DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 3**

Topic :- DETERMINANTS

1. If $f(x)=\begin{vmatrix} 1 & 2(x-1) & 3(x-1)(x-2) \\ x-1 & (x-1)(x-2) & (x-1)(x-2)(x-3) \\ x & x(x-1) & x(x-1)(x-2) \end{vmatrix}$

Then, the value of $f(49)$ is

a) $49x$ b) $-49x$ c) 0 d) 1

2. if $\begin{vmatrix} 1+ax & 1+bx & 1+cx \\ 1+a_1x & 1+b_1x & 1+c_1x \\ 1+a_2x & 1+b_2x & 1+c_2x \end{vmatrix} = A_0+A_1x+A_2x^2+A_3x^3$, then A_0 is equal to

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

3. If A,B,C are the angles of a triangle, then the value of

$\Delta=\begin{vmatrix} -1 & \cos C & \cos B \\ \cos C & -1 & \cos A \\ \cos B & \cos A & -1 \end{vmatrix}$ is

a) $\cos A\cos B\cos C$ b) $\sin A\sin B\sin C$ c) 0 d) None of these

4. The value of the determinant

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

a) $4\cos\alpha\cos\beta\cos\gamma$ b) $2\cos\alpha\cos\beta\cos\gamma$ c) $4\sin\alpha\sin\beta\sin\gamma$ d) None of these

5. If one root of determinant $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix}=0$, is -9, then the other two roots are

a) $2,7$ b) $2,-7$ c) $-2,7$ d) $-2,-7$

6. If $0\le[x]<2, -1\le[y]<1$ and $1\le[z]<3$, $[\cdot]$ denotes the greatest integer function, then the maximum value of the determinant

$\Delta=\begin{vmatrix} [x]+1 & [y] & [z] \\ [x] & [y]+1 & [z] \\ [x] & [y] & [z]+1 \end{vmatrix}$, is

a) 2 b) 6 c) 4 d) None of these

7. If $D=\begin{vmatrix} 1 & 1 & 1 \\ 1 & 1+x & 1 \\ 1 & 1 & 1+y \end{vmatrix}$ for $x\neq0, y\neq0$, then D is

a) Divisible by neither x nor y b) Divisible by both x and y

c) Divisible by x but not y d) Divisible by y but not x

8. If $f(x) = \begin{vmatrix} 1 & x & (x+1) \\ 2x & x(x-1) & x(x+1) \\ 3x(x-1) & x(x-1)(x-2) & x(x-1)(x+1) \end{vmatrix}$ then $f\ (11)$ equals

a) 0 b) 11 c) -11 d) 1

9. The roots of the equation $\begin{vmatrix} 1 & 4 & 20 \\ 1 & -2 & 5 \\ 1 & 2x & 5x^2 \end{vmatrix} = 0$

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

10. One root of the equation

$\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} =$

a) 8/3 b) 2/3 c) 1/3 d) 16/3

11. If $\begin{vmatrix} \alpha & x & x & x \\ x & \beta & x & x \\ x & x & \gamma & x \\ x & x & x & \delta \end{vmatrix} = f(x) - xf'(x)$ then $f(x)$ is equal to

a) $(x-\alpha)(x-\beta)(x-\gamma)(x-\delta)$

b) $(x+\alpha)(x+\beta)(x+\gamma)(x+\delta)$

c) $2(x-\alpha)(x-\beta)(x-\gamma)(x-\delta)$

d) None of these

12. In ΔABC if $\begin{vmatrix} 1 & a & b \\ 1 & c & a \\ 1 & b & c \end{vmatrix} = 0$, then

$\sin^2 A + \sin^2 B + \sin^2 C$ is equal to

a) $\frac{4}{9}$ b) $\frac{9}{4}$ c) $3\sqrt{3}$ d) 1

13. The value of determinant $\begin{vmatrix} b+c & a+b & a \\ c+a & b+c & b \\ a+b & c+a & c \end{vmatrix}$ is equal to

a) $a^3 + b^3 + c^3 - 3\,abc$ b) $2abc(a+b+c)$ c) 0 d) None of these

14. If $n = 3k$ and 1 ω, ω^2 are the cube roots of unity, then $\Delta = \begin{vmatrix} 1 & \omega^n & \omega^{2n} \\ \omega^{2n} & 1 & \omega^n \\ \omega^n & \omega^{2n} & 1 \end{vmatrix}$ has the value

a) 0 b) ω c) ω^2 d) 1

15. If $\begin{vmatrix} x & 3 & 6 \\ 3 & 6 & x \\ 6 & x & 3 \end{vmatrix} = \begin{vmatrix} 2 & x & 7 \\ x & 7 & 2 \\ 7 & 2 & x \end{vmatrix} = \begin{bmatrix} 4 & 5 & x \\ 5 & x & 4 \\ x & 4 & 5 \end{bmatrix} = 0$, then x is equal to

a) 9 b) -9 c) 0 d) -1

16. the system of simultaneous equations

$kx + 2y - z = 1$

$(k-1)y - 2z = 2$

$(k+2)z = 3$

Have a unique solution if k equals

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

17. If α,β are non-real numbers satisfying $x^3 - 1 = 0$, then the value of $\begin{vmatrix} \lambda+1 & \alpha & \beta \\ \alpha & \lambda+\beta & 1 \\ \beta & 1 & \lambda+\alpha \end{vmatrix}$ is equal to

a) 0 b) λ^3 c) $\lambda^3 + 1$ d) $\lambda^3 - 1$

18. If x,y,z are different from zero and $\Delta = \begin{vmatrix} a & b-y & c-z \\ a-x & b & c-z \\ a-x & b-y & c \end{vmatrix} = 0$, then the value of expression $\frac{a}{x} + \frac{b}{y} + \frac{c}{z}$ is

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

19. The value of the determinant $\begin{vmatrix} 1 & \cos(\alpha-\beta) & \cos\alpha \\ \cos(\alpha-\beta) & 1 & \cos\beta \\ \cos\alpha & \cos\beta & 1 \end{vmatrix}$ is

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

20. If A,b,C are the angles of a triangle, then the determinant $\Delta = \begin{vmatrix} \sin 2A & \sin C & \sin B \\ \sin C & \sin 2B & \sin A \\ \sin B & \sin A & \sin 2C \end{vmatrix}$ is equal to

a) 1 b) -1 c) $\sin A + \sin B + \sin C$ d) None of these