

Topic :- DETERMINANTS

1. The value of $\Delta = \begin{vmatrix} 1^2 & 2^2 & 3^2 \\ 2^2 & 3^2 & 4^2 \\ 3^2 & 4^2 & 5^2 \end{vmatrix}$, is

- a) 8 b) -8 c) 400 d) 1

2. The factors of $\begin{vmatrix} x & a & b \\ a & x & b \\ a & b & x \end{vmatrix}$ are

- a) $x - a, x - b$, and $x + a + b$
b) $x + a, x + b$ and $x + a + b$
c) $x + a, x + b$ and $x - a - b$
d) $x - a, x - b$ and $x - a - b$

3. Coefficient of x in

$f(x) = \begin{vmatrix} x & (1 + \sin x)^2 & \cos x \\ 1 & \log(1 + x) & 2 \\ x^2 & (1 + x)^2 & 0 \end{vmatrix}$, is

- a) 0
b) 1
c) -2
d) Cannot be determined

4. If $a \neq b, b, c$ satisfy $\begin{vmatrix} a & 2b & 2c \\ 3 & b & c \\ 4 & a & b \end{vmatrix} = 0$, then $abc =$

- a) $a + b + c$ b) 0 c) b^3 d) $ab + bc$

5. Which one of the following is correct?

If A non-singular matrix, then

- a) $\det(A^{-1}) = \det(A)$ b) $\det(A^{-1}) = \frac{1}{\det(A)}$ c) $\det(A^{-1}) = 1$ d) None of these

6. If $\begin{vmatrix} a & b & 0 \\ 0 & a & b \\ b & 0 & a \end{vmatrix} = 0$, then

- a) a is one of the cube roots of unity b) b is one of the cube roots of unity
c) $\left(\frac{a}{b}\right)$ is one of the cube roots of unity d) $\left(\frac{a}{b}\right)$ is one of the cube roots of -1

7. If $\begin{vmatrix} b+c & c+a & a+b \\ a+b & b+c & c+a \\ c+a & a+b & b+c \end{vmatrix} = k \begin{vmatrix} a & b & c \\ c & a & b \\ d & c & a \end{vmatrix}$, then the value of k , is

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

8. If the value of the determinant $\begin{vmatrix} a & 1 & 1 \\ 1 & b & 1 \\ 1 & 1 & c \end{vmatrix}$ is positive, then

- a) $abc > 1$ b) $abc > -8$ c) $abc < -8$ d) $abc > -2$

9. The value of the determinant

$$\begin{vmatrix} \cos \alpha & -\sin \alpha & 1 \\ \sin \alpha & \cos \alpha & 1 \\ \cos(\alpha + \beta) & -\sin(\alpha + \beta) & 1 \end{vmatrix}$$
 is

- a) Independent of α b) Independent of β
 c) Independent of α and β d) None of these

10. If B is a non-singular matrix and A is a square matrix such that $B^{-1}AB$ exists, then $\det(B^{-1}AB)$ is equal to

- a) $\det(A^{-1})$ b) $\det(B^{-1})$ c) $\det(B)$ d) $\det(A)$

11. If matrix $\begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ \lambda & -3 & 0 \end{bmatrix}$ is singular, then λ is equal to

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

12. If x, y, z are in AP, then the value of the $\det A$ is, where

$$A = \begin{vmatrix} 4 & 5 & 6 & x \\ 5 & 6 & 7 & y \\ 6 & 7 & 8 & z \\ x & y & z & 0 \end{vmatrix}$$

- a) 0 b) 1 c) 2 d) None of these

13. If $\Delta_r = \begin{vmatrix} 1 & n & n \\ 2r & n^2 + n + 1 & n^2 + n \\ 2r - 1 & n^2 & n^2 + n + 1 \end{vmatrix}$ and $\sum_{r=1}^n \Delta_r = 56$, then n equals

- a) 4 b) 6 c) 7 d) 8

14. $\begin{vmatrix} 1 & a & a^2 - bc \\ 1 & b & b^2 - ac \\ 1 & c & c^2 - ab \end{vmatrix}$ is equal to

- a) 0 b) $a^3 + b^3 + c^3 - 3abc$
 c) $3abc$ d) $(a + b + c)^3$

15. If the matrix M_r is given by $M_r = \begin{bmatrix} r & r-1 \\ r-1 & r \end{bmatrix}$ $r = 1, 2, 3, \dots$, then the value of $\det(M_1) + \det(M_2) + \dots + \det(M_{2008})$ is

a) 2007

b) 2008

c) $(2008)^2$

d) $(2007)^2$

16. If ω is the cube root of unity, then $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$ is equal to

a) 1

b) 0

c) ω

d) ω^2

17. If $1, \omega, \omega^2$ are the cube roots of unity, then

$\Delta = \begin{vmatrix} 1 & \omega^n & \omega^{2n} \\ \omega^n & \omega^{2n} & 1 \\ \omega^{2n} & 1 & \omega^n \end{vmatrix}$ is equal to

a) 0

b) 1

c) ω

d) ω^2

18. The value of the following determinant is

$\Delta = \begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix}$

a) $(a-b)(b-c)(c-a)(a+b+c)b$

$abc(a+b)(b+c)(c+a)$

c) $(a-b)(b-c)(c-a)$

d) None of the above

19. The value of $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix}$, is

a) $6abc$

b) $a+b+c$

c) $4abc$

d) abc

20. The value of $\begin{vmatrix} \log_5 729 & \log_3 5 \\ \log_5 27 & \log_9 25 \end{vmatrix} \begin{vmatrix} \log_3 5 & \log_{27} 5 \\ \log_5 9 & \log_5 9 \end{vmatrix}$ is equal to

a) 1

b) 6

c) $\log_5 9$

d)

$\log_3 5 \cdot \log_5 81$