DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 6**

Topic :- DETERMINANTS

1. If $A = \begin{bmatrix} 1 & 2 \\ 3 & 5 \end{bmatrix}$, then the value of the determinant $|A^{2009} - 5A^{2008}|$ is

a) -6 b) -5 c) -4 d) 4

2. If $f(x) = \begin{vmatrix} x-3 & 2x^2-18 & 3x^3-81 \\ x-5 & 2x^2-50 & 4x^3-500 \\ 1 & 2 & 3 \end{vmatrix}$, then

$f(1).f(3) + f(3).f(5) + f(5).f(1)$ is equal to

a) $f(1)$ b) $f(3)$ c) $f(1) + f(3)$ d) $f(1) + f(5)$

3. The value of the determinant $\begin{vmatrix} x & a & b+c \\ x & b & c+a \\ x & c & a+b \end{vmatrix} = 0$, if

a) $x = a$ b) $x = b$ c) $x = c$ d) x has any value

4. If the system of equations $x + ky - z = 0$, $3x - ky - z = 0$ and $x - 3y + z = 0$ has non-zero solution then k is equal to

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

5. If $\begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix} = 0$ and x,y,z are all distinct, then xyz is equal to

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

6. Let $[x]$ represent the greatest integer less than or equal to x, then the value of the determinant $\begin{vmatrix} [e] & [\pi] & [\pi^2-6] \\ [\pi] & [\pi^2-6] & [e] \\ [\pi^2-6] & [e] & [\pi] \end{vmatrix}$ is

a) -8 b) 8 c) 10 d) None of these

7. The determinant $\Delta = \begin{vmatrix} a & b & ax+b \\ b & c & bx+c \\ ax+b & bx+c & 0 \end{vmatrix}$ is equal to zero, if

a) a,b,c, are in A.P.
b) a,b,c, are in G.P.
c) a,b,c, are in H.P.

d) α is a root of $ax^2 + bx + c = 0$

8. Consider the following statements :

1. The determinants $\begin{vmatrix} 1 & a & bc \\ 1 & b & ca \\ 1 & c & ab \end{vmatrix}$ and $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix}$ are not identically equal.

2. For $a > 0, b > 0, c > 0$ the value of the determinant $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ is always positive.

3.If $\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = \begin{vmatrix} a_1 & b_1 & 1 \\ a_2 & b_2 & 1 \\ a_3 & b_3 & 1 \end{vmatrix}$, then the two triangles with vertices (x_1,y_1), (x_2,y_2),(x_3,y_3) and (a_1,b_1), (a_2,b_2),(b_3,b_3) must be congruent. Which of the statement given above is/are correct?

a) Only (1) b) Only (2) c) Only (3) d) None of these

9. The arbitrary constant on which the value of the

Determinant $\begin{vmatrix} 1 & a & a^2 \\ \cos(p-d)\,a & \cos pa & \cos(p-d)\,a \\ \sin(p-d)\,a & \sin pa & \sin(p-d)\,a \end{vmatrix}$

Does not depend, is

a) α b) pc) dd) a

10. **If $\begin{vmatrix} a+x & a-x & a-x \\ a-x & a+x & a-x \\ a-x & a-x & a+x \end{vmatrix} = 0$,then x is equal to**

a) 0,2a b) a,2a c) 0,3a d) None of these

11. If the equations $2x + 3y + 1 = 0$, $3x + y - 2 = 0$ and $ax + 2y - b = 0$ are consistent, then

a) $a - b = 2$ b) $a + b + 1 = 0$ c) $a + b = 3$ d) $a - b - 8 = 0$

12. If $\Delta(x) = \begin{vmatrix} 1 & \cos x & 1 - \cos x \\ 1 + \sin x & \cos x & 1 + \sin x - \cos x \\ \sin x & \sin x & 1 \end{vmatrix}$, then $\int_0^{\pi/2} \Delta(x)dx$ is equal to

a) $\frac{1}{4}$ b) $\frac{1}{2}$ c) 0 d) $-\frac{1}{2}$

13. If the system of equations

$x + a\,y + a\,z = 0$

$b\,x + y + b\,z = 0$

$c\,x + c\,y + z = 0$

Where a,b and c are non-zero non-unity, has a non-trivial solution, then the value of $\frac{a}{1-a} + \frac{b}{1-b} + \frac{c}{1-c}$ is

a) 0 b) 1 c) -1 d) $\frac{abc}{a^2 + b^2 + c^2}$

14. The system of equations $3x - 2y + z = 0$, $\lambda x - 14y + 15z = 0$, $x + 2y - 3z = 0$ has a solution other than $x = y = z = 0$ then λ is equal to

a) 1 b) 2 c) 3 d) 5

15. Let $D_r = \begin{vmatrix} 2^{r-1} & 2.3^{r-1} & 4.5^{r-1} \\ \alpha & \beta & \gamma \\ 2^n - 1 & 3^n - 1 & 5^n - 1 \end{vmatrix}$. Then, the value of $\sum_{r=1}^{n} D_r$ is

a) $\alpha\,\beta\,\gamma$ b) $2^n\,\alpha + 2^n\,\beta + 4^n\,\gamma$ c) $2\,\alpha + 3\,\beta + 4\,\gamma$ d) None of these

16. In the interval $\left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$, the number of real solutions of the equations $\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix} = 0$ is

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

17. If A,B and C are the angles of a triangle and $\begin{vmatrix} 1 & 1 & 1 \\ 1 + \sin A & 1 + \sin B & 1 + \sin C \\ \sin A + \sin^2 A & \sin B + \sin^2 B & \sin C + \sin^2 C \end{vmatrix} = 0$ then the triangle ABC is

a) Isosceles b) Equilateral c) Right angled isosceles d) None of these

18. If $A = \begin{vmatrix} a & b & c \\ x & y & z \\ p & q & r \end{vmatrix}$ and $B = \begin{vmatrix} q & -b & y \\ -p & a & -x \\ r & -c & z \end{vmatrix}$, then

a) $A = 2B$ b) $A = B$ c) $A = -B$ d) None of these

19. If $a = 1 + 2 + 4 + \ldots$to n terms, $b = 1 + 3 + 9 + \ldots$to n terms and $c = 1 + 5 + 25 + \ldots$ to n terms, then $\begin{vmatrix} a & 2b & 4c \\ 2 & 2 & 2 \\ 2^n & 3^n & 5^n \end{vmatrix}$ equals

a) $(30)^n$ b) $(10)^n$ c) 0 d) $2^n + 3^n + 5^n$

20. If $c = 2\cos\theta$, then the value of the determinant $\Delta = \begin{vmatrix} c & 1 & 0 \\ 1 & c & 1 \\ 6 & 1 & c \end{vmatrix}$ is

a) $\frac{\sin 4\theta}{\sin\theta}$ b) $\frac{2\sin^2 2\theta}{\sin\theta}$ c) $4\cos^2\theta(2\cos\theta - 1)$ d) None of these