Roll No. _____ (2)

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

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

Code: 6191 10/-11-1-23

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- The multiplicative inverse of complex number (0 , 1) is

(A) $(0,-1)$ (B) $(-1,0)$ (C) $(1,0)$ (D) $(1,1)$

2- Converse of $p \rightarrow q$ is

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

3- $(A^{-1})^t =$

(A) A (B) $-A^t$ (C) $A^{-1}A^t$ (D) $(A^t)^{-1}$

4- The trivial solution of the system $a_1x+b_1y=0$ and $a_2x+b_2y=0$ is

(A) $(1,0)$ (B) $(0,1)$ (C) $(0,0)$ (D) $(1,1)$

5- Sum of all four fourth roots of unity is

(A) 1 (B) –1 (C) 0 (D) i

6- Roots of the equation $ax^2+bx+c=0$ are real and distinct if

(A) $b^2-4ac=0$ (B) $b^2-4ac>0$ (C) $b^2-4ac<0$ (D) $a^2-4ac>0$

7- A relation in which the equality is true for any value of unknowns is called

(A) identity (B) equation (C) fraction (D) conditional

8- The sequence 3, 6, 12, ... is

(A) A.P. (B) G.P. (C) H.P. (D) infinite

9- Harmonic mean between 3 and 7 is

(A) $\frac{5}{21}$ (B) $\frac{21}{5}$ (C) 5 (D) 21

10- Factorial form of $n(n-1)(n-2) =$ _____

(A) $\frac{n!}{(n-1)!}$ (B) $\frac{n!}{(n-2)!}$ (C) $\frac{n!}{(n-3)!}$ (D) $\frac{n!}{(n+3)!}$

11- If A and B are independent events and $P(A) = 0.8$, $P(B) = 0.7$ then $P(A \cap B) =$

(A) 0.56 (B) $\frac{8}{7}$ (C) $\frac{7}{8}$ (D) 0.1

12- The sum of exponents of a and b in every term of the expansion of $(a+b)^n$ is

(A) 1 (B) 0 (C) 2n (D) n

13- The expansion of $(1+2x)^{-3}$ is valid only if

(A) $|x|<2$ (B) $|x|<\frac{1}{2}$ (C) $|x|<\frac{1}{3}$ (D) $|x|<\frac{1}{6}$

14- If length of arc and radius of circle are measured in cm then unit of Q is

(A) degree (B) radians (C) cm^2 (D) cm

15- $\cos 2\alpha =$

(A) $2\cos^2\alpha+1$ (B) $2\cos^2\alpha-1$ (C) $2\sin^2\alpha-1$ (D) $2\sin^2\alpha+1$

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16- The smallest positive number P for which $f(x+P)=f(x)$ is called

(A) domain (B) co-domain (C) range (D) period

17- In any triangle ABC, $c^2 =$ _____

(A) $a^2+c^2-2ac\cos\beta$ (B) $a^2+b^2-2ab\cos\gamma$

(C) $b^2+c^2-2bc\cos\alpha$ (D) $a^2+b^2-2ab\cos\alpha$

18- Point of intersection of the angle bisectors of a triangle is called

(A) circum–centre (B) in–centre (C) ex–centre (D) ortho–centre

19- $2\tan^{-1}A =$

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

20- If $\sin x + \cos x = 0$ then $x =$ _____

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

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MATHEMATICS | Intermediate Part-I, Class 11th (1st A 323) | 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- Check the closure property with respect to multiplication on the set $\{-1, 1\}$

ii- Simplify the complex numbers $(5, -4)(-3, -2)$

iii- Write down the descriptive and tabular form of $\{x \mid x \in P \wedge x < 12\}$

iv- Verify commutative property of union and intersection for sets $A = \{1,2,3,4,5\}$, $B = \{4,6,8,10\}$

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

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

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

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

ix- Solve the equation $x^2 - 7x + 10 = 0$ by factorization.

x- Reduce $2x^4 - 3x^3 - x^2 - 3x + 2 = 0$ into quadratic form.

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

xii- Define reciprocal equation.

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

i- Resolve into partial fractions of $\frac{x^2+1}{(x-1)(x+1)}$ without finding values of constants.

ii- Write down next two terms of sequence $-1, 2, 12, 40, \ldots\ldots$

iii- Insert two G.Ms. between 1 and 8

iv- Find n^{th} term of $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}, \ldots\ldots$

v- Prove that $\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$

vi- If 5, 8 are two A.Ms. between a and b. Find a and b.

vii- Find the value of n^{-1} when ${}^{n}P_4 : {}^{n-1}P_3 = 9:1$

viii- How many arrangements of letters of word PAKPATTAN, taken all together, can be made ?

ix- Two dice are thrown twice. What is probability that sum of dots shown in first throw is 7 and that of second throw is 11 ?

x- Show that in-equality $4^n > 3^n + 4$ holds for $n = 2$, $n = 3$

xi- Using binomial theorem, expand $(a+2b)^5$

xii- Expand up to 4 terms, taking the value of x such that expansion is valid: $(8-2x)^{-1}$

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

i- What is the length of the arc intercepted on a circle of radius 14cm by the arms of central angle of 45^o ?

ii- Verify that $\text{Sin}^2\frac{\pi}{6} : \text{Sin}^2\frac{\pi}{4} : \text{Sin}^2\frac{\pi}{3} : \text{Sin}^2\frac{\pi}{2} = 1:2:3:4$

iii- Prove that $\frac{\text{Sin}\theta}{1+\text{Cos}\theta} + \text{Cot}\theta = \text{Cosec}\theta$

iv- Without using table, find the value of $\tan(-135^o)$

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v- Prove that $\text{Cos}(\alpha+45^\circ)=\frac{1}{\sqrt{2}}(\text{Cos}\alpha-\text{Sin}\alpha)$

vi- Prove that $\frac{1-\text{Cos}\alpha}{\text{Sin}\alpha}=\tan\frac{\alpha}{2}$

vii- Find the period of $\text{Cot}\,8x$

viii- When the angle between the ground and the sun in 30°, flag pole casts a shadow of 40 m long. Find the height of the top of the flag.

ix- Find the smallest angle of the triangle ABC when $a=37.34$, $b=3.24$, $c=35.06$

x- Find the area of the triangle ABC when $a=200$, $b=120$, $\gamma=150^\circ$

xi- Show that $\text{Sin}(2\text{Cos}^{-1}x)=2x\sqrt{1-x^2}$

xii- Find the solution set of $\text{Sin}x.\text{Cos}x=\frac{\sqrt{3}}{4}$

xiii- Find the solution of $\text{Sin}x=\frac{1}{2}$ in $[0\ ,\ 2\pi]$

SECTION-II

Note: Attempt any three (3) questions.

5- **(a)** Use matrices to solve the system of equations

$$2x_1+x_2+3x_3=3$$
$$x_1+x_2-2x_3=0$$
$$-3x_1-x_2+2x_3=-4$$

5

(b) Solve the equation $\left(x-\frac{1}{x}\right)^2+3\left(x+\frac{1}{x}\right)=0$

5

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

5

(b) A die is thrown. Find the probability that the dots on the top are prime numbers or odd numbers.

5

7- **(a)** For what value of n , $\frac{a^n+b^n}{a^{n-1}+b^{n-1}}$ is the positive geometric mean between a and b ?

5

(b) If $y=\frac{2}{5}+\frac{1\cdot3}{2!}\left(\frac{2}{5}\right)^2+\frac{1\cdot3\cdot5}{3!}\left(\frac{2}{5}\right)^3+\ldots\ldots$ then prove that $y^2+2y-4=0$

5

8- **(a)** Prove that $\sqrt{\frac{1-\text{Sin}\theta}{1+\text{Sin}\theta}}=\text{Sec}\theta-\tan\theta$, where θ is not an odd multiple of $\frac{\pi}{2}$

5

(b) If $\alpha+\beta+\gamma=180^\circ$, show that $\cot\alpha\cot\beta+\cot\beta\cot\gamma+\cot\gamma\cot\alpha=1$

5

9- **(a)** Using law of tangents , solve the ΔABC in which $a=36.21$, $b=42.09$ and $\gamma=44^\circ29'$

5

(b) Prove that $2\tan^{-1}\left(\frac{1}{3}\right)+\tan^{-1}\left(\frac{1}{7}\right)=\frac{\pi}{4}$

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

Time: 30 Minutes Guj-11-2-23 **OBJECTIVE** **Marks: 20**

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) $a_{ij} \neq 0$ for all $i < j$ (B) $a_{ij} \neq 0$ 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) $\pm 25i, \pm 25$ (B) $\pm 16i, \pm 16$ (C) $\pm 5i, \pm 5$ (D) $\pm 4i, \pm 4$

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- $3+5+7+\ldots\ldots\ldots+(2n+5) = (n+2)(n+4)$ for integral values of n

(A) $n \geq -4$ (B) $n \geq -3$ (C) $n \geq -2$ (D) $n \geq -1$

13- $\binom{n}{1}+\binom{n}{3}+\binom{n}{5}+\ldots\ldots\ldots+\binom{n}{n-1} =$

(A) 2^{n+2} (B) 2^{n-2} (C) 2^{n-1} (D) 2^{n+1}

14- $\text{Cot}^2\theta - \text{Cosec}^2\theta =$

(A) 1 (B) -1 (C) $\text{Cos}^2\theta$ (D) $\tan^2\theta$

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15- $\tan 3\theta =$

(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 $y = \text{Sin}x$ 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- $\text{Cos}\frac{\beta}{2} =$

(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- $\text{Sin}(\tan^{-1}(-1)) =$

(A) 1 (B) -1 (C) $\frac{1}{\sqrt{2}}$ (D) $\frac{-1}{\sqrt{2}}$

20- Reference angle of $2\text{Sin}x - 1 = 0$ is

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

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. (4)

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 $x , 1 , 2-x , 3-2x , \ldots\ldots$
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 + ...
vi- Find the 9th term of H.P. $\frac{1}{3} , \frac{1}{5} , \frac{1}{7} , \ldots\ldots$
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 , ... , 10?
ix- If sample space S={1 , 2 , 3 , ... , 9} , event A={2 , 4 , 6 , 8} and event B={1 , 3 , 5}. Find P(A ∪ B)
x- Prove by mathematical induction $r+r^2+r^3+\ldots\ldots+r^n=\frac{r(1-r^n)}{1-r}$, $r \neq 1$
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 Sin0 < 0 and Cos θ > 0
iii- Verify $Sin60^\circ Cos30^\circ - Cos60^\circ Sin30^\circ = Sin30^\circ$
iv- Prove that $Sin3\alpha = 3Sin\alpha - 4Sin^3\alpha$
v- Prove that $Cot\alpha - tan\alpha = 2Cot2\alpha$
vi- Express $Sin(x+30^\circ)+Sin(x-30^\circ)$ as product .

(Turn Over)

vii- Write domain and range of $\text{Sin}\theta$

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 $\text{Cos}^{-1}(-x) = \pi - \text{Cos}^{-1}x$

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

xiii- Prove the identity $\text{Sin}^{-1}x = \frac{\pi}{2} - \text{Cos}^{-1}x$

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

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

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

Find values of remaining trigonometric ratios.

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

9- **(a)** Prove that $\Delta = 4Rr \cdot \text{Cos}\frac{\alpha}{2} \cdot \text{Cos}\frac{\beta}{2} \cdot \text{Cos}\frac{\gamma}{2}$ 5

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