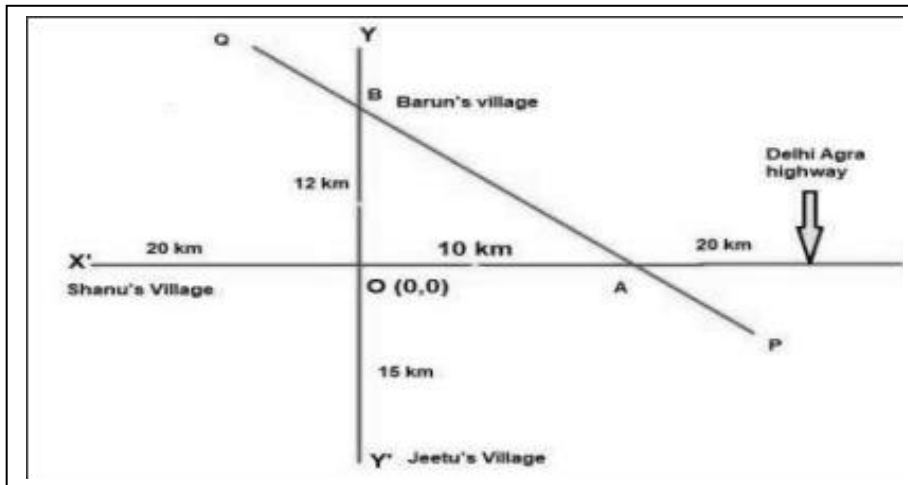


CHAPTER-10  
STRAIGHT LINES  
05 MARK TYPE QUESTIONS

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> <div style="text-align: center;"> </div> <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) <math>X + 2Y + 3 = 0</math>      b) <math>X - 2Y - 3 = 0</math></p> <p>c) <math>X - 2Y + 3 = 0</math>      d) None of the above</p> <p>ii) The equation formed by Rishabh and Vikram is</p> <p>a) <math>X + 2Y + 9 = 0</math>      b) <math>X + 2Y - 9 = 0</math></p> <p>c) <math>X - 2Y - 9 = 0</math>      d) None of the above</p> <p>iii) The equation formed by Shubham and Vikram is</p> <p>a) <math>X + 2Y + 9 = 0</math>      b) <math>X + 2Y - 9 = 0</math></p> <p>c) <math>X - 2Y - 9 = 0</math>      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> <div style="text-align: center;"> </div> <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) <math>\sqrt{5}</math>      b) <math>2\sqrt{5}</math>      c) <math>3\sqrt{5}</math>      d) <math>4\sqrt{5}</math></p> <p>ii) The equation of AB is</p> <p>a) <math>X + 2Y + 4 = 0</math>                      b) <math>X + 2Y - 4 = 0</math></p> <p>c) <math>X - 2Y + 4 = 0</math>                      d) None of these</p> <p>iii) The coordinates of point C are</p>	5

	<p>a) <math>(\frac{7}{2}, -3)</math>    b) <math>(3, \frac{7}{2})</math>    c) <math>(3, 3)</math>    d) <math>(3, -\frac{7}{2})</math></p> <p>iv) Distance between A and C is</p> <p>a) <math>\sqrt{5}</math>    b) <math>2\sqrt{5}</math>    c) <math>\frac{\sqrt{5}}{2}</math>    d) <math>\frac{\sqrt{5}}{2}</math></p> <p>v) Distance between C and B is</p> <p>a) <math>\frac{3\sqrt{5}}{2}</math>    b) <math>3\sqrt{5}</math></p> <p>c) <math>\frac{2\sqrt{5}}{3}</math>    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 <math>O(0, 0)</math> as shown in the figure .</p> <div data-bbox="248 835 1137 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 <math>(6, 8)</math>, <math>(12, 5)</math>, <math>(-5, 0)</math> and <math>(-3, -4)</math> 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) <math>2x + y = 22</math>    b) <math>x - 2y = -6</math>  c) <math>x + 2y - 22 = 0</math>    d) <math>x + 2y = 6</math></p> <p>(iii) What is the slope of line CD?  a) <math>2/1</math>    b) <math>-2</math>    c) <math>-1/2</math>    d) <math>3/2</math></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

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.



Based on the above information answer the following questions:  
 i) What are the coordinates of A?  
 a) (10, 0)  
 b) (10, 12)  
 c) (0,10)      d)

(0,15)

ii) What is the equation of line AB?

- a)  $5x + 6y = 60$     b)  $6x + 5y = 60$     c)  $x = 10$     d)  $y = 12$

iii) What is the distance of AB from  $O(0, 0)$ ?

- a) 60 km                  b)  $60/\sqrt{61}$  km                  c)  $\sqrt{61}$  km    d) 60 km

iv) What is the slope of line AB?

- a)  $\frac{6}{5}$                           b)  $\frac{5}{6}$                           c)  $-\frac{6}{5}$                           d)  $-\frac{10}{12}$

7.  $p_1, p_2$  are points on either of two lines  $y - \sqrt{3}|x| = 2$  at a distance of 5 units from their point of intersection.

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Based on the above information, answer the following question:

(i) The point of intersection of the given lines is

- (a) (2, 0)    (b) (0, 2)    (c)  $(\sqrt{3}, 2)$     (d)  $(-\sqrt{3}, 2)$

(ii) Angle between the given lines is

- (a)  $30^\circ$     (b)  $45^\circ$     (c)  $60^\circ$     (d)  $90^\circ$

(iii) Equation of bisector of the angle between the given lines is

- (a)  $x=0$     (b)  $y=0$     (c)  $x=2$     (d)  $y=2$

(iv) The co-ordinates of the points  $p_1, p_2$  are

- (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)  $(\pm \frac{5\sqrt{3}}{2}, 2 + \frac{5\sqrt{3}}{2})$

(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

- (a)  $(2 + \frac{5\sqrt{3}}{2}, 0)$     (b)  $(\frac{5}{2}, 0)$     (c)  $(0, \frac{5}{2})$     (d)  $(0, 2 + \frac{5\sqrt{3}}{2})$

8. 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.

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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

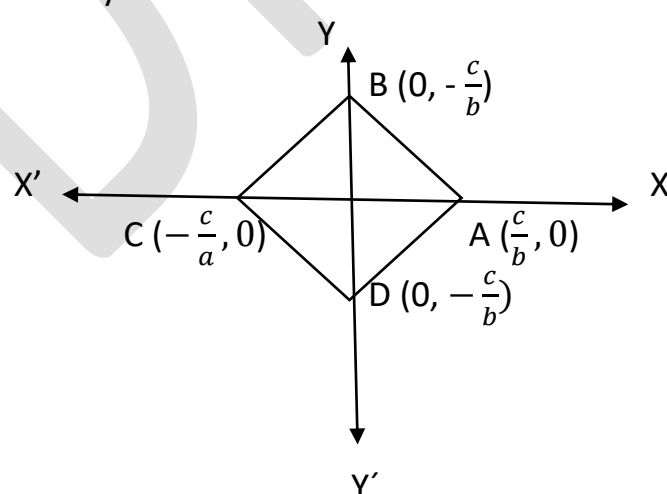
- (a)  $\sqrt{5}$       (b)  $2\sqrt{5}$       (c)  $\frac{\sqrt{5}}{2}$       (d)  $\sqrt{\frac{5}{2}}$

(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

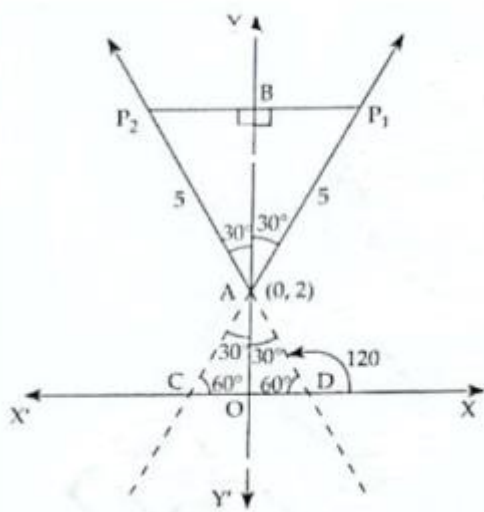
	<p>Based on the above information, answer the following questions.</p> <p>(i) The distance between A and B is</p> <p>(a) <math>\sqrt{5}</math>      (b) <math>2\sqrt{5}</math>      (c) <math>3\sqrt{5}</math>      (d) <math>4\sqrt{5}</math></p> <p>(ii) The equation of AB is</p> <p>(a) <math>X+2Y+4=0</math>    (b) <math>X+2Y-4=0</math>    (c) <math>X-2Y+4=0</math>    (d) None of these</p> <p>(iii) Coordinates of point C are</p> <p>(a) <math>(\frac{7}{2}, -3)</math>    (b) <math>(3, \frac{7}{2})</math>    (c) <math>(3, 3)</math>    (d) <math>(3, -\frac{7}{2})</math></p> <p>(iv) Distance between A and C is</p> <p>(a) <math>\sqrt{5}</math>      (b) <math>2\sqrt{5}</math>      (c) <math>\frac{\sqrt{5}}{2}</math>      (d) <math>\sqrt{\frac{5}{2}}</math></p> <p>(v) Distance between C and B is</p> <p>(a) <math>\frac{3\sqrt{5}}{2}</math>      (b) <math>3\sqrt{5}</math>      (c) <math>\frac{2\sqrt{5}}{3}</math>      (d) None of these</p>	
9.	<p>The line parallel to the x-axis and passing through the intersection of the lines <math>ax+2by+3b=0</math> and <math>bx-2ay-3a=0</math>, where (a,b)</p> <p>a) Above x axis at a distance of <math>\frac{3}{2}</math> from it.</p> <p>b) Above x axis at a distance of <math>\frac{2}{3}</math> from it.</p> <p>c) below x axis at a distance of <math>\frac{3}{2}</math> from it</p> <p>d) below x axis at a distance of <math>\frac{2}{3}</math> 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 <math>xy=0</math> and the lines <math>2x+y-2=0</math> and <math>4x+5y=20</math>. 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 <math>4x+7y+13=0</math>.</p>	5
12.	<p>Consider the <math>\Delta ABC</math> 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 <math>ax + by + c = 0 \rightarrow (i)</math>      <math>ax + by - c = 0 \rightarrow (ii)</math> <math>ax - by + c = 0 \rightarrow (iii)</math>      <math>ax - by - c = 0 \rightarrow (iv)</math></p> <p>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 <math>(-c/a, 0)</math> and <math>(c/a, 0)</math> respectively.</p>  <p>Solving (ii) with (iii) and (i) with (iv), we obtain the coordinates of B and D as <math>(0, c/b)</math> and <math>(0, -c/b)</math> respectively.</p> <p>Thus, the vertices of the parallelogram ABCD are A <math>(c/a, 0)</math>, B <math>(0, c/b)</math>, C <math>(-</math></p>	5

	<p><math>c/a, 0), D(0, -c/b)</math></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 = <math>\frac{1}{2}AC \times BD = \frac{1}{2}\left(\frac{2c}{a} \times \frac{2c}{b}\right) = 2c^2/ab</math></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 <math>\Delta ABC</math>.</p> <p>DE <math>\parallel</math> AB, EF <math>\parallel</math> BC, and DF <math>\parallel</math> 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 <math>m_1, m_2, m_3</math> be the slopes of AB, BC and CA respectively.</p> <p>Then</p> <p><math>m_1 = \text{Slope of AB} = \text{Slope of DE} = \frac{7-1}{-5-2} = -6/7</math></p> <p><math>m_2 = \text{Slope of BC} = \text{Slope of EF} = \frac{7+5}{-5-5} = (\text{undefined})</math></p> <p><math>m_3 = \text{Slope of CA} = \text{Slope of DF} = \frac{1+5}{2+5} = 6/7</math></p> <p>Side AB passes through F (-5, -5) and has slope <math>m_1 = -6/7</math>. So, its equation is <math>Y + 5 = -6/7(x + 5)</math> or <math>6x + 7y + 65 = 0</math></p> <p>Side BC is parallel to Y-axis and passes through D (2, 1). So, its equation is <math>x = k</math>. As it passes through (2, 1). <math>2 = k</math></p> <p>Hence equation of BC is <math>x = 2</math></p> <p>Side CA passes through E(-5, 7) and has slope <math>m_3 = 6/7</math>. So, its equation is <math>y - 7 = 6/7(x + 5)</math></p> <p><math>6x - 7y + 79 = 0</math></p>	5
5.	<p>(i) a) 5 m</p> <p>(iii) b) -2</p> <p>(ii) c) <math>x + 2y - 22 = 0</math></p> <p>(iv) a) 13 m</p>	5
6.	<p>(i) a) (10, 0)</p> <p>(iii) b) <math>60/\sqrt{61}</math> km</p> <p>(ii) b) <math>6x + 5y = 60</math></p> <p>(iv) c) <math>\frac{-6}{5}</math></p>	5
7.	<p>The equation of given lines are <math>y - \sqrt{3} x  = 2</math> or <math>y = \sqrt{3} x  + 2</math></p> <p>It can also be written as <math>y = -\sqrt{3}x + 2</math> if <math>x \leq 0</math> ..... (i) and <math>y = \sqrt{3}x + 2</math> if <math>x \geq 0</math> .....(ii)</p> <p>Slope of line (i), <math>m_1 = -\sqrt{3}</math> and <math>y</math> intercept = 2</p> <p>Slope of line (ii), <math>m_2 = \sqrt{3}</math> and <math>y</math> 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  $\theta_1$  and  $\theta_2$  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  $60^\circ$ .

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) $(a+b\lambda)x+(2b-2a\lambda)y+3b-3\lambda a=0$	5

	<p>As the line is parallel to x-axis</p> $a+b\lambda=0$ <p>so, <math>\lambda=(-a/b)</math></p> <p>Putting <math>\lambda=(-a/b)</math> 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 <math>y=-2/3</math></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=<math>\left(\frac{h-8}{2}, \frac{k+12}{2}\right)</math></p> <p>Since R lies on the line <math>4x+7y+13=0</math></p> <p>So, <math>4h + 7k +78 =0</math> ----- (i)</p> <p>Since AB is perpendicular to PQ</p> <p>So, slop of AB x Slop of PQ = - 1</p> $7h - 4k +104 = 0$ -----(ii) <p>Solving equations (i) and (ii). We get <math>h = -16, k = - 2</math></p> <p>Hence the image of point (-8, 12) in the line <math>4x + 7y +13=0</math> is (-16, - 2)</p>	5
12.	<p>i) Using Distance formula <math>AC= \sqrt{40}</math> units</p> <p>ii) Slop of BC=<math>\frac{-2-(-3)}{-1-2} = -1/3</math></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 <math>13x-y-9=0</math></p> <p>iv) Since AM is the altitude through A</p> <p>So, slop of AM = -1/(slop of BC)</p> $=3$ <p>Equation of altitude through A is <math>y-4=3(x-1)</math></p> $3x - y +1=0$ <p>v) Equation of right bisector of BC passes through D and having slop 3 is <math>3x - y - 4 =0</math></p>	5



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