Roll Number In Figures:_____
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PR XI (01) 16
MATHEMATICS (New)
Inter Part-I
(Fresh/Reappear)
Fic. No. _____
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Superintendent
Signature / Stamp:
_____

MATHEMATICS (New)
Inter Part-I
(Fresh/Reappear)

Fic. No. _____
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Time Allowed: 3 Hours **Marks:** 100

Note: There are THREE sections in this paper i.e. Section **A, B** and **C.**
Attempt Section-A on the same paper and return it to the Superintendent within the given time.
No marks will be awarded for **Cutting, Erasing** or **Overwriting. Marks of Identification** will lead to UFM case, **Mobile Phone** etc are not allowed in the examination hall.

Time Allowed: 20 minutes **Section – A** **Marks: 20**

Q-I **Write the correct option i.e. A, B, C or D in the empty box provided opposite to each part.**

i.	If $a_j = b_{j+1} - b_j$ then $\sum_{j=1}^{n} a_j$ = ...	A. $b_n - b_1$	B. $b_{n+1} - b_1$	C. $b_1 - b_n$	D. $b_n + b_1$	B i
ii.	The function $f(x) = x^3$ is called a .....function.	A. Linear	B. Squaring	C. Cubing	D. Intercepts	C ii
iii.	The Arithmetic mean of $(\sqrt{2}+3)$ and $(\sqrt{2}-3)$ is	A. $\sqrt{2}$	B. $2\sqrt{2}$	C. $\sqrt{2}+6$	D. $\sqrt{2}-6$	A iii
iv.	${}^6P_6$ = ...	A. 36	B. 6!	C. $(6)^6$	D. $(6)^{\frac{1}{6}}$	B iv
v.	The number of terms in the expansion of $(a+b)^n$ is	A. $(n+1)$	B. $(n-1)$	C. n	D. 2n	A v
vi.	$\text{Cos}(\alpha + \frac{\pi}{2})$ = ...	A. $-\sin(\alpha)$	B. $\sin(\alpha)$	C. $\cos(\alpha)$	D. $-\cos(\alpha)$	A vi
vii.	Sum of the series $(1+2+3+.....+n)$ is	A. $n(n+1)$	B. $\frac{n(n+1)}{2}$	C. $\frac{n(n-1)}{2}$	D. $n(n-1)$	B vii
viii.	If A and B are two independent events then P (A / B) = ...	A. P (B)	B. $\frac{P(A \cap B)}{P(B)}$	C. P (A)	D. $\frac{P(A \cap B)}{P(A)}$	B viii
ix.	The range of sin (x) is	A. [0, 1]	B. [– 1, 0]	C. [– 1, 1]	D. None of these	C ix
x.	A function f: x → y having one to one correspondence and onto, then such a function is called..... function.	A. Bijective	B. Surjective	C. Injective	D. None of these	A x
xi.	Two vectors having the same magnitude and direction are called.....vectors.	A. Negative	B. Zero	C. Parallel	D. Equal	D xi
xii.	Two complex numbers Z_1 and Z_2 are said to be the multiplicative inverse of each other if $Z_1 . Z_2$ = ...where $Z_1 = a + ib$, $Z_2 = c + id$	A. + i	B. – 1 + 0i	C. 1 + 0i	D. None of these	C xii
xiii.	The mid point of the vectors (2, 7, – 1) and (4, 1, 2) is	A. (6, 4, 6)	B. $(3, 4, \frac{1}{2})$	C. (2, – 2, – 2)	D. (8, 3, 8)	B xiii
xiv.	Real part of the complex number of the form $(x + iy)^2$ is	A. $(x^2 + y^2)$	B. $(x^2 - y^2)$	C. x^2	D. $(x - y)^2$	A xiv
xv.	If A, H and G be the Arithmetic Mean, Geometric mean and Harmonic Mean respectively then G^2 = ...	A. $(A \times H)^2$	B. $A^2 \times H^2$	C. $A \times H$	D. $\frac{A}{H}$	C xv
xvi.	A circle passing through the vertices of any triangle is called the.....	A. In circle	B. In center	C. Circum circle	D. Circum centre	C xvi
	If A is a square matrix then $(A^t)^t$ = ...	A. A	B. A^t	C. – A	D. $-A^t$	A xvii
	The set of all possible outcomes of an experiment is called.....	A. Event	B. Sample space	C. Equally likely events	D. None of these	B xviii
	$-2\text{Sin}^2\frac{0}{2}$ = ...	A. Sin 0	B. Cos 0	C. Sec 0	D. $\text{Cos}\frac{0}{2}$	B xix
	e matrix $\begin{bmatrix} a & 0 \\ 0 & a \end{bmatrix}$ is called a .:matrix.	A. Diagonal	B. Column	C. Row	D. Scalar	D xx

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Note: **Time allowed for Section – B and Section – C is 2 Hours and 40 minutes.**

Section – B

Marks: 50

Q-II Answer any TEN parts. Each part carries FIVE marks.

1. Separate $\frac{1-i}{(1+i)^2}$ into real and imaginary parts.
2. Find the multiplicative inverse of $(-1, 2)$.
3. Solve the system of equation, $x - y = 2$ and $2x + y = 3$ by Matrix.
4. Let $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & -1 & 4 \end{bmatrix}$, then show that $AA^t \neq A^tA$
5. If $\vec{r} = i - 9j$, $\vec{a} = i + 2j$ and $\vec{b} = 5i - j$. Determine the real number p and q such that $\vec{r} = p\vec{a} + q\vec{b}$.
6. Show that $i.j \times k = 1$.
7. Convert $0.\overline{21}$ to a common fraction.
8. Write in terms of factorial $n(n^2 - 1)$.
9. If $P(A) = \frac{1}{3}$, $P(A \cup B) = \frac{1}{2}$ and $P(A \cap B) = \frac{1}{4}$ find $P(B)$.
10. Prove that $(\sin\theta - \cos\theta)^2 = 1 - \sin 2\theta$.
11. Find the middle term of $(3x + \frac{1}{2x})^{10}$.
12. Let $f(x) = \frac{x-1}{x-4}$, then find the domain and range of f^{-1}.
13. Graph the linear inequality $x + y \leq 2$.

Section – C

Marks: 30

Note : Attempt any THREE questions. Each question carries equal marks.

Q-III (a) Solve the system of equations by matrix method.

$4x - 3y + Z = 11$

$2x + y - 4Z = -1$

$x + 2y - 2Z = 1$

(b) Prove that 5 is the factor of $3^{2n-1} + 2^{2n-1}$, where n is any positive integer.

Q-IV (a) Express $(2\sin\theta - 5\cos\theta)$ in the form of $r.\sin(\theta + \phi)$.

(b) Prove that $\tan\theta . \tan\frac{\theta}{2} = \sec\theta - 1$.

Q-V (a) Find the missing parts at ΔABC when $b = 1.6$, $c = 3.2$ and $\alpha = 100° 24'$.

(b) Find the area of the ΔABC where $a = 92$, $b = 71$ and $\gamma = 56° 44'$.

Q-VI (a) Find the domain and range of $\cos 4x$.

(b) Draw the graph of the functions $y = -\cot x \quad -\pi \leq x \leq \pi$.