DPP
DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**
DATE : **DPP NO. : 4**

Topic :- DETERMINANTS

1. $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix}$ is equal to

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

2. A and B are two non-zero square matrices such that $AB = O$. Then,
   a) Both A and B are singular
   b) Either of them is singular
   c) Neither matrix is singular
   d) None of these

3. The system of linear equations
$x + y + z = 2$
$2x + y - z = 3$
$3x + 2y + kz = 4$
Has a unique solution, is

a) $k \neq 0$ b) $-1 < k < 1$ c) $-2 < k < 2$ d) $k = 0$

4. If $a_1, a_2, \ldots\ldots, a_n, \ldots\ldots$ are in GP and $a_i > 0$ for each i, then the determinant

$\Delta = \begin{vmatrix} \log a_n & \log a_{n+2} & \log a_{n+4} \\ \log a_{n+6} & \log a_{n+8} & \log a_{n+10} \\ \log a_{n+12} & \log a_{n+14} & \log a_{n+16} \end{vmatrix}$ is equal to

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

5. The value of $\begin{vmatrix} 11 & 12 & 13 \\ 12 & 13 & 14 \\ 13 & 14 & 15 \end{vmatrix}$, is

a) 1 b) 0 c) -1 d) 67

6. The determinant $\begin{vmatrix} \cos C & \tan A & 0 \\ \sin B & 0 & -\tan A \\ 0 & \sin B & \cos C \end{vmatrix}$ has the value, where A, B, C are angles of a triangle

a) 0 b) 1 c) $\sin A \sin B$ d) $\cos A \cos B \cos C$

7. If $0 < \theta < \pi$ and the system of equations
$(\sin\theta)x + y + z = 0$

$x + (\cos\theta)y + z = 0$
$(\sin\theta)x + (\cos\theta)y + z = 0$
Has a non-trivial solution, then $\theta =$

a) $\frac{\pi}{6}$ b) $\frac{\pi}{4}$ c) $\frac{\pi}{3}$ d) $\frac{\pi}{2}$

8. Let $\omega = -\frac{1}{2} + i\frac{\sqrt{3}}{2}$, then the value of the determinant $\begin{vmatrix} 1 & 1 & 1 \\ 1 & -1-\omega^2 & \omega^2 \\ 1 & \omega^2 & \omega^4 \end{vmatrix}$, is

a) 3ω b) $3\omega(\omega - 1)$ c) $3\omega^2$ d) $3\omega(1 - \omega)$

9. Let $ax^6 + bx^5 + cx^4 + dx^3 + ex^2 + fx + g = \begin{vmatrix} (x+1) & (x^2+2) & (x^2+x) \\ (x^2+x) & (x^2+1) & (x^2+2) \\ (x^2+2) & (x^2+x) & (x+1) \end{vmatrix}$. Then,

a) $f = 3, g = -5$ b) $f = -3, g = -5$ c) $f = -3, g = -9$ d) None of these

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

11. The value of the determinant $\begin{vmatrix} 1 & 1 & 1 & 1 \\ 1 & 2 & 3 & 4 \\ 1 & 3 & 6 & 10 \\ 1 & 4 & 10 & 20 \end{vmatrix}$ is equal to

a) 0 b) -1 c) 1 d) 10

12. If $\Delta(x) = \begin{vmatrix} f(x) + f(-x) & 0 & x^4 \\ 3 & f(x) - f(-x) & \cos x \\ x^4 & 2x & f(x)f(-x) \end{vmatrix}$ (where $f(x)$ is a real valued function of x), then the value of $\int_{-2}^{2} x^4 \Delta(x)$

a) Depends upon the function $f(x)$ b) is 4
c) is -4 d) is zero

13. The value of $\begin{vmatrix} \cos(x-a) & \cos(x+a) & \cos x \\ \sin(x+a) & \sin(x-a) & \sin x \\ \cos a \tan x & \cos a \cot x & \text{cosec } 2x \end{vmatrix}$ is equal

a) 1 b) $\sin a \cos a$ c) 0 d) $\sin x \cos x$

14. The roots of the equation

$$\begin{vmatrix} 3x^2 & x^2 + x\cos\theta + \cos^2\theta & x^2 + x\sin\theta + \sin^2\theta \\ x^2 + x\cos\theta + \cos^2\theta & 3\cos^2\theta & 1 + \frac{\sin 2\theta}{2} \\ x^2 + x\sin\theta + \sin^2\theta & 1 + \frac{\sin 2\theta}{2} & 3\sin^2\theta \end{vmatrix} = 0$$

a) $\sin\theta, \cos\theta$ b) $\sin^2\theta, \cos^2\theta$ c) $\sin\theta, \cos^2\theta$ d) $\sin^2\theta, \cos\theta$

15. If A is a square matrix of order n such that its elements are polynomial in x and its r-rows become identical for $x = k$, then

a) $(x-k)^r$ is a factor of $|A|$

b) $(x-k)^{r-1}$ is a factor of $|A|$

c) $(x-k)^{r+1}$ is a factor $|A|$

d) $(x-k)^r$ is a factor of A

16. If $\begin{vmatrix} x^2+x & 3x-1 & -x+3 \\ 2x+1 & 2+x^2 & x^3-3 \\ x-3 & x^2+4 & 3x \end{vmatrix}$

$$= a_0 + a_1x + a_2x^2 + \ldots + a_7x^7,$$

The value of $a_0$is

a) 25 b) 24 c) 23 d) 21

17. If $\begin{vmatrix} a & \cot\frac{A}{2} & \lambda \\ b & \cot\frac{B}{2} & \mu \\ c & \cot\frac{C}{2} & \gamma \end{vmatrix} = 0$ where, a,b,c A,B and C are elements of a ΔABC with usual meaning. Then,

the value of $a(\mu-\gamma) + b(\gamma-\lambda) + c(\lambda-\mu)$ is

a) 0 b) abc c) $ab+bc+ca$ d) 2 abc

18. The value of the determinant $\begin{vmatrix} bc & ca & ab \\ p & q & r \\ 1 & 1 & 1 \end{vmatrix}$, where a,b,c are the p^{th},q^{th} and r^{th} terms of a H.P., is

a) $p+q+r$ b) $(a+b+c)$ c) 1 d) None of these

19. If a, $b.c$ are in AP, then the value of $\begin{vmatrix} x+2 & x+3 & x+a \\ x+4 & x+5 & x+b \\ x+6 & x+7 & x+c \end{vmatrix}$ is

a) $x-(a+b+c)$ b) $9x^2+a+b+c$ c) $a+b+c$ d) 0

20. For the values of A,B,C and P,Q,R the value of

$\begin{vmatrix} \cos(A-P) & \cos(A-Q) & \cos(A-R) \\ \cos(B-P) & \cos(B-Q) & \cos(B-R) \\ \cos(C-P) & \cos(C-Q) & \cos(C-R) \end{vmatrix}$ is

a) 0 b) $\cos A \cos B \cos C$ c) $\sin A \sin B \sin C$ d) $\cos P \cos Q \cos R$