I. CHOOSE THE CORRECT ANSWER:  

\[ \sqrt{2} \ 0 \ 0 \]

(1) The type of the matrix \[ \begin{bmatrix} 0 & \sqrt{3} & 0 \\ 0 & 0 & \sqrt{3} \end{bmatrix} \]

is

(1) diagonal and scalar  (2) a scalar matrix  (3) a diagonal matrix  (4) a unit matrix

(2) The minor of 2 in

\[ \begin{bmatrix} 2 & -3 \\ 6 & 0 \end{bmatrix} \]

is

(1) -3  (2) 0  (3) 1  (4) 2

(3) The value of

\[ \begin{bmatrix} 1 & 1 & 1 \\ 2x & 2y & 2z \\ 3x & 3y & 3z \end{bmatrix} \]

is

(1) 0  (2) 1  (3) \(xyz\)  (4) \(x + y + z\)

(4) Two rows of a determinant \(\Delta\) are identical when \(x = -a\) then the factor of \(\Delta\) is

(1) \((x - a)^2\)  (2) \(x + a\)  (3) \(x - a\)  (4) \((x + a)^2\)

(5) The value of the product

\[ \begin{bmatrix} 1 & 2 \\ 3 & -1 \end{bmatrix} \times \begin{bmatrix} 2 & 0 \\ 1 & -4 \end{bmatrix} \]

is

(1) -63  (2) 56  (3) -56  (4) -1

(6) If \(a\) is a non zero vector and \(k\) is a scalar such that \(|k\overrightarrow{a}| = 1\) then \(k\) is equal to

(1) \(\pm \frac{1}{|\overrightarrow{a}|}\)  (2) \(\overrightarrow{a}\)  (3) 1  (4) \(\frac{1}{|\overrightarrow{a}|}\)

(7) If \(G\) is the centroid of a triangle \(ABC\) and \(G'\) is the centroid of triangle \(A'B'C'\) then

\[ \overrightarrow{AA'} \ + \overrightarrow{BB'} \ + \overrightarrow{CC'} = \]

(1) \(4\overrightarrow{GG'}\)  (2) \(\overrightarrow{GG'}\)  (3) \(3\overrightarrow{GG'}\)  (4) \(2\overrightarrow{GG'}\)

(8) If \(\frac{ax}{(x+2)(2x+3)} = \frac{2}{x+2} + \frac{3}{2x-3}\) then \(a = \)

(1) 8  (2) 4  (3) 5  (4) 7

(9) 20 persons are invited for a party. The number of ways in which they and the host can be seated at a circular table if two particular persons be seated on either side of the host is equal to

(1) 20! 2!  (2) 18! 2!  (3) 18! 3!  (4) 19! 2!

(10) Number of elements in a matrix of order 2 \(\times\) 3 is

(1) 6  (2) 5  (3) 2  (4) 3

(11) Matrix \(A\) is of order 2 \(\times\) 3 and \(B\) is of order 3 \(\times\) 2 then order of matrix \(BA\) is

(1) 3 \(\times\) 2  (2) 3 \(\times\) 3  (3) 2 \(\times\) 3  (4) 2 \(\times\) 2

(12) The cofactor of -7 in

\[ \begin{bmatrix} 6 & 0 & 4 \\ 1 & 5 & -7 \end{bmatrix} \]

is

(1) 7  (2) -18  (3) 18  (4) -7
If \[ \Delta = \begin{vmatrix} 1 & 2 & 3 \\ 3 & 1 & 2 \\ 2 & 3 & 1 \end{vmatrix} \] then \( 3 \Delta \) is equal to

(1) \(-3 \Delta\)  
(2) \(\Delta\)  
(3) \(-\Delta\)  
(4) \(3 \Delta\)

The factor of the determinant \( \begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix} \) is

(1) \(x - a + b + c\)  
(2) \(x\)  
(3) \(x + b\)  
(4) \(x + c\)

Given that the value of a third order determinant is 11 then the value of the determinant formed by the respective co-factors as its elements will be

(1) 0  
(2) 11  
(3) 121  
(4) 1331

A factor of the determinant \( \begin{vmatrix} 1+ax & (1+ay)^2 & (1+az)^2 \\ (1+bx)^2 & (1+by)^2 & (1+bz)^2 \\ (1+cx)^2 & (1+cy)^2 & (1+cz)^2 \end{vmatrix} \) is

(1) \(a + b + c\)  
(2) \(x + y\)  
(3) \(a + b\)  
(4) \(x - y\)

The position vectors of A and B are \( \vec{a} \) and \( \vec{b} \). P divides AB in the ratio 3 : 1. Q is the mid point of AP. The position vector of Q is

(1) \(\frac{3\vec{a} + \vec{b}}{4}\)  
(2) \(\frac{5\vec{a} + 3\vec{b}}{8}\)  
(3) \(\frac{3\vec{a} + 5\vec{b}}{2}\)  
(4) \(\frac{5\vec{a} + 3\vec{b}}{4}\)

Which of the following vectors has the same direction as the vector \( \vec{i} - 2\vec{j} \)

(1) \(3\vec{i} - 6\vec{j}\)  
(2) \(-\vec{i} + 2\vec{j}\)  
(3) \(2\vec{i} + 4\vec{j}\)  
(4) \(-3\vec{i} + 6\vec{j}\)

If the position vectors of P and Q are \(2\vec{i} + 3\vec{j} - 7\vec{k}\) , \(4\vec{i} - 3\vec{j} + 4\vec{k}\) then the direction cosines of \( \overrightarrow{PQ} \) are

(1) \(1,2,3\)  
(2) \(\frac{2}{\sqrt{161}},\frac{6}{\sqrt{161}},\frac{11}{\sqrt{161}}\)  
(3) \(-\frac{2}{\sqrt{161}},-\frac{6}{\sqrt{161}},-\frac{11}{\sqrt{161}}\)  
(4) \(2,-6,11\)

A polygon has 44 diagonals then the number of its sides is

(1) 12  
(2) 11  
(3) 7  
(4) 8

The order of matrix \( B = \begin{bmatrix} 1 & 2 & 5 \\ 7 & 6 & 5 \end{bmatrix} \) is

(1) \(1 \times 1\)  
(2) \(1 \times 4\)  
(3) \(4 \times 1\)  
(4) \(2 \times 1\)

The true statements of the following are

(i) Every unit matrix is a scalar matrix but a scalar matrix need not be a unit matrix.  
(ii) Every scalar matrix is a diagonal matrix but a diagonal matrix need not be a scalar matrix.  
(iii) Every diagonal matrix is a square matrix but a square matrix need not be a diagonal matrix.

(1) (iii) and (i)  
(2) (i), (ii), (iii)  
(3) (i) and (ii)  
(4) (ii) and (iii)

If \( A = \begin{bmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{bmatrix} \) and \( |A| = 2 \) then \( |3A| \) is

(1) \(-54\)  
(2) \(54\)  
(3) \(6\)  
(4) \(27\)

The value of the determinant \( \begin{vmatrix} 1 & 2 & 3 \\ 7 & 6 & 5 \\ 1 & 2 & 3 \end{vmatrix} \) is

(1) \(-10\)  
(2) \(0\)  
(3) \(5\)  
(4) \(10\)

(25) If \( \Delta_1 = \begin{vmatrix} 7 & 6 & 1 \\ 5 & 3 & 8 \\ 8 & 2 & 4 \end{vmatrix} \) and \( \Delta_2 = \begin{vmatrix} 7 & 6 & 1 \\ 8 & 2 & 4 \\ 10 & 6 & 16 \end{vmatrix} \) then

(1) \( \Delta_1 = -2 \Delta_2 \)  
(2) \( \Delta_1 = -2 \Delta_2 \)  
(3) \( \Delta_2 = -2 \Delta_1 \)  
(4) \( \Delta_1 = 2 \Delta_2 \)

(26) The value of the determinant \( \begin{vmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{vmatrix} \) is

(1) \(-abc\)  
(2) \(abc\)  
(3) 0  
(4) \(a^2b^2c^2\)

(27) The position vector of A is \( \begin{vmatrix} 2i + 3j + 4k \end{vmatrix} \), \( \overrightarrow{AB} = 5i + 7j + 6k \) then position vector of B is

(1) \(-7i + 10j - 10k\)  
(2) \(7i + 10j + 10k\)  
(3) \(7i - 10j + 10k\)  
(4) \(7i + 10j - 10k\)

(28) If \( \overrightarrow{AB} = k \overrightarrow{AC} \) where \( k \) is a scalar then

(1) A, B, C are coincident  
(2) A, B, C are collinear  
(3) A, B, C are coplanar  
(4) \( \overrightarrow{AB}, \overrightarrow{AC} \) have the same magnitude

(29) If \( \begin{vmatrix} 2 \end{vmatrix} \begin{vmatrix} x \end{vmatrix} - 1 \begin{vmatrix} x \end{vmatrix} = 13 \) then the value of \( x \) is

(1) \( \pm 4\)  
(2) 5  
(3) 2  
(4) \( \pm 3\)

(30) If \( nPr = 720 \) \( nCr \), then the value of \( r \) is

(1) 7  
(2) 6  
(3) 5  
(4) 4

(31) If \( A = \begin{vmatrix} 2 & 1 & 4 \\ -3 & 2 & 1 \end{vmatrix} \) and \( X + A = 0 \) then matrix \( X \) is

(1) \begin{vmatrix} 2 & 1 & 4 \\ -3 & 2 & 1 \end{vmatrix}  
(2) \begin{vmatrix} 2 & 1 & 4 \\ -3 & 2 & 1 \end{vmatrix}  
(3) \begin{vmatrix} -2 & -1 & -4 \\ -3 & 2 & 1 \end{vmatrix}  
(4) \begin{vmatrix} -2 & -1 & -4 \\ -3 & 2 & 1 \end{vmatrix}

(32) If \( 2 \begin{vmatrix} x \end{vmatrix} - 1 \begin{vmatrix} x \end{vmatrix} = 13 \) then the value of \( x \) is

(1) \( \pm 4\)  
(2) 5  
(3) 2  
(4) \( \pm 3\)

(33) The matrix \( \begin{vmatrix} 0 & 6 & 4 \\ 0 & 0 & 2 \end{vmatrix} \) is

(1) null matrix  
(2) the upper triangular  
(3) lower triangular  
(4) square matrix

(34) The solution of \( \begin{vmatrix} 2 & x \\ 2 & 3 \end{vmatrix} = 0 \) is

(1) \( x = 0 \)  
(2) \( x = 1 \)  
(3) \( x = 2 \)  
(4) \( x = 3 \)

(35) If \( \Delta = \begin{vmatrix} 1 & 4 & 3 \\ -1 & 1 & 5 \end{vmatrix} \) and \( \Delta_1 = \begin{vmatrix} 2 & 8 & 6 \\ 3 & 2 & -1 \end{vmatrix} \) then

(1) \( \Delta = 8 \Delta_1 \)  
(2) \( \Delta_1 = 2 \Delta \)  
(3) \( \Delta_1 = 4 \Delta \)  
(4) \( \Delta_1 = 8 \Delta \)

(36) If \( \Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix} \) and \( A_1, B_1, C_1 \cdots \) are the cofactors of \( a_1, b_1, c_1 \cdots \)

then \( a_1 A_2 + b_1 B_2 + c_1 C_2 \) is equal to

(1) \( \Delta^2 \)  
(2) \( \Delta \)  
(3) 0  
(4) \( -\Delta \)
(37) Let \( \vec{a}, \vec{b} \) be the vectors \( \overrightarrow{AB}, \overrightarrow{BC} \) determined by two adjacent sides of regular hexagon ABCDEF. The vector represented by \( \overrightarrow{EF} \) is

(1) \(-\vec{b}\)  
(2) \(\vec{a} - \vec{b}\)  
(3) \(\vec{a} + \vec{b}\)  
(4) \(2\vec{a}\)

(38) The number of 4 digit numbers, that can be formed by the digits 3, 4, 5, 6, 7, 8, 0 and no digit is being repeated, is

(1) 560  
(2) 720  
(3) 840  
(4) 280

(39) The product of the matrices \( \begin{bmatrix} 7 & 5 & 3 \\ 2 & 7 & 3 \\ -2 & 2 & 2 \end{bmatrix} \) is equal to

(1) 70  
(2) 70  
(3) 49  
(4) 15

(40) If \( \begin{bmatrix} 3 & -1 & 2 \\ \end{bmatrix} \) \( B \) = \( \begin{bmatrix} 5 & 6 \\ \end{bmatrix} \) the order of matrix B is

(1) 1×1  
(2) 3×1  
(3) 1×3  
(4) 3×2

(41) In a third order determinant the cofactor of \( a_{23} \) is equal to the minor of \( a_{23} \) then the value of the minor is

(1) 0  
(2) 1  
(3) \( \Delta \)  
(4) \( -\Delta \)

(42) If \( A \) is a square matrix of order 3 then \( |kA| \) is

(1) \(-k^3|A|\)  
(2) \(k|A|\)  
(3) \(-k|A|\)  
(4) \(k^3|A|\)

(43) If all the three rows are identical in a determinant \( \Delta \) on putting \( x = a \) then the factor of \( \Delta \) is

(1) \((x + a)^2\)  
(2) \(x - a\)  
(3) \(x + a\)  
(4) \((x - a)^2\)

(44) The factor of the determinant \( \begin{vmatrix} x & -6 & -1 \\ 2 & -3x & x - 3 \\ -3 & 2x & x + 2 \end{vmatrix} \) is

(1) \(x + 3\)  
(2) \(x + 2\)  
(3) \(x - 3\)  
(4) \(2x + 1\)

(45) If \( G \) is the centroid of a triangle ABC and O is any other point then \( \overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC} \) is equal to

(1) \(4\overrightarrow{OG}\)  
(2) \(\overrightarrow{O}\)  
(3) \(\overrightarrow{OG}\)  
(4) \(3\overrightarrow{OG}\)

(46) If \( G \) is the centroid of a triangle ABC then \( \overrightarrow{GA} + \overrightarrow{GB} + \overrightarrow{GC} \) is equal to

(1) \(\frac{\vec{a} + \vec{b} + \vec{c}}{3}\)  
(2) \(3(\vec{a} + \vec{b} + \vec{c})\)  
(3) \(\overrightarrow{OG}\)  
(4) \(\overrightarrow{O}\)

(47) If \( \vec{a} = 2\vec{i} + \vec{j} - 8\vec{k} \), and \( \vec{b} = \vec{i} + 3\vec{j} - 4\vec{k} \) then the magnitude of \( \vec{a} + \vec{b} = \)

(1) \(\frac{4}{13}\)  
(2) \(13\)  
(3) \(\frac{13}{3}\)  
(4) \(\frac{3}{13}\)

(48) If the initial point of vector \(-2\vec{i} - 3\vec{j}\) is \((-1, 5, 8)\) then the terminal point is

(1) \(3\vec{i} + 2\vec{j} - 8\vec{k}\)  
(2) \(3\vec{i} + 2\vec{j} + 8\vec{k}\)  
(3) \(-3\vec{i} + 2\vec{j} + 8\vec{k}\)  
(4) \(-3\vec{i} - 2\vec{j} - 8\vec{k}\)

(49) How many different arrangements can be made out of letters of words ENGINEERING

(1) \(\frac{11!}{3!}\)  
(2) \(11!\)  
(3) \(\frac{11!}{(3!)^2(2!)^2}\)  
(4) \(\frac{11!}{3!2!}\)

(50) The number of diagonals that can be drawn by joining the vertices of an octagon is

(1) 24  
(2) 28  
(3) 48  
(4) 20

“தமிழ் அறிஞ்சில் நேரமில் குறிப்பிட்டு”

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**Hardwork Never Fails Everywhere**

I. **CHOOSE THE CORRECT ANSWER:**

50 \times 1 = 50

(1) The largest coefficient in the expansion of \((1 + x)^{24}\) is

- (1) \(24C_{11}\)
- (2) \(24C_{24}\)
- (3) \(24C_{13}\)
- (4) \(24C_{12}\)

(2) The last term in the expansion of \((2 + \sqrt{3})^8\) is

- (1) 3
- (2) 81
- (3) 27
- (4) \(\sqrt{3}\)

(3) The sum to the first 25 terms of the series 1 + 2 + 3 ... ... is

- (1) 335
- (2) 305
- (3) 325
- (4) 315

(4) The \(n^{th}\) term of the series 3 + 7 + 13 + 21 + 31 + ... ... is

- (1) \((n^3 + 2)\)
- (2) \(4n - 1\)
- (3) \(n^2 + 2n\)
- (4) \((n^2 + n + 1)\)

(5) If \(a, b, c\) are in A.P. as well as in G.P. then

- (1) \(a = b = c\)
- (2) \(a = b \neq c\)
- (3) \(a \neq b = c\)
- (4) \(a \neq b \neq c\)

(6) When the terms of a G.P. are written in reverse order the progression formed is

- (1) A.P. and H.P.
- (2) A.P.
- (3) G.P.
- (4) H.P.

(7) The slope of the straight line \(2x - 3y + 1 = 0\) is

- (1) \(\frac{3}{2}\)
- (2) \(\frac{-2}{3}\)
- (3) \(\frac{-3}{2}\)
- (4) \(\frac{2}{3}\)

(8) If the straight lines \(a_1x + b_1y + c_1 = 0\) and \(a_2x + b_2y + c_2 = 0\) are perpendicular, then

- (1) \(\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}\)
- (2) \(\frac{a_1}{a_2} = -\frac{b_1}{b_2}\)
- (3) \(\frac{a_1}{a_2} = \frac{b_1}{b_2}\)
- (4) \(a_1a_2 = -b_1b_2\)

(9) The graph of \(xy = 0\) is

- (1) a pair of parallel lines
- (2) a point
- (3) a line
- (4) a pair of intersecting lines

(10) The condition for \(ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0\) to represent a pair of straight lines is

- (1) \(abc + 2fgh - af^2 - bg^2 - ch^2 = 0\)
- (2) \(abc + 2fgh - bf^2 - ag^2 - ch^2 = 0\)
- (3) \(abc - 2fgh - ag^2 - bf^2 - ch^2 = 0\)
- (4) \(abc + 2fgh - ah^2 - bg^2 - cf^2 = 0\)

(11) The centre of the circle \(x^2 + y^2 + 2x - 4y - 4 = 0\) is

- (1) \((-2, -4)\)
- (2) \((2, 4)\)
- (3) \((1, 2)\)
- (4) \((-1, 2)\)

(12) The length of the tangent from \((4, 5)\) to the circle \(x^2 + y^2 = 25\) is

- (1) 16
- (2) 5
- (3) 4
- (4) 25

(13) The number of tangents that can be drawn from a point to the circle is

- (1) 4
- (2) 1
- (3) 2
- (4) 3
(14) The equation of a circle with centre (0, 0) and passing through the point (5, 0) is
(1) \(x^2 + y^2 - 10y = 0\)  
(2) \(x^2 + y^2 - 10x = 0\)  
(3) \(x^2 + y^2 = 25\)  
(4) \(x^2 + y^2 + 10x = 0\)

(15) When \(h^2 = ab\) the angle between pair of straight lines \(ax^2 + 2hxy + by^2 = 0\) is
(1) 0°  
(2) \(\frac{\pi}{4}\)  
(3) \(\frac{\pi}{6}\)  
(4) \(\frac{\pi}{2}\)

(16) The equation of the straight line containing the point \((-2, 1)\) and parallel to \(4x - 2y = 3\) is
(1) \(y = \frac{1}{2}x\)  
(2) \(y = 2x + 5\)  
(3) \(y = 2x - 1\)  
(4) \(y = x - 2\)

(17) Which of the following has the greatest y-intercept in magnitude?
(1) \(4x + 5y = 6\)  
(2) \(2x + 3y = 4\)  
(3) \(x + 2y = 3\)  
(4) \(3x + 4y = 5\)

(18) The A.M. between two numbers is 5 and the G.M. is 4. Then H.M. between them is
(1) \(\frac{1}{4}\)  
(2) \(3\frac{1}{5}\)  
(3) 1  
(4) 9

(19) The third term of a G.P. is 5, the product of its first five terms is
(1) \(625 \times 25\)  
(2) 25  
(3) 625  
(4) 3125

(20) Sum of the binomial coefficients is
(1) \(n + 17\)  
(2) \(2n\)  
(3) \(n^2\)  
(4) \(2^n\)

(21) If \(n\) is a positive integer then the number of terms in the expansion of \((x + a)^n\) is
(1) \(n + 2\)  
(2) \(n\)  
(3) \(n - 1\)  
(4) \(n + 1\)

(22) If the \(n^{th}\) term of an A.P. is \((2n - 1)\), then the sum of \(n\) terms is
(1) \(n^2 + 1\)  
(2) \(n^2 - 1\)  
(3) \((2n - 1)\)  
(4) \(n^2\)

(23) The first term of a G.P. is 1. The sum of third and fifth terms is 90. Find the common ratio of the G.P.
(1) \(-3\)  
(2) \(\pm 2\)  
(3) \(\sqrt{10}\)  
(4) \(\pm 3\)

(24) \(e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots\) is valid for
(1) \(x > 0\)  
(2) \(-1 < x < 1\)  
(3) \(-1 \leq x \leq 1\)  
(4) all real \(x\)

(25) The equation of \(x\)-axis is
(1) \(x = 4\)  
(2) \(x = 0\)  
(3) \(x = 0, y = 0\)  
(4) \(y = 0\)

(26) Which of the following is the equation of a straight line that is neither parallel nor perpendicular to the straight line given by \(x + y = 0\)
(1) \(y + x + 2 = 0\)  
(2) \(y = x\)  
(3) \(y - x + 2 = 0\)  
(4) \(2y = 4x + 1\)

(27) If the slope of a straight line is \(\frac{2}{3}\), then the slope of the line perpendicular to it is
(1) \(-\frac{3}{2}\)  
(2) \(\frac{2}{3}\)  
(3) \(-\frac{2}{3}\)  
(4) \(\frac{3}{2}\)
(28) If \(2x^2 + kxy + 4y^2 = 0\) represents a pair of parallel lines then \(k =\)

1. \(\pm 8\)  
2. \(\pm 32\)  
3. \(\pm 2\sqrt{2}\)  
4. \(\pm 4\sqrt{2}\)

(29) Given that \((1, -1)\) is the centre of the circle \(x^2 + y^2 + ax + by - 9 = 0\). Its radius is

1. \(11\)  
2. \(3\)  
3. \(\sqrt{2}\)  
4. \(\sqrt{11}\)

(30) If the line \(y = 2x - c\) is a tangent to the circle \(x^2 + y^2 = 5\), then the value of \(c\) is

1. \(\pm 5\sqrt{2}\)  
2. \(\pm 5\)  
3. \(\pm \sqrt{5}\)  
4. \(\pm 5\sqrt{5}\)

(31) Which of the following points lies inside the circle \(x^2 + y^2 - 4x + 2y - 5 = 0\)

1. \((1, 1)\)  
2. \((5, 10)\)  
3. \((-5, 7)\)  
4. \((0, 0)\)

(32) If the circle has both \(x\) and \(y\) axes as tangents and has radius 1 unit then the equation of the circle is

1. \((x - 1)^2 + y^2 = 1\)  
2. \(x^2 + (y - 1)^2 = 1\)  
3. \(x^2 + y^2 = 1\)  
4. \((x - 1)^2 + (y - 1)^2 = 1\)

(33) If \(2x + 3y = 0\) and \(3x - 2y = 0\) are the equations of two diameters of a circle, then its centre is

1. \((-3, 2)\)  
2. \((1, -2)\)  
3. \((2, 3)\)  
4. \((0, 0)\)

(34) The radius of the circle \(x^2 + y^2 - 2x + 4y - 4 = 0\) is

1. 4  
2. 1  
3. 2  
4. 3

(35) The length of the diameter of a circle with centre \((2, 1)\) and passing through the point \((-2, 1)\) is

1. 2  
2. 4  
3. 8  
4. \(4\sqrt{5}\)

(36) If \(2x^2 + 3y - cy^2 = 0\) represents a pair of perpendicular lines then \(c =\)

1. \(\frac{1}{2}\)  
2. \(-2\)  
3. \(-\frac{1}{2}\)  
4. 2

(37) If the pair of straight lines given by \(ax^2 + 2hxy + by^2 = 0\) are perpendicular then

1. \(a = 0\)  
2. \(ab = 0\)  
3. \(a + b = 0\)  
4. \(a - b = 0\)

(38) Equation of two parallel straight lines differ by

1. \(xy\) term  
2. \(x\) term  
3. \(y\) term  
4. constant term

(39) Which of the following is a parallel line to \(3x + 4y + 5 = 0\)?

1. \(3x + 4y + 6 = 0\)  
2. \(4x + 3y + 6 = 0\)  
3. \(3x - 4y + 6 = 0\)  
4. \(4x - 3y + 9 = 0\)

(40) If the equation of the straight line is \(y = \sqrt{3}x + 4\), then the angle made by the straight line with the positive direction of \(x\)-axis is

1. \(90^\circ\)  
2. \(45^\circ\)  
3. \(30^\circ\)  
4. \(60^\circ\)

(41) The \(y\)-intercept of the straight line \(3x + 2y - 1 = 0\) is

1. \(-\frac{1}{2}\)  
2. 2  
3. 3  
4. \(\frac{1}{2}\)

(42) \(e^{\log x}\) is equal to

1. \(\log e^x\)  
2. \(x\)  
3. 1  
4. \(e\)
(43) The A.M., G.M. and H.M. between two positive numbers \( a \) and \( b \) are equal then
(1) \( a < b \)  
(2) \( a = b \)  
(3) \( ab = 1 \)  
(4) \( a > b \)

(44) If A, G, H are respectively arithmetic mean, geometric mean and harmonic mean then
(1) \( A > G < H \)  
(2) \( A > G > H \)  
(3) \( A < G > H \)  
(4) \( A < G < H \)

(45) What number must be added to 5, 13 and 29 so that sum may form a G.P?
(1) 5  
(2) 2  
(3) 3  
(4) 4

(46) The sum of \( n \) terms of an A.P. is \( n^2 \). Then its common difference is
(1) 1  
(2) 2  
(3) \(-2\)  
(4) \(\pm 2\)

(47) If \( a, b, c \) are in A.P., then \( 3^a, 3^b, 3^c \) are in
(1) A.P. and G.P.  
(2) A.P.  
(3) G.P.  
(4) H.P.

(48) The total number of terms in the expansion of \( [(a + b)^2]^{18} \) is
(1) 35  
(2) 11  
(3) 36  
(4) 37

(49) The sum of the coefficients in the expansion of \( (1 - x)^{10} \) is
(1) 1024  
(2) 0  
(3) 1  
(4) \(10^2\)

(50) The values of \( nC_0 - nC_1 + nC_2 - nC_3 + \cdots (-1)^n \cdot nC_n \) is
(1) \(2^{n+1}\)  
(2) \(n\)  
(3) \(2^n\)  
(4) 0

“डॉ क्रिस्टिथन सैन्य सेल्वराज
श्रीमती सल्लवीर, M.Sc., M.A.,
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I. ANSWER KEY:  

(1) $24C_{12}$  
(2) $81$  
(3) $325$  
(4) $(n^2 + n + 1)$  
(5) $a = b = c$  
(6) G.P.  
(7) $\frac{2}{3}$  
(8) $a_1a_2 = -b_1b_2$  
(9) a pair of intersecting lines  
(10) $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$  
(11) $(-1, 2)$  
(12) $4$  
(13) $2$  
(14) $x^2 + y^2 = 25$  
(15) $0^\circ$  
(16) $y = 2x + 5$  
(17) $x + 2y = 3$  
(18) $3\frac{1}{5}$  
(19) $3125$  
(20) $2^n$  
(21) $n + 1$  
(22) $n^2$  
(23) $\pm 3$  
(24) all real $x$  
(25) $y = 0$  
(26) $2y = 4x + 1$  
(27) $-\frac{3}{2}$  
(28) $\pm 4 \sqrt{2}$  
(29) $\sqrt{11}$  
(30) $\pm 5$  
(31) $(1, 1)$  
(32) $(x - 1)^2 + (y - 1)^2 = 1$  
(33) $(0, 0)$  
(34) $3$  
(35) $8$  
(36) $2$  
(37) $a + b = 0$  
(38) constant term  
(39) $3x + 4y + 6 = 0$  
(40) $60^\circ$  

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