

# DETERMINANTS

## INTRODUCTION AND DETERMINANTS

### EXERCISE

**Q.1** The determinant  $\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix}$  of is equal to.

(A)  $2(a+b+c)$

(B)  $2(a+b+c)^2$

(C)  $2(a+b+c)^3$

(D)  $(2a+2b+2c)^3$

**Q.2**  $\begin{vmatrix} a & b & a\alpha+b \\ b & c & b\alpha+c \\ a\alpha+b & b\alpha+c & 0 \end{vmatrix} = 0$ , then a, b, c are in -

(A) A.P.

(B) G.P.

(C) H.P.

(D) None of these

**Q.3**  $\begin{vmatrix} b^2+c^2 & a^2 & a^2 \\ b^2 & c^2+a^2 & b^2 \\ c^2 & c^2 & a^2+b^2 \end{vmatrix}$  is equal to -

(A)  $a^2b^2c^2$

(B)  $2a^2b^2c^2$

(C)  $4a^2b^2c^2$

(D) None of these

**Q.4** If  $\begin{vmatrix} a & 5x & p \\ b & 10y & 5 \\ c & 15z & 15 \end{vmatrix} = 125$ , then the value of  $\begin{vmatrix} 3a & 3b & c \\ x & 2y & z \\ p & 5 & 5 \end{vmatrix}$  is

(A) 25

(B) 50

(C) 75

(D) 100

**Q.5**  $\Delta = \begin{vmatrix} \lambda & c & -b \\ -c & \lambda & a \\ b & -a & \lambda \end{vmatrix}$ , then the value of  $\Delta' = \begin{vmatrix} a^2+\lambda^2 & ab+c\lambda & ca-b\lambda \\ ab-c\lambda & b^2+\lambda^2 & bc+a\lambda \\ ac+b\lambda & bc-a\lambda & c^2+\lambda^2 \end{vmatrix}$  is -

(A)  $3\Delta$

(B)  $\Delta^2$

(C)  $\Delta^3$

(D) None of these

**Q.6** The value of the determinant  $\begin{vmatrix} 0 & (a-b)^2 & (a-c)^2 \\ (b-a)^2 & 0 & (b-c)^2 \\ (c-a)^2 & (c-b)^2 & 0 \end{vmatrix}$  is identical to -

- (A)  $(a-b)^2 (b-c)^2 (c-a)^2$  (B) 0  
(C)  $2(a-b)^2 (b-c)^2 (c-a)^2$  (D) None of these

**Q.7** If  $0 < \theta < \frac{\pi}{2}$  and  $\begin{vmatrix} 1+\sin^2 \theta & \cos^2 \theta & 4\sin 4\theta \\ \sin^2 \theta & 1+\cos^2 \theta & 4\sin 4\theta \\ \sin^2 \theta & \cos^2 \theta & 1+4\sin 4\theta \end{vmatrix} = 0$  then find the value of  $\theta$ .

- (A)  $\frac{\pi}{24}, \frac{5\pi}{24}$  (B)  $\frac{5\pi}{24}, \frac{7\pi}{24}$  (C)  $\frac{7\pi}{24}, \frac{11\pi}{24}$  (D) None of these

**Q.8**  $\begin{vmatrix} {}^x C_1 & {}^x C_2 & {}^x C_3 \\ {}^y C_1 & {}^y C_2 & {}^y C_3 \\ {}^z C_1 & {}^z C_2 & {}^z C_3 \end{vmatrix}$  is equal to -

- (A)  $xyz (x-y)(y-z)(z-x)$  (B)  $\frac{xyz}{6} (x-y)(y-z)(z-x)$   
(C)  $\frac{xyz}{12} (x-y)(y-z)(z-x)$  (D) None of these

**Q.9** 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 which one is right.

- (A)  $\Delta_1 = 3\Delta_2^2$  (B)  $\frac{d}{dx} (\Delta_1) = 3\Delta_2^2$   
(C)  $\frac{d}{dx} (\Delta_1) = 3\Delta_2$  (D) None of these

### ANSWER KEY

1. (C)  $2(a+b+c)^3$   
2. (B) G.P.

3. (C)  $4a^2b^2c^2$

4. (A) 25

5. (B)  $\Delta^2$

6. (C)  $2(a-b)^2(b-c)^2(c-a)^2$

7. (C)  $\frac{7\pi}{24}, \frac{11\pi}{24}$

8. (C)  $\frac{xyz}{12}(x-y)(y-z)(z-x)$

9. (C)  $\frac{d}{dx}(\Delta_1) = 3\Delta_2$