MHT-CET QUESTIONS

1) The order of matrix $\begin{bmatrix} 1 & 2 \\ 3 & 5 \\ -1 & 0 \end{bmatrix}$ is -

a) 2×3 b) 3×2
c) 3×3 d) 3×1

2) A matrix is

a) A collection of real numbers
b) An array of real numers
c) A collection of real or complex number
d) An array of real or complex number

3) The order of matrix $\begin{bmatrix} 1 & 0 & 0 \end{bmatrix}$ is

a) 1×2 b) 1×3
c) 3×1 d) 3×2

4) The order of matrix $\begin{bmatrix} -1 \\ 1 \\ 2 \end{bmatrix}$ is -

a) 3×1 b) 1×3
c) 2×3 d) 3×3

5) A square matrix $[a_{ij}]$ is such that $a_{ij} = 0$ for $i \neq j$ and $a_{ij} = k$ (constant) for $i = j$ then it is called

a) Null matrix
b) Diagonal matrix
c) Unit matrix
d) Sealar matrix

6) Choose the correct answer.

a) Every scalar matrix is an identity matrix
b) Every identity matrix is scalar matrix
c) every diagonal matrix is an identity matirx
d) Every square matrix whose each element is 1 is identity matrix

7) A matrix $A = [a_{ij}]$ is an upper triangular matrix if -

a) it is a square matrix and $a_{ij} = 0, i < j$
b) it is a square matrix and $a_{ij} = 0, i > j$
c) it is not square matrix & $a_{ij} = 0, i > j$
d) it is not square matrix & $a_{ij} = 0, i < j$

8) If A is any matrix of orfer $m \times n$ such that AB and BA are both defined then B is an

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

9) If $A = [a_{ij}]$ is skew symmetric matrix of order n then a_{ij} =

a) 0 for some i
b) 0 for i = 1, 2,.....n
c) 1 for some j
d) 1 for i = 1, 2, ...n.

10) If the order of matrix A is 3×5 and that of B is 2×3 then the order of the matrix BA is -

a) 5×2 b) 3×2
c) 2×3 d) 2×5

11) The matrix $\begin{bmatrix} 2 & 0 & -5 \\ 1 & -2 & 3 \end{bmatrix}$ is a

a) Row matrix
b) Column matrix
c) Rectangular matrix
d) Square matrix

Ans -

(1 - b)	**(2 - c)**	**(3 - b)**
(4 - a)	**(5 - d)**	**(6 - b)**
(7 - b)	**(8 - c)**	**(9 - b)**
(10 - d)	**(11 - c)**	

12) A matrix $A = [a_{ij}]_{m \times n}$ is said to be rectangular if -

a) m=n b) $m \neq n$

c) m = p d) m = r

13) The matrix $\begin{bmatrix} 1 & 4 & 2 \\ 0 & 3 & -1 \\ 0 & 0 & 2 \end{bmatrix}$ is a

a) Upper triangular

b) Lower triangular

c) Singular

d) Symmetric

14) The matrix $\begin{bmatrix} 3 & 1 & 2 \\ 0 & -2 & 4 \\ 5 & 6 & 3 \end{bmatrix}$ is a

a) Symmtric

b) Skew symmetric

c) Singular

d) Non-singular

15) The matrix $\begin{bmatrix} 0 & 2 & 5 \\ -2 & 0 & -4 \\ -5 & 4 & 0 \end{bmatrix}$ is a

a) Symmetric

b) Skew symmetric

c) Singular

d) Zero matrix

16) The matrix $\begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix}$ is

a) Scalar

b) Diagonal

c) Symmetric

d) Skew symmetric

17) If $A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 4 & 4 \\ 3 & 5 & 6 \end{bmatrix}$ then A is

a) Singular matrix

b) Non-singular matrix

c) Scalar matrix

d) Symmetric matrix

18) If $A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 5 \\ 2 & -5 & 0 \end{bmatrix}$ then

a) $A^{|} = A$ b) $A^{|} = -A$

c) $A^{|} = 2A$ d) none

19) In a skew symmetric matrix the diagonal elements are all -

a) Zero

b) One

c) Different from each other

d) None

20) If A is a square matrix such that $|A| = 2$ then $|A'| =$ where A' is transpose of A is equal to

a) 0 b) 1/2

c) -2 d) 2

21) If each element of a 3×3 matrix is multiplied by 3 then the determinant of the newly formed matrix is

a) $3|A|$ b) $9|A|$

c) $27|A|$ d) $|A|^3$

Ans -

(12 - b) (13 - a) (14 - d)

(15 - b) (16 - c) (17 - a)

(18 - b) (19 - a) (20 - d)

(21 - c)

22) **If** $A = \begin{bmatrix} 5 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 2 \end{bmatrix}$ **then A is**

a) Diagonal matrix
b) Nilpotent matrix
c) Idempotent matrix
d) Scalar matrix

23) **If** $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 1 & 0 \\ b & 0 & 0 \end{bmatrix}$ **is diagonal matrix b =**

a) 2 b) 1
c) 0 d) 3

24) **If** $A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 2 & 3 & 0 & 0 \\ 3 & 4 & 5 & 0 \\ 4 & 5 & 6 & 0 \end{bmatrix}$ **then A is**

a) Uppertraiangular matrix
b) A null matrix
c) Lower triangular matrix
d) Diagonal matrix

25) **If the matrix** $\begin{bmatrix} 1 & 3 & x+2 \\ 2 & 4 & 8 \\ 3 & 5 & 10 \end{bmatrix}$ **is a non singular then x =**

a) -2 b) 4
c) -4 d) 2

26) **The matrix** $A = \frac{1}{2\sqrt{2}}\begin{bmatrix} 2 & -2 \\ 2 & 2 \end{bmatrix}$ **is**

a) Nipotent b) Involantary
c) Orthogonal d) Conjugate

27) **Every diagonal element of skew symmetric matrix is -**

a) 0
b) 1
c) purely real
d) purely imaginary

28) **If $A^2 = A$ then then matrix A is**

a) Orthogonal b) Involantary
c) Iodempotent d) Indentity

29) **Every diagonal element of hermitian matrix is -**

a) 0
b) 1
c) Purely real
d) Purely imaginary

30) **A is square matrix of order n and $AA' = I = AA'$ then A is**

a) Orthogonal matrix
b) Unit matrix
c) Involuntary matrix
d) Nilpotent matrix

31) **If** $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & -2 & 5 \\ 4 & 1 & 6 \end{bmatrix}$ **then tr (A) is**

a) 2 b) 5
c) 1 d) 8

32) **If** $A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$ **then A^5 is**

a) 5A b) 16A
c) 10 A d) 32 A

33) **If** $A = \begin{bmatrix} 3 & -5 \\ -4 & 2 \end{bmatrix}$ **then A2 - 5A =**

a) I b) 14I
c) 0 d) 12I

Ans -

(22 - a)	**(23 - c)**	**(24 - c)**
(25 - b)	**(26 - c)**	**(27 - a)**
(28 - c)	**(29 - c)**	**(30 - a)**
(31 - b)	**(32 - b)**	**(33 - b)**

34) If $A = \begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$ then (A - 2I) (A-3I) =

a) A b) I
c) 0 d) 5I

35) If $\begin{bmatrix} x^2 & 1 \\ 1 & 2 \end{bmatrix} + \begin{bmatrix} x & 3 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} 2 & 4 \\ 2 & 3 \end{bmatrix}$

then x is -

a) -1 or 2 b) 1 or -2
c) -1 or -2 d) 3 or 2

36) If $\begin{bmatrix} x+y & -7 \\ 3 & x-y \end{bmatrix} = \begin{bmatrix} 3 & -7 \\ 3 & -1 \end{bmatrix}$

then (x, y) =

a) (1, 0) b) (1, 2)
c) (1, 3) d) (1, -1)

37) If $\begin{bmatrix} x+y & 2x+z \\ x-y & 2z+w \end{bmatrix} = \begin{bmatrix} 4 & 7 \\ 0 & 10 \end{bmatrix}$

then the values of x, y, z, w are

a) 2, 2, 3, 4 b) 2, 3, 1, 2
c) 3, 3, 0, 1 d) 3, 1, 2, 5

38) If $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ a & b & -1 \end{bmatrix}$ then A^2 is equal to

a) Unit matrix b) Null matrix
c) A d) -A

39) If $A(\alpha) = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$ then

$A(\alpha).A(\beta)$

a) $A(\alpha)$-$A(\beta)$ b) $A(\alpha)+A(\beta)$
c) $A(\alpha-\beta)$ d) $A(\alpha+\beta)$

40) $\begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix} \begin{bmatrix} 2 & 1 & -1 \end{bmatrix} =$

a) [-1] b) $\begin{bmatrix} 2 \\ -1 \\ -1 \end{bmatrix}$
c) $\begin{bmatrix} 2 & 1 & -1 \\ -2 & -1 & 1 \\ 4 & 2 & -2 \end{bmatrix}$ d) none

41) If $A = \begin{bmatrix} 1 & 3 \\ 2 & 1 \end{bmatrix}$ then determinant of $A^2 - 2A$ =

a) 5 b) -5
c) 25 d) -25

42) If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ then A^n is equal

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

43) Let $A = \begin{bmatrix} 1 & 2 \\ 3 & -5 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ and X be a matrix such that A = B X then X =

a) $\begin{bmatrix} 2 & 4 \\ 3 & -5 \end{bmatrix}$ b) $\frac{1}{2}\begin{bmatrix} 2 & 4 \\ 3 & -5 \end{bmatrix}$
c) $\frac{1}{2}\begin{bmatrix} -2 & 4 \\ 3 & 5 \end{bmatrix}$ d) $\begin{bmatrix} 2 & 4 \\ 3 & 1 \end{bmatrix}$

44) If $A = \begin{bmatrix} 2 & 3-i & -i \\ 3+i & \pi & 7+i \\ i & 7-i & e \end{bmatrix}$ then A is

a) Hermitian b) Skew hermitian
c) Symmetric d) None

Ans -

(34 - c) (35 - b) (36 - b)
(37 - a) (38 - a) (39 - d)
(40 - c) (41 - c) (42 - a)
(43 - b) (44 - a)

45) **If A = B + C such that B is symmetric matrix and c is a skew symmetric then B is given by**

a) $A + A'$ b) $A - A'$

c) $\frac{1}{2}(A + A')$ d) $\frac{1}{2}(A - A')$

46) **If A (adj A) = 8I for a 3×3 matrix A, then determinant A is equal to**

a) 1 b) 2

c) 4 d) 8

47) **If** $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$ **then det (adj. (adj A)) is**

a) 14^1 b) 14^2

c) 14^3 d) 14^4

48) **If** $A = \begin{bmatrix} i & 0 \\ 0 & i \end{bmatrix}$ **then** A^2

a) $\begin{bmatrix} 1 & 0 \\ 0 & -1 \end{bmatrix}$ b) $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ d) $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix}$

49) **If** $\begin{bmatrix} 2\sin\theta - 1 & \sin\theta & \cos\theta \\ \sin(\pi + \theta) & 2\cos\theta - \sqrt{3} & \tan\theta \\ \cos(\theta - \pi) & \tan(\pi - \theta) & 0 \end{bmatrix}$ **is skew symmetric matrix then the value of θ is in $[0, 2\pi]$ is**

a) $\pi/6$ b) $\pi/3$

c) $\pi/4$ d) $\pi/2$

50) **If** $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ **and** $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

then $A^2 - (a + d) A =$

a) (ab - ba) I b) (bc - ad) I

c) I d) 0

51) $[x \quad \text{cosec}\,\theta \quad \cot\theta] \begin{bmatrix} x \\ \text{cosec}\,\theta \\ -\cot\theta \end{bmatrix} = [17]$

then x =

a) $x = \pm 2$ b) $x = \pm 16$

c) $x = \pm 4$ d) none

52) **If**

$$\left\{3\begin{bmatrix} 4 & 1 & 3 \\ 1 & -1 & -3 \end{bmatrix} - 2\begin{bmatrix} 3 & 2 & 4 \\ -6 & 1 & -6 \end{bmatrix}\right\}\begin{bmatrix} 1 \\ 3 \\ 2 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$$

then (x, y) =

a) (-5, 6) b) (5, 5)

c) (5, -6) d) (3, 2)

53) **If 2x – y =** $\begin{bmatrix} 3 & -3 & 0 \\ 3 & 3 & 2 \end{bmatrix}$**, 2y + x =** $\begin{bmatrix} 4 & 1 & 5 \\ -1 & 4 & -4 \end{bmatrix}$ **then x =**

a) $\begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & 2 \end{bmatrix}$ b) $\begin{bmatrix} 2 & -1 & -1 \\ -1 & 2 & 2 \end{bmatrix}$

c) $\begin{bmatrix} 2 & -1 & 1 \\ 1 & 2 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 2 & 1 & -1 \\ -1 & 0 & 0 \end{bmatrix}$

54) **If x is a complex cube root of unity and if** $A = \begin{bmatrix} 1 & x & x^2 \\ x & x^2 & 1 \\ x^2 & 1 & x \end{bmatrix}$ **then $A^2 =$**

a) Unit matrix b) Scalar matrix

c) Null matrix d) None

Ans -

(45 - c) (46 - d) (47 - d)
(48 - b) (49 - a) (50 - b)
(51 - c) (52 - c) (53 - c)
(54 - c)

55) If $A = \begin{bmatrix} 0 & 3 & 3 \\ -3 & 0 & 4 \\ -3 & -4 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$, B' is transpose of B then $B'AB$ =

a) Unit matrix b) Scalar matrix
c) Null matrix d) None

56) If $A + I = \begin{bmatrix} 8 & -2 \\ -4 & 1 \end{bmatrix}$ then (A+I) (A-I) =

a) $\begin{bmatrix} 56 & -14 \\ -28 & 7 \end{bmatrix}$ b) $\begin{bmatrix} -56 & -14 \\ -28 & 7 \end{bmatrix}$

c) $\begin{bmatrix} 56 & -14 \\ -28 & -7 \end{bmatrix}$ d) $\begin{bmatrix} 56 & 14 \\ -28 & 7 \end{bmatrix}$

57) If $E(\theta) = \begin{bmatrix} \cos^2\theta & \cos\theta\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta \end{bmatrix}$ and θ and ϕ differ by air an odd multiple of $\pi/2$ then $E(\theta) \cdot E(\phi)$ is a

a) Null matrix b) Unit matrix
c) Diagonal matrix d) None

58) If $A = \begin{bmatrix} i & 0 \\ 0 & i \end{bmatrix}$ and $B = \begin{bmatrix} 0 & -i \\ -i & 0 \end{bmatrix}$ then (A+B) (A-B) =

a) $A^2 - B^2$
b) $A^2 + B^2$
c) $A^2 - B^2 + BA + AB$
d) none

59) If $A = \begin{bmatrix} 2 & 3 & -4 \\ -5 & 1 & 0 \\ -1 & 0 & 6 \end{bmatrix}$ then the additive inverse of A is

a) $\begin{bmatrix} 2 & 3 & -4 \\ -5 & 1 & 0 \\ -1 & 0 & 6 \end{bmatrix}$ b) $\begin{bmatrix} 2 & -5 & 1 \\ 3 & 1 & 0 \\ -4 & 0 & 6 \end{bmatrix}$

c) $\begin{bmatrix} -2 & -3 & 4 \\ 5 & -1 & 0 \\ 1 & 0 & -6 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

60) If $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$ then $(2A)\left[\frac{1}{4}A'\right]$

a) $\begin{bmatrix} 1/2 & 1/2 \\ 1/2 & 1/2 \end{bmatrix}$ b) $\begin{bmatrix} 1/2 & 0 \\ 0 & 1/2 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ d) $\frac{1}{4}\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$

61) If $A = \begin{bmatrix} 2 & x-3 & x-2 \\ 3 & -2 & -1 \\ 4 & -1 & -5 \end{bmatrix}$ is symmetric matrix then x =

a) 3 b) 6
c) 4 d) 8

62) If A = [2 3 0], $B = \begin{bmatrix} -1 \\ 5 \\ 8 \end{bmatrix}$ then B' - A

a) [1-2 -8] b) [1 3]
c) [−3 2 8] d) [2 10]

63) $\det \begin{bmatrix} 1 & w & w^2 \\ w & w^2 & 1 \\ w^2 & 1 & w \end{bmatrix}$ = where w is cube root of unity

a) 1 b) 3
c) 2 d) 0

Ans -

(55 - c)	**(56 - a)**	**(57 - a)**
(58 - a)	**(59 - c)**	**(60 - b)**
(61 - b)	**(62 - c)**	**(63 - d)**

64) The multiplicative inverse of the matrix $\begin{bmatrix} 6 & 3 \\ 4 & 2 \end{bmatrix}$ **is**

a) $\begin{bmatrix} 1/12 & -1/8 \\ -1/6 & 1/4 \end{bmatrix}$

b) $\begin{bmatrix} 1/12 & 1/8 \\ 1/6 & 1/4 \end{bmatrix}$

c) $\begin{bmatrix} 1/12 & -1/8 \\ 1/6 & 1/4 \end{bmatrix}$

d) $\begin{bmatrix} -1/12 & 1/8 \\ 1/6 & -1/4 \end{bmatrix}$

65) If $A = \begin{bmatrix} 0 & r & -q \\ -r & 0 & p \\ q & -p & 0 \end{bmatrix}$, $B = \begin{bmatrix} p^2 & pq & pr \\ pq & q^2 & qr \\ pr & qr & r^2 \end{bmatrix}$ **then AB =**

a) $\begin{bmatrix} p & 0 & 0 \\ 0 & q & 0 \\ q & -p & r \end{bmatrix}$ b) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

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

66) Let $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 4 & -3 \\ 5 & 6 \\ 0 & 1 \end{bmatrix}$ **then**

a) AB exists.

b) AB and BA both exists

c) neither AB nor BA exists

d) BA exists, but AB does not exists

67) If $A = \begin{bmatrix} 0 & 2 \\ 3 & -4 \end{bmatrix}$, $kA = \begin{bmatrix} 0 & 3a \\ 2b & 24 \end{bmatrix}$ **then values of k, a, b are**

a) -6, -12, -18 b) -6, 4, 9

c) -6, -4, -9 d) -6, 12, 18

68) The minors of -4 and 9 and the cofactor of -4 and 9 in determinant $\begin{bmatrix} -1 & -2 & -3 \\ -4 & -5 & -6 \\ -7 & 8 & 9 \end{bmatrix}$ **are**

a) 42, 3 and -42, 3

b) -42, -3 and 42, -3

c) 42, 3 and -42, -3

d) 42, 3 and 42, 3

69) The minors of the elements of 2nd row of $\begin{bmatrix} 1 & 3 & -2 \\ 4 & -5 & 6 \\ 3 & 5 & 2 \end{bmatrix}$ **are**

a) -16, -8, 3 b) 16, 8, -4

c) -8, 1, 15 d) 16, 3, 4

70) The cofactors of the elements of third column of $\begin{bmatrix} 4 & 3 & 1 \\ 1 & 3 & 2 \\ 2 & 1 & 5 \end{bmatrix}$

a) 5, 3, 1 b) -5, 2, 7

c) -5, 2, 9 d) 2, 3, 9

71) The cofactors of first column of $\begin{bmatrix} 1 & 1 & -2 \\ 2 & 3 & -5 \\ 4 & -1 & -3 \end{bmatrix}$ **are**

a) 14, -5, 3 b) -14, 3, -6

c) -14, 5, 1 d) 5, -3, -2

Ans -

(64 - c) (65 - c) (66 - d)

(67 - c) (68 - b) (69 - b)

(70 - c) (71 - c)

72) **If** $A=\begin{bmatrix}1&2&3\\2&3&2\\1&2&2\end{bmatrix}$ **then**

a) $C_{12}+C_{22}+C_{32}=0$

b) $C_{13}+C_{23}+C_{33}=1$

c) $C_{11}+C_{21}=C_{32}$

d) none

73) **If A is a non-singular matrix, then A(adj A) =**

a) A b) I

c) $|A|I$ d) $|A^2|I$

74) **If A is singular then adj A is**

a) singular b) non-singular

c) symmetric d) not defined

75) **Adj (AB) - (adj B) (adj A) =**

a) Adj A - Adj B b) 1

c) 0 d) Adj A

76) **For a 3×3 matrix A, if $|A| = 4$, then $|adjA| =$**

a) -4 b) 4

c) 16 d) 64

77) **If** $A=\begin{bmatrix}1&1&1\\2&1&-3\\-1&2&3\end{bmatrix}$ **then adj A is**

a) $\begin{bmatrix}9&-1&-4\\-3&4&5\\5&-3&-1\end{bmatrix}$ b) $\begin{bmatrix}9&1&4\\5&-3&-1\\-3&4&5\end{bmatrix}$

c) $\begin{bmatrix}-3&4&5\\9&-1&-4\\5&-3&-1\end{bmatrix}$ d) $\begin{bmatrix}-9&1&4\\3&-4&-5\\-5&3&1\end{bmatrix}$

78) **If A and B are two square matrices such that AB = A and BA = B then**

a) A, B are idempotent

b) only A is idempotent

c) only B is idempotent

d) none

79) **If A, B and C are the angles of a triangle and**

$$\begin{bmatrix}1&1&1\\1+\sin A&1+\sin B&1+\sin C\\\sin A+\sin^2 A&\sin B+\sin^2 B&\sin C+\sin^2 C\end{bmatrix}$$

then the triangle must be

a) Equilateral b) Isosceles

c) Any triangle d) Right angled

80) **For how many values of x in the closed interval [-4, -1] is the matrix**

$A=\begin{bmatrix}3&-1+x&2\\3&-1&x+2\\x+3&-1&2\end{bmatrix}$ **singular ?**

a) 2 b) 0

c) 3 d) 1

81) **For any 2×2 matrix A**

if $A(adj\ A)=\begin{bmatrix}10&0\\0&10\end{bmatrix}$ **the $|A| =$**

a) 0 b) 10

c) 20 d) 100

82) **If** $A=\begin{bmatrix}1&-1&1\\0&2&-3\\2&2&0\end{bmatrix}$ **and B (adj A) C = BA**

then $|B| =$

a) 5/16 b) 4/125

c) -1/25 d) 1/25

Ans -

(72 - c)	**(73 - c)**	**(74 - a)**
(75 - c)	**(76 - c)**	**(77 - a)**
(78 - a)	**(79 - b)**	**(80 - d)**
(81 - b)	**(82 - b)**	

83) If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$ then the value of $|\text{adj } A|$ is equal to

a) a^3 b) a^6

c) a^9 d) a^{27}

84) If $A = \begin{bmatrix} 1 & 0 & 2 \\ -1 & 1 & -2 \\ 0 & 2 & 1 \end{bmatrix}$ and

$\text{adj } A = \begin{bmatrix} 5 & x & -2 \\ 1 & 1 & 0 \\ -2 & -2 & y \end{bmatrix}$

then the value of (a, y) =

a) (4, -1) b) (-4, 1)

c) (-4, 10) d) (4, 1)

85) Let $A = \begin{bmatrix} 3 & 5 & -1 \\ 2 & 0 & 4 \\ 1 & -3 & 0 \end{bmatrix}$ then $\begin{bmatrix} 12 & 4 & -6 \\ 3 & 1 & 14 \\ 20 & -14 & -10 \end{bmatrix}$

a) $(\text{adj } A^T)$ b) $-(\text{adj } A)$

c) adj A d) $-A^{-1}$

86) The inverse of a matrix $\begin{bmatrix} 2 & 0 & 1 \\ 1 & 1 & 0 \\ 2 & 1 & 1 \end{bmatrix}$ is

a) $\begin{bmatrix} 1 & 2 & -1 \\ -1 & 0 & 1 \\ -1 & -2 & 2 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 2 & 1 \\ -1 & 0 & 1 \\ 1 & -2 & 2 \end{bmatrix}$

c) $\begin{bmatrix} 1 & 2 & -1 \\ -1 & 0 & 1 \\ -1 & 2 & 2 \end{bmatrix}$ d) none

87) If a non-singular matrix 'A' satisfies $A^2 - A + 2I = 0$ then $A^{-1} =$

a) I+A b) I-A

c) $\frac{I+A}{2}$ d) $\frac{I-A}{2}$

88) I_3 is the identity matrix of order 3 then $(I_3)^{-1}$ is

a) 0 b) $3I_3$

c) I_3 d) does not exists

89) The inverse of matrix $\begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix}$ is

a) $\begin{bmatrix} 1 & -2 \\ -3 & 5 \end{bmatrix}$ b) $\begin{bmatrix} -1 & 2 \\ 3 & -5 \end{bmatrix}$

c) $\begin{bmatrix} -1 & -2 \\ -3 & -5 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$

90) The inverse of matrix $A = \begin{bmatrix} \cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha \end{bmatrix}$ is

a) $\begin{bmatrix} \cos\alpha & \sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ b) $\begin{bmatrix} \sin\alpha & \cos\alpha \\ \cos\alpha & \sin\alpha \end{bmatrix}$

c) $\begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ d) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

91) If $A = \begin{bmatrix} -2 & 0 & 0 \\ -2 & -1 & 3 \end{bmatrix}$ $b = \begin{bmatrix} 0 & 1 \\ 2 & 3 \\ 1 & -1 \end{bmatrix}$ then

a) $(AB)^{-1}$ not exists

b) $(AB)^{-1}$ is null matrix

c) $(AB)^{-1}$ exists

d) $(AB)^{-1}$ unit matrix

Ans -

(83 - b) (84 - d) (85 - a)

(86 - a) (87 - d) (88 - c)

(89 - b) (90 - c) (91 - c)

92) $\begin{bmatrix} -6 & 5 \\ -7 & 6 \end{bmatrix}^{-1} =$

a) $\begin{bmatrix} -6 & 5 \\ -7 & 6 \end{bmatrix}$ b) $\begin{bmatrix} 6 & -5 \\ -7 & 6 \end{bmatrix}$

c) $\begin{bmatrix} 6 & 5 \\ 7 & 6 \end{bmatrix}$ d) $\begin{bmatrix} 6 & -5 \\ 7 & -6 \end{bmatrix}$

93) **If** $A = \begin{bmatrix} 2 & -3 \\ -4 & 7 \end{bmatrix}$ **then** $2A^{-1}$ **is**

a) 8I - 2A b) 9I - A

c) 2I - 2A d) A - 9I

94) **If** $A^{-1} = \frac{1}{3}\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$ **and** $|A| = 3$, **then adj A =**

a) $\begin{bmatrix} 1 & -2 & 1 \\ 4 & -5 & -2 \\ -2 & 4 & 1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 2 & 1 \\ -4 & -5 & 2 \\ -2 & -4 & 1 \end{bmatrix}$

c) $\frac{1}{9}\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{bmatrix}$

95) **If inverse of** $\begin{bmatrix} 1 & 2 & x \\ 4 & -1 & 7 \\ 2 & 4 & -6 \end{bmatrix}$ **does not exists then x =**

a) 3 b) -3

c) 0 d) 2

96) $\begin{bmatrix} 1 & -\tan\theta/2 \\ \tan\frac{\theta}{2} & 1 \end{bmatrix}\begin{bmatrix} 1 & \tan\theta/2 \\ -\tan\frac{\theta}{2} & 1 \end{bmatrix}^{-1} =$

a) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

b) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

c) $\begin{bmatrix} \cos\theta & \sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$

d) $\begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$

97) **If** $\begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix} A = \begin{bmatrix} 0 & 2 \\ -1 & 3 \end{bmatrix}$ **then A = ?**

a) $\begin{bmatrix} 5 & -2 \\ -7 & 3 \end{bmatrix}$ b) $\begin{bmatrix} 2 & 4 \\ -3 & -5 \end{bmatrix}$

c) $\begin{bmatrix} -2 & 12 \\ -5 & 29 \end{bmatrix}$ d) none

98) **If** $A = \begin{bmatrix} 2 & 2 \\ -3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ **$(B^{-1} A^{-1})^{-1} =$**

a) $\begin{bmatrix} 3 & -2 \\ 2 & 2 \end{bmatrix}$ b) $\begin{bmatrix} 2 & -2 \\ 2 & 3 \end{bmatrix}$

c) $\frac{1}{18}\begin{bmatrix} 3 & 2 \\ -2 & 2 \end{bmatrix}$ d) $\begin{bmatrix} 3 & 1 \\ 2 & 3 \end{bmatrix}$

99) **If** $A = \begin{bmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ **then A = ?**

a) 2A b) A

c) -A d) 1

Ans -

(92 - a) **(93 - b)** **(94 - d)**

(95 - b) **(96 - d)** **(97 - b)**

(98 - b) **(99 - b)**

100) If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$ the A^{-1} =

a) $\begin{bmatrix} \cos\alpha & \sin\alpha & 0 \\ \cos\alpha & \sin\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

b) $\begin{bmatrix} -\cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

c) $\begin{bmatrix} \cos\alpha & \sin\alpha & 0 \\ -\sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$

d) $\begin{bmatrix} -\cos\alpha & \sin\alpha & 0 \\ 0 & 1 & 1 \\ \cos\alpha & -\sin\alpha & 1 \end{bmatrix}$

101) If $A = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 8 \end{bmatrix}$ then A^{-1} =

a) $\begin{bmatrix} 1/3 & 0 & 0 \\ 0 & 1/3 & 0 \\ 0 & 0 & 1/3 \end{bmatrix}$

b) $\begin{bmatrix} 1/3 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 8/3 \end{bmatrix}$

c) $\begin{bmatrix} 1/3 & 0 & 0 \\ 0 & 1/6 & 0 \\ 0 & 0 & 1/8 \end{bmatrix}$

d) $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 8 \end{bmatrix}$

102) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ and A^{-1} exists and $\neq 0$

then $(A^2 - 4A)\,A^{-1}$ =

a) $\begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & 2 \\ 2 & 2 & -3 \end{bmatrix}$ b) $\begin{bmatrix} 3 & 2 & 2 \\ 2 & 3 & 2 \\ 2 & 2 & 3 \end{bmatrix}$

c) $\begin{bmatrix} 5 & 2 & 0 \\ 0 & 5 & 0 \\ 0 & 2 & 5 \end{bmatrix}$ d) $\begin{bmatrix} 5 & 2 & 5 \\ 2 & 5 & 5 \\ 5 & 2 & 5 \end{bmatrix}$

103) Find the value of x, y , z of the following equation

$x + y + z = 6,\ x - y + 2z = 5,\ 2x + y - z = 1$ are

a) $x = 1, y = 2, z = 3$
b) $x = 2, y = 1, z = 3$
c) $x = -1, y = 2, z = 3$
d) $x = y = z = 3$

104) the values of x, y z of the following equation $2x + y + z = 2,\ x + y + z = 0,\ 4x - y - 3z = 20$ are

a) $x = 1, y = 2, z = -5$
b) $x = 1, y = -2, z = 5$
c) $x = 2, y = 1, z = 1$
d) $x = 2, y = 3, z = -5$

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Ans -

(100 - c) (101 - c) (102 - a)

(103 - c) (104 - d)