

INTRODUCTION TO TRIGONOMETRY

SECTION A: (1 MARK)

1.	If $\sin(A + B) = 1$ and $\cos(A - B) = \frac{\sqrt{3}}{2}$, then find A and B.	$\{60^\circ, 30^\circ\}$
2.	Express $\sin 67^\circ + \cos 75^\circ$ in terms of trigonometric ratios of angles between 0° and 45° .	$\{\cos 23^\circ + \sin 15^\circ\}$
3.	If $\tan A = \cot B$, prove that $A + B = 90^\circ$ (CCE 2011)	

SECTION B: (2 MARKS)

4.	If $\tan^2(3A + 15)^\circ - 1 = 0$, then find the value of A that satisfy this condition.	$\{10^\circ\}$
5.	Prove that $(\sqrt{3} + 1)(3 - \cot 30^\circ) = \tan^3 60^\circ - 2 \sin 60^\circ$ (EXEMPLAR PROBLEM)	
6.	If $\sin \theta + \sin^2 \theta = 1$, check the validity of the expression: $\cos^2 \theta + \cos^4 \theta = 1$.	
7.	If $\sin \theta = \frac{a}{b}$, then find $\sec \theta + \tan \theta$ in terms of a and b . (CCE 2010)	$\left\{ \frac{\sqrt{b+a}}{\sqrt{b-a}} \right\}$

SECTION C: (3 MARKS)

8.	If $\sin \theta = \cos \theta$, find the value of $2 \tan^2 \theta + \sin^2 \theta - 1$ (HOTS QUESTION)	$\left\{ \frac{3}{2} \right\}$
9.	Find the value of $\sin 30^\circ$, $\sin 45^\circ$ and $\sin 60^\circ$ geometrically. (DELHI 2009)	
10.	Find the value of the following : $\frac{\cos 50^\circ}{2 \sin 40^\circ} + \frac{4(\operatorname{cosec}^2 59^\circ - \tan^2 31^\circ)}{3 \tan^2 45^\circ} - \frac{2}{3} \tan 12^\circ \tan 78^\circ \sin 90^\circ$ (AI 2008)	$\left\{ \frac{7}{6} \right\}$
11.	If $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$ and $x \sin \theta = y \cos \theta$, prove that $x^2 + y^2 = 1$.	

SECTION D: (4 MARKS)

12.	If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, then prove that $m^2 - n^2 = 4 \sqrt{mn}$ (CCE 2011)	
13.	If $\sin \theta + \cos \theta = p$ and $\sec \theta + \operatorname{cosec} \theta = q$, then prove that $q(p^2 - 1) = 2p$	
14.	If $\sec \theta = x + \frac{1}{4x}$, prove that $\sec \theta + \tan \theta = 2x$ or $\frac{1}{2x}$ (CCE 2011)	
15.	If $A + B = 90^\circ$, prove that $\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sec A \sec B}} - \frac{\sin^2 B}{\cos^2 A} = \tan A$ (CCE 2012)	
16.	$(\sec A + \tan A)(\sec B + \tan B)(\sec C + \tan C) = (\sec A - \tan A)(\sec B - \tan B)(\sec C - \tan C)$ Prove that each of the side is equal to ± 1 . (HOTS QUESTION)	
17.	In a acute angled triangle ABC, if $\sin (A + B - C) = \frac{1}{2}$ and $\cos (B + C - A) = \frac{1}{\sqrt{2}}$, find $\angle A$, $\angle B$ and $\angle C$. (CCE 2012)	$\{\angle A = 67.5^\circ,$ $\angle B = 37.5^\circ,$ $\angle C = 75^\circ\}$
18.	If $\sin A = \frac{1}{\sqrt{5}}$ and $\sin B = \frac{1}{\sqrt{10}}$, find the values of $\cos A$ and $\cos B$. Hence using the formula $\cos (A + B) = \cos A \cos B - \sin A \sin B$, show that $(A + B) = 45^\circ$.	
19.	Prove that : $\sec^2 \theta - \frac{\sin^2 \theta - 2 \sin^4 \theta}{2 \cos^4 \theta - \cos^2 \theta} = 1$ (EXEMPLAR PROBLEM)	
20.	If $a \cos \theta - b \sin \theta = c$, prove that $a \sin \theta + b \cos \theta = \pm \sqrt{a^2 + b^2 - c^2}$. (EXEMPLAR PROBLEM)	