HOLIDAY HOMEWORK

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Class - XII

SUBJECT MATHS

Q1 Using matrices solve the following System of equations

$$x + 2y + z = 7$$
$$x + 3z = 11$$
$$2x - 3y = 11$$

Q2 Prove that

$$\sin^{-1}\frac{63}{65} = \sin^{-1}\left(\frac{5}{13}\right) + \cos^{-1}\left(\frac{3}{5}\right)$$

Q3 If $\sin^{-1}\frac{2a}{1+a^2} - \cos^{-1}\frac{1-b^2}{1+b^2} = \tan^{-1}\frac{2x}{1-x^2}$ then prove that $x = \frac{a-b}{1+ab}$

Q4 Find the value of x such that

$$\begin{bmatrix} 1 & x & 1 \end{bmatrix}\begin{bmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 1 & 3 & 2 \end{bmatrix}\begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = 0$$

Q5 If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then find λ so that $A^2 = 5A + \lambda I$

Q6 If $A = \begin{bmatrix} \cos\theta & i\sin\theta \\ i\sin\theta & \cos\theta \end{bmatrix}$ then prove by PMI.

$$A^n = \begin{bmatrix} \cos n\theta & i\sin n\theta \\ i\sin n\theta & \cos n\theta \end{bmatrix}$$ for all $n \in N$

Q7 Express the matrix $\begin{bmatrix} 3 & -2 & -4 \\ 3 & -2 & -5 \\ -1 & 1 & 2 \end{bmatrix}$ as the sum of Symmetric and Skew Symmetric matrix and verify the result

2. Test will be conducted after Vacation.
Syllabus for C.T. (Ch, 4, 3, 2.)

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Or Without expanding show that-

$$\begin{vmatrix} b^2c^2 & bc & b+c \\ c^2a^2 & ca & c+a \\ a^2b^2 & ab & a+b \end{vmatrix} = 0$$

Q9 Using properties of determinants show that

$$\begin{vmatrix} 1 & a & a^2-bc \\ 1 & b & b^2-ca \\ 1 & c & c^2-ab \end{vmatrix} = 0$$

Q10 Evaluate $\begin{vmatrix} |6| & |11| & |21| \\ |11| & |21| & |36| \\ |21| & |36| & |41| \end{vmatrix}$

Q11 Find the inverse of matrix using elementary row transformations

$$\begin{bmatrix} 3 & 0 & -1 \\ 2 & 3 & 0 \\ 0 & 4 & 1 \end{bmatrix}$$

Q12 If A is a square of matrix of order 3 such that $|A| = 5$ write the value of $|adj\,A|$.

Q13 If C_{ij} is the cofactor of the element a_{ij} of the matrix $A = \begin{bmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix}$ then write the value of $a_{32}C_{32}$

Q14 If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ write A^{-1} in terms of A

Q15 Prove
$\cot^{-1}7 + \cot^{-1}8 + \cot^{-1}8 = \cot^{-1}3$