CHAPTER-10

STRAIGHT LINES

03 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	Find the equation of the lines which passes through the point (3, 4) and cuts off intercepts from the coordinate axes such that their sum is 14.	3
2.	Find the points on the line x+y = 4 which lie at a unit distance from the line 4x + 3y= 10	3
3.	What is the equation of the line which is at a perpendicular distance of 5 units from the origin and the angle made by the perpendicular with the positive x-axis is 30°?	3
4.	Prove that A (4, 3), B (6, 4), C (5, 6) and D (3, 5) are the angular points of a square.	3
5.	Find the equations of the line with slope 2 and the length of the perpendicular from the origin equal to $\sqrt{5}$.	3
6.	Find the equation of the line parallel to y-axis and drawn through the point of intersection of the lines x - 7y + 5 and 3x + y = 0.	3
7.	If p is the length of the perpendicular from the origin on the line whose intercepts on the axes a and b, then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.	3
8.	A parking lot in a Pharma company is triangular shaped with two of its vertices at B(2,0) and C(1,12). The third vertex A is at the midpoint of line joining the points (1,1) and (3,11) .  (I) Find the coordinates of A. (II) Find the equation of the line that passes through the points B(2,0) and C(1,12). (III) Find the equation of the line parallel to BC and passing through vertex A.	3
9.	Find equation of the line passing through the point (3,4) and cutting of intercepts on the axes whose sum is 14.	3
10.	The owner of a milk store finds that he can sell 980 litres of milk each week at Rs 14 per litre and 1220 litre of milk each week at Rs 16 per litre. Assuming a linear relationship between selling price and demand, how many litres could he sell weekly at Rs 17 per litre?	3
11.	The Fahrenheit temperature F and absolute temperature K satisfy a linear equation. Given that K=273 when F=32 and that K=373 when F=212. Express K in terms of F and find the value of F when K=0	3
12.	Find the values of k for the line $(k-3)x-(4-k^2)y+k^2-7k+6=0$ (a). Parallel to the x-axis (b). Parallel to y-axis (c). Passing through the origin	3
13.	If A and B are two points on the line 3x+4y+15=0 such that OA=OB=9 units, then the area of	3

	the triangle OAB is: a) 18 sq units b) $18\sqrt{2}$ sq units c) 17 sq units d) none of these.	
14.	Which of the following lines is farthest from the origin? (a) x-y+1=0 (b) 2x-y+3=0 (c) x+2y-2=0 (d) x+y-2=0?	3
15.	Assertion: Equation of the horizontal line having distance 'a' from the x -axis is either $y=a$ or $y=-a$. Reason: Equation of the vertical line having distance b from the y -axis is either $x=b$ or $x=-b$. a) Assertion is correct, reason is correct; reason is a correct explanation for assertion. b) Assertion is correct, reason is correct; reason is not a correct explanation for assertion c) Assertion is correct, reason is incorrect d) Assertion is incorrect, reason is correct.	3
16.	If the line passes through the points (-2, 6) and (4, 8) is perpendicular to the line through the point (8, 12) and (x, 24), find the value of x.	3
17.	Let PS is the median of the triangle with vertices P(2, 2), Q(6, -1) and R(7, 3). Find the equation of the line passing through (-1, -1) and parallel to PS.	3
18.	Find the equation of a straight line, which passes through the point (5, 6) and has intercepts on axes equal in magnitude and opposite in sign.	3

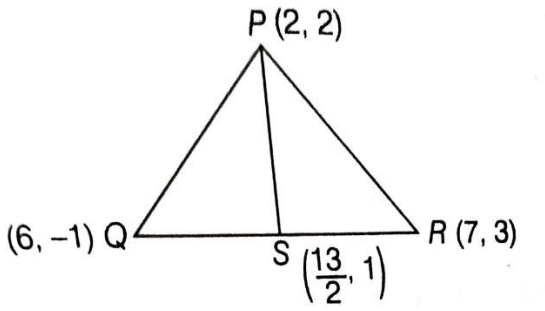
ANSWERS:

Q. NO	ANSWER	MARKS
1.	**Let the intercept by the line on the axes are a and (14−a)** **Thus the equation,** $\frac{x}{a} + \frac{y}{14-a} = 1$ **and passes through (3,4) ----- (1)** $\frac{3}{a} + \frac{4}{14-a} = 1$ **Therefore,** **a=6,b=8** **So the equation is** **Put in (1)** **4x+3y=24**	**3**
2.	**Any point on the line is (t,4−t)** **According to the question,** $\left\lvert\frac{4t + 3(4-t) - 10}{\sqrt{4^2 + 3^2}}\right\rvert$ **⇒|t+2|=5** **⇒t+2=±5** **⇒t=3, −7** **Hence, the required points are (3,1) and (−7,11).**	**3**
3.	**If p is the length of the normal from the origin to a line** **ω is the angle made by the normal with the positive direction of the x-axis** **Then, the equation of the line for the given condition is written by** **x cosωω + y sin ωω = p.** **Here, p = 5 units andωω = 30°** **Thus, the required equation of the given line is** **x cos 30°+ y sin 30° = 5** **x(√3/2√3/2) + y(½½) = 5** **It becomes** **√3√3x + y = 10** **Thus, the required equation of a line is √3x + y = 10**	**3**
4.	Clearly, AB =$\sqrt{(6-4)^2 + (4-3)^2} = \sqrt{5}$, BC =$\sqrt{(6-4)^2 + (5-4)^2} = \sqrt{5}$ CD = $\sqrt{(5-6)^2 + (3-5)^2} = \sqrt{5}$ DA =$\sqrt{(5-3)^2 + (3-4)^2} = \sqrt{5}$ AB = BC = CD = DA NOW, $= \ slope\ of\ AB = \frac{4-3}{6-4} = \frac{1}{2}$ $m_2 =$ slope of BC = $\frac{5-4}{6-4} = \frac{1}{2}$ $m_{3=} Slope\ of CD = \frac{5-6}{3-5} = \frac{1}{2}$ Clearly, $m_1 m_2$ = (1/2) (-2) and $m_{1=}\ m_2$	3

	Therefore, AB is perpendicular to CD. Thus, AB =BC=CA=AD, AB is perpendicular to BC and AB is parallel to CD. Hence, ABCD is a square.	
5.	Let the y-intercept of the required line be c. Then, its equation is Y = 2x + c →(i) or, - 2x + y = c Dividing through by $\sqrt{(coffient\ of\ x)^2 + (cofficient\ of\ y)^2}$,we obtain $\frac{-2x}{\sqrt{(-2)^2+1^2}} + \frac{y}{\sqrt{(-2)^2+1^2}} = \frac{c}{\sqrt{(-2)^2+1^2}}$ or, $\frac{-2x}{\sqrt{5}} + \frac{y}{\sqrt{5}} = \frac{c}{\sqrt{5}}$ This is the normal form of line (i). Therefore, RHS represents the length of the perpendicular from the origin. But, the length of the perpendicular from the origin is given to be $\sqrt{5}$. $\left\|\frac{c}{\sqrt{5}}\right\| = \sqrt{5}$ or, $\|c\| = 5$ or, $c = \pm 5$.	3
6.	On the solving equations x-7y+5=0 and 3x+y=0, we get x= $\frac{-5}{22}$, y = $\frac{15}{22}$ So, the given lines intersect at the point whose coordinates are (- 5/22, 15/22). We know that, the equation of a line parallel to y-axis is of the form x=constant. So, let the equation of the required line be x = λ → (i) It passes through (-5/22, 15/22). So, $\frac{-5}{22}$ = λ Putting the values of λ in (i), we get x= - 5/22 or, 22x + 5 = 0 as the equation of the required line.	3
7.	The equation of the line which makes intercept a,b on the axes is $\frac{x}{a} + \frac{y}{b} = 1$ i.e. $\frac{x}{a} + \frac{y}{b} - 1 = 0$ ….(i) Since perpendicular distance of a point (x_1, y_1) from the line $ax + by + c = 0$ is given by $\left\|\frac{ax_1+by_1+c}{\sqrt{a^2+b^2}}\right\|$ According to question $p = \left\|\frac{\frac{0}{a} + \frac{0}{b} - 1}{\sqrt{\frac{1}{a^2}+\frac{1}{b^2}}}\right\|$ Implies that $p^2 = \frac{1}{\frac{1}{a^2}+\frac{1}{b^2}}$ $\therefore \boldsymbol{p^2 = \frac{1}{a^2} + \frac{1}{b^2}}$	3
8.	(I) Given that, The third vertex A is at the midpoint of line joining the points (1,1) and (3,11) . so, A coordinates (x, y) will be :	3

	→ x = (1 + 3)/2 = 4/2 = 2 . → y = (1 + 11)/2 = 12/2 = 6 . therefore, coordinates of A will be **(2,6).** (II) The equation of the line that passes through the points B(–2,0) and C(1,12) : → slope of line = $\frac{y_2-y_1}{x_2-x_1} = \frac{12-0}{1-2} = \frac{12}{-1} = -12$ then, → Equation of line $y - y_1 = m(x - x_1)$ taking (x_1, y_1) as (2,0) we get, → (y – 0) = (–12)(x – 2) → y = –12x+24 → **12x+y–24 = 0** ,which is the required equation of line . (III) here $m_{BC} = 12$ → Slope of line parallel to BC = Slope of BC = 12 then, Equation of the line parallel to BC and passing through vertex A(2,6) :- → $y - y_1 = m(x - x_1)$ → y – 6 = 12(x – 2) → y – 6 = 12x –24 → **12x–y–18 = 0** ,which is the required equation of line .	
9.	Let the equation of the line in intercept form be $\frac{x}{a} + \frac{y}{b} = 1$. Give that a+b =14 and the line passes through the point (3,4) $\therefore \frac{3}{a} + \frac{4}{14-a} = 1$ Implies that a= 7,6 and b= 7,8	3
10.	Let selling price be P along x-axis demand of milk be D along y-axis We know that the equation of line is y=mx+c Here, P is along x-axis and D is along y-axis So, our equation becomes D=mp+c Now, Owner sells 980 litre milk at Rs 14 /litre So, D=980 & P=14 satisfies the equation Putting values in (1) 980=14m+c…….(A)	3

	Owner sells 1220 litre milk at Rs 16/16/ litre So, D=1220&P=16 Putting values in (1) 1220=16m+c……(B) So, our equations are 980=14m+c 1220=16m+c From (A) 980=14m+c 980−14m=c Putting value of c in (B) 1220=16m+980−14m m=120 Putting m=120 in (A) c=−700 Putting value of m & c in (1) D=mp+c D=120 P-700 Hence, the required equation is D=120P−700 We need to find how many litres could he sell weekly at Rs 17/litre i.e. we need to find D when P=17 Putting P=17 in the equation D=120 P-700 D=120(17)-700 D=2040-700 D=1340 Hence when price is Rs 17/litre, 1340 litres of milk could be sold.	
11.	Let Fahrenheit temperature F along x-axis and absolute temperature K along y-axis. Let (x1,y1) and (x2,y2) be (32,273) and (212,373) respectively. Using equation of straight line by two-point form, $$y - y_{1=} \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$$ $$K - 273 = \frac{373 - 273}{212 - 32}(F - 32)$$ Therefore, $K = \frac{10}{18}(F - 32) + 273$ When K=0, Then F= - 459.4	3
12.	Given, equation of line (k−3)x−(4−k^2)y+k^2−7k+6=0 (a) The line is parallel to x-axis, if coefficient of x=0 coefficient of x=k−3 ∴k−3=0 k=3 (b) The line is parallel to y-axis, if coefficient of y=0 coefficient of y=4−k^2 ∴4−k^2=0 k=±2 (c) line passes through the origin if (0,0) lies on given equation, (k−3)·(0)−(4−k2)(0)+k^2−7k+6=0 (k−6)(k−1)=0 k=6,1	3
13.	Correct option is B)	3

	Perpendicular distance from origin on the line 3x+4y+15=0 is: d=32+4215=515=3OA=9unitsBase=2×$\sqrt{9^2+3^2}=12\sqrt{2}$ area=$18\sqrt{2}$	
14.	d)	3
15.	(b)	3
16.	Let the points A(-2, 6), B(4, 8), C(8, 12) and D(x, 24). Again, let m_1 and m2be the slopes of AB and CD Since, AB and CD are perpendicular to each other So, m1 x m2 = - 1 (1/3) x (12/(x-8))= - 1 x= 4	3
17.	We have given that PS is the median So, S is the midpoint of Q and R Coordinate of S = $\left(\frac{6+7}{2}, \frac{-1+3}{2}\right)$= (13/2, 1)  Now slope of PS, m= - 2/9 Now equation of the line passing through (-1, -1) and parallel to PS is 2x+9y+11=0	3
18.	Let the equation of line in intercept form is $\frac{x}{a}+\frac{y}{b}=1$ We have a= - b Now the equation of line is $\frac{x}{-b}+\frac{y}{b}=1$ It passes through (5, 6) So, b=1 Hence, equation of line is x – y +1 = 0	3