1. $\begin{vmatrix} y+z & x & x \\ y & z+x & y \\ z & z & x+y \end{vmatrix}$ equals-

(A) $x^2y^2z^2$ (B) $4x^2y^2z^2$ (C) xyz (D) $4xyz$

2. If $\begin{vmatrix} 1 & 3 & 4 \\ 1 & x-1 & 2x+2 \\ 2 & 5 & 9 \end{vmatrix} = 0$, then x is equal to-

(A) 2 (B) 1 (C) 4 (D) 0

3. If a, b, c are in AP, then $\begin{vmatrix} x+1 & x+2 & x+a \\ x+2 & x+3 & x+b \\ x+3 & x+4 & x+c \end{vmatrix}$ equals - we know $a+b=2c$

$-(-1(-9))+3(14)$ $-9+30$ $=21$

(A) a + b + c (B) x + a + b + c (C) 0 (D) none of these

4. If $px^4 + qx^3 + rx^2 + sx + t = \begin{vmatrix} x^2+3x & x-1 & x+3 \\ x+1 & 2-x & x-3 \\ x-3 & x+4 & 3x \end{vmatrix}$ then t is equal to - Put $x=0$ $\begin{vmatrix} 0 & -1 & 3 \\ 1 & 2 & -3 \\ -3 & 4 & 0 \end{vmatrix}$

~~6(a)=18~~

(A) 33 (B) 0 (C) 21 (D) none

5. For positive numbers x, y and z, the numerical value of the determinant $\begin{vmatrix} 1 & \log_x y & \log_x z \\ \log_y x & 1 & \log_y z \\ \log_z x & \log_z y & 1 \end{vmatrix}$ is-

(A) 0 (B) log xyz (C) log(x + y + z) (D) logx logy logz

6. Let a determinant is given by $A = \begin{vmatrix} a & b & c \\ p & q & r \\ x & y & z \end{vmatrix}$ and suppose det. A = 6. If $B = \begin{vmatrix} p+x & q+y & r+z \\ a+x & b+y & c+z \\ a+p & b+q & c+r \end{vmatrix}$ then

(A) det. B = 6 (B) det. B = – 6 (C) det. B = 12 (D) det. B = – 12

7. If $\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ and A_2, B_2, C_2 are respectively cofactors of a_2, b_2, c_2 then $a_1A_2 + b_1B_2 + c_1C_2$ is equal to-

(A) $-\Delta$ (B) 0 (C) Δ (D) none of these

8. If $A = (a_{ij})$ is a 4×4 matrix and C_{ij} is the co-factor of the element a_{ij} in Det (A), then the expression $a_{11}C_{11} + a_{12}C_{12} + a_{13}C_{13} + a_{14}C_{14}$ equals-

(A) 0 (B) –1 (C) 1 (D) Det.(A)

9. The value of an odd order skew symmetric determinant is-

(A) perfect square (B) negative (C) ± 1 (D) 0

10. If in the determinant $\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$, A_1, B_1, C_1 etc. be the co-factors of a_1, b_1, c_1 etc., then which of the following relations is incorrect-

(A) $a_1A_1 + b_1B_1 + c_1C_1 = \Delta$ (B) $a_2A_2 + b_2B_2 + c_2C_2 = \Delta$

(C) $a_3A_3 + b_3B_3 + c_3C_3 = \Delta$ (D) $a_1A_2 + b_1B_2 + c_1C_2 = \Delta$

11. If $S_r = \begin{vmatrix} 2r & x & n(n+1) \\ 6r^2-1 & y & n^2(2n+3) \\ 4r^3-2nr & z & n^3(n+1) \end{vmatrix}$ then $\sum_{r=1}^{n} S_r$ does not depend on-

(A) x (B) y (C) n (D) all of these

12. If $f(x) = \begin{vmatrix} \cos x & 1 & 0 \\ 1 & 2\cos x & 1 \\ 0 & 1 & 2\cos x \end{vmatrix}$, then $\int_0^{\pi/2} f(x)\, dx =$

(A) $-\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) none

13. If a, b, c are sides of a scalene triangle, then the value of $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ is : [JEE-MAIN Online 2013]

(A) non-negative (B) negative (C) positive (D) non-positive

14. The value of k for which the set of equations $3x+ky-2z=0$, $x + ky + 3z = 0$ and $2x+3y-4z=0$ has a non-trivial solution is-

(A) 15 (B) 16 (C) 31/2 (D) 33/2

15. If the system of linear equations [JEE-MAIN Online 2013]

$$x_1 + 2x_2 + 3x_3 = 6$$
$$x_1 + 3x_2 + 5x_3 = 9$$
$$2x_1 + 5x_2 + ax_3 = b$$

is consistent and has infinite number of solutions, then :-

(A) $a \in R - \{8\}$ and $b \in R - \{15\}$ (B) a = 8, b can be any real number

(C) a = 8, b = 15 (D) b = 15, a can be any real number

16. Consider the system of equations : $x + ay = 0$, $y + az = 0$ and $z + ax = 0$. Then the set of all real values of 'a' for which the system has a unique solution is : [JEE-MAIN Online 2013]

(A) $\{1, -1\}$ (B) $R - \{-1\}$ $a^3 = 1$.

(C) $\{1, 0, -1\}$ (D) $R - \{1\}$

17. If a, b, c > 0 and x, y, z $\in$ R, then the determinant $\begin{vmatrix} (a^x+a^{-x})^2 & (a^x-a^{-x})^2 & 1 \\ (b^y+b^{-y})^2 & (b^y-b^{-y})^2 & 1 \\ (c^z+c^{-z})^2 & (c^z-c^{-z})^2 & 1 \end{vmatrix}$ is equal to -

(A) $a^x b^y c^z$ (B) $a^{-x} b^{-y} c^{-z}$ (C) $a^{2x} b^{2y} c^{2z}$ (D) zero

18. The determinant $\begin{vmatrix} {}^xC_1 & {}^xC_2 & {}^xC_3 \\ {}^yC_1 & {}^yC_2 & {}^yC_3 \\ {}^zC_1 & {}^zC_2 & {}^zC_3 \end{vmatrix}$ is equal to-

(A) $\frac{1}{3}xyz(x+y)(y+z)(z+x)$ (B) $\frac{1}{4}xyz(x+y-z)(y+z-x)$

(C) $\frac{1}{12}xyz(x-y)(y-z)(z-x)$ (D) none

19. There are two numbers x making the value of the determinant $\begin{vmatrix} 1 & -2 & 5 \\ 2 & x & -1 \\ 0 & 4 & 2x \end{vmatrix}$ equal to 86. The sum of these two numbers, is-

(A) –4 (B) 5 (C) –3 (D) 9

20. If $\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ and A_1, B_1, C_1 denote the co-factors of a_1, b_1, c_1 respectively, then the value of the determinant $\begin{vmatrix} A_1 & B_1 & C_1 \\ A_2 & B_2 & C_2 \\ A_3 & B_3 & C_3 \end{vmatrix}$ is-

(A) Δ (B) Δ^2 (C) Δ^3 (D) 0