**Delhi Public School Guwahati**
"Under the aegis of the Delhi Public School Society, Delhi"

# CLASS-XII
# REVISION QUESTIONS
# CHPTERS: 1 to 4

1. If A = $\begin{bmatrix}2 & 3\\1 & 2\end{bmatrix}$ and $I = \begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}$, then
   i. Find $\alpha, \beta$ so that $A^2 = \alpha A + \beta I$
   ii. Prove that $A^3 - 4A^2 + A = O$.
2. Find a matrix X such that 2A + B + X = O, where A = $\begin{bmatrix}-1 & 2\\3 & 4\end{bmatrix}$ and B = $\begin{bmatrix}3 & -2\\1 & 5\end{bmatrix}$.
3. If the matrix $\begin{bmatrix}0 & a & -3\\2 & 0 & -1\\b & 1 & 0\end{bmatrix}$ is skew symmetric, find the values of 'a' and 'b'.
4. Using properties, prove that $\begin{vmatrix}1 & 1 & 1+3x\\1+3y & 1 & 1\\1 & 1+3z & 1\end{vmatrix} = 9(3xyz + xy + yz + zx)$.
5. Express the following matrix as the sum of a symmetric and a skew-symmetric matrix.
   i. $\begin{bmatrix}4 & 2 & -1\\3 & 5 & 7\\1 & -2 & 1\end{bmatrix}$
   ii. $\begin{bmatrix}3 & -2 & -4\\3 & -2 & -5\\-1 & 1 & 2\end{bmatrix}$
6. A school wants to award its students for regularity and hard work with a total cash award of ₹ 6,000. If three times the award money for hard work added to that given for regularity amounts to ₹ 11,000, represent the above situation algebraically and find the award money for each value, using matrix method. (CBSE 2017)
7. Find matrix X if (CBSE 2017)
   $X\begin{bmatrix}1 & 2 & 3\\4 & 5 & 6\end{bmatrix} = \begin{bmatrix}-7 & -8 & -9\\2 & 4 & 6\\11 & 10 & 9\end{bmatrix}$
8. Solve: $\sin^{-1}x + \sin^{-1}2x = \frac{\pi}{3}$.
9. Prove that function $f: \mathbb{N} \to \mathbb{N}$, defined by $f(x) = x^2 + x + 1$ is one-one but not onto.
10. Prove that $2\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{7}\right) = sin^{-1}\left(\frac{31}{25\sqrt{2}}\right)$.
11. Solve for x: $\tan^{-1}\left(\frac{1-x}{1+x}\right) = \frac{1}{2}tan^{-1}x$.
12. Let $f: N \to N$ be function defined as $f(x) = 9x^2 + 6x - 5$. Show that $f: N \to S$, where S is the range of f, is invertible. Find the inverse of f and hence find $f^{-1}(43)$ and $f^{-1}(163)$.
13. If A = {1, 2, 3, 4 }, define relations on A which have properties of being:
    a. reflexive, transitive but not symmetric.
    b. symmetric but neither reflexive nor transitive.
    c. reflexive, symmetric and transitive.

14. Evaluate $\tan^{-1}\left(\sin\left(\frac{-\pi}{2}\right)\right)$.
15. Prove that $tan(cot^{-1}x) = cot(tan^{-1}x)$.
16. Solve $\sin^{-1}6x + \sin^{-1}6\sqrt{3}x = \frac{-\pi}{2}$.

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