# DPP
DAILY PRACTICE PROBLEMS

**CLASS : XIIth** **SUBJECT : MATHS**
**DATE :** **DPP NO. : 10**

## Topic :- DETERMINANTS

1. If $a \neq b \neq c$, then the value of $x$ satisfying the equation $\begin{vmatrix} 0 & x^2-a & a-b \\ x+a & 0 & x-c \\ x+b & x-c & 0 \end{vmatrix} = 0$ is

a) $a$ b) $b$ c) $c$ d) 0

2. The value of the determinant $\begin{vmatrix} 10! & 11! & 12! \\ 11! & 12! & 13! \\ 12! & 13! & 14! \end{vmatrix}$ is

a) 2(10!11!) b) 2(10!13!) c) 2(10!11!12!) d) 2(11!12!13!)

3. The number of distinct real root of $\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix} = 0$ in the interval $-\frac{\pi}{4} \leq x \leq \frac{\pi}{4}$ is

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

4. The value of determinant $\begin{vmatrix} (a^x+a^{-x})^2 & (a^x-a^{-x})^2 & 1 \\ (b^x+b^{-x})^2 & (b^x-b^{-x})^2 & 1 \\ (c^x+c^{-x})^2 & (c^x-c^{-x})^2 & 1 \end{vmatrix}$ is

a) 0 b) 2 $abc$ c) $a^2b^2c^2$ d) None of these

5. The matrix $\begin{bmatrix} \lambda & 1 & 0 \\ 0 & 2 & 3 \\ 0 & 0 & \lambda \end{bmatrix}$ is non- singular

a) For all real values of $\lambda$ b) Only when $\lambda = \pm \frac{1}{\sqrt{2}}$ c) Only when $\lambda \neq 0$
d) Only when $\lambda = 0$

6. If $\begin{vmatrix} a^2 & b^2 & c^2 \\ (a+1)^2 & (b+1)^2 & (c+1)^2 \\ (a-1)^2 & (b-1)^2 & (c-1)^2 \end{vmatrix} = k \begin{vmatrix} a^2 & b^2 & c^2 \\ a & b & c \\ 1 & 1 & 1 \end{vmatrix}$,

Then the value of $k$ is

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

7. If $f(x)$, $g(x)$ and $h(x)$ are three polynomials of degree 2 and $\Delta(x) = \begin{vmatrix} f(x) & g(x) & h(x) \\ f'(x) & g'(x) & h'(x) \\ f''(x) & g''(x) & h''(x) \end{vmatrix}$, then $\Delta(x)$ is polynomial of degree

a) 2 b) 3 c) At most 2 d) At most 3

8. The value of $\begin{vmatrix} x+y & y+z & z+x \\ x & y & z \\ x-y & y-z & z-x \end{vmatrix}$ is equal to

a) $2(x+y+z)^2$ b) $2(x+y+z)^3$ c) $(x+y+z)^3$ d) 0

9. If $f(x) = \begin{vmatrix} 1+a & 1+ax & 1+ax^2 \\ 1+b & 1+bx & 1+bx^2 \\ 1+c & 1+cx & 1+cx^2 \end{vmatrix}$, where $a,b,c$ are non-zero constants, then value of $f(10)$is

a) $10\,(b-a)(c-a)$ b) $100\,(b-a)(c-b)(a-c)$
c) $100\,abc$ d) 0

10. The value of $\lambda$, if $ax^4 + bx^3 + cx^2 + 50x + d = \begin{vmatrix} x^3 - 14x^2 & -x & 3x+\lambda \\ 4x+1 & 3x & x-4 \\ -3 & 4 & 0 \end{vmatrix}$, is

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

11. If $\begin{vmatrix} x^2+x & x+1 & x-2 \\ 2x^2+3x-1 & 3x & 3x-3 \\ x^2+2x+3 & 2x-1 & 2x-1 \end{vmatrix} = Ax - 12$, then the value of $A$ is

a) 12 b) 23 c) $-12$ d) 24

12. The value of $x$ obtained from the equation $\begin{vmatrix} x+\alpha & \beta & \gamma \\ \gamma & x+\beta & \alpha \\ \alpha & \beta & x+\gamma \end{vmatrix} = 0$ will be

a) 0 and $-(\alpha+\beta+\gamma)$ b) 0 and $(\alpha+\beta+\gamma)$
c) 1 and $(\alpha-\beta-\gamma)$ d) 0 and $(\alpha^2+\beta^2+\gamma^2)$

13. $\begin{vmatrix} 1+ax & 1+bx & 1+cx \\ 1+a_1x & 1+b_1x & 1+c_1x \\ 1+a_2x & 1+b_2x & 1+c_2x \end{vmatrix} = A_0 + A_1\,x + A_2\,x^2 + A_3\,x^3$, then $A_1$ is equal to

a) $abc$ b) 0 c) 1 d) None of these

14. From the matrix equation $AB = AC$ we can conclude $B = C$ provided that

a) $A$ is singular b) $A$ is non-singular c) $A$ is symmetric d) $A$ is square

15. If $a \neq b$, then the system of equation

$ax + by + bz = 0$
$bx + ay + bz = 0$
$bx + by + az = 0$

Will have a non-trivial solution, is

a) $a + b = 0$ b) $a + 2b = 0$ c) $2a + b = 0$ d) $a + 4b = 0$

16. If $\omega$ is an imaginary cube root of unity, then the value of

$$\begin{vmatrix} a & b\omega^2 & a\omega \\ b\omega & c & b\omega^2 \\ c\omega^2 & a\omega & c \end{vmatrix}, \text{ is}$$

a) $a^3 + b^3 + c^3$ b) $a^2b - b^2c$ c) 0 d) $a^3 + b^3 + c^3 - 3abc$

17. The value of determinant $\begin{vmatrix} a+b & a+2b & a+3b \\ a+2b & a+3b & a+4b \\ a+4b & a+5b & a+6b \end{vmatrix}$ is

a) $a^2 + b^2 + c^2 - 3abc$ b) $3ab$ c) $3a + 5b$ d) 0

18. The value of the determinant $\begin{vmatrix} y+z & x & x \\ y & z+x & y \\ z & z & x+y \end{vmatrix}$ is equal to

a) $6xyz$ b) $xyz$ c) $4xyz$ d) $xy + yz + zx$

19. If $\Delta_1 = \begin{vmatrix} x & b & b \\ a & x & b \\ a & a & x \end{vmatrix}$ and $\Delta_2 = \begin{vmatrix} x & b \\ a & x \end{vmatrix}$, then

a) $\Delta_1 = 3(\Delta_2)^2$ b) $\frac{d}{dx}(\Delta_1) = 3\,\Delta_2$ c) $\frac{d}{dx}(\Delta_1) = 3\,\Delta_2^2$ d) $\Delta_1 = 3\,(\Delta_2)^{3/2}$

20. For positive numbers $x$,$y$,$z$ (other than unity) the numerical value of the determinant

$$\begin{vmatrix} 1 & \log_x y & \log_x z \\ \log_y x & 3 & \log_y z \\ \log_z x & \log_z y & 5 \end{vmatrix}, \text{ is}$$

a) 0 b) $\log x \log y \log z$ c) 1 d) 8