Model Question Paper 1

MATRICES AND DETERMINANTS 1

11th Standard

Maths

Reg.No. : | | | | | | |

Answer all the Questions

Time : 02:00:00 Hrs

Total Marks : 65

Part A

10 x 1 = 10

1) The order of matrix $B = [1 \quad 2 \quad 5 \quad 7]$ is .....

(a) 1 x 4 (b) 4 x 1 (c) 2 x 1 (d) 1 x 1

2) Number of elements in a matrix of order 2 x 3 is .....

(a) 5 (b) 2 (c) 3 (d) 6

3) $A = \begin{bmatrix} 2 & 1 & 4 \\ -3 & 2 & 1 \end{bmatrix}$, and X + A = 0, then matrix X is

(a) $\begin{bmatrix} 2 & 1 & 4 \\ -3 & 2 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} -2 & -1 & -4 \\ 3 & -2 & -1 \end{bmatrix}$ (c) $\begin{bmatrix} -2 & -1 & -4 \\ 3 & 2 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 2 & 1 & 4 \\ 3 & -2 & -1 \end{bmatrix}$

4) The product of the matrices $\begin{bmatrix} 7 & 5 & 3 \end{bmatrix} \begin{bmatrix} 7 \\ 3 \\ 2 \end{bmatrix}$ is equal to .....

(a) [70] (b) [49] (c) [15] (d) 70

5) The product of the matrix $\begin{bmatrix} \sqrt{2} & 0 & 0 \\ 0 & \sqrt{3} & 0 \\ 0 & 0 & \sqrt{3} \end{bmatrix}$ is .....

(a) a scalar matrix (b) a diagonal matrix (c) a unit matrix (d) diagonal and scalar

6) If $a_{ij} = \begin{cases} 1 & if \quad i = j \\ 0 & if \quad i \neq j \end{cases}$ is

(a) Square matrix (b) Null matrix (c) Unit matrix (d) Zero matrix

7) The term 'Matrix' was first introduced by

(a) Cayley (b) Sylvester (c) Hamilton (d) Grassman

8) If A=$\begin{pmatrix} w & 0 \\ 0 & w \end{pmatrix}$, where $w^3=1$, then A^{100} is

(a) A (b) -A (c) 0 (d) None of these

9) If $A = \begin{pmatrix} \alpha & \beta \\ \gamma & -\alpha \end{pmatrix}$ is such that $A^2=I$, then

(a) $1+\alpha^2+\beta\gamma=0$ (b) $1-\alpha^2-\beta\gamma=0$ (c) $1-\alpha^2+\beta\gamma=0$ (d) $1+\alpha^2-\beta\gamma=0$

10) If AB=A and BA=B, then

(a) $A^2=A$ (b) $B^2=B$ (c) A=I (d) $A^2=A$ and $B^2=\bar{B}$

Part B

5 x 2 = 10

11) Construct a 3×3 matrix whose elements are $(i) a_{ij} = i + j \quad (ii) a_{ij} = i \times j$

12) Find the values of x, y, z if $\begin{bmatrix} x & 3x-y \\ 2x+z & 3y-w \end{bmatrix} = \begin{bmatrix} 0 & -7 \\ 3 & 2a \end{bmatrix}$

13) If $\begin{bmatrix} 2x & 3x-y \\ 2x+z & 3y-w \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 4 & 7 \end{bmatrix}$ find x, y, z, w

14) If $A = \begin{bmatrix} 2 & 1 \\ 4 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & -2 \\ 1 & 4 \end{bmatrix}$, $C = \begin{bmatrix} -2 & -3 \\ 1 & 2 \end{bmatrix}$ find -2A + (B + C)

15) If $A = \begin{bmatrix} 2 & 1 \\ 4 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & -2 \\ 1 & 4 \end{bmatrix}$, $C = \begin{bmatrix} -2 & -3 \\ 1 & 2 \end{bmatrix}$ find A - (3B - C)

Part C

5 x 3 = 15

16) Find the value of the determinant $\begin{vmatrix} 2 & 6 & 4 \\ -5 & -15 & -10 \\ 1 & 3 & 2 \end{vmatrix}$ without usual expansion.

17) Identify the singular and non-singular matrix

$\begin{bmatrix} 1 & 4 & 9 \\ 4 & 9 & 16 \\ 9 & 16 & 25 \end{bmatrix}$

18) Identify the singular and non-singular matrix

$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ -2 & -4 & -6 \end{bmatrix}$

19) Solve $\begin{vmatrix} 2 & x & 4 \\ 3 & 2 & 1 \\ 1 & 2 & 3 \end{vmatrix} = -3$

20) Solve $\begin{vmatrix} 4 & 3 & 9 \\ 3 & -2 & 7 \\ 4 & 4 & x \end{vmatrix} = -1$

Part D

6 x 5 = 30

21) Using factor method show that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

22) Prove by factor method $\begin{vmatrix} b+c & a-c & a-b \\ b-c & c+a & b-a \\ c-b & c-a & a+b \end{vmatrix} = 8abc$

23) Solve using factor method $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix} = 0$

24) Factorise $\begin{vmatrix} a & b & c \\ a^2 & b^2 & c^2 \\ bc & ca & ab \end{vmatrix}$

25) Show that $\begin{vmatrix} b+c & a & a^2 \\ c+a & b & b^2 \\ a+b & c & c^2 \end{vmatrix} = (a+b+c)(a-b)(b-c)(c-a)$

26) Prove that $\begin{vmatrix} 1 & x & x^2-yz \\ 1 & y & y^2-zx \\ 1 & z & z^2-xy \end{vmatrix} = 0$

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