SMART TEST SERIES

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Name:		Subject:	Mathematics-11
Roll # :		Unit(s):	3,
Class:	Inter Part-I	Test:	Type 4 - SQs+LQs Test - Marks=80
Date:		Time:	

Q.1 Write short answers to ALL of the following questions. (15x2=30)

(i) Define the Scalar matrix.

(ii) Solve the system of linear equations $3x_1 + x_2 = 1$ and $x_1 + x_2 = 3$.

(iii) Define row and column matrices.

(iv) Define the terms symmetric and skew symmetric matrices.

(v) Evaluate $\begin{vmatrix} i & -5 \\ 2 & i \end{vmatrix}$

(vi) If $A = \begin{bmatrix} -1 & 2 & 3 \\ 1 & 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 3 & 2 \\ 1 & -1 & 2 \end{bmatrix}$, find the following matrices: $4A - 3B$

(vii) Solve the matrix equation for X, 3X-2A=B if $A = \begin{bmatrix} 2 & 3 & -2 \\ -1 & 1 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -3 & 1 \\ 5 & 4 & -1 \end{bmatrix}$.

(viii) Define Co-factor of an element.

(ix) Find the value of γ if A is singular: $A = \begin{vmatrix} 4 & \gamma & 3 \\ 7 & 3 & 6 \\ 2 & 3 & 1 \end{vmatrix}$

(x) Show that $\begin{vmatrix} a+l & a & a \\ a & a+l & a \\ a & a & a+l \end{vmatrix} = l^2(3a+l)$.

(xi) Define a singular and non-singular matrix.

(xii) Define scalar matrix and Hermitian matrix.

(xiii) Without expansion verify that $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix} = 0$

(xiv) Evaluate the following determinant: $\begin{vmatrix} a+1 & a-1 & a \\ a & a+1 & a-1 \\ a-1 & a & a+1 \end{vmatrix}$

(xv) If A and B are non-singular matrices, then show that $(A^{-1})^{-1} = A$

Q.2 Write detail answers to ALL of the following questions. (10x5=50)

1 If $A = [a_{ij}]_{3\times 4}$, then show that $AI_4 = A$

2 If $A = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 2 & 5 \\ -1 & 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 3 & 4 \\ -1 & 2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 3 & -2 \\ -1 & 2 & 0 \\ 3 & 4 & -1 \end{bmatrix}$, then find A-(B-C).

3 If A and B are square matrices of the same order, then explain why in general: $(A+B)^2 \neq A^2 + 2AB + B^2$

4 Solve: $\begin{vmatrix} x & 0 & 1 & 1 \\ 0 & 1 & -1 & -1 \\ 1 & -2 & 3 & 4 \\ -2 & x & 1 & -1 \end{vmatrix} = 0$

5 Find the inverse of $A = \begin{bmatrix} 2 & 1 & 0 \\ 1 & 1 & 0 \\ 2 & -3 & 5 \end{bmatrix}$ and show that $A^{-1}A = I_3$.

6 Verify that $(AB)^t = B^tA^t$, if $A = \begin{bmatrix} 1 & -1 & 2 \\ 0 & 3 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 \\ 3 & 2 \\ 0 & -1 \end{bmatrix}$.

7 Show that $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

8 If $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & 2 & -1 \\ -1 & 3 & 2 \end{bmatrix}$ show that $A - A^t$ is Skew– Symmetric?

9 Use Matrices to solve the system. $x_1 - 2x_2 + x_3 = -4$; $2x_1 - 3x_2 + 2x_3 = -6$; $2x_1 + 2x_2 + x_3 = 5$

10 Solve the following systems of linear equations by Cramer's rule:

$$\left.\begin{aligned} 2x_1 - x_2 + x_3 &= 5 \\ 4x_1 + 2x_2 + 3x_3 &= 8 \\ 3x_1 - 4x_2 - x_3 &= 3 \end{aligned}\right\}$$