TEST MATRICES XII CLASS

MARKS: 54

MATRICES

Topic: ← EXAM NO: 1 → Date: MARKS: : 54

TIME: 1:45 HRS

SET-A

SECTION: A (ONE MARKS EACH)

Q.No.1 → If $A^2 = I$, then $(A-I)^3 + (A+I)^3 - 7A$ is equal to

(A) A (B) I−A (C) I+A (D) I

Q.No.2 → If $A = [a_{ij}]_{2\times 2}$ where $a_{ij} = \begin{cases} 1 & ; \text{if } i \neq j \\ 0 & ; \text{if } i = j \end{cases}$

then A^2 is equal to

(A) I (B) A (C) O (D) none of these

Q.No.3 → Sum of two Skew symmetric matrices is always

(A) Symm. Matrix (B) Skew Symm matrix (C) Null Matrix (D) none of these

Q.No.4 → If A & B are Symm Matrices, then BA − 2AB is

(A) Symm Matrix (B) Skew symm (C) both symm & Skew symm

(D) Neither Symm. nor Skew-symm

Q.No.5 → If $\begin{bmatrix} 1 & 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 1 \\ 1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 0 \\ 2 \\ x \end{bmatrix} = 0$, then $x =$ _____

Q.No.6 → If $AB = A$ and $BA = B$, then B^2 is equal to

(A) B (B) A (C) I (D) Null Matrix

Q.No.7 → If $A = \begin{bmatrix} 1 & 0 \\ -1 & 7 \end{bmatrix}$ Find 'k' such that $A^2 - 8A + kI = 0$

Q.No.8 → Find value of x and y if $\begin{bmatrix} x+10 & y^2+2y \\ 0 & -4 \end{bmatrix} = \begin{bmatrix} 3x+4 & 3 \\ 0 & y^2-5y \end{bmatrix}$

SECTION: B (TWO MARKS EACH)

Q.No.9 → Show that all the diagonal elements of a Skew-symm. matrix are always zero

Q.No.10 → If $A = \begin{bmatrix} 3 \\ 5 \\ 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 4 \end{bmatrix}$ Show that $(AB)' = B'A'$

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QN 11 → If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ a & 2 & b \end{bmatrix}$ and $AA' = 9I$. Find a & b

QN 12 → If $F(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$ Show that $F(x) \cdot F(y) = F(x+y)$

→ SECTION: C (4 MARKS EACH) →

Q-13 If $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ Show $(aI + bA)^n = a^n I + n a^{n-1} bA$ for all $n \in N$

QN 14 → Let $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$ $C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$. Find a matrix D such that $CD - AB = 0$

QN 15 → If $A = \begin{bmatrix} 0 & -\tan(\alpha/2) \\ \tan(\alpha/2) & 0 \end{bmatrix}$ Show that $I + A = (I - A)\begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$

QN 16 → Express the matrix $A = \begin{bmatrix} 2 & 1 & 0 \\ -1 & 2 & 0 \\ 1 & 3 & 5 \end{bmatrix}$ as the sum of Symm and Skew Symm matrix

QN 17 → A trust fund has Rs 30000 that must be invested in two types of bonds. The first bond pays 5% interest per year and the second pays 7% per year. Using matrix multiplication determine how to divide Rs 30,000 among two types of bonds. If the trust fund must obtain an annual bond interest of (i) Rs 1800 (ii) Rs 2000

SECTION: D (SIX MARKS EACH)

Find Inverse of the given matrices Using Row transformation

QN (18) $A = \begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$ QN 19 $A = \begin{bmatrix} 3 & -1 & -2 \\ 2 & 0 & -1 \\ 3 & -5 & 0 \end{bmatrix}$

QN 20 → $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$ and $f(x) = x^2 - 4x + 7$ Show that $f(A) = 0$ Hence find A^5