1. If $\begin{vmatrix} a & 5x & p \\ b & 10y & 5 \\ c & 15z & 15 \end{vmatrix} = 125$, then $\begin{vmatrix} 3a & 3b & c \\ x & 2y & z \\ p & 5 & 5 \end{vmatrix}$ is equal to

(1) 25 (2) 50

(3) 75 (4) 100

2. If $f\left(x\right) = \begin{vmatrix} a & -1 & 0 \\ ax & a & -1 \\ ax^2 & ax & a \end{vmatrix}$ then $f(2x) - f(x)$ *is* not a multiple of

(1) x (2) 0

(3) $2\,a + 3\,x$ (4) x^2

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

(1) -2 (2) -1

(3) -3 (4) None of these

4. Let $\begin{vmatrix} x^2+x+1 & x+1 & 2x-3 \\ 3x^2 & x+2 & x-1 \\ x^2+5x+1 & 2x+3 & x+4 \end{vmatrix} = ax^4 + bx^3 + cx^2 + dx + e$ be an identity in x, then the value of e is

(1) 16 (2) 24

(3) 19 (4) 9

5. Let the numbers 2, b, c be in an A.P. and $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & b & c \\ 4 & b^2 & c^2 \end{bmatrix}$. If $\det(A) \in [2,16]$, then c lies in the interval:

(1) $[2,3)$ (2) $[4,6]$

(3) $\left[3,2+2^{\frac{3}{4}}\right]$ (4) $\left(2+2^{\frac{3}{4}},4\right)$

6. If A, B and C are $n \times n$ matrices and det $det\,(A) = 2$, $det\,(B) = 3$ *and* $det\,(c) = 5$. If $det\left(A^2BC^{-1}\right) = \frac{\lambda}{5}$, then find the value of λ.

7. If A, B and C are $n \times n$ matrices and $|A| = 2$, $|B| = 3$ and $|C| = 5$, then the value of the $\left|A^2BC^{-1}\right|$ is equal to

(1) $\frac{6}{5}$ (2) $\frac{12}{5}$

(3) $\frac{18}{5}$ (4) $\frac{24}{5}$

8. The value ofλ , if $ax^4 + bx^3 + cx^2 + 50x + d = \begin{vmatrix} x^3 - 14x^2 & -x & 3x+\lambda \\ 4x+1 & 3x & x-4 \\ -3 & 4 & 0 \end{vmatrix}$, is

(1) 0 (2) 1

(3) 2 (4) 3

9. $|A - B| \neq 0$, $A^4 = B^4$, $C^3A = C^3B$, $B^3A = A^3B$, then $|A^3 + B^3 + C^3| =$

(1) 0 (2) 1

(3) $3|\mathrm{A}|^3$ (4) 6

10. If $\Delta_r = \begin{vmatrix} r & 2r-1 & 3r-2 \\ \frac{n}{2} & n-1 & a \\ \frac{1}{2}n(n-1) & (n-1)^2 & \frac{1}{2}(n-1)(3n+4) \end{vmatrix}$, then the value of $\sum_{r=1}^{n-1} \Delta_r$

(1) Is independent of both a and n (2) Depends only on a

(3) Depends only on n (4) Depends both on a and n