KNS school

MATRICES AND DETERMINANTS

12th Standard

Maths

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

use blue ink pen only

Time : 01:00:00 Hrs

Total Marks : 100

Part A

19 x 1 = 19

1) The rank of the matrix \begin{pmatrix} 1 & -1 & 2 \\ 2 & -2 & 4 \\ 4 & -4 & 8 \end{pmatrix} is,

(a) 1 (b) 2 (c) 3 (d) 4

2) The rank of the diagonal matrix \begin{pmatrix} -1 &0 &0 &0 \\ 0& 2 &0 & 0&0 \\0 &0 & 0 &0 &0 \\ 0& 0& 0& -4 &0 \\0 &0 & 0& 0& 0 \end{pmatrix}is

(a) 0 (b) 2 (c) 3 (d) 5

3) If A = (2 0 1), then the rank of { AA }^{ T } is .....

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

4) If A = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}, then the rank of { AA }^{ T } is,

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

5) If the rank of the matrix \begin{pmatrix} \lambda & -1 & 0 \\ 0 & \lambda & -1 \\ -1 & 0 & \lambda \end{pmatrix} is 2, then \lambda is,

(a) 1 (b) 2 (c) 3 (d) any real number

6) If A is a scalar matrix with scalar k\neq 0 , of order 3, then { A }^{ -1 } is

(a) \frac { 1 }{ { k }^{ 2 } } I (b) \frac { 1 }{ { k }^{ 3 } } I (c) \frac { 1 }{ k } I (d) K \ I

7) If the matrix \begin{pmatrix} -1 & 3 & 2 \\ 1 & k & -3 \\ 1 & 4 & 5 \end{pmatrix}has an inverse then the values of k

(a) k is any real number (b) k = -4 (c) k\neq -4 (d) k\neq 4

8) If A = \begin{pmatrix} 2 & 1 \\ 3 & 4 \end{pmatrix}, then (adjA) A =

(a) \begin{pmatrix} \frac { 1 }{ 5 } & 0 \\ 0 & \frac { 1 }{ 5 } \end{pmatrix} (b) \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}

(c) \begin{pmatrix} 5 & 0 \\ 0 & -5 \end{pmatrix} (d) \begin{pmatrix} 5 & 0 \\ 0 & 5 \end{pmatrix}

9) If A is a square matrix of order n then |adjA| is

(a) { |A| }^{ 2 } (b) { |A| }^{ n } (c) { |A| }^{ n-1 } (d) |A|

10) The inverse of the matrix \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix} is

(a) \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}

(b) \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ -1 & 0 & 0 \end{pmatrix}

(c) \begin{pmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}

(d) \begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}

11) If A is a matrix of order 3, then det(kA) is,

(a) { k }^{ 3 }det(A) (b) { k }^{ 2 }det(A) (c) { k } \ det(A) (d) det \ (A)

12) If I is the unit matrix of order n, where k\neq 0 is a constant, then adj(kI) is

(a) { k }^{ n }(adj \ I) (b) { k }(adj \ I) (c) { { k }^{ 2 } }(adj(I)) (d) { { k }^{ n-1 } }(adj \ I)

13) If A and B are any two matrices such that AB= 0 and A is non-singular, then

(a) B=0 (b) B is singular (c) B is non-singular (d) B =A

14) If A = \begin{pmatrix} 0 & 0 \\ 0 & 5 \end{pmatrix}, then { A }^{ 12 } is,

(a) \begin{pmatrix} 0 & 0 \\ 0 & 60 \end{pmatrix} (b) \begin{pmatrix} 0 & 0 \\ 0 & { 5 }^{ 12 } \end{pmatrix}

(c) \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} (d) \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}

15) Inverse of \begin{pmatrix} 3 & 1 \\ 5 & 2 \end{pmatrix} is,

(a) \begin{pmatrix} 2 & -1 \\ -5 & 3 \end{pmatrix} (b) \begin{pmatrix} -2 & 5 \\ 1 & -3 \end{pmatrix}

(c) \begin{pmatrix} 3 & -1 \\ -5 & -3 \end{pmatrix} (d) \begin{pmatrix} -3 & 5 \\ 1 & -2 \end{pmatrix}

16) In a system of 3 linear non-homogeneous equation with three unknowns, if \Delta =0 and { \Delta }_{ x }=0 , { \Delta }_{ y }=0, { \Delta }_{ y }\neq 0, { \Delta }_{ z }=0 then the system has

(a) unique solution (b) two solutions (c) infinitely many solutions (d) no solutions

17) The system of equations ax+y+z = 0 ; x+by+z = 0; x+y+cz = 0 has a non – trivial solution then\frac { 1 }{ 1-a } +\frac { 1 }{ 1-b } +\frac { 1 }{ 1-c } =

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

18) If { ae }^{ x }+be^{ y }=c ; { pe }^{ x }+qe^{ y }=d and \Delta _1 =\begin{vmatrix} a & b \\ p & q \end{vmatrix} ;{ \Delta }_{ 2 }=\begin{vmatrix} c & b \\ d & q \end{vmatrix} ; { \Delta }_{ 3 }=\begin{vmatrix} a & c \\ p & d \end{vmatrix} then the value of (x, y) is

(a) \left(\frac { { \Delta }_{ 2 } }{ { \Delta }_{ 1 } } \frac { { \Delta }_{ 3 } }{ { \Delta }_{ 1 } } \right)

(b) \left(log\frac { { \Delta }_{ 2 } }{ { \Delta }_{ 1 } } ,log\frac { { \Delta }_{ 3 } }{ { \Delta }_{ 1 } } \right)

(c) \left(log\frac { { \Delta }_{ 1 } }{ { \Delta }_{ 3 } } ,log\frac { { \Delta }_{ 1 } }{ { \Delta }_{ 2 } } \right)

(d) \left(log\frac { { \Delta }_{ 1 } }{ { \Delta }_{ 2 } } ,log\frac { { \Delta }_{ 1 } }{ { \Delta }_{ 3 } } \right)

19) If the equations –2x+y+z=l ; x-2y+z=m ; x+y-2z=n such that l+m+n = 0, then the system has .....

(a) non-zero unique solution (b) trivial solution (c) infinitely many solutions (d) no solution

Part B

19 x 3 = 57

20) Find the adjoint of the matrix A=\begin{bmatrix} 1 & 2 \\ 3 & -5 \end{bmatrix} and verify the result A\left(adjA \right) =\left(adjA \right) \ A=\left| A \right| .I

21) Find the inverse of the following matrices : \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}\\

22) Show that the adjoint of A=\begin{bmatrix} -4 & -3 & -3 \\ 1 & 0 & 1 \\ 4 & 4 & 3 \end{bmatrix} is **A** itself.

23) For A=\begin{bmatrix} -1 & 2 & -2 \\ 4 & -3 & 4 \\ 4 & -4 & 5 \end{bmatrix}show that A= { A }^{ -1 }

24) Find the adjoint of the matrix=A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}

25) Find the inverse of the following matrices: \begin{bmatrix} -1 & 2 \\ 1 & -4 \end{bmatrix}

26) Find the rank of the matrix \begin{bmatrix} 1 & -2 & 3 \\ -2 & 4 & -6 \\ 5 & 1 & -1 \end{bmatrix}

27) Solve: x+y+2z=0\ \ ;\ \ 2x+y-z=0\ \ ;\ \ 2x+2y+z=0

28) Show that the adjoint of A=\begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix} is 3{ A }^{ T }

29) Solve the following non-homogeneous system of linear equations determinant method: 2x+y-z=4 \ ;\ x+y-2z=0 \ ;\ 3x+2y-3z=4

30) Solve the following non-homogeneous system of linear equations determinant method: 3x+y-z=2 \ ;\ 2x-y+2z=6 \ ;\ 2x+y-2z=-2

31) Solve the following non-homogeneous system of linear equations determinant method: $x+2y+z=6 \ ;\ 3x+3y-z=3 \ ;\ 2x+y-2z=-3$

32) Find the inverse of the following matrices : $\begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}$

33) Find the inverse of the following matrices : $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

34) Find the inverse of the following matrices :$\begin{bmatrix} 8 & -1 & -3 \\ -5 & 1 & 2 \\ 10 & -1 & -4 \end{bmatrix}$

35) Find the inverse of the following matrices :$\begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$

36) Find the inverse of the following matrices: $\begin{bmatrix} 2 & -1 \\ -4 & 2 \end{bmatrix}$

37) Find the inverse of the following matrices:$\begin{bmatrix} \cos { \alpha } & \sin { \alpha } \\ -\sin { \alpha } & \cos { \alpha } \end{bmatrix}$

38) If $A=\begin{bmatrix} 5 & 2 \\ 7 & 3 \end{bmatrix}$ and $B=\begin{bmatrix} 2 & -1 \\ -1 & 1 \end{bmatrix}$ Verify that (i) $(AB)^{-1}=B^{-1}A^{-1}$ (ii) $(AB)^{T}=B^{T}A^{T}$

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