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MATHEMATICS **Intermediate Part-I, Class 11th (1stA 323-I)** **PAPER: I** **GROUP: II**

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

Guj-11-2-23 **Code: 6192**

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- Every real number is a complex number with its imaginary part equal to
(A) real part (B) i (C) 0 (D) 1

2- If A and B are disjoint sets, then $A-B=$
(A) $B-A$ (B) A (C) B (D) ϕ

3- If order of a matrix A is 2×3 and that of matrix B is 3×2, then order of $(AB)^t$ is
(A) 3×3 (B) 2×2 (C) 3×2 (D) 2×3

4- A square matrix $A=[a_{ij}]$ is lower triangular if
(A) $a_{ij}\neq0$ for all $i<j$ (B) $a_{ij}\neq0$ for all $i>j$
(C) $a_{ij}=0$ for all $i>j$ (D) $a_{ij}=0$ for all $i<j$

5- Four 4^{th} roots of 625 are
(A) $\pm25i, \pm25$ (B) $\pm16i, \pm16$ (C) $\pm5i, \pm5$ (D) $\pm4i, \pm4$

6- If α, β are roots of the equation $3x^2-2x+4=0$, then value of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$ is
(A) $\frac{3}{4}$ (B) $-\frac{4}{3}$ (C) $\frac{5}{3}$ (D) $-\frac{5}{3}$

7- Partial fractions of $\frac{1}{x^2+1}$ are
(A) $\frac{A}{x+1}-\frac{B}{x-1}$ (B) $\frac{A}{x+1}+\frac{B}{x-1}$ (C) $\frac{Ax+B}{x^2+1}$ (D) not possible

8- 5^{th} term of the sequence whose general term is $a_n=n+(-1)^n$, is
(A) 4 (B) 5 (C) 0 (D) -5

9- Which one is true
(A) G, H, A are in G.P. (B) A, G, H are in G.P.
(C) A,G,H are in H.P. (D) A,G,H are in A.P.

10- The complementary combination ${}^nC_r={}^nC_{n-r}$ is useful when
(A) $n=r$ (B) $n<r$ (C) $r<\frac{n}{2}$ (D) $r>\frac{n}{2}$

11- Two dice are thrown simultaneously, then the probability of getting a total of "7" number of dots is
(A) $\frac{1}{6}$ (B) $\frac{1}{18}$ (C) $\frac{4}{9}$ (D) $\frac{1}{9}$

12- $3+5+7+\dots\dots\dots+(2n+5)=(n+2)(n+4)$ for integral values of n
(A) $n\geq-4$ (B) $n\geq-3$ (C) $n\geq-2$ (D) $n\geq-1$

13- $\binom{n}{1}+\binom{n}{3}+\binom{n}{5}+\dots\dots\dots+\binom{n}{n-1}=$
(A) 2^{n+2} (B) 2^{n-2} (C) 2^{n-1} (D) 2^{n+1}

14- $\cot^2\theta-\operatorname{Cosec}^2\theta=$
(A) 1 (B) -1 (C) $\cos^2\theta$ (D) $\tan^2\theta$

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15- $\tan3\theta=$
(A) $\frac{3\tan\theta-\tan^3\theta}{1-3\tan^2\theta}$ (B) $\frac{3\tan^2\theta-\tan\theta}{1-3\tan^3\theta}$ (C) $3\tan\theta$ (D) $\tan^3\theta$

16- Range of $y=\operatorname{Sin}x$ is
(A) $[-1,1]$ (B) $\left[-\frac{1}{2},\frac{1}{2}\right]$ (C) $[-2,2]$ (D) $\left[-\frac{\pi}{2},\frac{\pi}{2}\right]$

17- Number of elements of a triangle is
(A) 4 (B) 5 (C) 6 (D) infinite

18- $\cos\frac{\beta}{2}=$
(A) $\sqrt{\frac{s(s-b)}{ac}}$ (B) $\sqrt{\frac{(s-c)(s-a)}{ac}}$
(C) $\sqrt{\frac{s(s-a)}{bc}}$ (D) $\sqrt{\frac{(s-b)(s-c)}{bc}}$

19- $\operatorname{Sin}(\tan^{-1}(-1))=$
(A) 1 (B) -1 (C) $\frac{1}{\sqrt2}$ (D) $\frac{-1}{\sqrt2}$

20- Reference angle of $2\operatorname{Sin}x-1=0$ is
(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{2}$

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MATHEMATICS — **Intermediate Part-I, Class 11th (1stA 323)** — **PAPER: I** — **GROUP: II**

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

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

SECTION-I

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

i- State the DeMoiver's theorem.

ii- Factorize $9a^2+16b^2$

iii- Write down two proper subsets of $\{0, 1\}$

iv- Construct truth table $(p\to\sim p)\vee(p\to q)$

v- Define unary and binary operations.

vi- Find matrix X if $X\begin{bmatrix}5 & 2\\ -2 & 1\end{bmatrix}=\begin{bmatrix}-1 & 5\\ 12 & 3\end{bmatrix}$

vii- Solve the following system of linear equations
$3x_1-x_2=1$, $x_1+x_2=3$

viii- If $A=\begin{bmatrix}2 & -1\\ 3 & 1\end{bmatrix}$, verify that $(A^{-1})^t=(A^t)^{-1}$

ix- Solve the equation $x^{2/5}+8=6x^{1/5}$

x- Find four fourth roots of 16

xi- Discuss the nature of the roots of a quadratic equation $x^2+2x+3=0$

xii- When the polynomial x^3+2x^2+kx+4 is divided by $x-2$, the remainder is 14. Find the value of k

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

i- Define rational fraction.

ii- Write down the first four terms of the sequence, if $a_n=n\cdot a_{n-1}$, $a_1=1$

iii- Find the 13th term of the sequence $x, 1, 2-x, 3-2x, \ldots\ldots\ldots$

iv- Find the nth term of geometric sequence, if $\frac{a_5}{a_3}=\frac{4}{9}$ and $a_2=\frac{4}{9}$

v- Sum to n terms of the series $3+33+333+\ldots\ldots\ldots$

vi- Find the 9th term of H.P. $\frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \ldots\ldots\ldots$

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

viii- What is the probability that a slip of numbers divisible by 4 is picked from the slips bearing numbers $1, 2, 3, \ldots\ldots\ldots, 10$?

ix- If sample space $S=\{1, 2, 3, \ldots\ldots\ldots, 9\}$, event $A=\{2, 4, 6, 8\}$ and event $B=\{1, 3, 5\}$. Find $P(A\cup B)$

x- Prove by mathematical induction $r+r^2+r^3+\ldots\ldots\ldots+r^n=\frac{r(1-r^n)}{1-r}$, $r\neq 1$

xi- Find the 6th term in the expansion of $\left(x^2-\frac{3}{2x}\right)^{10}$

xii- Evaluate $\sqrt[3]{30}$ correct to three places of decimal.

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

i- Write down any two fundamental trigonometric identities.

ii- In which quadrant the terminal arm of the angle lie when $\sin\theta<0$ and $\cos\theta>0$

iii- Verify $\sin 60^\circ\cos 30^\circ-\cos 60^\circ\sin 30^\circ=\sin 30^\circ$

iv- Prove that $\sin 3\alpha=3\sin\alpha-4\sin^3\alpha$

v- Prove that $\cot\alpha-\tan\alpha=2\cot 2\alpha$

vi- Express $\sin(x+30^\circ)+\sin(x-30^\circ)$ as product.

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vii- Write domain and range of $\sin\theta$

viii- A ladder leaning against a vertical wall makes an angle of 24° with the wall. Its foot is 5m from the wall. Find its length.

ix- Find the area of the triangle ABC, if $a = 18$, $b = 24$, $c = 30$

x- Prove that $r_1 r_2 r_3 = rs^2$

xi- Show that $\cos^{-1}(-x) = \pi - \cos^{-1}x$

xii- Find the value of $\sin\left(\cos^{-1}\frac{\sqrt{3}}{2}\right)$

xiii- Prove the identity $\sin^{-1}x = \frac{\pi}{2} - \cos^{-1}x$

SECTION-II

Note: Attempt any three (3) questions.

5- (a) Reduce the matrix $\begin{bmatrix} 2 & 3 & -1 & 9 \\ 1 & -1 & 2 & -3 \\ 3 & 1 & 3 & 2 \end{bmatrix}$ into echelon form 5

(b) Solve the equation $(x+4)(x+1) = \sqrt{x^2+2x-15} + 3x + 31$ 5

6- (a) Resolve $\frac{(x-1)(x-3)(x-5)}{(x-2)(x-4)(x-6)}$ into partial fractions. 5

(b) Find the values of n and r, when ${}^nC_r = 35$ and ${}^nP_r = 210$ 5

7- (a) Find n so that $\frac{a^{n+1}+b^{n+1}}{a^n+b^n}$ may be H.M. between 'a' and 'b'. 5

(b) Use mathematical induction to prove the formula for every positive integer n 5

$$1 + \frac{1}{2} + \frac{1}{4} + \dots\dots\dots + \frac{1}{2^{n-1}} = 2\left[1 - \frac{1}{2^n}\right]$$

8- (a) If $\operatorname{Cosec}\theta = \frac{m^2+1}{2m}$ and $m > 0$ $\left(0 < \theta < \frac{\pi}{2}\right)$, 5

Find values of remaining trigonometric ratios.

(b) Prove that $\sin 10^\circ \sin 30^\circ \sin 50^\circ \sin 70^\circ = \frac{1}{16}$ 5

9- (a) Prove that $\Delta = 4Rr.\cos\frac{\alpha}{2}.\cos\frac{\beta}{2}.\cos\frac{\gamma}{2}$ 5

(b) Prove that $\sin^{-1}\frac{1}{\sqrt{5}} + \cot^{-1}3 = \frac{\pi}{4}$ 5

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