B	B	A	B ✓
38	A	D	B	B ✓
39	D	A	C	C ✓
40	C	A	C	D ✓
41 ✓	D	B	D	D ✓
42	A	B	A	B ✓
43	B	A	A	A ✓
44	C	B	A	C ✓
45	A	C	B	A ✓
46	B	C	A	B ✓
47	C	B	B	A ✓
48	B	A	C	B ✓
49	A	D	A	C ✓

Sumeet ✓ *Ektan* ✓
Isqah ✓ *Mubawab* ✓

Answer key of Mathematics (Centralized Entrance Exam 2019)				
Question No.	A	B	C	D
50	A	C	A	C ✓
51 ✓	A	C	B	D ✓
52	C	D	B	A ✓
53	C	B	A	A ✓
54	C	D	B	A ✓
55	C	A	C	B ✓
56	D	C	C	A ✓
57	B	C	B	B ✓
58	D	B	A	C ✓
59	A	C	D	A ✓
60	A	A	C	A ✓
61 ✓	D	D	B	D ✓
62	A	A	D	B ✓
63	A	B	B	A ✓
64	A	C	A	C ✓
65	B	A	B	B ✓
66	A	B	C	A ✓
67	B	C	A	B ✓
68	C	B	C	A ✓
69	A	A	D	C ✓
70	A	A	B	D ✓
71 ✓	B	D	D	D ✓
72	D	A	B	A ✓
73	B	A	A	B ✓
74	A	A	C	C ✓
75	B	B	B	A ✓
76	C	A	A	B ✓
77	A	B	B	C ✓
78	C	C	A	B ✓
79	D	A	C	A ✓
80	B	A	D	A ✓
81 ✓	D	D	A	C ✓
82	B	A	C	D ✓
83	A	A	A	B ✓
84	C	D	C	D ✓
85	B	C	C	A ✓
86	A	A	C	C ✓
87	B	D	B	C ✓
88	A	A	B	B ✓
89	C	B	C	C ✓
90	D	B	D	A ✓
91 ✓	D	D	A	D ✓
92	B	B	C	A ✓
93	A	A	C	A ✓
94	C	C	C	D ✓
95	A	B	C	C ✓
96	B	A	D	A ✓
97	A	B	B	D ✓
98	B	A	D	A ✓
99	C	C	A	B ✓
100	C	D	A	B ✓

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