MARGSHREE CLASSES PVT. LTD.

IIT-JEE / NEET / FOUNDATION (IX &X)

Time: 2 hours | Math | IIT-JEE | Marks: 50

(Straight line, Circles & Sequence serial)

NAME OF THE STUDENT:-____________________________ DATE:-

INSTRUCTION – ATTEMPT ALL QUESTIONS

Q.1. For a > b > c >o the distance between (I.I) and the point of intersection of the lines ax + by + c = o and bx + ay + c = o is less than $\sqrt[2]{2}$ then

(a) a + b – c > 0 (b) a – b + c <0 (c) a – b + c > 0 (d) a + b –c > 0

Q.2. For a point pin the plane, let d_1(p) and d_2 (p) be the distance of the point P from the lines x - y =0 and x + y = 0 respectively . The area of the region R consisting of all points P tying in the first quadrant of the plane and satisfying 2 < d_1 (p) + d_2 (p) < 4 is ________---

Q.3. The locus of the mid – point of the perpendiculars drown from points on the line x =2y to the line x = y is ____

(a) 2x – 3y =0 (b) 5x -7y =0 (c) 3x -2y =0 (d) 7x -5y =0

Q.4. A straight line L at a distance of 4 units from the origin makes positive internets on the co – ordinate axes and the perpendicular from the origin to this line makes an angle of 60^{o} with the live x +y = 0 then an equation of the live

(a) x + $\sqrt{3}$ y = 8 (b) ($\sqrt{3}$ +1) x +($\sqrt{3} - 1$)y = 8 $\sqrt{2}$

(c) $\sqrt{3}$ x+y = 8 (d) none of these

Q.5. Find the value of m^2 for which the lines joining origin to the point of intersection of y = mx-1 with x^2 + 4xy + $3y^2$ -1 = 0 are perpendicular to each other.

Q.6. The number of integral value of K for which the line $3x + 4y = K$ intersects the circle $x^2 + y^2 - 2x - 4y + 4 = 0$ at two distance point is __________

Q.7. If a $2b > 0$ then the positive value of m for which $y = mx - b\sqrt{1+m^2}$ is a common tangent to $x^2 + y^2 = b^2$ and $(x-a)^2 + y^2 = b^2$ is

(a) $\frac{2b}{\sqrt{a^2-4b^2}}$ (b) $\frac{\sqrt{a^2-4b^2}}{2b}$ (c) $\frac{2b}{a-2b}$ (d) $\frac{b}{a-2b}$

Q.8. Let the point B be the reflection of the point A (2,3) with respect to the line $8x - 6y - 23 = 0$ Let T_A and T_B be circles of radii 2 and 1 with centres A and B respectively. Let T be a common tangent to the circles T_A & T_B such that both the circles are on the same side of T. If c is the point of intersection of T and the line segment AC is ___________

Q.9. A circle is given by $x^2 + (y-1)^2 = 1$ another circle c touches it externally and also the x-axis, then the locus of its centre is

(a) $\{(x,y): x^2 = 4y\} \cup \{(x,y); y \le 0\}$

(b) $\{(x,y): x^2 + (y-1)^2 = 4\} \cup \{(x,y); y \le 0\}$

(c) $\{(x,y): x^2 = y\} \cup \{(o,y); y \le 0\}$

(d) $\{(x,y): x^2 = 4y\} \cup \{(o,y); y \le 0\}$

Q.10. If one of the diameters of the circle given by the equation, $x^2 + y^2 + 4x + 6y - 12 = 0$: is a chord of a circle 5, whose centre is at (-3,2) then the radius of 5___?

Q.11. If m arithmetic means (AMs) and three geometric means (G.Ms) are inserted between 3 and 243 such that 4th am is equal to 2nd 4m then m is equal to ______

Q.12. Let m be the minimum possible value of lof 3 (3)

Q.13. Let m be the minimum possible value of $\log_3(3^{y1} + 3^{y2} + 3^{y3})$. where y_1, y_2, y_3 are real numbers for which $y_1 + y_2 + y_3 = 9$. Let M be the maximum possible value of $(\log_3 x_1 + \log_3 x_2 + \log_3 x_3)$, where x_1, x_2, x_3 are positive real number for which $x_1 + x_2 + x_3 = 9$. Then the value of $\log_2(m^3) + \log_3(M^2)$ is _______

Q.14. A straight line through the vertex P of a triangle PQR intersects the side QR at the point S and circumcircle of the triangle PQR at the point T. IF S is not the centre of circumcircle, then

(a) $\frac{1}{PS} + \frac{1}{ST} < \frac{2}{\sqrt{QS \times SR}}$ (b) $\frac{1}{PS} + \frac{1}{ST} > \frac{2}{\sqrt{QS \times SR}}$

(c) $\frac{1}{PS} + \frac{1}{ST} < \frac{4}{QR}$ (d) $\frac{1}{PS} + \frac{1}{ST} > \frac{4}{QR}$

Q.15. Let $a_1, a_2, a_3 \ldots$. be a sequence of positive integers in arithmetic progression with common difference 2. Also let $b_1, b_2, b_3 \ldots$.. be a sequence of positive integers in geometric progression with common ratio 2. If $a_1 = b_1 = c$, then the number of all possible values of c, for with equality

$$2(a_1 + a_2 + \dots + a_n) = b_1 + b_2 + \dots + b_n$$

Holds for some positive integer n, is_____

Q.16. Let a, b, c be positive integers such that $\frac{b}{a}$ is an integer If a,b,c are in geometric progression and the arithmetic mean of a, b, c is b + 2 the value of $\frac{a^2+a-14}{a+1}$ is

Q.17. Let a, b, c, d be real number in G.P. If u, v, w, satisfy the system of equation

$u + 2v + 3w = 6$
$4u + 5v + 6w = 12$
$6u + 9v = 4$

then show that the roots of the equation

$$\left(\frac{1}{u} + \frac{1}{v} + \frac{1}{w}\right)x^2$$
$$+[(b-c)^2 + (c-a)^2 + (d-b)^2]\,x + u + v + w = 0$$

and $20x^2 + 10(a-d)^2 x - 9 = 0$ are reciprocals of each other

Q.18. If $S_1, S_2\ S_3$, ... , S_n are the sums of infinite geometric series whose first terms are 1, 2, 3, _______, n and whose common ratios are $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$, _______ $\frac{1}{n+1}$ respectively, then find the value of $S_1^2 + S_2^2 + S_3^2 +$ _____________ $+ S^2_{2n-1}$