# MATHS

## BOOKS - RD SHARMA MATHS (ENGLISH)

## SOLUTION OF SIMULTANEOUS LINEAR EQUATIONS

**Others**

**1.** Show that the following systems of linear equations is consistent and also find their solutions: $6x + 4y = 2\,,\, 9x + 6y = 3$

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**2.** Solve the following system of equations by matrix method : $5x + 7y + 2 = 0, 4x + 6y + 3 = 0$

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**3.** If $A = \begin{pmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{pmatrix}$ find $A^{-1}$. Use it to solve the system of equations $2x - 3y + 5z = 11$ , $3x + 2y - 4z = -5$ and $x + y - 2z = -3$

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**4.** For the system of equitions: $x + 2y + 3z = 1$ $2x + y + 3z = 2$ $5x + 5y + 9z = 4$ there is only one solutions there exists infinitely many solution there is no solution (d) none of these

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**5.** Let $a, b, c$ be the real numbers. The following system of equations in $x, y, and z$

$\frac{x^2}{a^2}+\frac{y^2}{b^2}-\frac{z^2}{a^2}=1, \frac{x^2}{a^2}-\frac{y^2}{b^2}+\frac{z^2}{a^2}=1, -\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{a^2}=1$ has a. no solution b. unique solution c. infinitely many solutions d. finitely many solutions

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**6.** The existence of the unique solution of the system of equations: $x+y+z=\lambda\ 5x-y+\mu z=10\ 2x+3y-z=6$ depends on(a) $\mu only$ (b) $\lambda only$ (c)$\lambda and \mu \perp h$ (d) $neither \lambda \|u\|$

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**7.** Let $x=\begin{vmatrix} x1 \\ x2 \\ x3 \end{vmatrix}, A=\begin{vmatrix} 1 & -1 & 2 \\ 2 & 0 & 1 \\ 3 & 2 & 1 \end{vmatrix} and B=\begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix} \dot{I} f AX=B,$ Then $X$ is equal to

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**8.** The system of equations: $x+y+z=5 \quad x+2y+3z=9$ $x+3y+\lambda z=\mu$ has a unique solution, if $\lambda=5, \mu=13$ (b) $\lambda \neq 5$ $\lambda=5, \mu \neq 13$ (d) $\mu \neq 13$

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**9.** The number of solution of the system of equations: $x+y+z=2$ $2x+y-z=3,$ is $3x+2y+kz=4$ has a unique solution if $k \neq 0$ (b) $-1<k<1$ (c) $-2<k<2$ (d) $k=0$

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**10.** The system of equation $x+y+z=2, 3x-y+2z=6 and 3x+y+z=-18$ has (a) unique solution (b) no solution (c)an infinite number of solutions (d) zero solution as the only solution

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**11.** Solve the following system of homogeneous equations:

$2x + 3y - z = 0\ x - y - 2z = 0\ 3x + y + 3z = 0$

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**12.** Given $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}, B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$ find AB and use this to solve the system of equations:

$y + 2x = 7, x - y = 3, 2x + 3y + 4z = 17$

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**13.** A mixture is to be made of three foods $A$, $B$, $C$. The three foods $A$, $B$, $C$ contain nutrients $P$, $Q$, $R$ as shown below: Ounces per

pound of Nutrient $\begin{bmatrix} Food & P & Q & R \\ A & 1 & 2 & 5 \\ B & 3 & 1 & 1 \\ C & 4 & 2 & 1 \end{bmatrix}$ How to form a mixture which will have 8 ounces of $P$, 5 ounces of $Q$ and 7 ounces of $R$?

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**14.** If $a_1x + b_1y + c_1z = 0, a_2x + b_2y + c_2z = 0, a_3x + b_3y + c_3z = 0$ and $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = 0$, then the given system has, 1) more than two solutions 2) one trivial and one non trivial solutions 3) no solution 4) only trivial solution (0, 0, 0)

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**15.** Solve the following system of homogeneous equations: $x + y - z = 0\ x - 2y + z = 0\ 3x + 6y - 5z = 0$

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**16.** If $A = [1 - 1121 - 3111]$, find $A^{-1}$ and hence solve the system of linear equation.

$x + 2y + z = 4, \ -x + y + z = 0, x - 3y + z = 2$

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**17.** Show that the following system of equation is consistent.

$2x - y + 3z = 5, 3x + 2y - z = 7, 4x + 5y - 5z = 0$

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**18.** Solve the following system of equations, using matrix method.

$x + 2y + z = 7, x + 3z = 11, 2x - 3y = 1$

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**19.** The number of solutions of the system of equations: $2x + y - z = 7\ x - 3y + 2z = 1, is\ x + 4y - 3z = 5$ is (a) 3 (b) 2 (c) 1 (d) 0

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**20.** An amount of Rs 5000 is put into three investments at the rate of interest of $6\%, 7\%$ and $8\%$ per annum respectively. The total annual income is Rs 358. If the combined income from the first taoinvestments is Rs 70 more than the income from the third, find the amount of each investment by matrirx method

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**21.** The sum of three numbers is 6. If we multiply the third number 2 and add the first number to the result, we get 7. Be adding second

and third numbers to three times the first number we get 12. Use determinants to find the numbers.

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**22.** Find $A^{-1}$, where $A = [12 - 32323 - 3 - 4]$ . Hence solve the system of equations: $x + 2y - 3z = -4, 2x + 3y + 2z = 2$ , 3x-3y-4z=11

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**23.** Determine the product $\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix} \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$ and use it to solve the system of equations $x - y + z = 4, x - 2y - 2z = 9, 2x + y + 3z = 1$

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**24.** Express the following system of simultaneous linear equation as a matrix equation:

$2x + 3y - z = 1, \quad x + y + 2z = 2, \quad 2x - y + z = 3$

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**25.** Use matrix method to solve the equations $5x - 7y = 2$ and $7x - 5y = 3$

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**26.** Use matrix method to solve the following system of equations:

$x - 2y - 4 = 0, \quad -3x + 5y + 7 = 0$

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**27.** Solve the following system of equations, using matrix method.

$x + 2y + z = 7, x + 3z = 11, 2x - 3y = 1$

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**28.** Use matrix method to examine the following system of equations for consistency or inconsistency $4x - 2y = 3$ and $6x - 3y = 5$

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**29.** Show that the following system of equation is inconsistent.

$2x - y + 3z = 5, 3x + 2y - z = 7, 4x + 5y - 5z = 0$

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**30.** If $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{bmatrix}$ find $A^{-1}$ and hence solve the system of linear equation. $x + 2y + z = 4, \ -x + y + z = 0, x - 3y + z = 2$

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**31.** Determine the product $\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix} \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$ and use it to solve the system of equations:

$x - y + z = 4, \ x - 2y - 2z = 9, \ 2x + y + 3z = 1.$

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**32.** If $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$ then find $A^{-1}$ and hence solve the follwoing equations:

$x + 2y - 3z = 4, 2x + 3y + 2z = 2 \text{ and } 3x - 3y - 4z = 11$

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**33.** The sum of three numbers is 6. If we multiply the third number 2 and add the first number to the result, we get 7. Be adding second and third numbers to three times the first number we get 12. Use determinants to find the numbers.

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**34.** An amount of Rs 5000 is put into three investments at the rate of interest of $6\%, 7\%$ and $8\%$ per annum respectively. The total annual income is Rs 350. If the combined income from the first two investments is Rs 70 more than the income from the third, find the amount of each investment by matrix method.

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**35.** A mixture is to be made of three foods $A,\ B,\ C$. The three foods $A,\ B,\ C$ contain nutrients $P,\ Q,\ R$ as shown below: Ounces per pound of Nutrient $\begin{bmatrix} Food & P & Q & R \\ A & 1 & 2 & 5 \\ B & 3 & 1 & 1 \\ C & 4 & 2 & 1 \end{bmatrix}$ How to form a mixture which will have 8 ounces of $P$, 5 ounces of $Q$ and 7 ounces of $R$?

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**36.** Solve the following system of equations by matrix method:

$5x + 7y + 2 = 0,\ \ 4x + 6y + 3 = 0$

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**37.** Solve the following system of equations by matrix method:

$5x + 2y = 3,\ \ 3x + 2y = 5$

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**38.** Solve the following system of equations by matrix method:

$3x + 4y - 5 = 0, \quad x - y + 3 = 0$

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**39.** Solve the following system of equations by matrix method:

$3x + y = 19, \quad 3x - y = 23$

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**40.** Solve the following system of equations by matrix method:

$3x + 7y = 4, \quad x + 2y = -1$

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**41.** Solve the following system of equations by matrix method:

$3x + y = 7, \quad 5x + 3y = 12$

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**42.** Solve the following system of equations by matrix method:

$x + y - z = 3, 2x + 3y + z = 10, 3x - y - 7z = 1$

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**43.** Solve the following system of equations by matrix method:

$x + y + z = 3, \quad 2x - y + z = -1, \quad 2x + y - 3z = -9$

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**44.** Solve the following system of equations by matrix method:

$6x - 12y + 25z = 4, \quad 4x + 15y - 20z = 3, \quad 2x + 18y + 15z = 10$

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**45.** Solve the following system of equations by matrix method:

$3x + 4y + 7z = 14, \quad 2x - y + 3z = 4, \quad x + 2y - 3z = 0$

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**46.** Solve the following system of equations by matrix method :

$x + y - 2z = 3, 2x + 3y + z = 10$ and $3x - y - 7z = 1$

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**47.** Solve the following system of equations by matrix method:

$5x + 3y + z = 16, \quad 2x + y + 3z = 19, \quad x + 2y + 4z = 25$

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**48.** Using matrix method, solve the following system of linear equations. $3x + 4y + 2z = 8, 2y - 3z = 3$ and $x - 2y + 6z = -2$

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**49.** Solve the following system of equations by matrix method:

$2x + y + z = 2, \quad x + 3y - z = 5, \quad 3x + y - 2z = 6$

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**50.** Solve the following system of equations by matrix method:

$2x + 6y = 2, \quad 3x - z = -8, \quad x - y + z = -3$

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**51.** Solve the following system of equations by matrix method:

$x - y + z = 2, \quad 2x - y = 0, \quad 2y - z = 1$

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**52.** Solve the following system of equations by matrix method:

$8x + 4y + 3z = 18, \quad 2x + y + z = 5, \quad x + 2y + z = 5$

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**53.** Solve the following system of equations by Cramer's Rule:

$x + y + z = 6, \quad x + 2z = 7, \quad 3x + y + z = 12$

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**54.** Using matrix method, solve the following system of equations:

$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4, \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1, \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2; x, \ y, \ z \neq 0$

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**55.** Using matrices, solve the following system of linear equations:

$x - y + 2z = 7 \, 3x + 4y - 5z = -5 \, 2x - y + 3z = 12$

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**56.** Show that following systems of linear equations is consistent :

$7x + 4y = 2\,, 9x + 6y = 3$

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**57.** Show that following system of linear equations is consistent

$3x + 3y = 5,\ \ 6x + 9y = 15$

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**58.** Show that following system of linear equations is consistent

`5x+3y=4, 3x+26 y=9,

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**59.** Show that the following system of equations is consistent.

$x - y + z = 3, 2x + y - z = 2, \ -x - 2y + 2z = 1$

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**60.** Show that following system of linear equations is consistent and also find their solution:

$x + y + z = 6, \ x + 2y + 3z = 14, \ x + 4y + 7z = 30$

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**61.** Show that following system of linear equations is consistent and also find their solution:

$2x + 2y - 2z = 1, \ 4x + 4y - z = 2, \ 6x + 6y + 2z = 3$

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**62.** Show that following system of linear equations is inconsistent:

$2x + 5y = 7, \quad 6x + 15y = 13$

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**63.** Show that following system of linear equations is inconsistent:

$2x + 3y = 5, \quad 6x + 9y = 10$

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**64.** Examine the following system of equations for consistency or inconsistency $4x - 2y = 3$ and $6x - 3y = 5$

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**65.** Show that following system of linear equations is inconsistent:

$4x - 5y - 2z = 2, \quad 5x - 4y + 2z = -2, \quad 2x + 2y + 8z = -1$

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**66.** Show that following system of linear equations is inconsistent:

$3x - y - 2z = 2, \quad 2y - z = -1, \quad 3x - 5y = 3$

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**67.** Show that following system of linear equations is inconsistent:

$x + y - 2z = 5, \quad x - 2y + z = -2, \quad -2x + y + z = 4$

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**68.** If $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$ are two square matrices, find $AB$ and hence solve the system of linear equations:

$x - y = 3, \quad 2x + 3y + 4z = 17, \quad y + 2z = 7$

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**69.** If $A = \begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$, find $A^{-1}$ and hence solve the system of linear equations: $2x - 3y + 5z = 11, \quad 3x + 2y - 4z = 5,$

$x + y - 2z = -3$

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**70.** Find $A^{-1}$, if $A = [1251 - 1 - 123 - 1]$. Hence, solve the following system of linear equations:

$x + 2y + 5z = 10, \quad x - y - z = -2, \quad 2x + 3y - z = -11$

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**71.** If $A = [120 - 2 - 1 - 20 - 11]$, find $A^{-1}$. Using $A^{-1}$, solve the system of linear equations:

$x - 2y = 10, \quad 2x + y + 3z = 8, \quad -2y + z = 7$

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**72.** $A = [3 - 42235101]$ , find $A^{-1}$ and hence solve the following system of equations:

$3x - 4y + 2z = -1,\ \ 2x + 3y + 5z = 7,\ \ x + z = 2$

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**73.** $A = \begin{bmatrix} 1 & -2 & 0 \\ 2 & 1 & 3 \\ 0 & -2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 7 & 2 & -6 \\ -2 & 1 & -3 \\ -4 & 2 & 5 \end{bmatrix}$ , find $AB$ . Hence, solve the system of equations:

$x - 2y = 10,\ \ 2x + y + 3z = 8\ and\ -2y + z = 7$

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**74.** If $A\begin{vmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{vmatrix}$, then find the value of $A^{-1}$

Using $A^{-1}$, solve the system of linear equations $x - 2y = 10$, $2xy - z = 8$ and $-2y + z = 7$

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**75.** If $A = \begin{vmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{vmatrix}$ and $B = \begin{vmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{vmatrix}$ then find BA

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**76.** The sum of three numbers is 2. If twice the second number is added to the sum of first and third, the sum is 1. By adding second and third number to five times the first number, we get 6. Find the three numbers by using matrices.

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**77.** An amount of Rs 10,000 is put into three investments at the rate of 10, 12 and 15% per annum. The combined income is Rs 1310 and the combined income of first and second investment is Rs 190 short of the income from the third. Find the investment in each using matrix method.

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**78.** A company produces three products every day. Their production on a certain day is 45 tons. It is found that the production of third product exceeds the production of first product by 8 tons while the total production of first and third product is twice the production of second product. Determine the production level of each product using matrix method.

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**79.** The prices of three commodities $P,\ Q,\ and\ R$ are Rs $x,\ y\ and\ z$ per unit respectively. $A$ purchases 4 units of $R$ and sells 3 unit of $P$ and 5 units of $Q\cdot B$ purchases 3 units of $Q$ and sells 2 units of $P$ and 1 unit of $R\cdot C$ purchases 1 unit of $P$ and sells 4 units of $Q$ and 6 units of $R\cdot$ In the process $A,\ B\ and\ C$ earn Rs 6000, 5000 and 13000 respectively. If selling the units is positive earning and buying the units is negative earnings, find the price per unit of three commodities by using matrix method.

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**80.** The management committee of a residential colony decided to award some of its members (say $x$ ) for honesty, some (say $y$ ) for helping others (say $z$ ) for supervising the workers to keep the colony neat and clean. The sum of all the awardees is 12. Three times the sum of awardees for cooperation and supervision added to two times the number of awardees for honesty is 33. If the sum of the number

of awardees for honesty and supervision is twice the number of awardees for helping others. find the number of awardees of each category. Apart from these values namely: honesty, cooperation and supervision, suggest one more value which the management must include for awards.

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**81.** A school wants to award its students for the value of honesty, regularity and hard work will total cash award of Rs. $6000$. Three times the award money for hard work added to that added to that given for honesty amounts to Rs. $11000$. The award money given for honesty and hard work together is double the one given for regularity. Represent the above situation algebraically and find the award money for each value, using matrix method.

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**82.** Two institutions decided to award their employees for the three values of resourcefulness, competence and determination in the form of prizes at the rate of Rs $x,\ y\ and\ z$ respectively per person. The first institution decided to award respectively 4, 3 and 2 employees with a total prize money of Rs 37000 and the second institution decided to award respectively 5, 3 and 4 employees with a total prize money of Rs 47000. If all the three prizes per person together amount to Rs 12000, then using matrix method find the value of $x,\ y,\ and\ z$. What values are described in this equations?

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**83.** Two factories decided to award their employees for three values of (a) adaptable to new techniques, (b) careful and alert in difficult situations and (c) keeping calm in tense situations, at the rate of Rs $x,\ y\ and\ z$ per person respectively. The first factory decided to honour respectively 2, 4 and 3 employees with a total prize money of Rs 29000. The second factory decided to honour respectively 5, 2 and

3 employees with the prize money of Rs 30500. If the three prizes per person together cost Rs 9500, then represent the above situation by a matrix equation and form linear equations using matrix multiplication. Solve these equations using matrices. (iii) Which values are reflected in the questions?

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**84.** Two schools P and Q want to award their selected students on the values of Tolerance, Kindness and Leadership. The school P wants to award Rs. x each, Rs. y each and Rs. z each for the three respective values to 3, 2 and 1 students respectively with a total award money of Rs. 2,200. School Q wants to spend Rs. 3,100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school P). If the total amount of award for one prize on each value is Rs. 1,200, using matrices, find the award money for each value. Apart from these three values, suggest one more value which should be considered for award.

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**85.** Two schools P and Q want to award their selected students on the values of Discipline, politeness and punctuality. The school P wants to awards Rs. x each, Rs. y each and Rs. z each for the three respective values to its 3, 2 and 1 students with a total award money of Rs. 1000. School Q wants to spend Rs 1500 to award its 4, l and 3 students on the respective values (by giving the same award money for the three values before) If the total amount of awards for one prize on each value is Rs. 600, using matrices, find the award money for each value. Apart from the above three values suggest one more value for awards.

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**86.** Two schools $P\ and\ Q$ want to award their selected students on the values of Tolerance, Kindness and Leadership. The school $P$ wants

to award Rs $x$ each, Rs $y$ each and Rs $z$ each for the three respective values to 3, 2 and 1 students respectively with a total award money of Rs 2,200. School $Q$ wants to spend Rs 3,100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school $P$) . If the total amount of award for one prize on each values is Rs 1,200, using matrices, find the award money for each value. Apart from these three values, suggest one more value which should be considered for award.

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**87.** A total amount of Rs 7000 is deposited in three different saving bank accounts with annual interest rates 5%, 8% and $8\frac{1}{2}\%$ respectively. The total annual interest from these three accounts is Rs 550. Equal amounts have been deposited in the 5% and 8% savings accounts. Find the amount deposited in each of the three accounts, with the help of matrices.

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**88.** A shopkeeper has 3 varieties of pens $A, B$ and $C$. Meenu purchased 1 pen of each variety for a total of Rs 21. Jeen purchased 4 pens of $A$ variety, 3 pens of $B$ variety and 2 pens of $C$ variety for Rs 60. While Shikha purchased 6 pens of $A$ variety, 2 pens of $B$ variety and 3 pens of $C$ variety for Rs 70. Using matrix method find the cost of each pen.

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**89.** Solve the following system of homogeneous equations:

$2x + 3y - z = 0\ x - y - 2z = 0\ 3x + y + 3z = 0$

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**90.** Find the solution of homogeneous system of equations:

$x - 2y + z = 0;\ x + y = z$ and $3x + 6y = 5z$

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**91.** Solve the following system of homogeneous linear equations by matrix method:

$2x - y + z = 0, \quad 3x + 2y - z = 0, \quad x + 4y + 3z = 0$

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**92.** Solve the following system of homogeneous linear equations by matrix method:

$2x - y + 2z = 0, \quad 5x + 3y - z = 0, \quad x + 5y - 5z = 0$

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**93.** Solve the following system of homogeneous linear equations by matrix method:

$3x - y + 2z = 0, \quad 4x + 3y + 3z = 0, \quad 5x + 7y + 4z = 0$

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**94.** Solve the following system of homogeneous linear equations by matrix method:

$x + y - 6z = 0, \quad x - y + 2z = 0, \quad -3x + y + 2z = 0$

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**95.** Solve the following system of homogeneous linear equations by matrix method: $x + y + z = 0, \quad x - y - 5z = 0, \quad x + 2y + 4z = 0$

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**96.** Solve the following system of homogeneous equations:

$x + y + z = 0 \; x - 2y + z = 0 \; 3x + 6y - 5z = 0$

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**97.** Solve the following system of homogeneous linear equations by matrix method: $3x + y - 2z = 0,\ \ x + y + z = 0,\ \ x - 2y + z = 0$

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**98.** Solve the following system of homogeneous equations: $2x + 3y - z = 0\ x - y - 2z = 0\ 3x + y + 3z = 0$

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**99.** If $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$, find $x,\ y\ and\ z$.

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**100.** If $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$, find $x,\ y\ and\ z$.

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**101.** If $\begin{bmatrix} 1 & 0 & 0 \\ 0 & y & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ -1 \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$, find $x,\ y\ and\ z$.

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**102.** Solve $\begin{bmatrix} 3 & -4 \\ 9 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 2 \end{bmatrix}$ for $x\ and\ y$.

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**103.** If $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}$, find $x,\ y,\ z$.

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**104.** If $A = \begin{bmatrix} 2 & 4 \\ 4 & 3 \end{bmatrix}, X = \begin{bmatrix} n \\ 1 \end{bmatrix}, B = \begin{bmatrix} 8 \\ 11 \end{bmatrix}$ and $AX = B$, then find $n$.

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**105.** The system of equation $x + y + z = 2$ , $3x - y + 2z = 6$ and $3x + y + z = -18$ has (a) a unique solution (b) no solution (c) an infinite number of solutions (d) zero solution as the only solution

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**106.** The number of solutions of the system of equations: $2x + y - z = 7\ x - 3y + 2z = 1,\ x + 4y - 3z = 5$ is

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**107.** Let $x = \begin{vmatrix} x_1 \\ x_2 \\ x_3 \end{vmatrix}, A = \begin{vmatrix} 1 & -1 & 2 \\ 2 & 0 & 1 \\ 3 & 2 & 1 \end{vmatrix} and B = \begin{vmatrix} 3 \\ 2 \\ 1 \end{vmatrix} \dot{I} f AX = B,$ Then $X$ is equal to

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**108.** The number of solutions of the system of equations: $2x + y - z = 7\, x - 3y + 2z = 1,\ x + 4y - 3z = 5$ is

A. (a) 3

B. (b) 2

C. (c) 1

D. (d) 0

**Answer: null**

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**109.** The system of linear equations $x+y+z=2, 2x+y-z=3, 3x+2y+kz=4$ has a unique solution if

A. (A) $k \neq 0$

B. (B) $-1 < k < 1$

C. (C) $-2 < k < 2$

D. (D) $k = 0$

**Answer: null**

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**110.** $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = 0$ then the system of equations $a_1x+b_1y+c_1z=0, a_2x+b_2y+c_2z=0, a_3x+b_3y+c_3z=0$ has

A. (A) no solution

B. (B) one trivial and one non trivial solutions

C. (C) only the trivial solution (0,0,0)

D. (D) more than two solution

**Answer: null**

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**111.** Let $a, b, c$ be real numbers. The following system of equations in $x, y$ and $z$

$$\frac{x^2}{a^2}+\frac{y^2}{b^2}-\frac{z^2}{a^2}=1, \frac{x^2}{a^2}-\frac{y^2}{b^2}+\frac{z^2}{a^2}=1, -\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{a^2}=1$$

has a. no solution b. unique solution c. infinitely many solutions d. finitely many solutions

A. no solution

B. unique solution

C. infinitely many solutions

D. finitely many solutions

**Answer: null**

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**112.** For the system of equations:

$x + 2y + 3z = 1$

$2x + y + 3z = 2$

$5x + 5y + 9z = 4$

A. (a) there is only one solution

B. (b) there exists infinitely many solution

C. (c) there is no solution

D. (d) none of these

**Answer: null**

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**113.** The existence of the unique solution of the system $x + y + z = \lambda, 5x - y + \mu z = 10, 2x + 3y - z = 6$ depends on

A. a. $\lambda$ only

B. b. $\mu$ only

C. c. Both $\lambda$ and $\mu$

D. d. Neither $\lambda$ nor $\mu$

**Answer: null**

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**114.** The system of equations: $x + y + z = 5$, $x + 2y + 3z = 9$ and $x + 3y + \lambda z = \mu$ has a unique solution, if

(a) $\lambda = 5, \mu = 13$

(b) $\lambda \neq 5$

(c)$\lambda = 5, \mu \neq 13$

(d) $\mu \neq 13$

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