MATHEMATICS **Intermediate Part-I , Class 11th (1stA 324)** **PAPER: I** **GROUP - I**

Time: 2:30 hours **SUBJECTIVE** **Marks: 80**

Note: Section-I is compulsory. Attempt any three (3) questions from Section-II.

SECTION-I

2. Write short answers to any EIGHT questions: **(2 x 8 = 16)**

i- Define binary operation.

ii- Show that the set $\{1 , -1\}$ possess closure property with respect to multiplication.

iii- Simplify the following $(-1)^{\frac{-21}{2}}$

iv- Graph the number $-5 - 6i$ on complex plane.

v- Write the union and intersection of two sets A and B in set builder notation.

vi- Write down the difference between induction and deduction.

vii- Find the value of x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix}$

viii- If A and B are non-singular matrices then show that $(AB)^{-1} = B^{-1}A^{-1}$

ix- Write down two properties of determinant.

x- Solve the equation : $x^{1/2} - x^{1/4} - 6 = 0$

xi- Show that : $x^3 + y^3 + z^3 = (x + y + z)(x+\omega y+\omega^2 z)(x+\omega^2 y+\omega z)$

xii- Show that $(x - 2)$ is a factor of $x^4 - 13x^2 + 36$

3. Write short answers to any EIGHT questions: **(2 x 8 = 16)**

i- What is the difference between proper rational fraction and improper rational fraction?

ii- Find value of A and B if $\frac{x^2+1}{(x+1)(x-1)} = \frac{A}{x+1} + \frac{B}{x-1}$

iii- Which term of the A.P 5 , 2 , –1 , ... is –85 ?

iv- Find the sum of infinite G.P : $2 , \sqrt{2} , 1 , ...$

v- Sum the series : $3 + 5 - 7 + 9 + 11 - 13 + 15 + 17 - 19$ ..... to 3n terms.

vi- If $\frac{1}{K}$, $\frac{1}{2K+1}$ and $\frac{1}{4K-1}$ are in harmonic sequence , find K.

vii- How many permutations of the letters of the word PANAMA can be made, if P is to the first letter in each arrangement?

viii- Find the number of the diagonals of a 6–sided figure.

ix- Two dice are thrown twice. What is probability that sum of dots shown in throw is 7?

x- Prove that the statement is true : $n! > n^2$ for $n = 4 , 5$

xi- Use Binomial theorem, find the value of $(.98)^{1/2}$ up to three decimal places.

xii- Find the term involving a^4 in the expansion of $\left(\frac{2}{x} - a\right)^9$

4. Write short answers to any NINE questions: **(2 x 9 = 18)**

i- Define Radian.

ii- $\text{Sin}\theta = \frac{12}{13}$, terminal arm of the angle is in quadrant I. Find the values of $\text{Sec}\theta$, $\text{Cos}\theta$

iii- Prove that $\text{Cos}\left(\frac{\pi}{2} - \beta\right) = \text{Sin}\beta$

(Turn Over)

iv- Prove that $\frac{\text{Cos}\,11^\circ + \text{Sin}\,11^\circ}{\text{Cos}\,11^\circ - \text{Sin}\,11^\circ} = \tan 56^\circ$

v- Express the product $\text{Sin}\,12^\circ\ \text{Sin}\,46^\circ$ as sum or difference.

vi- Prove that period of tangent is π

vii- Find the period of $3\text{Sin}x$

viii- Draw the graph $y = -\text{Sin}x\ ,\ x \in [-2\pi\ ,\ 2\pi]$

ix- Find the value of θ if $\text{Cos}\theta = 0.9316$

x- Solve the right angle triangle in which $\gamma = 90^\circ$, $\alpha = 37^\circ 20'$, $a = 243$

xi- Solve the triangle ABC, if $\beta = 60^\circ$, $\gamma = 15^\circ$, $b = \sqrt{6}$

xii- Find the value of $\text{Cos}^{-1}(1/2)$

xiii- Solve the equation : $\text{Sin}^2x + \text{Cos}x = 1$

SECTION-II

5- **(a)** Show that $\begin{vmatrix} a+\lambda & b & c \\ a & b+\lambda & c \\ a & b & c+\lambda \end{vmatrix} = \lambda^2(a+b+c+\lambda)$ **5**

(b) If α and β are the roots of $x^2 - 3x + 5 = 0$, form the equation whose roots are : **5**

$\frac{1-\alpha}{1+\alpha}$ and $\frac{1-\beta}{1+\beta}$

6- **(a)** Resolve $\frac{x^2}{(x^2+4)(x+2)}$ into partial fractions. **5**

(b) Find a_n of a G.P if $a_4 = \frac{8}{27}$ and $a_7 = -\frac{64}{729}$ **5**

7- **(a)** Prove that : ${}^{n-1}C_r + {}^{n-1}C_{r-1} = {}^{n}C_r$ **5**

(b) Show that : $\frac{n^3+2n}{3}$ represents an integer $\forall\ n \in N$ **5**

8- **(a)** Prove that $\frac{\text{Sin}\theta + \text{Sin}3\theta + \text{Sin}5\theta + \text{Sin}7\theta}{\text{Cos}\theta + \text{Cos}3\theta + \text{Cos}5\theta + \text{Cos}7\theta} = \tan 4\theta$ **5**

(b) With usual notations, prove that $a^2 = b^2 + c^2 - 2bc\text{Cos}\alpha$ **5**

9- **(a)** If $\tan\theta = -\frac{1}{3}$, and terminal arm of angle θ is in quadrant II. Find the values of remaining trignometric functions. **5**

(b) Prove that $\tan^{-1}\frac{3}{4} + \tan^{-1}\frac{3}{5} + \tan^{-1}\frac{8}{19} = \frac{\pi}{4}$ **5**