MM: 20 **Class Test XII Class** Time: 45 min

Q 1-4 carry 1 mark, Q 5-8 carry 4 marks .

1. Write the points of discontinuity of $f(x)=[x]$.

2. If $y=\tan^{-1}\left(\cot x^2\right)$, write value of dy/dx .

3. Is Rolle's theorem applicable to $f(x)=x^2-4$ for $x\in[1,2]$?

4. If $f(1)=4,\ f'(1)=2$ find the value of the derivative of $\log f(e^x)$ at $x=0$.

5. Show $f(x)=\begin{cases}x-1 & if\ x<2\\ 2x-3 & if\ x\geq 2\end{cases}$ is not differentiable at $x=2$.

6. If $y=\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$, find $\frac{dy}{dx}$.

MM: 20 **Class Test XII Class** Time: 40 min

Each question carries 4 marks.

1. Evaluate the following:

(i) $\tan\left(2\tan^{-1}\left(\frac{1}{5}\right)-\frac{\pi}{4}\right)$ (ii) $\cos^{-1}\left(\cos\frac{5\pi}{4}\right)$

2. Find the value of

$$4\left[2\sin^{-1}\left(-\frac{1}{2}\right)+5\tan^{-1}1-3\cos^{-1}\frac{1}{2}\right]+\frac{1}{2}\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$$

3. Prove that: $\sin^{-1}\frac{5}{13}+\cos^{-1}\frac{3}{5}=\tan^{-1}\frac{63}{16}$

4. Write the following in the simplest form:

$$\tan^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$$

5.Solve the following equation:

$$\tan^{-1}(x+1)+\tan^{-1}(x-1)=\tan^{-1}\frac{6}{17}$$

MM: 20 **Class Test XII** **Determinants** Time: 40 min

Q 1 carry 2 marks, Q 2-4 each carry 4 marks and Q 5 carry 6 marks.

1. Find the value of x if $\begin{vmatrix}x-2 & -3\\ 3x & 2x\end{vmatrix}=3$

2. Using elementary transformations, find inverse of $A=\begin{bmatrix}2 & -3\\ 3 & 4\end{bmatrix}$ **3.** Using properties of determinants show that:

$$\begin{vmatrix}1 & a & a^2+bc\\ 1 & b & b^2+ca\\ 1 & c & c^2+ab\end{vmatrix}=2(a-b)(b-c)(c-a)$$

4. Using properties of determinants, solve for x:

$$\begin{vmatrix}a+x & a-x & a-x\\ a-x & a+x & a-x\\ a-x & a-x & a+x\end{vmatrix}=0$$

5. Using matrix method, solve the following system of linear equation:

$$x+y-z=1\ ,\ 3x+y-2z=3\ ,\ x-y-z=-1$$

MM: 30 **Class Test XII Class** Time: 45 min

Relation Function & Inverse Trigonometry

Q 1-6 each carries 4 marks and Q 7 carry 6 marks.

1. Show that relation R in set $A=\{x\in Z:0\leq x\leq 12\}$ given by $R=\{(a,b):|a-b| \text{ is a multiple of } 4\}$ is equivalence relation.

2. Let $f:R-\{2\}\to R-\{1\}$ is a mapping defined by $f(x)=\frac{x-1}{x-2}$, show that f is bijective.

3. Let A be a set of all real numbers i.e. $A=R-\{-1\}$.
Let $*$ be defined on A as $a*b=a+b+ab$.
Prove that: (i) $*$ is commutative and associative
(ii) 0 is the identity element.
(iii) $-a/(1+a)$ is inverse of a.

4. Prove that: $\sin^{-1}\frac{5}{13}+\cos^{-1}\frac{3}{5}=\tan^{-1}\frac{63}{16}$

5. Write the following in the simplest form:

$$\tan^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$$

6.Solve the following equation:

$$\tan^{-1}(x+1)+\tan^{-1}(x-1)=\tan^{-1}\frac{8}{31}$$

7. Let $f:N\to R$ be a function defined as $f(x)=4x^2+12x+15$. Show that $f:N\to R_f$ is invertible. Also find the inverse of f .