Determinants (M.C.Qs)

Q.1 $A=\begin{bmatrix}200 & 50\\ 10 & 2\end{bmatrix}$ and $B=\begin{bmatrix}50 & 40\\ 2 & 3\end{bmatrix}$, then $|AB|$ is

(a) 460 (b) 2000 (c) 3000 (d) -7000

Q.2 If $A=\begin{vmatrix}2 & \lambda & -3\\ 0 & 2 & 5\\ 1 & 1 & 3\end{vmatrix}$. Then A^{-1} exist if

(a) $\lambda=2$ (b) $\lambda=-\frac{8}{5}$ (c) $\lambda\neq 2$ (d) $\lambda\neq-\frac{8}{5}$

Q3 If A and B are invertible matrices, then which of the following is not correct?

(a) $\text{adj}\,A = |A|\cdot A^{-1}$ (b) $\det(A^{-1}) = [\det(A)]^{-1}$

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

Q4 If $\begin{vmatrix}a & b & c\\ m & n & p\\ x & y & z\end{vmatrix}=k$, then value of $\Delta=\begin{vmatrix}6a & 2b & 2c\\ 3m & n & p\\ 3x & y & z\end{vmatrix}$ is

(a) $k/6$ (b) $2k$ (c) $3k$ (d) $6k$

Q5 The value of $|A|\,|\text{adj}\,A|$ if $A=\begin{bmatrix}-1 & 0 & 0\\ 0 & -1 & 0\\ 0 & 0 & -1\end{bmatrix}$ is

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

Q6 If $A=\begin{bmatrix}a & 0 & 0\\ 0 & a & 0\\ 0 & 0 & a\end{bmatrix}$, then $|\text{adj}\,A|$ is

(a) a^{27} (b) a^{6} (c) a^{9} (d) a^{2}

Q7 If A and B are square matrices of order 3 such that $|A|=-1$, $|B|=3$, then the determinant of $3AB$ is

(a) -81 (b) 9 (c) 81 (d) -9

Q8 If $A = [a_{ij}]$ is a scalar matrix of order n by n such that $a_{ii} = k$ for all i, then $|A|$ is

(a) nk (b) k^n (c) n^k (d) $n+k$

Q9 The product of a matrix and its transpose is an identity matrix. The determinant value of this matrix is

(a) 0 (b) 1 (c) ± 1 (d) -1

Q10 If $A = \begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ and $A \cdot (\text{adj} A) = k \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then the value of k is

(a) $\sin x \cdot \cos x$ (b) 1 (c) 2 (d) -1

Q11 If $A = (a_{ij})_{3\times 3}$ is an orthogonal matrix, then

(a) $|A| = 1, -1$ (b) $|A| = 0$ (c) $|A| = 2, -2$

(d) None of these

Q12 $A^{-1} = \begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}$, then find A

(a) $\begin{bmatrix} 6 & -4 \\ -5 & 3 \end{bmatrix}$ (b) $\begin{bmatrix} -3 & 2 \\ 5/2 & -3/2 \end{bmatrix}$ (c) $\begin{bmatrix} 1/3 & 4 \\ 5/3 & 1/6 \end{bmatrix}$ (d) Not possible

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Q13 If $A = \begin{bmatrix} 2 & \lambda & -3 \\ 0 & 3 & 5 \\ 1 & 1 & 3 \end{bmatrix}$, then A^{-1} exists if

(a) $\lambda = 2$ (b) $\lambda \neq 2$ (c) $\lambda \neq -2$ (d) None

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Q14 Matrix $A_\alpha = \begin{bmatrix} \alpha & \alpha-1 \\ \alpha-1 & \alpha \end{bmatrix}$, $\alpha \in N$, then the value of $|A_1| + |A_2| + \dots + |A_{300}|$ is

(a) $(999)^2$ (b) 300^2 (c) 600^2 (d) 2700^2

Q15 The value of $\begin{vmatrix} \cos 20^\circ & \sin 20^\circ \\ \sin 70^\circ & \cos 70^\circ \end{vmatrix}$ is

(a) 1 (b) -1 (c) 0 (d) $1/2$

Q16 $\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$, then Value of Δ is

(a) $a_{11}A_{31} + a_{12}A_{32} + a_{13}A_{33}$
(b) $a_{11}A_{11} + a_{12}A_{21} + a_{13}A_{31}$
(c) $a_{21}A_{11} + a_{22}A_{12} + a_{23}A_{13}$
(d) $a_{11}A_{11} + a_{21}A_{21} + a_{31}A_{31}$

Q17 If A is a Singular matrix, then $A \cdot (adj A)$ is
(a) Null Matrix (b) Scalar Matrix (c) Identity Matrix (d) None

Q18 If A and B are invertible matrices of order 2, $|A| = 5$, $|AB|^{-1} = \frac{1}{20}$, then value of $|B|$ is
(a) 2 (b) 3 (c) -4 (d) 4

Q19 Let $f(x) = \begin{vmatrix} x & -4 & 5 \\ 1 & 1 & -2 \\ 2 & x & 1 \end{vmatrix}$, then $f'(5)$ is equal to
(a) 1 (b) 26 (c) 40 (d) None

Q20 The Value of $\begin{vmatrix} 5^2 & 5^3 & 5^4 \\ 5^3 & 5^4 & 5^5 \\ 5^4 & 5^5 & 5^6 \end{vmatrix}$ is
(a) 5^2 (b) 0 (c) 5^{13} (d) 5^9

Q21 If $A+B+C = \pi$, then the value of

$$\begin{vmatrix} \sin(A+B+C) & \sin(A+C) & \cos C \\ -\sin B & 0 & \tan A \\ \cos(A+B) & \tan(B+C) & 0 \end{vmatrix}$$ is equal to

(a) 0 (b) 1 (c) $2 \sin B \tan A \cos C$ (d) None

Q22 If a, b, c are distinct, then the value of x satisfying $\begin{vmatrix} 0 & x^2-a & x^3-b \\ x^2+a & 0 & x^2+c \\ x^4+b & x-c & 0 \end{vmatrix} = 0$ is

(a) c (b) a (c) b (d) 0

Q23 If $P = \begin{bmatrix} 1 & \alpha & 3 \\ 1 & 3 & 3 \\ 2 & 4 & 4 \end{bmatrix}$ is the adjoint of a 3×3 matrix A and $|A| = 4$, then α is equal to

(a) 4 (b) 11 (c) 5 (d) 13

Q24 If A is an invertible matrix of order 2, then $\det(A^{-1})$ is equal to

(a) $\det A$ (b) $\frac{1}{\det A}$ (c) 1 (d) 0

Q25 If A is a square matrix of order 3, such that $A\cdot(\text{adj}A) = 10I$, then $|\text{adj}A|$ is equal to

(a) 1 (b) 10 (c) 1000 (d) 100

Q26 If A is a non-singular square matrix of order 3 such that $A^2 = 3A$, then value of $|A|$ is

(a) -3 (b) 3 (c) 9 (d) 27

Q27 If A is a skew-symmetric matrix of odd order n, then

(a) $|A| = 0$ (b) $|A| = 1$ (c) $|A| = -1$ (d) None

Q28 If A is a square matrix such that $A^2 = I$, then $(A-I)^3 + (A+I)^3 - 7A$ is equal to

(a) A (b) $I-A$ (c) $I+A$ (d) 0