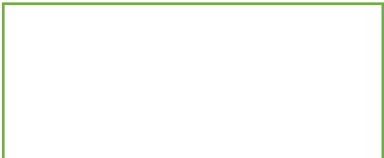

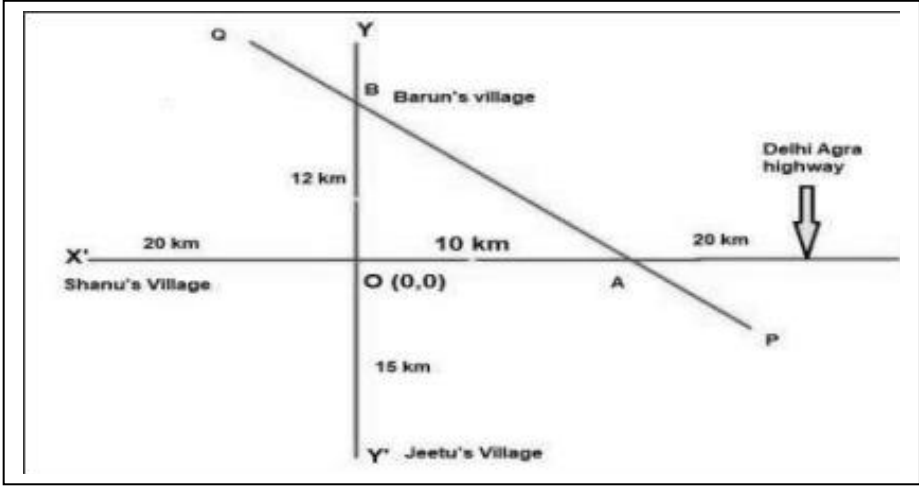
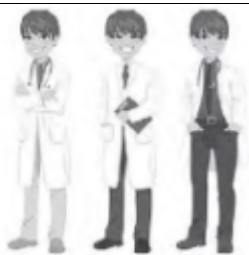


CHAPTER-10
STRAIGHT LINES
05 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	<p>Four friends Rishabh, Shubham, Vikram and Rajkumar are sitting on vertices of a rectangle, whose coordinates are given.</p> <p style="text-align: center;">Rishabh (1, 4) Rajkumar (5, 4)</p>  <p style="text-align: center;">Shubham (1, 2) Vikram (5, 2)</p> <p>Based on the above information, answer the following questions.</p> <p>i) The equation formed by Shubham and Rajkumar is a</p> <p>a) $X + 2Y + 3 = 0$ b) $X - 2Y - 3 = 0$</p> <p>c) $X - 2Y + 3 = 0$ d) None of the above</p> <p>ii) The equation formed by Rishabh and Vikram is</p> <p>a) $X + 2Y + 9 = 0$ b) $X + 2Y - 9 = 0$</p> <p>c) $X - 2Y - 9 = 0$ d) None of the above</p> <p>iii) The equation formed by Shubham and Vikram is</p> <p>a) $X + 2Y + 9 = 0$ b) $X + 2Y - 9 = 0$</p> <p>c) $X - 2Y - 9 = 0$ d) None of the above</p> <p>iv) Slope of equation of line formed by Rishabh and Rajkumar is</p> <p>a) ZERO b) 1 c) 2 d) 3</p> <p>v) Pair of the same slope is</p> <p>a) Rishabh – Rajkumar and Shubham-Vikram</p> <p>b) Rishabh-Rajkumar and Rajkumar – Vikram</p> <p>c) Rishabh – Rajkumar and Rishabh -Shubham</p> <p>d) None of the above</p>	5
2.	<p>If A and B are two persons sitting at the positions (2, -3) and (6, -5). If C is a third person who is sitting between A and B such that it divides the line AB in 1: 3 ratio.</p>  <p style="text-align: center;">A(2, -3) C(X, Y) B(6, -5)</p> <p>Based on the above information, answer the following questions.</p> <p>i) The distance between A and B is</p> <p>a) $\sqrt{5}$ b) $2\sqrt{5}$ c) $3\sqrt{5}$ d) $4\sqrt{5}$</p> <p>ii) The equation of AB is</p> <p>a) $X + 2Y + 4 = 0$ b) $X + 2Y - 4 = 0$</p> <p>c) $X - 2Y + 4 = 0$ d) None of these</p> <p>iii) The coordinates of point C are</p>	5

	<p>a) $\left(\frac{7}{2}, -3\right)$ b) $\left(3, \frac{7}{2}\right)$ c) $(3, 3)$ d) $\left(3, -\frac{7}{2}\right)$</p> <p>iv) Distance between A and C is</p> <p>a) $\sqrt{5}$ b) $2\sqrt{5}$ c) $\frac{\sqrt{5}}{2}$ d) $\sqrt{\frac{5}{2}}$</p> <p>v) Distance between C and B is</p> <p>a) $\frac{3\sqrt{5}}{2}$ b) $3\sqrt{5}$</p> <p>c) $\frac{2\sqrt{5}}{3}$ d) None of these.</p>	
3.	Show that the four lines $ax + by + c = 0$ enclosed a rhombus whose area is $\frac{2c^2}{ab}$.	5
4.	The mid points of the sides of a triangle are $(2, 1)$, $(-5, 7)$ and $(-5, -5)$. Find the equations of the sides of the triangle.	5
5.	<p>In a park Road 1 and road 2 of width 5 m and 4 m are crossing at centre point $O(0, 0)$ as shown in the figure .</p> <div data-bbox="247 828 1141 1205" data-label="Figure"> </div> <p>For trees A, B, C and D are situated in four quadrants of the Cartesian system of coordinate. The coordinates of the trees A, B, C and D are $(6, 8)$, $(12, 5)$, $(-5, 0)$ and $(-3, -4)$ respectively.</p> <p>Based on the above information answer the following questions:</p> <p>(i) What is the distance of Tree C from the Origin? a) 5 m b) 10 m c) 15 m d) 25 m</p> <p>(ii) What is the equation of line AB? a) $2x + y = 22$ b) $x - 2y = -6$ c) $x + 2y - 22 = 0$ d) $x + 2y = 6$</p> <p>(iii) What is the slope of line CD? a) $2/1$ b) -2 c) $-1/2$ d) $3/2$</p> <p>(iv) What is the distance of point B from the origin? a) 13 m b) 15 m c) 12 m d) 5 m</p>	5
6.	Villages of Shanu and Arun's are 50km apart and are situated on Delhi Agra highway as shown in the following picture. Another highway YY' crosses Agra Delhi highway at $O(0,0)$. A small local road PQ crosses both the highways at	5

	<p>pints A and B such that OA=10 km and OB =12 km. Also, the villages of Barun and Jeetu are on the smaller high way YY'. Barun's village B is 12km from O and that of Jeetu is 15 km from O.</p>  <p>Based on the above information answer the following questions:</p> <p>i) What are the coordinates of A?</p> <p>a) (10, 0) b) (10, 12) c) (0,10) d) (0,15)</p> <p>ii) What is the equation of line AB?</p> <p>a) $5x + 6y = 60$ b) $6x + 5y = 60$ c) $x = 10$ d) $y = 12$</p> <p>iii) What is the distance of AB from O(0, 0)?</p> <p>a) 60 km b) $60/\sqrt{61}$ km c) $\sqrt{61}$ km d) 60 km</p> <p>iv) What is the slope of line AB?</p> <p>a) $\frac{6}{5}$ b) $\frac{5}{6}$ c) $-\frac{6}{5}$ d) $-\frac{10}{12}$</p>	
7.	<p>p_1, p_2 are points on either of two lines $y - \sqrt{3} x = 2$ at a distance of 5 units from their point of intersection.</p> <p>Based on the above information, answer the following question:</p> <p>(i) The point of intersection of the given lines is</p> <p>(a) (2, 0) (b) (0, 2) (c) $(\sqrt{3}, 2)$ (d) $(-\sqrt{3}, 2)$</p> <p>(ii) Angle between the given lines is</p> <p>(a) 30° (b) 45° (c) 60° (d) 90°</p> <p>(iii) Equation of bisector of the angle between the given lines is</p> <p>(a) $x=0$ (b) $y=0$ (c) $x=2$ (d) $y=2$</p> <p>(iv) The co-ordinates of the points p_1, p_2 are</p> <p>(a) $(\pm \frac{5}{2}, 2 + \frac{5\sqrt{3}}{2})$ (b) $(\pm 2 + \frac{5\sqrt{3}}{2}, \frac{5}{2})$ (c) $(2 \pm \frac{5\sqrt{3}}{2}, -\frac{5}{2})$ (d) $(\pm \frac{5\sqrt{3}}{2}, 2 + \frac{5\sqrt{3}}{2})$</p> <p>(v) the co-ordinates of the foot of the perpendiculars drawn from p_1, p_2 on the bisectors of the angle between the given lines are</p> <p>(a) $(2 + \frac{5\sqrt{3}}{2}, 0)$ (b) $(\frac{5}{2}, 0)$ (c) $(0, \frac{5}{2})$ (d) $(0, 2 + \frac{5\sqrt{3}}{2})$</p>	5
8.	<p>If A and B are two persons sitting at the positions (2, -3) and (6, -5). If C is a third person who is sitting between A and B such that it divides the line AB in 1:3 ratio.</p>	5



Based on the above information, answer the following questions.

(i) The distance between A and B is

- (a) $\sqrt{5}$ (b) $2\sqrt{5}$ (c) $3\sqrt{5}$ (d) $4\sqrt{5}$

(ii) The equation of AB is

- (a) $X+2Y+4=0$ (b) $X+2Y-4=0$ (c) $X-2Y+4=0$ (d) None of these

(iii) Coordinates of point C are

- (a) $(\frac{7}{2}, -3)$ (b) $(3, \frac{7}{2})$ (c) $(3, 3)$ (d) $(3, -\frac{7}{2})$

(iv) Distance between A and C is

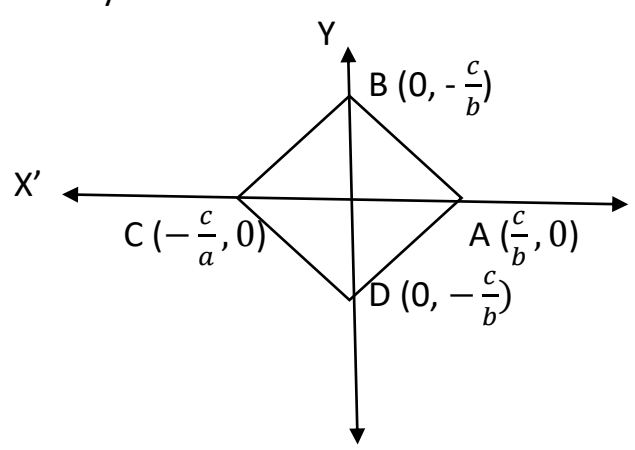
- (a) $\sqrt{5}$ (b) $2\sqrt{5}$ (c) $\frac{\sqrt{5}}{2}$ (d) $\sqrt{\frac{5}{2}}$

(v) Distance between C and B is

- (a) $\frac{3\sqrt{5}}{2}$ (b) $3\sqrt{5}$ (c) $\frac{2\sqrt{5}}{3}$ (d) None of these

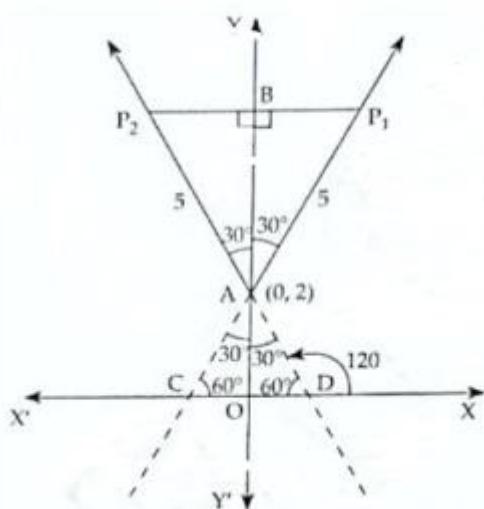
	<p>Based on the above information, answer the following questions.</p> <p>(i) The distance between A and B is</p> <p>(a) $\sqrt{5}$ (b) $2\sqrt{5}$ (c) $3\sqrt{5}$ (d) $4\sqrt{5}$</p> <p>(ii) The equation of AB is</p> <p>(a) $X+2Y+4=0$ (b) $X+2Y-4=0$ (c) $X-2Y+4=0$ (d) None of these</p> <p>(iii) Coordinates of point C are</p> <p>(a) $(\frac{7}{2}, -3)$ (b) $(3, \frac{7}{2})$ (c) $(3, 3)$ (d) $(3, -\frac{7}{2})$</p> <p>(iv) Distance between A and C is</p> <p>(a) $\sqrt{5}$ (b) $2\sqrt{5}$ (c) $\frac{\sqrt{5}}{2}$ (d) $\sqrt{\frac{5}{2}}$</p> <p>(v) Distance between C and B is</p> <p>(a) $\frac{3\sqrt{5}}{2}$ (b) $3\sqrt{5}$ (c) $\frac{2\sqrt{5}}{3}$ (d) None of these</p>	
9.	<p>The line parallel to the x-axis and passing through the intersection of the lines $ax+2by+3b=0$ and $bx-2ay-3a=0$, where (a,b)</p> <p>a) Above x axis at a distance of $\frac{3}{2}$ from it.</p> <p>b) Above x axis at a distance of $\frac{2}{3}$ from it.</p> <p>c) below x axis at a distance of $\frac{3}{2}$ from it</p> <p>d) below x axis at a distance of $\frac{2}{3}$ from it</p>	5
10.	<p>P(m,n) (where m,n are natural numbers) is any point in the interior of the quadrilateral formed by the pair of lines $xy=0$ and the lines $2x+y-2=0$ and $4x+5y=20$. The possible number of positions of the point P is :</p> <p>a) 6</p> <p>b) 5</p> <p>c) 4</p> <p>d) 11</p>	5
11.	<p>Let the point P(-8, 12) lies on the top of Qutub Minar, Delhi. Find the image of the point in the line $4x+7y+13=0$.</p>	5
12.	<p>Consider the ΔABC with vertices A (1, 4), B(2, -3), and C(-1, -2). AD and AM are the median and altitude through A. Answer the following questions:</p> <p>i) Find the distance of AC.</p> <p>ii) Find the slope of BC</p> <p>iii) Find the equation of median AD</p> <p>iv) Find the equation of altitude AM</p> <p>v) Find the equation of right bisector of side BC.</p>	5

ANSWERS:

Q. NO	ANSWER	MARKS
1.	i) c ii) b iii) c iv) a v) a	5
2.	i) b ii) a iii) d iv) c v) a	5
3.	<p>The four lines are $ax + by + c = 0 \rightarrow (i)$ $ax - by + c = 0 \rightarrow (iii)$ $ax + by - c = 0 \rightarrow (ii)$ $ax - by - c = 0 \rightarrow (iv)$ Clearly, (i), (ii) and (iii), (iv) are pairs of parallel lines. Solving (i) with (iii) and (ii) with (iv), we obtain the coordinates of C and A as $(-c/a, 0)$ and $(c/a, 0)$ respectively.</p>  <p>Solving (ii) with (iii) and (i) with (iv), we obtain the coordinates of B and D as $(0, c/b)$ and $(0, -c/b)$ respectively. Thus, the vertices of the parallelogram ABCD are A $(c/a, 0)$, B $(0, c/b)$, C $(-$</p>	5

	<p>$c/a, 0), D(0, -c/b)$</p> <p>This shows that the vertices of the parallelogram are on the coordinate axes such that one diagonal is along to X-axis and other along to Y-axis. Since, the diagonals are right angles. Hence, ABCD are a rhombus.</p> <p>Area of rhombus = $\frac{1}{2}AC \times BD = \frac{1}{2}\left(\frac{2c}{a} \times \frac{2c}{b}\right) = 2c^2/ab$</p>	
4.	<p>Let D (2, 1), E (-5, 7) and F (-5, -5) be the mid points of sides BC, CA and AB respectively of ΔABC.</p> <p>DE \parallel AB, EF \parallel BC, and DF \parallel AC</p> <p>Slope of AB = Slope of DE</p> <p>Slope of BC = slope of EF, and Slope of AC = Slope of DF</p> <p>Let m_1, m_2, m_3 be the slopes of AB, BC and CA respectively.</p> <p>Then</p> <p>$m_1 = \text{Slope of AB} = \text{Slope of DE} = \frac{7-1}{-5-2} = -6/7$</p> <p>$m_2 = \text{Slope of BC} = \text{Slope of EF} = \frac{7+5}{-5-5} = (\text{undefined})$</p> <p>$m_3 = \text{Slope of CA} = \text{Slope of DF} = \frac{1+5}{2+5} = 6/7$</p> <p>Side AB passes through F (-5, -5) and has slope $m_1 = -6/7$. So, its equation is $Y + 5 = \frac{-6}{7}(x + 5)$ or $6x + 7y + 65 = 0$</p> <p>Side BC is parallel to Y-axis and passes through D (2, 1). So, its equation is $x = k$. As it passes through (2, 1).</p> <p>$2 = k$</p> <p>Hence equation of BC is $x = 2$</p> <p>Side CA passes through E(-5, 7) and has slope $m_3 = 6/7$. So, its equation is</p> <p>$y - 7 = \frac{6}{7}(x + 5)$</p> <p>$6x - 7y + 79 = 0$</p>	5
5.	<p>(i) a) 5 m</p> <p>(iii) b) -2</p> <p>(ii) c) $x + 2y - 22 = 0$</p> <p>(iv) a) 13 m</p>	5
6.	<p>(i) a) (10, 0)</p> <p>(iii) b) $60/\sqrt{61}$ km</p> <p>(ii) b) $6x + 5y = 60$</p> <p>(iv) c) $\frac{-6}{5}$</p>	5
7.	<p>The equation of given lines are $y - \sqrt{3} x = 2$ or $y = \sqrt{3} x + 2$</p> <p>It can also be written as $y = -\sqrt{3}x + 2$ if $x \leq 0 \dots \dots (i)$ and</p> <p>$y = \sqrt{3}x + 2$ if $x \geq 0 \dots \dots (ii)$</p> <p>Slope of line (i), $m_1 = -\sqrt{3}$ and y intercept = 2</p> <p>Slope of line (ii), $m_2 = \sqrt{3}$ and y intercept = 2</p> <p>(i) Since y-intercept of lines (i) and (ii) is 2, so both the lines passes through the point (0, 2).</p> <p>Hence, the point of intersection of the given lines is (0, 2)</p> <p>Therefore, Option (b) is the correct answer.</p>	5

(ii) Let θ_1 and θ_2 be the inclination of the lines (i) and (ii) with the x-axis, then $\tan\theta_1 = -\sqrt{3} \Rightarrow \theta_1 = 120^\circ$ and $\tan\theta_2 = \sqrt{3} \Rightarrow \theta_2 = 60^\circ$



The given lines can be extended in one direction only. So the given lines are actually rays.

Points p_1, p_2 have a point on y-axis as common foot of the perpendicular.

From the graph, the angle between the given lines is 60° .

Therefore, Option (c) is the correct answer.

(iii) From the given figure, we have angle $\angle CAO = 30^\circ$

And $\angle DAO = 30^\circ$

So $\angle p_1AB = \angle CAO = 30^\circ$ and $\angle p_2AB = \angle DAO = 30^\circ$

So, y-axis is the bisector of angle between the given lines.

Hence, the equation of required bisector is $x=0$

Therefore, Option (a) is the correct answer.

(iv) In $\triangle ABp_1$, $\sin 30^\circ = \frac{Bp_1}{Ap_1} = \frac{1}{2} = \frac{Bp_1}{5} \Rightarrow Bp_1 = \frac{5}{2}$, Similarly $Bp_2 = \frac{5}{2}$

And $\cos 30^\circ = \frac{AB}{Ap_1} \Rightarrow AB = \frac{5\sqrt{3}}{2}$.

Therefore, $OB = OA + AB = 2 + \frac{5\sqrt{3}}{2}$

So, the coordinates of points p_1 and p_2 are $(\frac{5}{2}, 2 + \frac{5\sqrt{3}}{2})$ and $(-\frac{5}{2}, 2 + \frac{5\sqrt{3}}{2})$

Therefore, Option (a) is the correct answer.

(v) Since y-axis is the bisector of angle between the given lines and these points

p_1 and p_2 have a point on y-axis as common foot of perpendicular.

So, the coordinates of foot of perpendiculars drawn from p_1 and p_2 on the bisector of angle between the given lines are $(0, 2 + \frac{5\sqrt{3}}{2})$.

Therefore, Option (d) is the correct answer

8. (i)b (ii)a (iii)d (iv)c (v)a

5

9. The line passing through the intersection of the lines $ax+2by+3b=0$ and $bx-2ay-3a=0$ is $ax+2by+3b+\lambda(bx-2ay-3a)=0$(1)
 $(a+b\lambda)x+(2b-2a\lambda)y+3b-3\lambda a=0$

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	<p>As the line is parallel to x-axis</p> $a+b\lambda=0$ <p>so, $\lambda=(-a/b)$</p> <p>Putting $\lambda=(-a/b)$ in equation (1), we get</p> $ax+2by+3b+(-a/b)(bx-2ay-3a)=0$ <p>Since it is parallel to x-axis, so coefficient of x=0. Hence we get:</p> $\Rightarrow y(2b+a^2)+3b+3ba^2=0$ <p>On simplifying we get $y=-2/3$</p> <p>So it is 2/3 units below x-axis</p>	
10.	<p>Using graph.</p> <p>(a)</p>	5
11.	<p>Let the image of the point P(-8, 12) in the line given AB be Q (h, k). Then PQ is perpendicularly bisected by AB, say at R.</p> <p>So Co-ordinate of R=$\left(\frac{h-8}{2}, \frac{k+12}{2}\right)$</p> <p>Since R lies on the line $4x+7y+13=0$</p> <p>So, $4h + 7k + 78 = 0$ ----- (i)</p> <p>Since AB is perpendicular to PQ</p> <p>So, slop of AB x Slop of PQ = - 1</p> <p>$7h - 4k + 104 = 0$ -----(ii)</p> <p>Solving equations (i) and (ii). We get $h = -16, k = -2$</p> <p>Hence the image of point (-8, 12) in the line $4x + 7y + 13=0$ is (-16, -2)</p>	5
12.	<p>i) Using Distance formula $AC= \sqrt{40}$ units</p> <p>ii) Slop of BC=$\frac{-2-(-3)}{-1-2} = -1/3$</p> <p>iii) Since D is the midpoint of BC.</p> <p>So, Coordinate of point D is (1/2, -5/2)</p> <p>Equation of median AD is $13x-y-9=0$</p> <p>iv) Since AM is the altitude through A</p> <p>So, slop of AM = -1/(slop of BC)</p> <p>$=3$</p> <p>Equation of altitude through A is $y-4=3(x-1)$</p> <p>$3x - y + 1=0$</p> <p>v) Equation of right bisector of BC passes through D and having slop 3 is $3x - y - 4 = 0$</p>	5