

Unit 1

SET-1(MCQs)

1.

. The matrix $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 6 & 5 \end{pmatrix}$ is a

- a) symmetric matrix
- b) skew-symmetric matrix
- c) diagonal matrix
- d) none of these

Ans-a

2.

If A is a non-null square matrix then $A + A^T$ is a

- a) symmetric matrix
- b) skew-symmetric matrix
- c) null matrix
- d) none of these

Ans-a

3.

If $A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$ then $(A^2)^T =$

- a) $\begin{pmatrix} 0 & -1 \\ 1 & -1 \end{pmatrix}$
- b) I_2
- c) $2A$
- d) none of these

Ans-c

4.

$(AB)^T$ is equal to

- a) $A^T + B^T$
- b) $A^T B^T$
- c) $B^T A^T$
- d) none of these

Ans-c

5.

If $A = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$ then $A \cdot A^t =$

- a) I_2
- b) A
- c) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$
- d) none of these

Ans-a

6.

If $A = \begin{pmatrix} 2 & -1 \\ 1 & 3 \end{pmatrix}$ then $A^2 + 7I =$

- a) O
- b) $2A$
- c) $3A$
- d) $5A$

Ans-d (use cayley theorem $A^2 - 5A + 7I = O$)

7.

$(2A + 3B)^T$ is equal to

- a) $2A + 3B^T$ b) $2A^T + 3B^T$
c) $4A^T + 9B^T$ d) none of these

Ans-b

8.

If $\begin{pmatrix} 2 & k \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} = \begin{pmatrix} 1 & 2 \\ -3 & 1 \end{pmatrix}$ then the value of k is

- a) -5 b) 0 c) 5 d) -1

Ans-d

9.

The trace of $A = \begin{pmatrix} 3 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{pmatrix}$ is

- a) 7 b) 5 c) 6 d) 4 .

Ans-c

10.

The trace of A^T is same as

- a) trace of A b) trace of A^{-1}
c) $[\text{trace of } A]^T$ d) none of these

Ans-a

11.

For an orthogonal matrix A , A^{-1} is same as

- a) A b) A^T c) $\text{adj } A$ d) none of these

Ans-b [matrix A is said to be orthogonal if $A^{-1} = A^T$]

12.

For any nonsingular matrix A , $(A^T)^{-1}$ is same as

- a) $(A^{-1})^T$ b) A^T c) A d) none of these

Ans-a

13.

For any orthogonal matrix A , $\det A$ is equal to

- a) 0 b) 1 c) ± 1 d) -1

Ans-c

14. If the order of matrix A is $m \times p$. And the order of B is $p \times n$. Then the order of AB is ?

- A. $n \times p$
B. $m \times p$
C. $m \times n$
D. $n \times m$

Ans:c

15. • What is a , if

If $B = \begin{bmatrix} 1 & 4 \\ 2 & a \end{bmatrix}$ is a singular matrix ?

- A. 5
- B. 6
- C. 7
- D. 8 **Ans:d**

16. • If

$$A = \begin{bmatrix} 2i & i \\ i & -i \end{bmatrix}$$

then $|A| = ?$

- A. 2
- B. 3
- C. 4
- D. 5 **Ans:b**

17. • The matrix

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

is a ?

- A. symmetric
- B. skew-symmetric
- C. hermitian
- D. skew-hermitian **Ans-a**

18. Transpose of a rectangular matrix is a

- 1. rectangular matrix
- 2. diagonal matrix
- 3. square matrix
- 4. scalar matrix **Ans-1**

19. Two matrices A and B are multiplied to get AB if

- 1. both are rectangular
- 2. both have different order

3. no of columns of A is equal to rows of B
4. no of rows of A is equal to no of columns of B **Ans:4**

20. If $|A| = 0$, then A is

1. zero matrix
2. singular matrix
3. non-singular matrix
4. 0 **Ans:2**

21. If A is a symmetric matrix, then $A^t =$

1. A
2. $|A|$
3. 0
4. diagonal matrix **Ans:1**

22.

If $\begin{bmatrix} x+3 & 1 \\ 2 & y+2 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ 2 & 0 \end{bmatrix}$ then values of x and y are

(a) $x = 1$ and $y = 2$ (b) $x = -1$ and $y = -2$ (c) $x = 2$ and $y = 3$ (d) none of these. **Ans:-b**

SET-2

1. Transpose of a rectangular matrix is a
 - a. rectangular matrix
 - b. diagonal matrix
 - c. square matrix
 - d. scalar matrix **Ans-a**
2. Transpose of a column matrix is
 - a. zero matrix
 - b. diagonal matrix
 - c. column matrix
 - d. row matrix **Ans: d**
3. Two matrices A and B are multiplied to get AB if
 - a. both are rectangular
 - b. both have same order
 - c. no of columns of A is equal to **rows** of B
 - d. no of rows of A is equal to no of columns of B **Ans:-c**
4. If eigen values of A are 0, 1, 2, then A is
 - a. zero matrix
 - b. singular matrix
 - c. non-singular matrix
 - d. none of these **Ans:-b**

5. If A is a symmetric matrix, then $A^t =$

- a. A
- b. $|A|$
- c. 0
- d. diagonal matrix **Ans:-a**

6. Rank of $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$ is

- a. 1 b. 2 c. 3 d. none of these **Ans:-b** [R3 is sum of R1 and R2]

7. Rank of $\begin{bmatrix} 1 & 3 & 1 \\ 0 & 6 & 0 \\ 0 & 0 & 5 \end{bmatrix}$ is

- b. 1 b. 2 c. 3 d. none of these **Ans:-c**

8. Rank of an identity matrix of order 4X4 is

- a. 2 b. 3 c. 4 d. 5 **Ans:-c**

9. Rank of a scalar matrix of order 4X4 is

- a. 2 b. 3 c. 4 d. 5 **Ans:-c**

10. Rank of a matrix of order pXq is

- a.) p b.) q c.) p or less than p d.) cannot say **Ans:d**

11. $v_1=(4,2,1,3), v_2=(6,3,4,7), v_3=(2,1,0,1)$.

- a. $-4.v_1+v_2+5v_3=0$ b. $v_1+v_2+5v_3=0$ c. $v_1-v_2+5v_3=0$ d. none of these **Ans:a**

12. $(1,3,4,3), (1,3,2,3)$ and $(1,3,4,1)$ are given vectors.

- a. Vectors are Linearly independent.
- b. Vectors are Linearly dependent.
- c. Cannot say
- d. None of these **Ans:a**

13. $v_1=(1,2,0), v_2=(2,0,1), v_3=(6,4,3)$. Which of the following is correct

- a. Vectors are Linearly independent.
- b. Vectors are Linearly dependent.
- c. Vectors are Linearly dependent and $2v_1+3v_2-v_3=0$
- d. None of these **Ans:a**

14.If A is a matrix of order 3×2 and B is a matrix of order 2×3 , then what is the order of AB:

- (a) 3×2 (b) 2×3 (c) 3×3 (d) 3×4 **Ans:c**

15.If $\begin{bmatrix} x+3 & 2y \\ x-1 & 4 \end{bmatrix} = \begin{bmatrix} 4 & 6 \\ 0 & 4 \end{bmatrix}$, then what is the value of x :

- (a) 2 (b) 3 (c) 5 (d) 1 **Ans:d**

16.If $A = \begin{bmatrix} 1 & 4 \\ -2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 6 \\ 3 & 5 \end{bmatrix}$, then value of $3A-2B$ is equal to :

- (a) $A = \begin{bmatrix} 1 & 1 & 4 \\ 3 & 5 & 2 \\ 1 & 1 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} -1 & 5 \\ -12 & -7 \end{bmatrix}$ (c) $\begin{bmatrix} -1 & 0 \\ -12 & -1 \end{bmatrix}$ (d) $\begin{bmatrix} -1 & 2 \\ -3 & -1 \end{bmatrix}$ **Ans:c**

17.Product of eigen value is equals to

- (a) trace of matrix (b) determinant of matrix (c) rank of matrix (d) none **Ans:b**

18

Which of the properties are true for matrix multiplication

- a. Distributive
- b. Commutative
- c. both a and b
- d. neither a nor b

Ans:a

19

Which of the operations can be valid with two matrices of different sizes?

- a. addition
- b. subtraction
- c. multiplication
- d. Division

Ans:c

20

Which of the following statements are true?

- a. $\text{trace}(A) = \text{trace}(A')$
- b. $\det(A) = \det(A')$
- c. both a and b
- d. neither a nor b

ans-c

21.

Which of the statements are true?

- a. If A is a symmetric matrix, $\text{inv}(A)$ is also symmetric
- b. $\det(\text{inv}(A)) = 1/\det(A)$
- c. If A and B are invertible matrices, AB is an invertible matrix too.
- d. all of the above

ans- d

22

Which of the following options hold true?

- a. $\text{inv}(\text{inv}(A)) = A$
- b. $\text{inv}(kA) = \text{inv}(A)/k$
- c. $\text{inv}(A') = \text{inv}(A)'$
- d. all of the above

Ans:d

23

What is the rank of the matrix $\begin{bmatrix} 2 & -1 & 1 & -6 & 8 \\ 1 & -2 & -4 & 3 & -2 \\ -7 & 8 & 10 & 3 & -10 \\ 4 & -5 & -7 & 0 & 4 \end{bmatrix}$

Ans:a

- a. 2
- b. 3
- c. 4
- d. 5

24.

The vectors $x_1 = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$, $x_2 = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}$, $x_3 = \begin{pmatrix} 3 \\ 1 \\ 4 \end{pmatrix}$ are :

- a. Linearly dependent
- b. Linearly independent

Ans:a

25

The vectors $x_1 = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$, $x_2 = \begin{pmatrix} -5 \\ 3 \end{pmatrix}$ are :

- a. Linearly dependent
- b. Linearly independent

Ans:b

26

The number of non-zero rows in an echelon form is called?

- a. reduced echelon form
- b. rank of a matrix
- c. conjugate of the matrix
- d. cofactor of the matrix

Ans:b

27

The rank of the matrix $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ is

- a. 0
- b. 2
- c. 1
- d. 3

Ans:a

28

The rank of $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ is

- a. 3
- b. 2
- c. 1
- d. 0

Ans:c

29

5. Consider the following two statements:

I. The maximum number of linearly independent column vectors of a matrix A is called the rank of A.

II. If A is an $n \times n$ square matrix, it will be nonsingular if $\text{rank } A = n$.

With reference to the above statements, which of the following applies?

- a. Both the statements are false
- b. Both the statements are true
- c. I is true but II is false.
- d. I is false but II is true

Ans:b

30

The Eigenvalues of a matrix $\begin{bmatrix} 2 & 7 \\ -1 & -6 \end{bmatrix}$ are

- a. 3 and 0
- b. -2 and 7
- c. -5 and 1
- d. 3 and -5

Ans:c

31

The Eigenvalues of $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ are

- a. -1, 1 and 2
- b. 1, 1 and -2
- c. -1, -1 and 2
- d. 1, 1 and 2

Ans c

32

The Eigenvectors of $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$ are

- a. (1 1 1), (1 0 1) and (1 1 0)
- b. (1 1 -1), (1 0 -1) and (1 1 0)
- c. (-1 1 -1), (1 0 1) and (1 1 0)
- d. (1 1 1), (-1 0 1) and (-1 1 0)

Ans d

33

Indicate which of the statements are true?

- a. If m is an Eigenvalue of A , the m is an Eigenvalue of A'
- b. If m is an Eigenvalue of A , then $1/m$ is the Eigenvalue of $\text{inv}(A)$
- c. both a and b
- d. neither a nor b

Ans:c

34

Indicate which of the statements are true?

- a. A singular matrix must have a zero Eigenvalue
- b. A singular matrix must have a negative Eigenvalue
- c. A singular matrix must have a complex Eigenvalue
- d. (d) All of the above

Ans:a

35. To multiply a matrix by 2, multiply

- (a) any row by 2 (b) every element by 2 (c) any column by 2 (d) none of these. Ans:b

36. Matrix has a value. This statement is

- (a) always true (b) depend upon the matrices (c) false (d) none of these. Ans:c

37 The product of the Eigen values of $\begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 5 \\ 0 & 0 & 5 \end{bmatrix}$ is

- (a) 10 (b) 20 (c) 30 (d) none of these Ans:c

38. If two Eigen values of $\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ are 2 and 13, then the third value is

- (a) 0 (b) 3 (c) 2 (d) 4 Ans:b

39. The rank of matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 4 & 6 \end{bmatrix}$ is

- (a) 3 (b) 2 (c) 1 (d) 0 Ans:b

40. For any 2 x 2 matrix A, if $A(\text{Adj } A) = \begin{bmatrix} 10 & 0 \\ 0 & 10 \end{bmatrix}$, then $|A| =$

- a) 0 b) 10 c) 20 d) 100

Ans:b [$A \cdot \text{adj}(A) = \text{adj}(A) \cdot A = \det(A) \cdot I$ here $A(\text{Adj } A) = 10I$ so $\det(A) = 10$]

41. The eigen values of a matrix $\begin{bmatrix} 2 & 7 \\ -1 & -6 \end{bmatrix}$ are

- a) 3 and 0 b) 3 and -7 c) -5 and 1 d) 3 and -5 Ans:c

42. The system of equations $3x + y + 2z = 3$, $2x - 3y - z = -3$, $x + 2y + z = 4$ has the solution

- a) 2, 1, -2 b) 1, 1, 1 c) 1, 4, -2 d) 1, 2, -1 Ans:d

43. If $x_1 = (1, 1, 1, 3)$, $x_2 = (1, 2, 3, 4)$ and $x_3 = (2, 3, 4, 7)$ are vectors, Which of following is false:

- a. x_1, x_2 and x_3 are Linearly independent.
- b. x_1, x_2 and x_3 are Linearly dependent.
- c. x_1, x_2 and x_3 are Linearly dependent and $x_1 + x_2 - x_3 = 0$.
- d. x_1, x_2 and x_3 are Linearly dependent and $x_1 + x_2 = x_3$ Ans:a

44..The eigen values of $A = \begin{bmatrix} 1 & 1 & 3 \\ 0 & -3 & -3 \\ 0 & 0 & -4 \end{bmatrix}$ are

- a. 1,-3,-4 b. 1,3,4 c. -1,3,4 d. 1,-3,4 **Ans:a**

45.If $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 6 \\ 0 & 0 & 5 \end{bmatrix}$ and $\lambda = 2$ is eigen value of A, the eigen vector corresponding to $\lambda = 2$ is :

- a. $[1 \ -1 \ 0]^t$ b. $[1 \ 2 \ 1]^t$ c. $[1 \ 2 \ 2]^t$ d. $[1 \ -1 \ 1]^t$ **Ans:a**

46.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 a square matrix and $a_{ij} = 0, i > j$ d) it is not a square matrix and $a_{ij} = 0, i < j$ **Ans:b**

47.The characteristic equation of the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$ is

- a) $\lambda^3 - 20\lambda + 8 = 0$ b) $\lambda^3 + 20\lambda + 8 = 0$ c) $\lambda^3 - 20\lambda - 8 = 0$ **Ans:a**

Multiple Choice Questions.

Indicate the correct answer for each question by writing the corresponding letter from (a), (b), (c) and (d).

11. If A is a matrix such that there exists a square submatrix of order r which is non-singular and every square submatrix of order $r + 1$ or more is singular, then

- (a) $\text{rank } A = r + 1$ (b) $\text{rank } A = r$ (c) $\text{rank } A > r$ (d) $\text{rank } A \geq r + 1$

12. Let $A = [a_{ij}]_{m \times n}$ be a matrix such that $a_{ij} = 1$ for all i, j . Then

- (a) $\text{rank } A > 1$ (b) $\text{rank } A = 1$ (c) $\text{rank } A = m$ (d) $\text{rank } A = n$

13. The rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 0 \\ 2 & 4 & 3 & 2 \\ 3 & 2 & 1 & 3 \\ 6 & 8 & 7 & 5 \end{bmatrix}$ is

- (a) 1 (b) 2 (c) 3 (d) 4

14. If A and B are two matrices such that $\text{rank of } A = m$ and $\text{rank of } B = n$, then

- (a) $\text{rank } (A B) = m n$ (b) $\text{rank } (A B) \geq \text{rank } A$
(c) $\text{rank } (A B) \geq \text{rank } B$ (d) $\text{rank } (A B) \leq \min (\text{rank } A, \text{rank } B)$

15. If A is an invertible matrix and B is a matrix, then

- (a) $\text{rank } (A B) = \text{rank } A$ (b) $\text{rank } (A B) = \text{rank } B$
(c) $\text{rank } (A B) > \text{rank } A$ (d) $\text{rank } (A B) > \text{rank } B$

16. The rank of the matrix $A = \begin{bmatrix} 1 & 2 & 0 & 0 \\ 2 & 3 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$ is

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

(Bundelkhand 2001; Meerut 2003)

[Answers of above 11 to 16: 11b, 12b, 13 c, 14 d, 15 b, 16 c]

- (a), (b), (c) **and** (d).
10. If λ is a characteristic root of a matrix A , then a characteristic root of A^{-1} is
 (a) $1/\lambda$ (b) λ
 (c) λ^2 (d) $1/\lambda^2$.
11. The **eigenvalues** of the matrix $A = \begin{bmatrix} a & h & g \\ 0 & b & 0 \\ 0 & c & c \end{bmatrix}$ are
 (a) a, h, g (b) a, h, c
 (c) a, g, c (d) a, b, c .
12. If λ is a characteristic root of the matrix A , then a characteristic root of the matrix $A + kI$ is
 (a) λ (b) $k + \lambda$
 (c) $k - \lambda$ (d) none of these.
13. The characteristic equation of $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ is
 (a) $\lambda^2 - 5\lambda + 7 = 0$ (b) $\lambda^2 - 3\lambda + 7 = 0$
 (c) $\lambda^2 - 2\lambda + 7 = 0$ (d) none of these.

[Ans above 10 to 13: 10 a, 11 d, 12 b, 13 a]

1. For the matrix $P = \begin{bmatrix} 3 & -2 & 2 \\ 0 & -2 & 1 \\ 0 & 0 & 1 \end{bmatrix}$, one of the eigenvalues is equal to -2 .

Which of the following is an eigenvector?

- (a) $\begin{bmatrix} 3 \\ -2 \\ 1 \end{bmatrix}$ (b) $\begin{bmatrix} -3 \\ 2 \\ -1 \end{bmatrix}$ (c) $\begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$ (d) $\begin{bmatrix} 2 \\ 5 \\ 0 \end{bmatrix}$

2. Eigenvalues of a matrix $S = \begin{bmatrix} 3 & 2 \\ 2 & 3 \end{bmatrix}$ are 5 and 1. What are the eigenvalues of the matrix S^2 ?

- (a) 1 and 25 (b) 6 and 4 (c) 5 and 1 (d) 2 and 10

3. The sum of eigenvalues of matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ is

- (a) 5 (b) 7 (c) 9 (d) 18

4. The eigenvalues of the matrix $\begin{bmatrix} 2 & -1 & 0 & 0 \\ 0 & 3 & 0 & 0 \\ 0 & 0 & -2 & 0 \\ 0 & 0 & 1 & 4 \end{bmatrix}$ are

- (a) 2, -2 , 1, -1 (b) 2, 3, -2 , 4 (c) 2, 3, 1, 4 (d) none of these

5. The eigenvalues of $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ are
 (a) 0, 0, 0 (b) 0, 0, 1 (c) 0, 0, 3 (d) 1, 1, 1
6. The minimum and maximum eigenvalues of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ are
 -2 and 6 respectively. What is the other eigenvalue?
 (a) 5 (b) 3 (c) 1 (d) -1
7. If A be a 3×3 matrix with eigenvalues 1, -1, 0, then the determinant of $I + A^{100}$ is
 (a) 6 (b) 4 (c) 9 (d) 100
8. The sum of the eigenvalues of the matrix $\begin{bmatrix} 3 & 4 \\ x & 1 \end{bmatrix}$ for real and negative value of x is
 (a) greater than zero (b) less than zero (c) zero (d) dependent values of x .
9. A is a singular matrix of order 3 with eigenvalues 2 and 3. The third eigenvalue is
 (a) 1 (b) 0 (c) 4 (d) -1

[Ans above 1 to 9: 1.d, 2a, 3b, 4b, 5b, 6b, 7d, 8a, 9b]

25. The number of independent eigenvectors to the matrix $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is
 (a) 1 (b) 2 (c) 3 (d) zero.
26. The number of independent eigenvectors to the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ is
 (a) 0 (b) 1 (c) 2 (d) 3.
27. The sum of the eigenvalues of the matrix $\begin{bmatrix} 1 & 2 & 3 & 1 \\ 1 & 4 & 1 & 2 \\ 2 & 1 & 3 & 1 \\ 0 & 0 & 1 & 2 \end{bmatrix}$ is
 (a) 9 (b) 8 (c) 10 (d) none of these.

[Ans above 3 ques : 25b , 26d , 27 c]

13. For the matrix $A = \begin{bmatrix} 1 & 1 & 0 \\ 1 & 2 & 1 \\ 2 & 1 & 0 \end{bmatrix}$, which of the following is correct ?

- (a) $A^3 + 3A^2 - I = 0$ (b) $A^3 - 3A^2 - I = 0$
(c) $A^3 + 2A^2 - I = 0$ (d) $A^3 - A^2 + I = 0$

Ans-b