



DELHI PUBLIC SCHOOL CIVIL LINES, ALIGARH
SUMMER HOLIDAY HOMEWORK (2017-18)
CLASS- XII [PCM/B]

ENGLISH : [1] Prepare an article or a poem on any topic of your choice.

[2] Read the novel '**THE INVISIBLE MAN**' and write all the character sketches along with **theme**.

PHYSICS : Prepare the investigatory project based on CBSE XII syllabus (on the given topics).

CHEMISTRY : Prepare the investigatory project based on CBSE XII syllabus (on the given topics).

BIOLOGY: Select any one suggested investigatory project. The project should be innovative and attractive. Collect information from internet, newspaper, journals, etc. Paste relevant pictures. It should be hand written.

MATHS: Do practice of Chapter-1: Relation & Function, Chapter-2: Inverse Trigonometric Functions, Chapter-3: Matrices and Chapter-4: Determinant from R.S. Agarwal with examples.

INVERSE TRIGONOMETRIC FUNCTIONS

1 Mark

- 1) Find the value of $\cos\left\{\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right) + \frac{\pi}{6}\right\}$ Ans: -1
- 2) Find the value of $\tan^{-1}1 + \tan^{-1}2 + \tan^{-1}3$. Ans: π
- 3) Solve for x: $\sin\left[\sin^{-1}\frac{1}{5} + \cos^{-1}x\right] = 1$ Ans: $\frac{1}{5}$
- 4) Write the simplest form: $\tan^{-1}\left(\frac{\cos x}{1 - \sin x}\right)$ Ans: $\frac{\pi}{4} + \frac{x}{2}$
- 5) Considering the principal solutions, find the number of solutions of $\tan^{-1}2x + \tan^{-1}3x = \frac{\pi}{4}$ Ans: 2
- 6) Find the principal value of $\sin^{-1}\left(\frac{-\sqrt{3}}{2}\right) + \cos^{-1}\left(\frac{-\sqrt{3}}{2}\right)$ Ans: $\frac{\pi}{2}$
- 7) Find the value of x if $\operatorname{Cosec}^{-1}x + 2\cot^{-1}7 + \cos^{-1}\frac{3}{4}$ Ans: $x = \operatorname{Cosec}^{-1}\frac{125}{117}$
- 8) If $\cos^{-1}x = \tan^{-1}x$, show that $\sin(\cos^{-1}x) = x^2$
- 9) If $x > 0$ and $\sin^{-1}\left(\frac{5}{x}\right) + \sin^{-1}\left(\frac{12}{x}\right) = \frac{\pi}{2}$, then find the value of x. Ans: $x = 13$
- 10) Prove that $\cos\left\{2\cot^{-1}\sqrt{\frac{1-x}{1+x}}\right\} = x = 0$

4 Marks / 6 Marks

- 11) Prove that $4\tan^{-1}\frac{1}{5} - \tan^{-1}\frac{1}{70} + \tan^{-1}\frac{1}{99} = \frac{\pi}{4}$
- 12) If $x, y, z \in [-1, 1]$ such that $\sin^{-1}x + \sin^{-1}y + \sin^{-1}z = \frac{3\pi}{2}$, find the value of $x^{2006} + y^{2007} + z^{2008} - \frac{9}{x^{2006} + y^{2007} + z^{2008}}$ Ans: zero ; $x=1, y=1, z=1$
- 13) If $\cos^{-1}\frac{x}{a} + \cos^{-1}\frac{y}{b} = \alpha$, prove that $\frac{x^2}{a^2} - \frac{2xy}{ab}\cos\alpha + \frac{y^2}{b^2} = \sin^2\alpha$
- 14) If $\sin^{-1}x + \sin^{-1}y + \sin^{-1}z = \pi$, prove that $x\sqrt{1-x^2} + y\sqrt{1-y^2} + z\sqrt{1-z^2} = 2xyz$
- 15) Prove that: $\sin 2\left[\cot^{-1}\left\{\cos(\tan^{-1}x)\right\}\right] = \sqrt{\frac{x^2+1}{x^2+2}}$
- 16) In any Triangle ABC, if $A = \tan^{-1}2$ and $B = \tan^{-1}3$, prove that $C = \frac{\pi}{4}$