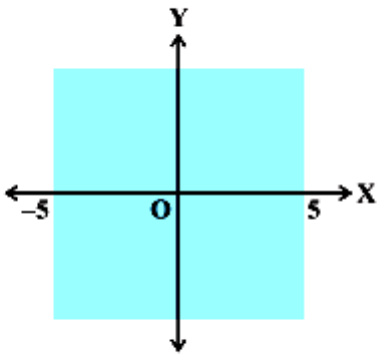
CHAPTER-6

LINEAR INEQUALITIES

02 MARK TYPE QUESTIONS

<table>
<tr><th>Q. NO</th><th>QUESTION</th><th>MARK</th></tr>
<tr><td>1.</td><td>Find all pairs of consecutive even positive integers, both of which are larger than 5 such that their sum is less than 23.</td><td>2</td></tr>
<tr><td>2.</td><td>Hari obtained 70 and 75 marks in first two unit tests. Find the number if minimum marks he should get in the third unit test to have an average of at least 60 marks.</td><td>2</td></tr>
<tr><td>3.</td><td>The length of a rectangle is three times the breadth.
If the minimum perimeter of the rectangle is 320 cm, then what is the minimum breadth?</td><td>2</td></tr>
<tr><td>4.</td><td>To receive grade ‘A’ in a course, one must obtain an average of 90 marks or more in five examinations (each of 100 marks).
 
If Sunita’s marks in first four examinations are 87, 92, 94 and 95, find the minimum mark in the fifth examination to get grade ‘A’ in the course.</td><td>2</td></tr>
<tr><td>5.</td><td>A company manufactures Compact Disc. Its cost and revenue functions are C(x) = 52000 + 30 x and R(x) = 43 x, respectively, where x is the number of Compact Discproduced and sold in a week.
  
How many Compact Disc must be sold by the company to realize some profit?</td><td>2</td></tr>
<tr><td>6.</td><td>A store sells frozen foods, ice creams, cool drinks, milk and dairy products. The labels on these items show ideal temperature as follows.
<table><tr><td>Frozen foods</td><td>4^0 to 20^0</td></tr><tr><td>Ice creams</td><td>10^0 to 30^0</td></tr><tr><td>Cool drinks</td><td>20^0 to 25^0</td></tr><tr><td>Dairy items</td><td>20^0 to 30^0</td></tr></table>At what temperature should the store be maintained so that all items get required temperature.</td><td>2</td></tr>
<tr><td>7.</td><td>A country has constructed an elevated expressway road which can cater to the vehicles speeds up to 200 Kmph. But the city has decided to optimize the fuel usage of vehicles plying so that the valuable foreign exchange spent on buying oil from foreign countries can be saved. What should be the common speed limit for vehicles containing up to 4 wheels.
<table><tr><td>Vehicle type</td><td>Speed ranges for max mileage</td></tr><tr><td>Motor cycles upto 110 cc</td><td>40 kmph to 60 kmph</td></tr><tr><td>Motor cycles upto 160 cc</td><td>50 to 65 kmph</td></tr><tr><td>Cars Low ground clearance</td><td>60 to 80 kmph</td></tr></table></td><td>2</td></tr>
</table>

	SUVs	55 to 85 kmph	
8.	In the Ordered pairs given below the first value represents salary income and second value represents income from other sources of various individuals. As per a government scheme a person can take a loan up to the sum of two times his salary income and 3 times his additional income. To start a manufacturing unit one needs a 20 lakh of capital. Who among the following can start the manufacturing unit by taking a loan. Ravi (3 L , 1 L) Raju (5 L, 1 L) Khanum (8 L, 0L) Robert (3 L,6 L)		2
9.	The cost function and revenue function of a business is C(X)=2x+200 and R(x) =5x+150. How many minimum items must manufacturer sell for realizing a profit. Clue To realize a profit the revenue must be more than cost		2
10.	In a guessing game a participant has to guess the numbers imagined by opponent by clues. The clues he got is that the opponent chose two consecutive even numbers both of which are less than 10 and sum of them is more than 13. What are the numbers.		2
11.	The cost and revenue functions of a product are given by C(x) = 20 x + 4000 and R(x) = 60x + 2000, respectively, where x is the number of items produced and sold. (i) How many items must be sold to realise some profit? (ii) if C(x) = 2 x + 400 and R(x) = 6x + 20 respectively, where x is the number of items produced and sold. How many items must be sold to realise some profit?		2
12.	**The inequality representing the following graph is:**  **Fig 6.7** **(A) $\|x\| < 5$ (B) $\|x\| \leq 5$ (C) $\|x\| > 5$ (D) $\|x\| \geq 5$**		2

13.	 To receive Grade 'A' in a course, one must obtain an average of 90 marks or more in five examinations (each of 100 marks). If Sunita's marks in first four examinations are 87, 92, 94 and 95. (i) Let Sunita got x marks in fifth exam ,Find the average marks ? (iI) Find minimum marks that Sunita must obtain in fifth examination to get grade 'A' in the course.	2
14.	State which of the following statements is True or False (i) If $\lvert x \rvert \le 4$, then $x \in [-4, 4]$ (T/F) (ii) If $\lvert x \rvert > 5$, then $x \in (-\infty, -5) \cup [5, \infty)$ (T/F)	2
15.	Fill in the blanks in the following: (i) If $x \ge -3$, then $x + 5$ ☐ 2 (ii) If $-x \le -4$, then $-2x$ ☐ -8	2
16.	A shop has various prices of pen and pencil.  Minimum cost for 2 pen and 3 pencils is Rs 19 and for 5 pen and 4 pencil is Rs 37. Find the minimum cost of one pen and one pencil.	2
17.	Solve $\frac{1}{x-5} \ge 0.5$, $x \ne 5$ when x is natural number. Also show the graph of the solutions on number line.	2
18.	Jitendra, Mahendra and Dharmendra together invest money into a new business. Mahendra gives twice of Jitendra and Dharmendra gives 20000 more than Mahendra. Find the minimum amount of money invested by Mahendra if at least 1 crore needed to start business.	2
19.	Solve $\frac{3x-2}{5} - \frac{2-x}{4} < x$, when x is real number. Show the graph of the solutions on number line.	2
20.	Prajesh has started his journey by bike from Alampur to Bamungola which is 5km, after take turn gone straight to kadubari which is 4km away Bamungola. Find the minimum and	2

	maximum possible distance from Alampur to Kadubari.	
21.	 In a game, a person wins if he gets the sum greater than 20 in four throws of a die. In three throws he got numbers 6, 5, 4. What should be number in his fourth throw, so that he wins the game.	2
22.	Solve 5x + 6 > 1 when x is real number?	**2**
23.	50x < 540, where x is the natural number?	**2**
24.	Solve the equation, $4x-2 \leq 6$ and $9x+3 \geq -15$.	**2**
25.	Solve the inequalities, $2x-1 \leq 3$ and $3x+1 \geq -5$ is.	**2**
26.	Find all pairs of consecutive odd natural numbers both of which are larger than 10 such that their sum is less than 40.	**2**
27.	Solve $5x - 3 < 7$ when a) X is an integer b) X is a real number	2
28.	Solve the given inequality for real x: $4x + 3 < 5x + 7$	2
29.	Solve the given inequality for real x: $\frac{x}{3} > \frac{x}{2} + 1$	2
30.	**solve – 3x + 17 < – 13**	2
31.	**Solve: 4x + 3 < 6x +7**	2

ANSWERS:

Q. NO	ANSWER	MARKS
1.	Let x be the smaller of the two positive consecutive even integers, then the other on is (x + 2) Given x > 5 and x+ x + 2 < 23 2x +2 < 23 or x < 10.5 Value of x may be 6 , 8 , 10 (even integers) The pairs may be(6, 8), (8, 10), (10, 12)	2
2.	(70 + 75 + x)/3 $\geq$ 60 or 145 + x $\geq$ 180 or x $\geq$ 35	2
3.	Let breadth be b, so its length l = 3b Thus 2 (l + b) $\geq$ 320 or 2(3b + b) $\geq$ 320 or 8b $\geq$ 320 or b $\geq$ 40 Therefore, minimum breadth is 40 cm.	2
4.	(87 + 92 + 94 + 95 + x)/5 >= 90 or 368 + x >= 450 or x >= 82 Sunita should obtain at least 82 marks in the fifth examination.	2
5.	R(x) > C(x) Or x > 4000 More than 4000 Compact Discs must be produced to get profit.	2
6.	Frozen foods 4≤x≤20 ice creams 10≤x≤30 cool drinks 20≤x≤25 and dairy items 20≤x≤30 (½ m) Mapping on number line (1 m) Solution 20^0 (1/2 m)	2
7.	Statements (1/2 m) mapping (1m) solution 60 kmph (1/2m)	2
8.	Robert (3 L,6 L) can take loan as 2(3,00,000)+3(6,00,000) ≥ 20,00,000	2
9.	To realize a profit the revenue must be more than cost So 5x+150 > 2x+200 which give solution x>50	2
10.	X< 10 and y < 10 and x+y >13 or 2x< 10 2x+2 <10 and 4x+2>13 Solution 6 and 8	2

11.	(i) $x > 50$ (ii) $x > 95$	2
12.	(A)	2
13.	(i) $\frac{368+x}{5}$ (ii) $x \geq 82$	2
14.	(i) T (ii) F	2
15.	(i) $\geq$ (ii) $\leq$	2
16.	Let the cost price of one pen and one pencil are x and y respectively. $\therefore 2x + 3y \geq 19$ ……(i) $\therefore 5x + 4y \geq 37$ …….(ii) From (i)and (ii) we get, $(2x + 3y)+(5x+4y) \geq 19 + 37$ $\Rightarrow 7(x + y) \geq 56$ $\Rightarrow x + y \geq 56/7$ $\Rightarrow x + y \geq 8$ Hence, minimum cost of one pen and one pencil is Rs 8	2
17.	$\frac{1}{x-5} \geq 0.5$ $\Rightarrow \frac{1}{x-5} \geq \frac{1}{2}$ $\Rightarrow \frac{1}{x-5} - \frac{1}{2} \geq 0$ $\Rightarrow \frac{2-(x-5)}{2(x-5)} \geq 0$ $\Rightarrow \frac{7-x}{2(x-5)} \geq 0$ $\Rightarrow \frac{7-x}{x-5} \geq 0$ $\therefore x \in (5,7]$ and x is natural number. Therefore, x = 6 , 7	2
18.	Let investment of Jitendra be x. Therefore, investment of Mahendra is 2x and investment of Dharmendra is 2x +20000. ATQ, $\Rightarrow X+2x+2x+20000 \geq 10000000$ $\Rightarrow 5x +20000 \geq 10000000$ $\Rightarrow 5x \geq 9980000$ $\Rightarrow x \geq 9980000/5$ $\Rightarrow x \geq 1996000$ Hence investment of Mahendra is 2×1996000 = 3992000	2
19.	$\frac{3x-2}{5} - \frac{2-x}{4} < x$ $\Rightarrow \frac{3x-2}{5} - \frac{2-x}{4} - x < 0$ $\Rightarrow \frac{4(3x-2)-5(2-x)-20x}{20} < 0$ $\Rightarrow \frac{12x-8-10+5x-20x}{20} < 0$ $\Rightarrow \frac{-3x-18}{20} < 0$	2

	$\Rightarrow \frac{-3(x+6)}{20} < 0$ $\Rightarrow x+6 > 0$ $\Rightarrow x > -6$ $\therefore x \in (-6, \infty)$	
20.	Let distance between Alampur and kadubari be x km. If we join these three places by straight line then it forms a triangle whose sides are 5 km, 4 km and x km. If 5 km is the longest side then x+4> 5 ⇒ x > 5 – 4 ⇒ x > 1 If x km is the longest side then 5+4 > x ⇒ 9 > x ∴ 1 < x < 9 Therefore, the minimum and maximum possible distance from Alampur to Kadubari 1km and 9 km respectively.	2
21.	$x \geq 5 \; that \; is, 6$	2
22.	Ans: 5x + 6 > 1 5x > -5 x > -1 ……Dividing by 5 Hence the solution (-1, ∞)	
23.	Given: 50x < 540 Dividing both sides by 50 x < 540/50 x < 54/5 Hence the solution set {1,2,3,4,5,6,7,8,9,10}	
24.	4x-2 ≤ 6 and 9x+3 ≥ -15 First, 4x-2 ≤ 6 2x -1 ≤ 3……divide by 2 2x ≤ 4 x ≤ 2 ……divide 2 Second, 9x+3 ≥ -15 3x+1 ≥ -5 …….Divide by 3 3x ≥ -6 x ≥ -2 ……divide by 3	

	From both the solutions, $-2 \leq x \leq 2$ Hence the solution [-2, 2]	
25.	14We are given equations 2x-1 <3 and 3x+1-5, so now solving them we have 2x-1s 3 2x≤ 4 x≤ 2 So the solution set for this is (-infinity, 2] Now, 3x+12-5 3x 2-6 X 2-2 So the solution set for this is [-2, Infinity) Now the combined solution set for both the equations will be, [-2.2] Hence, the solution set is [-2,2]..	
26.	Let the two consecutive odd positive integer be xx and x+2x+2. Both number are smaller than 10 Therefore x+2<10 Adding −2−2 to both sides, x<10−2 ⇒x<8 Also sum of the two integers is more than 40. So,x+x+2>40 ⇒2x+2>40 adding −2to both sides, 2x>40−2 ⇒2x>38 Divided by 2 both sides	

	x>19 Then the number greater then 10 and less then 19 are the consecutive odd number pair In (C) (11,13),(13,15) ,(15,17) ,(17,19) is right answer	
27.	a) ……..-4,-3,-2,-1,0,1 b) $(-\infty, 2)$	2
28.	$(-4, \infty)$	2
29.	$(-\infty, -6)$	2
30.	**Solution:** Given, -3x + 17 < -13 Subtracting 17 from both sides, -3x + 17 – 17 < -13 – 17 ⇒ -3x < -30 ⇒ x > 10 {since the division by negative number inverts the inequality sign} ⇒ x ∈ (10, ∞)	2
31.	**Solution:** Given, 4x + 3 < 6x + 7 Subtracting 3 from both sides, 4x + 3 – 3 < 6x + 7 – 3 ⇒ 4x < 6x + 4 Subtracting 6x from both sides, 4x – 6x < 6x + 4 – 6x ⇒ – 2x < 4 or ⇒ x > – 2 i.e., all the real numbers greater than –2, are the solutions of the given inequality. Hence, the solution set is (–2, ∞), i.e. x ∈ (-2, ∞)	2
