

← ULTIMATE MATHEMATICS →

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EXAM No: 2: DETERMINANTS

TIME: 1 hr 45 Min
(105 Mins)

MARKS: 72
(Each Qns 4 Marks)

Qns: 1 → value of x for which the matrix

$$A = \begin{bmatrix} x-1 & 1 & 1 \\ 1 & x-1 & 1 \\ 1 & 1 & x-1 \end{bmatrix} \text{ is singular is}$$

- (A) ☐ $x=1, 2$ (B) ☐ $x=-1, 2$ (C) ☐ $x=1, -2$ (D) ☐ None of these

Qns: 2 → If any triangle ABC with vertices $A(2, -6)$, $B(5, 4)$, $C(k, 4)$ is 35 square units, then value of k is

- (A) ☐ $k=12$ (B) ☐ $k=-12, 2$ (C) ☐ $k=12, -2$ (D) ☐ $k=-12, -2$

Qns: 3 → If the points $(k, 2-2k)$, $(-k+1, 2k)$, $C(-4-k, 6-2k)$ are collinear, then value of k is

- (A) ☐ $k=1, -1/2$ (B) ☐ $k=-1, -1/2$ (C) ☐ $k=-1, 1/2$ (D) ☐ None

Qns: 4 → If $A = \begin{bmatrix} 1 & \tan x \\ -\tan x & 1 \end{bmatrix}$, then $A'A^{-1} =$

(A) ☐ $\begin{bmatrix} \cos(2x) & \sin(2x) \\ \sin(2x) & -\cos(2x) \end{bmatrix}$ (B) ☐ $\begin{bmatrix} \sin(2x) & -\cos(2x) \\ \cos(2x) & \sin(2x) \end{bmatrix}$

(C) ☐ $\begin{bmatrix} \cos(2x) & -\sin(2x) \\ -\sin(2x) & -\cos(2x) \end{bmatrix}$ (D) ☐ None of these

Qns: 5 → If $A^{-1} = \begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$ & $B = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ then

$(AB)^{-1} = ?$ (A) ☐ $\begin{bmatrix} 9 & -3 & 5 \\ -2 & 1 & 0 \\ 1 & 0 & 2 \end{bmatrix}$ (B) ☐ $\begin{bmatrix} 1 & -3 & 5 \\ 2 & 1 & 0 \\ 1 & 2 & 0 \end{bmatrix}$

(C) $O \begin{bmatrix} 9 & 3 & -5 \\ -2 & -1 & 0 \\ 1 & 0 & 2 \end{bmatrix}$ (D) O none of these

QNS 6 → System of equations $5x - y + 4z = 5$; $2x + 3y + 5z = 2$
and $5x - 2y + 6z = -1$ is

- (A) O Inconsistent (B) O consistent with Unique Solution
(C) O consistent with Infinite Many Solution

QNS 7 → value of x for which $\Delta = \begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0$
is

- (A) $O -\frac{2}{3}, \frac{1}{3}$ (B) $O \frac{2}{3}, -\frac{8}{3}$ (C) $O \frac{2}{3}, \frac{8}{3}$ (D) $O \frac{2}{3}, \frac{11}{3}$

QNS 8 → $\begin{vmatrix} x & x^2 & yz \\ y & y^2 & zx \\ z & z^2 & xy \end{vmatrix} = ?$

- (A) $O (x-y)(y-z)(z-x)(x+y+z)$ (B) $O (x-y)(y-z)(z-x)$
(C) $O (x-y)(y-z)(z-x)(xyz)$ (D) $O (x-y)(y-z)(z-x)(xy+yz+zx)$

QNS 9 → Solution of system of linear equations
 $\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4$; $\frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1$ & $\frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2$

is $x = \underline{\hspace{2cm}}$, $y = \underline{\hspace{2cm}}$, $z = \underline{\hspace{2cm}}$

(Fill in the blanks)

QNS 10 → $A = \begin{bmatrix} 3 & 1 \\ 2 & -1 \end{bmatrix}$, then $|Adj(A \&A)|$ is

- (A) $O 5$ (B) $O 5, -5$ (C) $O -5$ (D) O none of these

Qns 11 \rightarrow order 3×3 , $|2AB| = 120$; $|A| = 5$,
then $|-B| = ?$

- (A) 0 3 (B) 0 -2 (C) 0 2 (D) 0 -3

Qns 12 \rightarrow If $\begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix} \times \begin{bmatrix} 5 & 3 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

then matrix X equals to

(fill in the blanks)

Qns 13 \rightarrow value of $\begin{vmatrix} 1 & 1 & 1 \\ nC_1 & n+2C_1 & n+4C_1 \\ nC_2 & n+2C_2 & n+4C_2 \end{vmatrix}$ is

- (A) 0 16 (B) 0 18 (C) 0 12 (D) 0 none of these

Qns 14 \rightarrow If $\Delta = \begin{vmatrix} 3 & -2 & \sin(3\theta) \\ -7 & 8 & \cos(2\theta) \\ -1 & 14 & 2 \end{vmatrix} = 0$ then

- (A) $\cos\theta = 0$, $\sin\theta = 1/2$ (B) $\sin\theta = 0$, $\cos\theta = 1/2$
(C) $\sin\theta = 1/2$ (D) $\sin\theta = 0$, $\sin\theta = 1/2$

Qns 15 \rightarrow $\begin{vmatrix} a & b-c & c-b \\ a-c & b & c-a \\ a-b & b-a & c \end{vmatrix} = ?$

- (A) 0 $(a-b+c)(b+c-a)(c-a+b)$ (B) 0 $(a+b-c)(b+c-a)(c+a-b)$
(C) 0 $(a+b+c)(a-b-c)(c-a-b)$ (D) 0 none of these

Q. 16 \rightarrow order 3×3 ; $|2A + A| = 128$, find $|A| = ?$

- (A) 0 4 (B) 0 ± 5 (C) 0 -4 (D) 0 ± 4

Q. 17 \rightarrow
$$\begin{vmatrix} a^2 & bc & ac + c^2 \\ a^2 + ab & b^2 & ac \\ ab & b^2 + bc & c^2 \end{vmatrix} = ?$$

- (A) 0 $2abc$ (B) 0 $4abc$ (C) 0 $2a^2b^2c^2$ (D) 0 none of these

Q. 18 \rightarrow If $A = \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$, then $|A^{-1}| =$

- (A) 0 10 (B) 0 $\frac{1}{100}$ (C) 0 $\frac{1}{10}$ (D) 0 $-\frac{1}{10}$