

QUESTIONS ASKED IN CBSE BOARD EXAMINATION 2025

ONE MARKERS

1. If A and B are invertible matrices, then which of the following is not correct? **CBSE CODE 65/1/1**
- (A) $(A + B)^{-1} = B^{-1} + A^{-1}$ (B) $(AB)^{-1} = B^{-1} A^{-1}$
(C) $\text{adj}(A) = |A|A^{-1}$ (D) $|A|^{-1} = |A^{-1}|$

2. If $A = \begin{bmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then A^{-1} is **CBSE CODE 65/1/2**
- (A) $\begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix}$
(C) $\begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

A system of linear equations is represented as $AX = B$, where A is

3. Coefficient matrix, X is variable matrix and B is the constant matrix. Then the system of equations is
- (A) Consistent, if $|A| \neq 0$, solution is given by $X = BA^{-1}$. **CBSE CODE 65/1/3**
(B) Inconsistent if $|A| = 0$ and $(\text{adj}A)B = 0$
(C) Inconsistent if $|A| \neq 0$
(D) May or may not be consistent if $|A| = 0$ and $(\text{adj}A)B = 0$

4. If M and N are square matrices of order 3 such that $\det(M) = m$ and $MN = mI$, then $\det(N)$ is equal to:
- (A) -1 (B) 1 (C) $-m^2$ (D) m^2 **CBSE CODE 65/4/1**

5. If $\begin{vmatrix} -1 & 2 & 4 \\ 1 & x & 1 \\ 0 & 3 & 3x \end{vmatrix} = -57$, the product of the possible values of x is: **CBSE CODE 65/4/2**
- (A) -24 (B) -16 (C) 16 (D) 24

6. If A and B are invertible matrices of order 3×3 such that $\det(A) = 4$ and $\det[(AB)^{-1}] = \frac{1}{20}$, then $\det(B)$ is equal to: **CBSE CODE 65/4/3**
- (A) $\frac{1}{20}$ (B) $\frac{1}{5}$ (C) 20 (D) 5

7. If $\begin{vmatrix} 2x & 5 \\ 12 & x \end{vmatrix} = \begin{vmatrix} 6 & -5 \\ 4 & 3 \end{vmatrix}$, then the value of x is: **CBSE CODE 65/5/1 & CBSE CODE 65/5/3**
- (A) 3 (B) 7 (C) ± 7 (D) ± 3

8. If $A = [a_{ij}]$ is a 3×3 diagonal matrix such that $a_{11} = 1, a_{22} = 5$ and $a_{33} = -2$, then $|A|$ is:

(A) 0

(B) -10

(C) 10

(D) 1

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9. If $A = kB$, where A and B are two square matrices of order n and k is a scalar, then:

(A) $|A| = k|B|$

(B) $|A| = k^n|B|$

(C) $|A| = k + |B|$

(D) $|A| = |B|^k$

TWO MARKERS

2. Let A and B be two square matrices of order 3 such that $\det(A) = 3$ and $\det(B) = -4$. Find the value of $\det(-6AB)$.

CBSE CODE 65/4/1 (2 MARKERS)

FIVE MARKERS

1. A school wants to allocate students into three clubs: Sports, Music and Drama, under following conditions:

- The number of students in Sports club should be equal to the sum of the number of students in Music and Drama club.
- The number of students in Music club should be 20 more than half the number of students in Sports club.
- The total number of students to be allocated in all three clubs are 180.

Find the number of students allocated to different clubs, using matrix method.

CBSE CODE 65/1/3

2. Given $A = \begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$, find AB . Hence, solve the system of linear equations:

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$$x - y + z = 4$$

$$x - 2y - 2z = 9$$

$$2x + y + 3z = 1$$

OR

(b) If $A = \begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$, then find A^{-1} .

$$x - 2y = 10$$

Hence, solve the system of linear equations: $2x - y - z = 8$

$$-2y + z = 7$$

3. If A is a 3×3 invertible matrix, show that for any scalar $k \neq 0$, $(kA)^{-1} = \frac{1}{k}A^{-1}$. Hence calculate $(3A)^{-1}$,

where $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$.

4. A furniture workshop produces three types of furniture - chairs, tables and beds each day. On a particular day the total number of furniture pieces produced is 45. It was also found that production of beds exceeds that of chairs by 8, while the total production of beds and chairs together is twice the production of tables. Determine the units produced of each type of furniture, using matrix method.

If $A = \begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$, then A^3 is:

CBSE CODE 65/5/1

(A) $3 \begin{bmatrix} 5 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$

(B) $\begin{bmatrix} 125 & 0 & 0 \\ 0 & 125 & 0 \\ 0 & 0 & 125 \end{bmatrix}$

(C) $\begin{bmatrix} 15 & 0 & 0 \\ 0 & 15 & 0 \\ 0 & 0 & 15 \end{bmatrix}$

(D) $\begin{bmatrix} 5^3 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 5 \end{bmatrix}$

5. An amount of ₹ 10,000 is put into three investments at the rate of 10%, 12% and 15% per annum. The combined annual income of all three investments is ₹ 1,310, however the combined annual income of the first and the second investments is ₹ 190 short of the income from the third. Use matrix method and find the investment amount in each at the beginning of the year.

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6. Three students run on a racing track such that their speeds add up to 6 km/h. However, double the speed of the third runner added to the speed of the first results in 7 km/h. If thrice the speed of the first runner is added to the original speeds of the other two, the result is 12 km/h. Using matrix method, find the original speed of each runner.

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