Model Question Paper 3

MATRICES AND DETERMINANTS 3

11th Standard

Maths

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

Answer all the Questions

Time : 02:30:00 Hrs

Total Marks : 100

Part A

15 x 1 = 15

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 $\Delta = \begin{vmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \\ 2 & 3 & 1 \end{vmatrix}$, 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

8) 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

9) 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) $\Delta_1 = 8\Delta_1$

10) If $\Delta_1 = \begin{vmatrix} 7 & 6 & 1 \\ 5 & 3 & 8 \\ 8 & 2 & 4 \end{vmatrix}$ and $\Delta_2 = \begin{vmatrix} 7 & 6 & 1 \\ 8 & 2 & 4 \\ 10 & 6 & 16 \end{vmatrix}$, then .....

(a) $\Delta_1 = -2\Delta_2$ (b) $\Delta_2 = -2\Delta_1$ (c) $\Delta_1 = 2\Delta_2$ (d) $\Delta_1 = -2\Delta_2$

11) Two rows of a determinant Δ are identical when x = -a, then the factor of Δ is .....

(a) x + a (b) x - a (c) $(x + a)^2$ (d) $(x - a)^2$

12) The factor of the determinant $\begin{vmatrix} x & -6 & -1 \\ 2 & -3x & x-3 \\ -3 & 2x & x+2 \end{vmatrix}$ is .....

(a) x + 2 (b) x - 3 (c) x - 2 (d) x + 3

13) If all the three rows are identical in a determinant Δ on putting x=a, then the factor of is .....

(a) x - a (b) x + a (c) $(x - a)^2$ (d) $(x + a)^2$

14) The factor of the determinant $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix}$ is .....

(a) x (b) x+b (c) x+c (d) x-a+b+c

15) The value of the determinant $\begin{vmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{vmatrix}^2$ is .....

(a) abc (b) 0 (c) $a^2b^2c^2$ (d) -abc

Part B

10 x 2 = 20

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

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

18) 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

19) 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)

20) 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)

21) 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)

22) 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

23) 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

24) 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 B + A

25) 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 AB

Part C

5 x 3 = 15

26) Prove that $\begin{vmatrix} b+c & c+a & a+b \\ q+r & r+p & p+q \\ y+z & z+x & x+y \end{vmatrix} = 2\begin{vmatrix} a & b & c \\ p & q & r \\ x & y & z \end{vmatrix}$

27) Prove that $\begin{vmatrix} -a^2 & ab & ac \\ ab & -b^2 & bc \\ ac & bc & -c^2 \end{vmatrix} = 4a^2b^2c^2$

28) Prove that $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = 3abc - a^3 - b^3 - c^3$

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

30) If $A = \begin{bmatrix} 3 & -2 \\ 4 & -2 \end{bmatrix}$ find K. So that $A^2 = KA - 2I$.

Part D

10 x 5 = 50

31) Find the minor and cofactor of each element of the determinant $\begin{vmatrix} 3 & 4 & 1 \\ 0 & -1 & 2 \\ 5 & -2 & 6 \end{vmatrix}$

32) Solve $\begin{vmatrix} x-1 & x & x-2 \\ 0 & x-2 & x-3 \\ 0 & 0 & x-3 \end{vmatrix} = 0$

33) Solve for x if $\begin{vmatrix} x & 5 \\ 7 & x \end{vmatrix} + \begin{vmatrix} 1 & -2 \\ -1 & 1 \end{vmatrix} = 0$

34) Solve for x if $\begin{vmatrix} 0 & 1 & 0 \\ x & 2 & x \\ 1 & 3 & x \end{vmatrix} = 0$

35) Evaluate $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix}$

36) Evaluate $\begin{vmatrix} x+2a & x+3a & x+4a \\ x+3a & x+4a & x+5a \\ x+4a & x+5a & x+6a \end{vmatrix}$

37) Prove that: $\begin{vmatrix} 2x+y & x & y \\ 2y+z & y & z \\ 2z+x & z & x \end{vmatrix} = 0$

38) Prove that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$

39) Prove that $\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{vmatrix} = xy$

40) 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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