Class – XI
Subject – Mathematics
[Coordinate Geometry _ Straight Lines in a Plane]

1) Find the value of K such that the line joining the points (2, K) and (-1, 3) is parallel to the line joining (0, 1) and (-3, 1).

2) Show that points (a, b + c), (b, c + a), (c, a + b) are collinear.

3) Show that points $(at_1^2, 2at_1)$, $(at_2^2, 2at_2)$ and $(a, 0)$ are collinear if $t_1t_2 = -1$

4) Find the equation of the line that has y intercept 4 and is parallel to the line $2x – 3y = 7$

5) Find the equation of the line that has x intercept - 3 and is perpendicular to the line $3x + 5y = 4$.

6) Prove that the lines $7x – 2y + 5 = 0$ and $14x – 4y – 8 = 0$ are parallel to each other.

7) Prove that the lines $3x – 2y + 5 = 0$ and $4x + 6y – 23 = 0$ are perpendicular.

8) Find out the angle between the following pair of lines
   a) $y – \sqrt{3}x – 5 = 0$ and $\sqrt{3}y – x + 6 = 0$
   b) $y = (2 – \sqrt{3})x + 5$ and $y = (2 + \sqrt{3})x – 2$

9) Find the equation of a line which passes through the point (3, - 2) and is inclined at 60^0 to the line $\sqrt{3}x + y = 1$.

10) Find the equation of a line which passes through the point (x_1, y_1) and perpendicular to the line $xy_1 + x_1y = a^2$

11) A line such that its segment between the axis is bisected at the point (x_1, y_1). prove that the equation of the line is $\dfrac{x}{2x_1} + \dfrac{y}{2y_2} = 1$

12) If the three lines $a_1x + b_1y = 1$, $a_2x + b_2y = 1$ and $a_3x + b_3y = 1$ are concurrent, prove that the points (a_1,b_1), (a_2,b_2) and (a_3,b_3) are collinear.

13) Find the value of k such that the three lines $x + y – 3 = 0$, $kx – y – 5 = 0$ and $3x + y – 7 = 0$ are concurrent.

14) Find the length of the perpendicular drawn from the point (b, a) to the line $\dfrac{x}{a} + \dfrac{y}{b} = 1$

15) If p and q are the perpendicular from the origin upon the lines whose equations are $x \sec\theta + y \csc\theta = a$ and $x \cos\theta – y \sin\theta = a \cos2\theta$. Prove that $4p^2 + q^2 = a^2$

16) If P be the measure of the perpendicular segment from the origin to the line whose intercept on the axes are 'a' and 'b'. Show that $\dfrac{1}{P^2} = \dfrac{1}{a^2} + \dfrac{1}{b^2}$.