Answer Sheet No. _____ **MATHEMATICS (OBJECTIVE PART)** Roll No. _____

PART – I **21/01 (✡✡✡)**

(INTERMEDIATE)

Sign. Dy. Supdnt. Fictitious Roll No. (For Office Use) Sign. Candidate

MATHEMATICS (INTERMEDIATE) **(✡✡✡)**

(PART – I) **21/01** **Marks : 20**

(OBJECTIVE PART) **Time : 30 Minutes**

Note:- Write your Roll No. in space provided. Over writing, cutting, using of lead pencil will result in loss of marks. All questions are to be attempted.

1- Each question has four possible answers, Tick (√) the correct answer. (20)

1	Solution set of the equation $x^2-7x+10=0$ is;							
	A	$\{-2,5\}$	B	$\{-2,-5\}$	C	$\{2,-5\}$	D	$\{2,5\}$
2	Partial fractions of $\frac{3x}{(x-1)(x+2)}$ are;							
	A	$\frac{1}{x-1}+\frac{2}{x+2}$	B	$\frac{2}{x-1}+\frac{1}{x+2}$	C	$\frac{1}{x-1}-\frac{2}{x+2}$	D	$\frac{2}{x-1}-\frac{1}{x+2}$
3	A.M between x+1 and (x-1) is;							
	A	$x-1$	B	x	C	$\frac{x+1}{2}$	D	$\frac{x-1}{2}$
4	The common ratio of a geometric sequence cannot be;							
	A	3	B	1	C	2	D	0
5	An infinite geometric series is convergent if;							
	A	$\|r\|\leq 1$	B	$\|r\|<1$	C	$\|r\|<2$	D	$\|r\|>1$
6	Trichotomy is the property of;							
	A	Inequality	B	Equality	C	Division	D	Subtraction
7	Converse of $p \rightarrow q$ is;							
	A	$\sim p \rightarrow q$	B	$p \rightarrow \sim q$	C	$q \rightarrow p$	D	$\sim p \rightarrow \sim q$
8	If a system of linear equations has a unique solution or infinitly many solutions then it can be known as;							
	A	Consistent system	B	Inconsistent system	C	Non-linear system	D	Unique solution
9	The matrix $\begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$ is a;							
	A	Unit matrix	B	Scalar Matrix	C	Zero matrix	D	Rectangular matrix
10	If a polynomial function f(x) is divided by (x-a) then f(x) is called;							
	A	Divisor	B	Quotient	C	Remainder	D	Dividend

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11	The period of $\tan(\frac{x}{3})$ is;							
	A	π	B	2π	C	3π	D	4π
12	Number of the elements of a triangle are;							
	A	3	B	4	C	6	D	8
13	In-radius r of a triangle is;							
	A	$S\Delta$	B	$\frac{\Delta}{S}$	C	$\frac{S}{\Delta}$	D	$\frac{4ab}{\Delta}$
14	$Cos(\tan^{-1}(\sqrt{3}))$ is equal to;							
	A	$\frac{1}{2}$	B	$-\frac{1}{2}$	C	$\frac{\sqrt{3}}{2}$	D	$-\frac{\sqrt{3}}{2}$
15	If $Cos(2x) = 0$ then solution in 1st quadrant is;							
	A	30°	B	45°	C	60°	D	15°
16	$\frac{8!}{6!} =$ _____							
	A	8	B	6	C	50	D	56
17	The expansion $(1+x)^{-3}$ holds when;							
	A	$\|x\| > 0$	B	$\|x\| < 1$	C	$\|x\| \leq 1$	D	$\|x\| < 0$
18	$Cos(330°) =$ _____							
	A	$\frac{1}{2}$	B	$\frac{\sqrt{3}}{2}$	C	$\frac{2}{\sqrt{3}}$	D	$\frac{1}{\sqrt{2}}$
19	If ℓ and r are in Cms, then the unit of θ is in;							
	A	Radians	B	Degree	C	Cm^2	D	Cm
20	$Sin(2\pi - \theta) =$ _____							
	A	$Sin\theta$	B	$-Sin\theta$	C	$Cos\theta$	D	$-Cos\theta$

(The End)

MATHEMATICS **21/01** **Roll. No. _____**

PAPER : PART – I
INTERMEDIATE

MARKS: 80

TIME : 2:30 Hours **(SUBJECTIVE PART)**

Note:- Attempt any TWENTY FIVE (25) short questions in all selecting eight from Q. 2 and Q. 3 each and nine from Q. 4. **(25 x 2 = 50)**

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SECTION – I

2- Write short answers of any eight questions. **(2 x 8 = 16)**

i	Show that $\forall z_1, z_2 \in C,\ \overline{z_1 z_2} = \overline{z_1}\,\overline{z_2}$	ii	Find out real and imaginary parts of complex number $(\sqrt{3}+i)^3$
iii	Factorize a^2+4b^2	iv	For the set $A=\{1,2,3,4\}$ Find the relation $\{(x,y) \mid x+y>5\}$. Also state domain and range of this relation.
v	Prepare the table of addition of the elements of set of residue classes modulo 4.	vi	Use Venn diagram to verify $(A-B)^C \cap B = B$
vii	Solve the matrix equation for X, $2X-3A=B$ If $A=\begin{bmatrix}1 & -1 & 2\\ -2 & 4 & 5\end{bmatrix}, B=\begin{bmatrix}3 & -1 & 0\\ 4 & 2 & 1\end{bmatrix}$	viii	Without expansion show that $\begin{vmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ 7 & 8 & 9\end{vmatrix}=0$
ix	If $A=\begin{bmatrix}1 & -2 & 3\\ -2 & 3 & 1\\ 4 & -3 & 2\end{bmatrix}$ Find A_{12} and A_{32}	x	Solve $x^{\frac{1}{2}}-x^{\frac{1}{4}}-6=0$
xi	Find four fourth roots of 625.	xii	If α, β are the roots of $3x^2-2x+4=0$ Find the value of $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$

3- Write short answers of any eight questions. **(2 x 8 = 16)**

i	Write $\frac{1}{(x-1)(2x-1)(3x-1)}$ in the form of partial fraction without finding constants.	ii	If $\frac{7x+25}{(x+3)(x+4)}=\frac{A}{x+3}+\frac{B}{x+4}$, then find the value of B.
iii	If $\frac{1}{a}, \frac{1}{b}$ and $\frac{1}{c}$ are in G.P. Show that the common ratio is $\pm\sqrt{\frac{a}{c}}$	iv	Fine the 5the term of G.P. 3,6,12,...
v	Find A.M. between x-3 and x+5	vi	If $a_{n-3}=2n-5$ Find the n th term of the sequence.
vii	What is the probability that a slip of numbers divisible by 4 is picked from the slips bearing numbers 1,2,3,...,10?	viii	Find the value of n if ${}^nC_{12}={}^nC_6$
ix	Evaluate: $\frac{9!}{2!(9-2)!}$	x	Verify the statement $1+2+4+...+2^{n-1}=2^{n-1}$ for n=2 and n=3
xi	If x is so small that it square and higher powers can be neglected, then show that $\frac{1-x}{\sqrt{1+x}} \approx 1-\frac{3}{2}x$	xii	Find the term involving x^{-2} in the expansion of $\left(x-\frac{2}{x^2}\right)^{13}$

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4- **Write short answers of any nine questions.** **(2 x 9 = 18)**

i	**Convert into radians the** $54°45'$	ii	**Find the value of** $Cos\theta$ **and** $\tan\theta$**, when** $Sin\theta = \frac{12}{13}$ **and terminal arm of the angle is in quadrant I**
iii	**Prove that** $\frac{Sin\theta}{1+Cos\theta} + Cot\theta = Cosec\theta$	iv	**Without use of table or calculator, Find the value of** $Sin(-300°)$
v	**Prove that** $\tan(45° + A)\tan(45° - A) = 1$	vi	**Express** $Sin\ 5x + \sin 7x$ **as a product.**
vii	**Find the period of** $\tan 4x$	viii	**Find the measure of greatest angle, if sides of the triangle are 16,20,33.**
ix	**Find the area of the triangle, whose sides are a=18, b=24, c=30**	x	**At the top of a cliff 80 m high, the angle of depression of a boat is** 12^O**. How for is the boat from the cliff?**
xi	**Show that** $Cos^{-1}\frac{12}{13} = Sin^{-1}\frac{5}{13}$ **where domain of the function is** $[0, \pi]$	xii	**Find the value of the equation, which lies in** $[0,2\pi]$, $Secx = -2$
xiii	**Solve the trigonometric equation** $\tan^2\theta = \frac{1}{3}$		

SECTION – II

Note:- Attempt any three questions. **(10 x 3 = 30)**

5	a	**Show that** $\begin{vmatrix} x & 1 & 1 & 1 \\ 1 & x & 1 & 1 \\ 1 & 1 & x & 1 \\ 1 & 1 & 1 & x \end{vmatrix} = (x+3)(x-1)^3$	(05)
	b	**Solve the equation** $3^{2x-1} - 12.3^x + 81 = 0$	(05)
6	a	**Resolve into partial fraction.** $\frac{1}{(x-1)^2(x^2+2)}$	(05)
	b	**Find the 11th term of the sequence.** $1+i, 2, \frac{4}{1+i}, \ldots$	(05)
7	a	**A die is thrown twice. What is the probability that the sum of the number of dots shown is 3 or 11.**	(05)
	b	**Find the term independent of x in the expansion** $\left(\sqrt{x} + \frac{1}{2x^2}\right)^{10}$	(05)
8	a	**Without using calculator / tables, show that** $Cos20°Cos40°\cos 80° = \frac{1}{8}$	(05)
	b	**If** $Sin\theta = \frac{12}{13}$ **and terminal arm of the angle is in quadrant I, then find the remaining Trigonometric functions.**	(05)
9	a	**Solve the following triangle using first law of tangents and then law of sines. If** $b = 14.8$, $c = 16.1$ **and** $\alpha = 42°45'$	(05)
	b	**Prove that** $2\tan^{-1}\left(\frac{2}{3}\right) = Sin^{-1}\left(\frac{12}{13}\right)$	(05)

(The End)