St. Xavier's Sr. Sec. School
Delhi-54

Class 12 | Time : 1 hr.
13-5-2015 | First Unit Test in MATHEMATICS | M. Marks : 20

GENERAL INSTRUCTIONS :
1. All questions are compulsory.
2. Questions 1 – 4 are of 1 mark each.
3. Questions 5 – 9 are 2 marks each.
4. Questions 10 – 11 are of 3 marks each.
5. Use of calculator is not allowed.

Section - A

1. Evaluate : $\cos^{-1}(\cos\frac{5\pi}{3})$.

2. Evaluate : $\sin\left(\frac{\pi}{3}-\sin^{-1}(-1/2)\right)$

3. Find the derivative of $\sqrt{\cot\sqrt{x}}$ with respect to x.

4. Differentiate $\log\left(x+\sqrt{x^2+4}\right)$ w.r.t x.

Section - B

5. Prove that $\cot^{-1}\left(\frac{ab+1}{a-b}\right)+\cot^{-1}\left(\frac{bc+1}{b-c}\right)+\cot^{-1}\left(\frac{ca+1}{c-a}\right)=0$

6. Simplify: $y=\tan^{-1}\left(\frac{\cos x}{1+\sin x}\right)$

7. Differentiate $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ with respect to x.

8. Solve : $\cos^{-1}\left(\frac{x^2-1}{x^2+1}\right)+\tan^{-1}\left(\frac{2x}{x^2-1}\right)=\frac{2\pi}{3}$

9. Prove : $\tan^{-1}\left(\frac{1}{4}\right)+\tan^{-1}\left(\frac{2}{9}\right)=\frac{1}{2}\cos^{-1}\frac{3}{5}$

Section - C

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

11. Find the value of k for which the function f defined as

$$f(x) = \begin{cases} k \sin \frac{\pi}{2}(x+1) & , x \le 0 \\ \frac{\tan x - \sin x}{x^3} & , x > 0 \end{cases}$$

is continuous at x = 0

-x-x-x-x-x-