Roll No. ____________

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

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

Code: 6191

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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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ATHEMATICS | Intermediate Part-I, Class 11th (1st A 323) (4) | 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 $\dfrac{x^2+1}{(x-1)(x+1)}$ without finding values of constants.

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

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

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

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

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 $45°$?

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

iii- Prove that $\dfrac{\sin\theta}{1+\cos\theta} + \cot\theta = \operatorname{Cosec}\theta$

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

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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 5

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

(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 $2\tan^{-1}\left(\frac{1}{3}\right)+\tan^{-1}\left(\frac{1}{7}\right)=\frac{\pi}{4}$ 5