PARISHRAM 2025

Mathematics

Determinants

Q1 The value of k for which $\begin{vmatrix} k & -2 & 7 \\ 1 & 0 & -1 \\ 2 & 3 & -3 \end{vmatrix}$ is singular, is

(A) $\frac{19}{3}$

(B) $\frac{17}{3}$

(C) $\frac{16}{3}$

(D) $\frac{-19}{3}$

Q2 If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ then A^{-1} is equal to

(A) A' (B) $2A$

(C) $\frac{1}{2}A$ (D) $\frac{1}{19}A$

Q3 Choose the correct option

(A) $(AB)^{-1} = B^{-1}A^{-1}$

(B) $(AB)^{-1} = A^{-1}B^{-1}$

(C) $(AB)^{-1} = \frac{A^{-1}}{B^{-1}}$

(D) $(AB)^{-1} = \frac{B^{-1}}{A^{-1}}$

Q4 Find P for which matrix $A = \begin{bmatrix} P & 1 & -9 \\ -1 & 7 & 2 \\ 0 & 6 & 5 \end{bmatrix}$ is invertible

(A) $P \neq -\frac{59}{23}$

(B) $P \neq \frac{59}{23}$

(C) $P \neq 2$

(D) $P \neq -3$

Q5 If A and B are square matrices of order 3 such that $|A| = -1, |B| = 3$, then $|3AB|$ equals

(A) -9 (B) -81

(C) -27 (D) 81

Q6 If A is a square matrix of order $3, |A| = 3$, then $|\mathrm{adj}\,(\mathrm{adj}\,A)|$ is equal to

(A) 3^5

(B) 3^7

(C) 9

(D) 81

Q7 A system is said to be inconsistent if it has

(A) unique solutions

(B) 2 solutions

(C) infinite solutions

(D) no solutions

Q8 The system

$$x + y - z = 2$$
$$2x + 3y - 4z = 3$$
$$-x + 2y + 3z = 9$$

is having

(A) unique solutions

(B) infinite solutions

(C) no solutions

(D) none of these

Q9 Find k for which system

$$2x + 3ky = -1$$
$$5x + 4y = 7$$

is having unique solutions

(A) $k \neq \frac{8}{15}$

(B) $k = \frac{8}{15}$

(C) $k \neq \frac{2}{15}$

(D) $k = \frac{2}{15}$

Q10 Find k for which system

$$kx - y + 2z = 3$$
$$x + 2y - 3z = 7$$
$$3x + 4y - 9z = 1$$

is having unique solutions
(A) $k \neq \frac{-2}{3}$
(B) $k = \frac{2}{3}$
(C) $k = \frac{1}{3}$
(D) $k \neq \frac{-1}{3}$

Q11 The system of equation,

$$\lambda x + y + z = 0,$$
$$-x + \lambda y + z = 0,$$
$$-x - y + \lambda z = 0$$

will have a non-zero solution if real values of λ are given by:
(A) 5 (B) -1
(C) 1 (D) 0

Q12 Solve x, y and z for

$$x + y + z = 6$$
$$x - y + z = 2$$
$$3x + 2y - 4z = -5$$

Q13
If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 3 & -1 \\ -2 & 1 & 1 \end{bmatrix}$, find A^{-1}

Using A^{-1} solve the following system of equations:

$$2x + y + 3z = 9, x + 3y - z = 2, -2x + y + z = 7$$

Q14 The sum of three numbers is -1 . If we multiply second number by 2, third number by 3 and add them, we get 5 . If we subtract third number from the sum of first and second number, we get -1 . Represent the information by the system of equations and find the numbers using inverse of matrix.

Q15 A factory produces three products everyday. The production on a certain day is $45\ \text{kg}$. It is found that the production of third product exceeds the production of first by $8\ \text{kg}$, while the total production of first and third production is twice the production of second product. Determine the production of each product.

Answer Key

Q1	(D)
Q2	(D)
Q3	(A)
Q4	(A)
Q5	(B)
Q6	(D)
Q7	(D)
Q8	(A)
Q9	(A)

Q10 (A)

Q11 (D)

Q12 $x = 1,\ y = 2,\ z = 3$

Q13
$$A^{-1} = \frac{1}{30}\begin{bmatrix} 4 & 2 & -10 \\ 1 & 8 & 5 \\ 7 & -4 & 5 \end{bmatrix}$$
$x = -1,\ y = 2,\ z = 3$

Q14 $x = -\frac{7}{2},\ y = \frac{5}{2},\ z = 0$

Q15 $x = 11,\ y = 15,\ z = 19$