

PYQs

2023

M.C.Q (Marks -1)

<1> If $A = \begin{bmatrix} 1 & 0 \\ -2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -5 & 10 \\ -10 & -5 \end{bmatrix}$, then

AB is —

(a) $\begin{bmatrix} -5 & 10 \\ 0 & -5 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & -5 \\ 25 & 10 \end{bmatrix}$ (c) $\begin{bmatrix} 10 & -25 \\ -5 & 0 \end{bmatrix}$

(d) $\begin{bmatrix} -5 & 10 \\ 0 & -25 \end{bmatrix}$

<2> If $\begin{bmatrix} x+y & x+2 \\ 2x-y & 16 \end{bmatrix} = \begin{bmatrix} 8 & 5 \\ 1 & 3y+1 \end{bmatrix}$, then the values

of x and y are —

(a) $x=2, y=5$ (b) $x=5, y=3$ (c) $x=2, y=7$ (d) $x=7, y=2$

<3> A and B are square matrices each of order 3 such that $|A| = -1$ and $|B| = 3$, what is the value of $|3AB|$?

(a) -9 (b) -18 (c) -27 (d) -81

Q4) If $\begin{vmatrix} 2 & 3 & 2 \\ x & x & x \\ 4 & 9 & 1 \end{vmatrix} + 3 = 0$, then the value of

- x is —
- (a) -1 (b) 0 (c) 1 (d) 3.

VSA (Marks - 2)

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

$$\begin{aligned} 2x - y &= 17 \\ 3x + 5y &= 16 \end{aligned}$$

2. Determine the integral value(s) of x for which the matrix A is singular:

$$A = \begin{bmatrix} x+1 & -3 & 4 \\ -5 & x+2 & 2 \\ 4 & 1 & x-6 \end{bmatrix}$$

LAQ (Marks - 5)

1. Find the inverse of the matrix

$$A = \begin{bmatrix} -1 & 1 & 2 \\ 3 & -1 & 1 \\ -1 & 3 & 4 \end{bmatrix}$$

2. Using matrix method, solve the following system of equations for x, y and z :

$$\begin{aligned} x - y + z &= 4; \quad 2x + y - 3z = 0; \\ x + y + z &= 0 \end{aligned}$$

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MCQs (Mark: 1)

1. If $A = \begin{bmatrix} 4 & 1 \\ 3 & 2 \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, then

$(A^2 - 6A)$ is equal to —

- (a) $3I$ (b) $-5I$ (c) $5I$ (d) $-8I$

2. If $A = \begin{bmatrix} 2x & 0 \\ x & x \end{bmatrix}$ and $A^{-1} = \begin{bmatrix} 1 & 0 \\ -1 & 2 \end{bmatrix}$, then

the value of x is —

- (a) 1 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) 2

Assertion-Reason (Mark: 1)

Assertion (A): Minor of element a_{13} in the

matrix $\begin{bmatrix} 0 & 2 & 6 \\ 1 & 2 & -1 \\ 2 & 1 & 3 \end{bmatrix}$ is

Reason (R): Minor of an element a_{ij} of a matrix is the determinant obtained by deleting its j th row and i th column in which the element lies.

- (a) $A \checkmark R \checkmark E \checkmark$ (b) $A \checkmark R \checkmark EX$
(c) $A \checkmark R \checkmark X$ (d) $A \checkmark R \checkmark$

SAQ (Marks - 3)

(1) Evaluate :

$$\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix}$$

(2) Find the inverse of the matrix —

$$\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$$

Case Study (Marks - 4)

Rohini wants to give a rectangular plot of land for a school in her village. When she was asked to mention the dimensions of the plot, she told that if its length decreases by 50 m and breadth is increased by 50 m, then its area does not alter, but if its length is decreased by 10 m, and breadth is decreased by ~~20~~ 20 m, then its area will decrease by 5300 sq. m.

Based on the above informations, answer the following question: —

(i) Assuming x m and y m as the length and breadth of the plot respectively, write the system of linear equations in x and y . [1]

ii) Write the system of linear equations obtained in (i) in the matrix equation

$$AX = B$$

iii) (a) Determine A^{-1} . [2]

OR

(b) Find the area of the plot. [2]

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MCQs (Mark-1)

1) If A and B are symmetric matrices of the same order then $(AB' - BA')$ is a —

- (a) symmetric matrix
- (c) diagonal matrix

(b) Null matrix

(d) skew symmetric matrix

2) The inverse of matrix $A = \begin{bmatrix} 4 & -1 \\ 2 & 1 \end{bmatrix}$ is —

(a) $\frac{1}{6} \begin{bmatrix} -4 & 2 \\ -1 & -1 \end{bmatrix}$

(b) $\begin{bmatrix} \frac{1}{3} & \frac{1}{6} \\ \frac{2}{3} & -\frac{1}{6} \end{bmatrix}$

(c) $\begin{bmatrix} \frac{1}{6} & \frac{1}{6} \\ -\frac{1}{3} & \frac{2}{3} \end{bmatrix}$

(d) $\begin{bmatrix} -\frac{2}{3} & \frac{1}{6} \\ -\frac{1}{3} & -\frac{1}{6} \end{bmatrix}$

3) If $\begin{vmatrix} 2x & 5 \\ 4 & x \end{vmatrix} = \begin{vmatrix} 3 & 5 \\ 4 & 6 \end{vmatrix}$, then the value of

x is —

(a) $\frac{3}{2}$

(b) 6

(c) 3

(d) ± 2

VSAQ (Marks - 2)

(1) Given, $A = \begin{bmatrix} 2 & 0 & 1 \\ 3 & 4 & 5 \\ 0 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 & -5 \\ -5 & 1 & -5 \\ 1 & -2 & 4 \end{bmatrix}$,

find BA .

LAQ (Marks - 5)

(1) If $A = \begin{bmatrix} 2 & -3 & 5 \\ 3 & 2 & -4 \\ 1 & 1 & -2 \end{bmatrix}$, find A^{-1} and

hence solve the following system of linear equations:

$$2x - 3y + 5z = 11$$

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

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

OR

Using properties of determinants, prove that

$$\Delta = \begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc(a+b+c)^2$$