4. PAIR OF LINES

I. MCQ (2 marks each)

1.The combined equation of the two lines passing through the origin ,each making angle 45^0 and 135^0 with the positive X axis is …

A. $x^2 + y^2 = 0$ B. xy=1

C. $x^2 - y^2 = 0$ D . $x^2 +$ xy =0

2. The separate equations of the lines represented by $3x^2 - 2\sqrt{3}\,xy - 3y^2 = 0$ are…

A. x+$\sqrt{3}$y=0 and $\sqrt{3}$x+y=0 B x-$\sqrt{3}$y=0 and $\sqrt{3}$x-y=0

C. x-$\sqrt{3}$y=0 and $\sqrt{3}$x+y=0 D x+$\sqrt{3}$y=0 and $\sqrt{3}$x-y=0

3.The equation $4x^2 + 4xy + y^2 = 0$ represents two….

A.real and distinct lines B.real and coincident lines
C.imaginary lines D. perpendicular lines

4.If the lines represented by $kx^2 - 3xy + 6y^2 = 0$ are perpendicular to each other then…..

A.k = 6 B.k= -6 C. k = 3 D. k = -3

5. Auxillary equation of $2x^2 + 3xy - 9y^2 = 0$ is…..

A. $2m^2 + 3m - 9 = 0$ B. $9m^2 - 3m - 2 = 0$

C. $2m^2 - 3m + 9 = 0$ D. $-9m^2 - 3m + 2 = 0$

6. The combined equation of the lines through origin and perpendicular to the pair of lines $3x^2 + 4xy - 5y^2 = 0$ is…….

A $5x^2 + 4xy - 3y^2 = 0$ B. $3x^2 + 4xy - 5y^2 = 0$

C. $3x^2 - 4xy + 5y^2 = 0$ D. $5x^2 + 4xy + 3y^2 = 0$

7.The acute angle between the lines represented by $x^2 + xy = 0$ is…….

A. $\frac{\pi}{2}$ B. $\frac{\pi}{4}$ C. $\frac{\pi}{6}$ D. $\frac{\pi}{3}$

8 .If 2x+y=0 is one of the line represented by $3x^2 + kxy + 2y^2 = 0$

then k = …

A. $\frac{1}{2}$. B. $\frac{11}{2}$ C. $\frac{2}{3}$ D. $\frac{3}{2}$

9. If the equation $3x^2 + 10xy + 3y^2 + 16y + k = 0$ represents a pair of lines , then$k = \cdots$

A) 21 B) -12 C) 12 D) -21

10. The line $5x + y - 1 = 0$ coincides with one of the lines given by$5x^2 + xy - kx - 2y + 2 = 0$, then$k = \cdots$

A) -11 B) 31 C) 11 D) -31

II. Very Short Answers (2 mark)

1) Find the combine equation of the pair of lines passing through the point (2,3) and parallel to the coordinate axes.
2) Find the separate equations of the lines given by $x^2 + 2xytan \propto -y^2 = 0$
3) Find k, if the sum of the slopes of the lines represented by $x^2 + kxy - 3y^2 = 0$ is twice their products.
4) Find the measure of acute angle between the lines given by $x^2 - 4xy + y^2 = 0$
5) Find the value of h , if the measure of the angle between the lines $3x^2 + 2hxy + 2y^2 = 0$ is 45^0.

III. Short Answers (3 marks)

1) Find the combine equation of pair of lines passing through (-1,2), one is parallel to x+3y-1=0 and other is perpendicular to 2x-3y-1=0.
2) Find the joint equation of pair of lines through the origin which are perpendicular to the lines represented by $5x^2 + 2xy - 3y^2 = 0$
3) Find the condition that the line 4x+5y=0 coincides with one of the lines given by $ax^2 + 2hxy + by^2 = 0$
4) Find the measure of acute angle between the lines represented by $3x^2 - 4\sqrt{3}\,xy + 3y^2 = 0$

IV. Short answers (4 Marks)

1) Show that the combine equation of pair of lines passing through the origin is a homogeneous equation of degree 2 in x and y. Hence find the combined equation of the lines 2x+3y=0 and x-2y=0
2) Show that the homogeneous equation of degree 2 in x and y represents a pair of lines passing through the origin if $h^2 - ab \geq 0$
3) If θ is the acute angle between the lines given by $ax^2 + 2hxy + by^2 = 0$

then prove that $\tan\theta = \left|\frac{2\sqrt{h^2}-ab}{a+b}\right|$. Hence find acute angle between the lines $2x^2 + 7xy + 3y^2 = 0$

4) If the angle between the lines represented by $ax^2 + 2hxy + by^2 = 0$ is equal to the angle between the lines $2x^2 - 5xy + 3y^2 = 0$ then show that $100(h^2 - ab) = (a + b)^2$

5) The equation $4x^2 + 2pxy + 25y^2 + 2x + 5y - 1 = 0$ represents a pair of parallel lines , then find value of p.

6. Find the acute angle between the pair of straight lines $x^2 - 6xy + 5y^2 + 10x - 4y + 9 = 0$.