AUSTIN GROUP EDUCATORS

CET-MATHEMATICS: MATRICES

FACULTY: PADMANABHA KAMATH

CET-2004   1. What must be the matrix X if $2X + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$?

(a) $\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}$ (c) $\begin{bmatrix} 2 & 6 \\ 4 & -2 \end{bmatrix}$ (d) $\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}$

CET-2006   2. If $2A + 3B = \begin{bmatrix} 2 & -1 & 4 \\ 3 & 2 & 5 \end{bmatrix}$ and $A + 2B = \begin{bmatrix} 5 & 0 & 3 \\ 1 & 6 & 2 \end{bmatrix}$, then B is:

(a) $\begin{bmatrix} 8 & -1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 8 & 1 & 2 \\ -1 & 10 & -1 \end{bmatrix}$ (c) $\begin{bmatrix} 8 & 1 & -2 \\ -1 & 10 & -1 \end{bmatrix}$ (d) $\begin{bmatrix} 8 & 1 & 2 \\ 1 & 10 & 1 \end{bmatrix}$

CET-2006   3. If $O(A) = 2 \times 3$, $O(B) = 3 \times 2$ and $O(C) = 3 \times 3$; which one of the following is not defined?

(a) $CB + A'$ (b) BAC (c) $C(A + B')'$ (d) $C(A + B')$

CET-2006   4. If $A = \begin{bmatrix} 1 & -3 \\ 2 & k \end{bmatrix}$ and $A^2 - 4A + 10I = A$, then k is equal to:

(a) 0   (b) -4   (c) 4 and not 1   (d) 1 or 4

CET-2007   5. If $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$, $10B = \begin{bmatrix} 4 & 2 & 2 \\ -5 & 0 & \alpha \\ 1 & -2 & 3 \end{bmatrix}$ and B is the inverse of A, then the value of α is

(a) 2   (b) 0   (c) 5   (d) 4

CET-2010   6. If $A = \begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$ then $A^2 + xA + yI = 0$ for (x, y) is

(a) $(-4, 1)$ (b) $(-1, 3)$ (c) $(4, -1)$ (d) $(1, 3)$

CET-2011   7. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then $A \cdot A'$ is

(a) I (b) A (c) $-A$ (d) A^2

8. If A and B are symmetric matrices of the same order, then which one of the following is not
CET-2011   true?

(a) $A + B$ is symmetric   (b) $A - B$ is symmetric
(c) $AB + BA$ is symmetric   (d) $AB - BA$ is symmetric

CET-2013

9. If A and B are square matrices of order n such that $A^2 - B^2 = (A - B)(A + B)$, then which of the following will be true?

(a) Either A or B is zero matrix   (b) $A = B$

(c) $AB = BA$ (d) Either A or B is identity matrix

CET-2013

10. If the matrix $\begin{bmatrix} 2 & 3 \\ 5 & -1 \end{bmatrix} = A + B$, where A is symmetric and B is skew-symmetric, then B is equal to

(a) $\begin{bmatrix} 2 & 4 \\ 4 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & -2 \\ 2 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$

CET-2014

11. If A is 3×4 matrix and B is a matrix such that $A'B$ and BA' are both defined, then B is of the type:

(a) 4×4 (b) 3×4 (c) 4×3 (d) 3×3

CET-2014

12. The symmetric part of the matrix $A = \begin{bmatrix} 1 & 2 & 4 \\ 6 & 8 & 2 \\ 2 & -2 & 7 \end{bmatrix}$ is

(a) $\begin{bmatrix} 0 & -2 & -1 \\ -2 & 0 & -2 \\ -1 & -2 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 4 & 3 \\ 2 & 8 & 0 \\ 3 & 0 & 7 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & -2 & 1 \\ 2 & 0 & 2 \\ -1 & 2 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 4 & 3 \\ 4 & 8 & 0 \\ 3 & 0 & 7 \end{bmatrix}$

CET-2015

13. If $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, then A^2 is equal to

(a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$

CET-2016

14. If A is a matrix of order $m \times n$ and B is a matrix, such that AB' and $B'A$ are both defined, then the order of the matrix B is

(a) $m \times m$ (b) $n \times n$ (c) $n \times m$ (d) $m \times n$

CET-2016

15. If $A = \begin{bmatrix} \cos 2\theta & -\sin 2\theta \\ \sin 2\theta & \cos 2\theta \end{bmatrix}$ and $A + A' = I$, where I is a unit matrix of 2×2 and A' is the transpose of A, then the value of θ is equal to

(a) $\pi/6$ (b) $\pi/3$ (c) π (d) $3\pi/2$

CET-2016

16. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, then $A^2 - 5A$ is equal to

(a) I (b) $-I$ (c) $7I$ (d) $-7I$