Model Question Paper 2

MATRICES AND DETERMINANTS 2

11th Standard

Maths

Reg.No. :

Answer all the Questions

Time : 02:00:00 Hrs

Total Marks : 60

Part A

10 x 1 = 10

1) The minor of 2 in $\begin{vmatrix} 2 & -3 \\ 6 & 0 \end{vmatrix}$ is ....

(a) 0 (b) 1 (c) 2 (d) -3

2) The confactor of -7 in $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$ is ....

(a) -18 (b) 18 (c) -7 (d) 7

3) If $A = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ and $|A| = 2$, then $|3A|$ is ....

(a) 54 (b) 6 (c) 27 (d) -54

4) In a thrid order determinant the cofactor of a_{23} is equal to the minor of a_{23}, then the value of the mminor is..................

(a) 1 (b) Δ (c) $-\Delta$ (d) 0

5) The solution of $\begin{vmatrix} 2x & 3 \\ 2 & 3 \end{vmatrix} = 0$ is ....

(a) x = 1 (b) x = 2 (c) x = 3 (d) x = 0

6) The value of $\begin{vmatrix} 1 & 1 & 1 \\ 2x & 2y & 2z \\ 3x & 3y & 3z \end{vmatrix}$ is ....

(a) 1 (b) xyz (c) x+y+z (d) 0

7) If A is a square matrix of order 3, then $|kA|$ is ....

(a) $k \quad |A|$ (b) $-k \quad |A|$ (c) $k^3 \quad |A|$ (d) $-k^3 \quad |A|$

8) If $\Delta = \begin{vmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \\ 2 & 3 & 1 \end{vmatrix}$, then $\begin{vmatrix} 3 & 1 & 2 \\ 1 & 2 & 3 \\ 2 & 3 & 1 \end{vmatrix}$ is eqaul to ....

(a) Δ (b) $-\Delta$ (c) 3Δ (d) -3Δ

9) The value of the determinant $\begin{vmatrix} 1 & 2 & 3 \\ 7 & 6 & 5 \\ 1 & 2 & 3 \end{vmatrix}$ is ....

(a) 0 (b) 5 (c) 10 (d) -10

10) If $\Delta = \begin{vmatrix} 1 & 4 & 3 \\ -1 & 1 & 5 \\ 3 & 2 & -1 \end{vmatrix}$ and $\Delta_1 = \begin{vmatrix} 2 & 8 & 6 \\ -2 & 2 & 10 \\ 6 & 4 & -2 \end{vmatrix}$, then ....

(a) $\Delta_1 = \Delta$ (b) $\Delta_1 = 4\Delta$ (c) $\Delta_1 = 8\Delta$ (d) $\Delta_1 = 8\Delta_1$

Part B

10 x 2 = 20

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

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

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

17) 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 + B) + C

18) 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 + B

19) 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 B + A

20) 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 AB

Part C

5 x 3 = 15

21) Prove that $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = abc(a+b+c)^3$

22) Prove that $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1 + \frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)$ where a, b, c are non-zero real numbers and hence evaluate the value of $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+a & 1 \\ 1 & 1 & 1+a \end{vmatrix}$

23) Prove that $\begin{vmatrix} 1 & a & a^3 \\ 1 & b & b^3 \\ 1 & c & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$

24) If x, y, z are all different and $\begin{vmatrix} x & x^2 & 1-x^3 \\ y & y^2 & 1-y^3 \\ z & z^2 & 1-z^3 \end{vmatrix} = 0$ then show that xyz = 1

25) Prove that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = \begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$

Part D

3 x 5 = 15

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

27) , If A_1, B_1, C_1 are the co-factors of a_1, b_1, c_1 in $\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ then show that $\begin{vmatrix} A_1 & B_1 & C_1 \\ A_2 & B_2 & C_2 \\ A_3 & B_3 & C_3 \end{vmatrix} = \Delta^2$

28) Show that, $\begin{vmatrix} 2bc-a^2 & c^2 & b^2 \\ c^2 & 2ca-b^2 & a^2 \\ b^2 & a^2 & 2ab-c^2 \end{vmatrix} = \begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}^2$

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