MATHEMATICS Part-I	Paper Code	Roll No. of the Student
Time: 20 Minutes Marks: 20	①	
Multiple Choice Questions 01 Mark for each	● ③	Serial No. Of the Answer Book____________

SECTION-A

Note:

1) Attempting all MCQs is compulsory. This paper along with the OMR sheet must be returned to the superintendent after due time.
2) Fill the circle Ⓐ Ⓑ Ⓒ Ⓓ, which one is correct with blue or black ball point, in this sheet as well as in separate OMR Sheet like ●
3) If more than one circle in the OMR sheet is filled then no credit will be given to such answer.

I.i. If two rows of a square matrix A are interchanged, the determinant of the resulting matrix =________.
Ⓐ $|A|$ Ⓑ 0 Ⓒ I_n Ⓓ $-|A|$

ii. If in a right angled ΔABC $\alpha=45^\circ$ then the triangle is________.
Ⓐ Isosceles Ⓑ Equilateral Ⓒ Obtuse Ⓓ Scalene

iii. Period of $5\tan(2x)$ is ________.
Ⓐ Π Ⓑ 2π Ⓒ $\frac{\pi}{2}$ Ⓓ 5π

iv. If the common ratio of a geometric series $g_1, g_2, g_3 \ldots$ is r, then the common ratio of $g_1^3, g_2^3, g_3^3, \ldots$ will be ________.
Ⓐ R Ⓑ r^2 Ⓒ $\frac{1}{r^3}$ Ⓓ r^3

v. If ${}^nC_r = {}^nC_q$ then ________.
Ⓐ r-q=n Ⓑ r+q=n Ⓒ r+n=q Ⓓ n+q=r

vi. $1 - x + x^2 - x^3 + \ldots$ is the expansion of ________.
Ⓐ $(1-x)^{-2}$ Ⓑ $(1-x)^{-1}$ Ⓒ $(1+x)^{-2}$ Ⓓ $(1+x)^{-1}$

vii. If $\vec{c}$ lies in the plane of $\vec{a}$ & $\vec{b}$, then $\vec{c}$ =________.
Ⓐ $\alpha\vec{a}+\beta\vec{b}$ Ⓑ $\alpha\vec{a} \times \beta\vec{b}$ Ⓒ $\alpha\vec{a} \cdot \beta\vec{b}$ Ⓓ $\vec{0}$

viii. Range of $f(x)=x^2$ is the set of all ________real numbers.
Ⓐ Negative Ⓑ Positive Ⓒ Non-negative Ⓓ Non-positive

ix. $\cos^{-1}A+\cos^{-1}B=\cos^{-1}$ ________.
Ⓐ (A+B) Ⓑ $(AB - \sqrt{1-A^2}\sqrt{1-B^2})$ Ⓒ (AB) Ⓓ (A-B)

x. If $Z + \frac{-1}{i}=2$ then Z=________.
Ⓐ 2+i Ⓑ 2i+1 Ⓒ 2i-1 Ⓓ 2-i

xi. The range of $y=2\sin(3x+1)$ is ________.
Ⓐ R Ⓑ R-{2} Ⓒ [-2,2] Ⓓ [-1,1]

xii. Let $A=\begin{bmatrix} 3 & -2 \\ 5 & 7 \end{bmatrix}$. Then the co-factor of -2 is ________.
Ⓐ -5 Ⓑ 2 Ⓒ -2 Ⓓ 5

xiii. The value of $2\cos^2\left(\frac{x}{2}\right)$ =________.
Ⓐ 1+cos x Ⓑ 1-cos x Ⓒ 1+sin x Ⓓ 1-sin x

xiv. The arithematic and geometric mean of two positive real numbers with usual notation are related by ______.
Ⓐ $A > G$ Ⓑ $A = G$ Ⓒ $A < G$ Ⓓ $A \geq G$

xv. If A is rectangular matrix then $A-A^t$ is ________.
Ⓐ Singular Ⓑ Non-singular Ⓒ Symmetric Ⓓ Skew-symmetric

xvi. A fair die is rolled, the probability that dots on top are greater than 4 is ________.
Ⓐ $\frac{1}{3}$ Ⓑ $\frac{1}{2}$ Ⓒ $\frac{1}{4}$ Ⓓ $\frac{1}{6}$

xvii. Sum of the A.P -11 + (-9) + (-7) + …. up to 6 terms is ________.
Ⓐ 12 Ⓑ -12 Ⓒ -36 Ⓓ 36

xviii. When a fair coin is tossed two times, then sample space is ________.
Ⓐ {HH,TT} Ⓑ {HH,HT,TH,TT} Ⓒ {T,T} Ⓓ {HT,TH}

xix. If $\frac{p}{q}$ is the third term of H.P, then third term of corresponding A.P will be ________.
Ⓐ P Ⓑ $\frac{q}{p}$ Ⓒ q Ⓓ $-\frac{p}{q}$

xx. The expansion $(1+2x)^{-1}$ is valid for ________.
Ⓐ $|x| < \frac{1}{2}$ Ⓑ $|x| > \frac{1}{2}$ Ⓒ $|x| = \frac{1}{2}$ Ⓓ $|x| \geq \frac{1}{2}$

Result.pk

MATHEMATICS Part-I

Note: Time allowed for section B and C is 2 hours and 40 minutes.

SECTION "B" — Marks: 50

I. Attempt any Ten Parts out of the following. Each Part carries equal marks.

i. Separate into real & imaginary parts $\left(\frac{5-2i}{2+3i}\right)$.

ii. Find the value of 'x' when $\begin{vmatrix} -1 & 0 & 1 \\ x^3 & 1 & x \\ 2 & 3 & 4 \end{vmatrix} = -6$.

iii. If 'x' be so small that its square & higher power may be neglected, then evaluate $\frac{\sqrt{4+x}}{4-\frac{x}{3}}$.

iv. How many eight digit different numbers are possible using all of the digits 1,1,1,1,2,2,3,4.

v. Given two non-zero vectors $\vec{a}$ & $\vec{b}$ if $\vec{a}+\vec{b}$ & $\vec{a}-\vec{b}$ are perpendicular, then $|\vec{a}| = |\vec{b}|$.

vi. Insert three harmonic means between $\frac{1}{6}$ & $\frac{1}{41}$.

vii. Find the indicated term of the sequence $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}, \ldots$ 9th term.

viii. Sum the series $1^3+5^3+9^3 \ldots$ to n terms.

ix. How many diagonals can be drawn in a plane figure with 8 sides?

x. Prove that $2^n > n \ \forall n \in N$.

xi. Find the domain & range of $f(x) = \frac{x-3}{x+5}$.

xii. Find the general solution of the equation $2\sin^2 x + 3\sin x - 2 = 0$.

xiii. Show that $\sin^{-1} x + \operatorname{Cos}^{-1} x = \frac{\pi}{2}$.

SECTION "C" — Marks: 30

Note: Attempt any Three questions of the following. Each question carries equal Marks.

III. i. Let $A=\begin{bmatrix} 1 & 4 & 4 \\ 4 & 1 & 4 \\ 4 & 4 & 1 \end{bmatrix}$ show that $A^2 - 6A - 27I = O$, where I is the identity matrix.

ii. Verify that $|Z_1 - Z_2| > |Z_1| - |Z_2|$ when $Z_1 = 2+3i$, $Z_2 = 1-5i$.

IV. If $y = \frac{1}{2^2} + \frac{1.3}{2!}\cdot\frac{1}{2^4} + \frac{1.3.5}{3!}\cdot\frac{1}{2^6} + \ldots$, then show that $y^2 + 2y - 1 = 0$

V. i. Find sum of the series $\sum_{k=1}^{n} \frac{1}{9k^2+3k-2}$

ii. For what value of 'n' will $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ be the harmonic mean between 'a' & 'b'.

VI. i. Find the area of ΔABC where $\alpha = 18.4^\circ$, $b = 154$ft, $c = 211$ft.

ii. Find a vector of magnitude 10 & perpendicular to $\vec{a} = 2\hat{i} - 3\hat{j} + 4\hat{k}$, $\vec{b} = 4\hat{i} - 2\hat{j} - 4\hat{k}$.

Result.pk