CHAPTER 4

DETERMINANTS

TRUE FALSE QUESTIONS

Read the statements and state true or false.

- 1. If det (A) = 3 then the det(2A) = 6
- 2. If det(A) = 0 then A= O always.
- 3. If A is invertible then, det(A) is never 0.
- 4. If the value of a third order determinant is 12, then the value of the determinant formed by replacing each element by its co-factor will be 144.
- 5. For any square matrix A, det(-A) = det(A)
- 6. If AB = BA = I whereA and B are square matrices, then B is inverse of A but A is not inverse of B.
- 7. A square matrix A is invertible if and only if A is non-singular matrix.
- 8. The determinant of the product of matrices is equal to product of their respective determinants.
- 9. If the elements of a row (or column) are multiplied with co-factors of elements of any other row (or column), then their sum is zero
- 10. Matrices of any order have determinants.
- 11. $|A^{-1}| = |A|^{-1}$, where A is a non -singular matrix
- 12. $|adj A| = |A|^2$, where A is squre matrix of order 3.
- 13. If A and B are matrices of order 3 and |A| = 5, |B| = 3, then |3AB| = 405

14. The maximum value of
$$\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1 + sinx & 1 \\ 1 & 1 & 1 + cosx \end{vmatrix}$$
 is $\frac{1}{2}$

15. The matrix $\begin{pmatrix} 2 & 3 \\ 4 & 6 \end{pmatrix}$ is invertible.

16. For any square matrix A, (A.
$$adjA$$
) = $|A||$

17. The cofactor of
$$a_{21}$$
 in $\begin{vmatrix} 2 & -4 \\ 0 & 3 \end{vmatrix}$ is -4

18. If
$$A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$$
, then $A^{-1} = \frac{1}{19}A$,

- 19. If A and B are invertible matrices of the same order, then $(AB)^{-1}=A^{-1}B^{-1}$
- 20. Determinant is defined only for a square matrix
- 21. If A = diag(4,3,5) then det A is 12
- 22. If |A|=5, then | adj A | = 5 where A is of order 2 x 2.
- 23. If |A|=3, then |2A| = 24 where A is of order 2 x 2.
- 24. When two columns of a determinant are identical then its value is not zero.
- 25. If M_{23} =8 then A_{23} =8 where M and A are minor and Cofactor respectively
- 26. The order of the matrix A is 3 x 3 and B is any matrix of order 3 x 2, Then the order of $A^{T}B$ is 2 x 3
- 27. If the point (-3,0), (3,0) and (0,k) are the vertices of a triangle having area 9 square units then the value of k is 4
- 28. If A is a matrix of order 2 then A(adj A) = $|A|I_3$
- 29. The order of the square matrix A is always same or order of adj A
- 30. If any two rows (columns) of a determinant are identical then |A| = 0
- 31. If $A = diag(d_1, d_2, d_3, ..., d_n)$ then |A| = 0

- 32. The determinant is used to find the area of a triangle.
- 33. The determinant is used to check collinearity of three points.
- 34. The determinant is used to find the equation of a line passing through two given points.
- 35. If area of triangle is 35 square units with vertices (2, -6), (5, 4), and (k, 4). Then k is 10
- 36. Let A be a nonsingular square matrix of order 3×3 . Then $|adj A| = |A|^2$
- 37. A determinant always has an equal number of rows and columns.
- 38. Matrix gives numerical value but Determinant does not give numerical value.
- 39. For any square matrix A, A(adj A) = (adj A)A
- 40. $|adjA| = |A|^2$, where A is a square matrix of order two.
- 41. If A is an 4×4 matrix, then det(A) may be expressed as a cofactor expansion using any row or column of A.
- 42. If A is a 1×1 matrix, then det(A)=0
- 43. If *A* is an $n \times n$ matrix, then $det(A^T) = det(A)$.
- 44. If A is an $n \times n$ triangular matrix, then det(A) equals the product of the diagonal elements of A
- 45. If A is an $n \times n$ matrix, and has two identical rows, det(A)=1
- 46. The cofactor expansion of a 4×4 determinant will involve six 3×3 determinants.
- 47. If $\begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = \begin{vmatrix} x & 3 \\ 2x & 5 \end{vmatrix}$, then the value of x is 2.
- 48. The nature of solution of the system of linear equations $a_1x + b_1y = c_1, a_2x + b_2y = c_2$, is determined by the number $a_1b_2 a_2b_1$
- 49. If A is an invertible square matrix, then A^{T} is invertible
- 50. The inverse of invertible symmetric matrix is a symmetric matrix.
- 51. If A is an invertible matrix of order 3 and |A| = 5 then , |adj A| = 25.
- 52. If A is a non- singular matrix of order n. then, $|adjA| = |A|^{n-1}$.
- 53. $|adj(adjA)| = |A|^{(n-1)}$
- 54. Determinant is a square matrix.
- 55. Determinant is a number associated to a matrix.
- 56. Determinant is a number associated to a square matrix.
- 57. If A and B are square matrix of same order, then |AB| = AB.
- 58. Only Square matrices have their determinant
- 59. Minor and cofactor of an element of a square matrix are always same.
- 60. For square matrices A, B of same order, |AB| = |A||B|
- 61. The determinant of a square matrix of order 3 can be expanded along any row or column
- 62. $|A^{-1}|=1/|A|$, where A is an invertible square matrix.
- 63. $|kA| = k^n |A|$, where A is a square matrix of order n and k is any scalar.
- 64. If a row or column of a determinant consists of all zeros, then the value of determinant is zero.
- 65. For any square matrix A, $|A| = |A^T|$
- 66. The determinant of a skew symmetric matrix of even order is a perfect square.
- 67. A square matrix is singular if its determinant is zero.
- 68. $(A^3)^{-1} = (A^{-1})^3$ where A is a square matrix and $|A| \neq 0$.
- 69. If A is a matrix of order 3×3 , then number of minors in determinant of A are 27.

70. The sum of the products of the elements of any row with the co-factor of the corresponding elements is equal to value of the determinant.

71. $(aA)^{-1} = \frac{1}{a}A^{-1}$, where a is any real number and A is a square matrix.

72. $|A^{-1}| \neq |A|^{-1}$, where A is a non-singular matrix.

73. $|adj.A| = |A|^2$, where A is a square matrix of order two.

- $|\sin A \cos A \sin A + \cos A|$
- 74. The determinant $\begin{vmatrix} \sin B & \cos B & \sin B + \cos B \\ \sin C & \cos C & \sin C + \cos C \end{vmatrix}$ is equal to zero. $\begin{vmatrix} x & 3 & 7 \end{vmatrix}$

75. If x = -9 is a root of
$$\begin{vmatrix} 2 & x & 2 \\ 7 & 6 & x \end{vmatrix}$$
 = 0 then other two roots are 2 and 7.

76. A square matrix A is invertible if A is singular matrix.

77. A square matrix A is called singular if |A| = 0

78. If A =
$$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}$$
, then $|3A| = 9|A|$

79. If
$$\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$$
 then value of x is $\pm 2\sqrt{2}$

- 80. If A is a square matrix of order n, then A(adjA) = (adjA)A = |A|I
- 81. A system is said to be consistent if its unique solution exists
- 82. System of equations x+3y= 5 and 2x+6y=8 is consistent.
- 83. Unique solution of equation AX = B is given by X = $A^{-1}B$, where $|A| \neq 0$
- 84. Determinant evaluated across any row or column is same.
- 85. Determinant of anidentity matrix of order 3 is 3
- 86. If any two row (or two column) of a determinant are interchanged the value of the determinant is multiplied by -1.
- 87. If all the elements of a row (or column) are zeros, then the value of the determinant is zero.
- 88. Let A and B be two matrices, then det (AB) = det(A). det(B).
- 89. Determinant of diagonal matrix, triangular matrix (upper triangular or lower triangular matrix) is product of element of the principal diagonal.
- 90. If A be a squarematrix, then, $|A^n| = |A|^n$.
- 91. In a determinant each element in any row (or column) consists of the sum of two terms, then the determinant can be expressed as sum of two determinants of same order.

ANSWERS

1	F	2	F	3	Т	4	Т	5	F
6	F	7	Т	8	Т	9	Т	10	F
11	Т	12	Т	13	Т	14	Т	15	F
16	Т	17	F	18	Т	19	F	20	Т
21	F	22	Т	23	F	24	F	25	F
26	F	27	F	28	Т	29	Т	30	Т
31	F	32	Т	33	Т	34	Т	35	F
36	Т	37	Т	38	F	39	Т	40	F
41	Т	42	F	43	Т	44	Т	45	F
46	F	47	Т	48	Т	49	Т	50	Т
51	Т	52	Т	53	F	54	F	55	F
56	Т	57	F	58	Т	59	F	60	Т
61	Т	62	Т	63	Т	64	Т	65	Т
66	Т	67	Т	68	Т	69	F	70	Т
71	F	72	F	73	Т	74	Т	75	Т
76	F	77	Т	78	F	79	Т	80	Т
81	F	82	F	83	Т	84	Т	85	F
86	Т	87	Т	88	Т	89	Т	90	Т
91	Т								

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