# SAMPLE TEST PAPER - 02 FOR CLASS 12

## MATRICES & DETERMINANT



*This question paper consists of 29 questions divided into four sections – A, B, C and D*

*Section A contains 4 questions of 1 mark each*

*Section B contains 8 questions of 2 marks each*

*Section C contains 11 questions of 4 marks each*

*Section D contains 6 questions of 6 marks each*

| Ques No. | Question |
|---|---|
| 1 - 1458244 ***[1 mark]*** | The matrix $A=\begin{bmatrix} 0 & -5 & 8 \\ 5 & 0 & 12 \\ -8 & -12 & 0 \end{bmatrix}$ is a (a) diagonal matrix (b) symmetric matrix (c) skew-symmetric matrix (d) scalar matrix<br>Watch Free Video Solution on Doubtnut |
| 2 - 1458201 ***[1 mark]*** | If $A$= $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ a & b & -1 \end{bmatrix}$, then $A^2$ is equal to (a) a null matrix (b) a unit matrix (c) $A$ (d) $A$<br>Watch Free Video Solution on Doubtnut |
| 3 - 34444 ***[1 mark]*** | If $A^2-A+I=0,$ then the invers of $A$ is $A^{-2}$ b. $A+I$ c. $I-A$ d. $A-I$<br>Watch Free Video Solution on Doubtnut |
| 4 - 32689 ***[1 mark]*** | If $x\neq 0, y\neq 0, z\neq 0$ and $\begin{vmatrix} 1+x & 1 & 1 \\ 1+y & 1+2y & 1 \\ 1+z & 1+z & 1+3z \end{vmatrix}=0,$ then $x^{-1}+y^{-1}+z^{-1}$ is equal to a.1 b.-1 c.-3 d. none of these<br>Watch Free Video Solution on Doubtnut |
| 5 - 1457909 ***[2 marks]*** | Find $x,\ y,\ z$ and $w$ such that $\begin{bmatrix} x-y & 2z+w \\ 2x-y & 2x+w \end{bmatrix}=\begin{bmatrix} 5 & 3 \\ 12 & 15 \end{bmatrix}$.<br>Watch Free Video Solution on Doubtnut |
| 6 - 19354 | |

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| ***[2 marks]*** | Without expanding evaluate the determinant $\begin{vmatrix} 41 & 1 & 5 \\ 79 & 7 & 9 \\ 29 & 5 & 3 \end{vmatrix}$<br>Watch Free Video Solution on Doubtnut |
| 7 - 1457924<br>***[2 marks]*** | Find $x, y, a$ and $b$ if $\begin{bmatrix} 3x+4y & 2 & x-2y \\ a+b & 2a-b & -1 \end{bmatrix} = \begin{bmatrix} 2 & 2 & 4 \\ 5 & -5 & -1 \end{bmatrix}$<br>Watch Free Video Solution on Doubtnut |
| 8 - 1400<br>***[2 marks]*** | If $\begin{bmatrix} x+3 & z+4 & 2y-7 \\ -6 & a-1 & 0 \\ b-3 & -21 & 0 \end{bmatrix} = \begin{bmatrix} 0 & 6 & 3y-2 \\ -6 & -3 & 2c+2 \\ 2b+4 & -21 & 0 \end{bmatrix}$<br>Watch Free Video Solution on Doubtnut |
| 9 - 19269<br>***[2 marks]*** | If $\begin{vmatrix} x-2 & -3 \\ 3x & 2x \end{vmatrix} = 3$ find the value of x<br>Watch Free Video Solution on Doubtnut |
| 10 - 1458251<br>***[2 marks]*** | Evaluate D $= \begin{vmatrix} 2 & 3 & -2 \\ 1 & 2 & 3 \\ -2 & 1 & -3 \end{vmatrix}$ by expanding it along the second row.<br>Watch Free Video Solution on Doubtnut |
| 11 - 1458255<br>***[2 marks]*** | For what value of x the matrix $A = \begin{bmatrix} 1 & -2 & 3 \\ 1 & 2 & 1 \\ x & 2 & -3 \end{bmatrix}$ is singular?<br>Watch Free Video Solution on Doubtnut |
| 12 - 1458260<br>***[2 marks]*** | Let $\begin{vmatrix} 3 & y \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$ Find possible values of x and y if x,y are natural numbers<br>Watch Free Video Solution on Doubtnut |
| 13 - 19001<br>***[4 marks]*** | Find non-zero values of x satisfying the matrix equation : $x\begin{bmatrix} 2x & 2 \\ 3 & x \end{bmatrix} + 2\begin{bmatrix} 8 & 5x \\ 4 & 4x \end{bmatrix} = 2\begin{bmatrix} x^2+8 & 24 \\ 10 & 6z \end{bmatrix}$<br>Watch Free Video Solution on Doubtnut |
| 14 - 1359<br>***[4 marks]*** | Let $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}, B = \begin{bmatrix} 5 & 4 \\ 7 & 4 \end{bmatrix}, C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$. Find a matrix D such that $CD - AB = 0$<br>Watch Free Video Solution on Doubtnut |
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| 15 - 10894<br>***[4 marks]*** | Using properties of determinants, prove the following: $\begin{vmatrix} 1 & 1+p & 1+p+q \\ 2 & 3+2p & 1+3p+2q \\ 3 & 6+3p & 1+6p+3q \end{vmatrix} = 1$<br>Watch Free Video Solution on Doubtnut |
| 16 - 1556<br>***[4 marks]*** | If $a, b, c$ are in A.P, find value of $\begin{vmatrix} 2y+4 & 5y+7 & 8y+a \\ 3y+5 & 6y+8 & 9y+b \\ 4y+6 & 7y+9 & 10y+c \end{vmatrix}$<br>Watch Free Video Solution on Doubtnut |
| 17 - 32610<br>***[4 marks]*** | Show that $\begin{vmatrix} 1 & 1+p & 1+p+q \\ 2 & 3+2p & 1+3p+2q \\ 3 & 6+3p & 1+6p+3q \end{vmatrix} =$<br>Watch Free Video Solution on Doubtnut |
| 18 - 19339<br>***[4 marks]*** | If $f(x) = \begin{vmatrix} a & -1 & 0 \\ ax & a & -1 \\ ax^2 & ax & a \end{vmatrix}$, using properties of determinants, find the value of $f(2x) - f(x)$.<br>Watch Free Video Solution on Doubtnut |
| 19 - 19331<br>***[4 marks]*** | Prove that $\begin{vmatrix} a^2+2a & 2a+1 & 1 \\ 2a+1 & a+2 & 1 \\ 3 & 3 & 1 \end{vmatrix} = (a-1)^3$<br>Watch Free Video Solution on Doubtnut |
| 20 - 13404<br>***[4 marks]*** | Using properties of determinants, prove the following: $\begin{vmatrix} 1 & a & a^2 \\ a^2 & 1 & a \\ a & a^2 & 1 \end{vmatrix} = \left(1-a^3\right)^2$<br>Watch Free Video Solution on Doubtnut |
| 21 - 15163<br>***[4 marks]*** | If $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -1 & 4 \\ 3 & 1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 & 0 \\ 1 & 4 & 3 \\ 3 & 0 & -2 \end{bmatrix}$, verify that $(AB)^{-1} = B^{-1}A^{-1}$.<br>Watch Free Video Solution on Doubtnut |
| 22 - 19271<br>***[4 marks]*** | Find the minors of cofactors of elements of the matrix $A = [a_{ij}] = \begin{bmatrix} 1 & 3 & -2 \\ 4 & -5 & 6 \\ 3 & 5 & 2 \end{bmatrix}$<br>Watch Free Video Solution on Doubtnut |
| 23 - 1458103 | |

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| ***[4 marks]*** | Find the values of $x, y, z$ if the matrix $A = \begin{bmatrix} 0 & 2y & z \\ x & y & -z \\ x & -y & z \end{bmatrix}$ satisfy the equation $A^T A = I_3$<br><br>Watch Free Video Solution on Doubtnut |
| 24 - 23264<br><br>***[6 marks]*** | Prove that $\begin{vmatrix} \alpha & \beta & \gamma \\ \alpha^2 & \beta^2 & \gamma^2 \\ \beta+\gamma & \gamma+\alpha & \beta+\alpha \end{vmatrix}$ = $(\alpha-\beta)(\beta-\gamma)(\gamma-\alpha)(\alpha+\beta+\gamma)$<br><br>Watch Free Video Solution on Doubtnut |
| 25 - 13485<br><br>***[6 marks]*** | The monthly incomes of Aryan and Babban are in the ratio 3 : 4 and their monthly expenditures are in the ratio 5 : 7. If each saves Rs. 15,000 per month, find their monthly incomes using matrix method. This problem reflects which value ?<br><br>Watch Free Video Solution on Doubtnut |
| 26 - 19009<br><br>***[6 marks]*** | Let $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$ and $f(x) = x^2 - 4x + 7$ Show that $f(A) = 0$ Use this result of find $A^5$<br><br>Watch Free Video Solution on Doubtnut |
| 27 - 38204<br><br>***[6 marks]*** | $\begin{vmatrix} bc-a^2 & ca-b^2 & ab-c^2 \\ ca-b^2 & ab-c^2 & bc-a^2 \\ ab-c^2 & bc-a^2 & ca-b^2 \end{vmatrix} = \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}^2$<br><br>Watch Free Video Solution on Doubtnut |
| 28 - 19316<br><br>***[6 marks]*** | If $x+y+z=0$ , prove that $\begin{vmatrix} xa & yb & zc \\ yc & za & xb \\ zb & xc & ya \end{vmatrix} = xyz \begin{vmatrix} a & b & c \\ c & a & b \\ b & c & c \end{vmatrix}$<br><br>Watch Free Video Solution on Doubtnut |
| 29 - 12904<br><br>***[6 marks]*** | If a,b,c are positive and are the $pth, qthrth$ terms respectively of a GP then $\begin{vmatrix} \log a & p & 1 \\ \log b & q & 1 \\ \log c & r & 1 \end{vmatrix} =$<br><br>Watch Free Video Solution on Doubtnut |
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