Roll No. _____

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

Time: 30 Minutes **OBJECTIVE** **Marks: 20**

Code: 6197 GUJ-1-24

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1- 1- A square matrix A is symmetric if $A^t =$

(A) $-A$ (B) A (C) $\overline{A}$ (D) $-\overline{A}$

2- If $\sin\theta > 0$ and $\sec\theta > 0$, then terminal arm of θ lies in quadrant

(A) I (B) II (C) III (D) IV

3- Conditional equation $3x - 1 = 0$ is true only if

(A) $x = 3$ (B) $x = -3$ (C) $x = \frac{1}{3}$ (D) $x = -\frac{1}{3}$

4- Reference angle always lies in quadrant

(A) I (B) II (C) III (D) IV

5- $\cos\left(\sin^{-1}\frac{1}{\sqrt{2}}\right) =$

(A) $\frac{1}{\sqrt{2}}$ (B) 1 (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{4}$

6- The value of the determinant $\begin{vmatrix} 1 & 12 & 25 \\ 0 & 3 & 15 \\ 0 & 0 & 8 \end{vmatrix}$ is

(A) 0 (B) 1 (C) 8 (D) 24

7- $\sin(\pi - \theta) =$

(A) $\sin\theta$ (B) $-\sin\theta$ (C) $\cos\theta$ (D) $-\cos\theta$

8- If "n" is even , then middle term of $(a + b)^n$ is

(A) $\left(\frac{n}{2}-1\right)^{th}$ term (B) $\left(\frac{n}{2}+1\right)^{th}$ term (C) $\left(\frac{n}{2}\right)^{th}$ term (D) $\left(\frac{n}{2}-2\right)^{th}$ term

9- When $3x^4 + 4x^3 + x - 5$ is divided by $x + 1$, then remainder is

(A) -7 (B) -6 (C) 6 (D) 7

10- Converse of the conditional $p \rightarrow q$ is

(A) $q \rightarrow p$ (B) $\sim q \rightarrow \sim p$ (C) $\sim p \rightarrow \sim q$ (D) $p \rightarrow \sim q$

11- Multiplicative inverse of $-3i$ is

(A) $3i$ (B) $\frac{1}{3}i$ (C) $-\frac{1}{3}i$ (D) $-3i$

12- $A' \cap B' =$

(A) $A' - B'$ (B) $A' \cup B'$ (C) $(A \cap B)'$ (D) $(A \cup B)'$

13- In a quadratic equation $ax^2 + bx + c = 0$, if $b^2 - 4ac > 0$, then roots are

(A) real (B) equal (C) rational (D) irrational

14- 20^{th} term of 1 , 3 , 5 , ... is

(A) 38 (B) 39 (C) 40 (D) 41

(Turn over)

15- $\sqrt{3}\,i$ is

(A) rational number (B) irrational number (C) even number (D) odd number

16- $r_2 =$

(A) $\frac{\Delta}{S}$ (B) $\frac{\Delta}{S-a}$ (C) $\frac{\Delta}{S-b}$ (D) $\frac{\Delta}{S-c}$

17- Factorial form of $(n+2)(n+1)(n)$ is

(A) $\frac{(n+2)!}{(n+1)!}$ (B) $\frac{(n+1)!}{(n-2)!}$ (C) $\frac{(n+2)!}{n!}$ (D) $\frac{(n+2)!}{(n-1)!}$

18- Tanθ is a periodic function of period

(A) π (B) $\frac{\pi}{2}$ (C) $\frac{3\pi}{2}$ (D) 2π

19- Let A={1,2,3}, then the number of its subsets is

(A) 2 (B) 3 (C) 7 (D) 8

20- If $a = 2i$, $b = 4i$, then G =

(A) $\pm 2\sqrt{2}\,i$ (B) $\pm 2\,i$ (C) $\pm 4\,i$ (D) $\pm\sqrt{6}\,i$

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

Time: 2:30 hours **SUBJECTIVE** GUJ-I-24 **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- $\sin\theta = \frac{12}{13}$, terminal arm of the angle is in quadrant I. Find the values of $\sec\theta$, $\cos\theta$

iii- Prove that $\cos\left(\frac{\pi}{2} - \beta\right) = \sin\beta$

(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

Roll No. _____

MATHEMATICS **Intermediate Part-I , Class 11th (1st A 324- IV)** **PAPER: I** **GROUP: II**

Time: 30 Minutes **OBJECTIVE** **Marks: 20**

Code: 6198 GUJ-2-24

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1- 1- a , b and c are in A.P , then

(A) $2a = b - c$ (B) $2b = a + c$ (C) $2b = a - c$ (D) $2a = b + c$

2- Number of terms in expansion of $(1 + x)^{n-1}$ is

(A) $n + 2$ (B) $n + 1$ (C) n (D) $n - 1$

3- H is Harmonic mean between a and b then H = _____ .

(A) $\frac{2ab}{a+b}$ (B) $\frac{a+b}{2ab}$ (C) $\frac{2ab}{a-b}$ (D) $\frac{a-b}{2ab}$

4- $\cos(\tan^{-1}0) =$ _____

(A) 0 (B) 1 (C) –1 (D) ∞

5- In $\frac{p(x)}{q(x)}$, degree of p(x) is less than degree of q(x), then fraction is

(A) proper (B) improper (C) combined (D) partial

6- Set having no proper subset

(A) { } (B) { 1 } (C) { 1 , 2} (D) { 1 , 2 , 3 }

7- Recurring decimal is a _____ number.

(A) prime (B) rational (C) irrational (D) integer

8- Sum of roots of equation $x^2 - 5x + 6 = 0$

(A) 6 (B) –6 (C) 5 (D) –5

9- ${}^nC_8 = {}^nC_{12}$, then value of n is

(A) 8 (B) 12 (C) 16 (D) 20

10- Proposition _____ is called biconditional

(A) $p \rightarrow q$ (B) $p \leftrightarrow q$ (C) $p \wedge q$ (D) $p \vee q$

11- $\sin x = \frac{1}{2}$, then x = _____ .

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{2}$

12- Number of radians in semi-circle

(A) $\frac{\pi}{2}$ (B) π (C) 2π (D) $\frac{2\pi}{3}$

13- $3^{2x} + 4.3^x + 4 = 0$ is _____ equation.

(A) cubic (B) radical (C) reciprocal (D) exponential

14- Period of tanx is

(A) $\frac{\pi}{2}$ (B) 3π (C) 2π (D) π

15- $(-1)^{-\frac{21}{2}} =$ .....

(A) 1 (B) –1 (C) i (D) $-i$

16- If $\begin{bmatrix} x & 1 \\ 3 & 1 \end{bmatrix}$ is singular, then x = _____ .

(A) –3 (B) 3 (C) 1 (D) –1

17- Sum of opposite angles of cyclic quadrilateral is

(A) 90 (B) 120 (C) 180 (D) 270

18- The matrix [1 2 3] is _____ matrix.

(A) square (B) unit (C) null (D) row

19- Co-ratio of Cosine is

(A) sine (B) cosine (C) tangent (D) secant

20- If A = {1 , 2 , 3} and B = {4 , 5} , which is not element of A x B

(A) (1 , 4) (B) (2 , 4) (C) (3 , 4) (D) (4 , 3)

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

Time: 2:30 hours SUBJECTIVE GUJ-2-24 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- Write trichotomy and transitive properties of inequalities of real numbers.

ii- Simplify $(2, 6) \div (3, 7)$

iii- Find the modulus of $3 + 4i$

iv- Express the complex number $1 + i\sqrt{3}$ in polar form

v- Write inverse , converse and contrapositive of the conditional $\sim p \rightarrow \sim q$

vi- Define groupoid.

vii- If $A = \begin{bmatrix} i & 0 \\ 1 & -i \end{bmatrix}$, show that $A^4 = I_2$

viii- Without expansion verify that $\begin{vmatrix} \alpha & \beta+\gamma & 1 \\ \beta & \gamma+\alpha & 1 \\ \gamma & \alpha+\beta & 1 \end{vmatrix} = 0$

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

x- Find the three cube roots of -27

xi- Use the factor theorem to determine if $x - 1$ is a factor of $x^2 + 4x - 5$

xii- If α , β are the roots of $3x^2 - 2x + 4 = 0$, find the value of $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$

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

i- Resolve into Partial Fractions $\frac{3x}{(x-1)(x+2)}$

ii- Define the term Partial Fraction.

iii- Write the first four terms of the sequence, if $a_n - a_{n-1} = n + 2$, $a_1 = 2$

iv- If 5 , 8 are two A.Ms between a and b , find a and b.

v- Find the sum of infinite Geometric Series $\frac{9}{4} + \frac{3}{2} + 1 + \frac{2}{3} + \ldots\ldots$

vi- Find the 8^{th} term of H.P ; $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}, \ldots\ldots$

vii- Prove that ${}^nC_r = {}^nC_{n-r}$

viii- Find the value of n when ${}^{11}P_n = 11.10.9$

ix- What is the probability that a slip of numbers divisible by 4 are picked from the slips bearing numbers 1,2,3, ... , 10 ?

x- Prove that the inequality $n^2 > n + 3$ for $n = 3 , 4$

xi- Calculate $(9.9)^5$ by means of Bionomial Theorem.

xii- Expand $(1 - x)^{1/2}$ upto 4 terms.

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

i- Find r when $\ell = 5\text{cm}$, $\theta = \frac{1}{2}$ radian

ii- Evaluate $\frac{\tan\frac{\pi}{3} - \tan\frac{\pi}{6}}{1 + \tan\frac{\pi}{3} \cdot \tan\frac{\pi}{6}}$

iii- Prove that $\text{Sin}(\alpha + \beta)\ \text{Sin}(\alpha - \beta) = \text{Cos}^2\beta - \text{Cos}^2\alpha$

(Turn Over)

iv- Prove that $\frac{\text{Cos}8^\circ - \text{Sin}8^\circ}{\text{Cos}8^\circ + \text{Sin}8^\circ} = \tan 37^\circ$

v- Express as product : $\text{Cos}7\theta - \text{Cos}\theta$

vi- Define Periodicity.

vii- Find period of $3\text{Cos}\frac{x}{5}$

viii- Draw graph of Sinx when $x \in [0, \pi]$

ix- Find a and c for the right angle triangle ABC, when $\alpha = 58°13'$, $b = 125.7$, $\gamma = 90°$

x- A vertical pole is 8m high and length of its shadow is 6m. What is angle of elevation of the sum at that moment?

xi- Solve the triangle ABC if $b = 125$, $\gamma = 53°$, $\alpha = 47°$

xii- Show that $\tan(\text{Sin}^{-1}x) = \frac{x}{\sqrt{1-x^2}}$

xiii- Solve the trignometric equation $\text{Sin}x = -\frac{\sqrt{3}}{2}$

SECTION-II

5- (a) Solve the system of linear equations by Cramer's Rule : 5

$$2x + 2y + z = 3$$
$$3x - 2y - 2z = 1$$
$$5x + y - 3z = 2$$

(b) Show that the roots of $(mx + c)^2 = 4ax$ will be equal if $c = \frac{a}{m}$, $m \neq 0$ 5

6- (a) Resolve $\frac{x^2 + x - 1}{(x+2)^3}$ into partial fractions. 5

(b) The sum of an infinite Geometric Series is 9 and the sum of the squares of its terms is $\frac{81}{5}$. 5

Find the series.

7- (a) Two dice are thrown. E_1 is the event that the sum of their dots is an odd number and E_2 is the event that 1 is the dot on the top of the first die. Show that $P(E_1 \cap E_2) = P(E_1) \cdot P(E_2)$ 5

(b) Find the term independent of x in expansion of $\left(\sqrt{x} + \frac{1}{2x^2}\right)^{10}$ 5

8- (a) Prove that $\text{Sin}\frac{\pi}{9}\text{Sin}\frac{2\pi}{9}\text{Sin}\frac{\pi}{3}\text{Sin}\frac{4\pi}{9} = \frac{3}{16}$ 5

(b) Show that $r_2 = 4R\,\text{Cos}\frac{\alpha}{2}\text{Sin}\frac{\beta}{2}\text{Cos}\frac{\gamma}{2}$ 5

9- (a) Find x if $\tan^2 45° - \text{Cos}^2 60° = x\text{Sin}45°\,\text{Cos}45°\tan 60°$ 5

(b) Prove that $\text{Sin}^{-1}\frac{4}{5} + \text{Sin}^{-1}\frac{5}{13} + \text{Sin}^{-1}\frac{16}{65} = \frac{\pi}{2}$ 5