STUDY mate
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Chapter End Test

Date : _____ Duration: 45 Min. Max. Marks : 25	**Mathematics** **Topic :** PMI & Linear Inequalities (Set–1)	**BATCH** **XI**

Disclaimer: The objective is to test the understanding of the children. For long question is to write coherently in more than one paragraph.

General instruction:

1. This paper consist of two Sections. Students has to attempt both sections.
2. Section – A is objective carry 1 mark each.
3. Section – B is subjective.

[Section – A]

1. Let P(n): "$2^n < (1 \times 2 \times 3 \times \ldots\ldots x^n)$", then the smallest positive integer for which P(n) true is

(a) 1 (b) 2

(c) 3 (d) 4

2. A student was asked to prove a statement P(n) by induction. He proved that P(k + 1) is true whenever P(k) is true for all K > 5 $\in$ N and also that P(5) is true. On the basis of this he could conclude that P(n) is true

(a) for all $n \in$ N (b) for all $n > 5$

(c) for all $n \geq 5$ (d) for all $n < 5$

3. If P(n) : "$2.4^{2n+1} + 3^{3n+1}$ is divisible by λ for $n \in$ N" is true, then the value of λ is

(a) 10 (b) 11

(c) 12 (d) 13

4. If P(n) : "$49^n + 16^n + k$ is divisible by 64 for $n \in$ N" is true, then the value of k is

(a) 1 (b) 0

(b) – 1 (d) 2

5. P(n) : " $\sqrt{n} < \frac{1}{\sqrt{1}} + \frac{1}{\sqrt{2}} + \ldots\ldots + \frac{1}{\sqrt{n}}$: P(n) is true for

(a) $n \geq 2$ (b) $n > 2$

(c) $n \in$ N (d) $n < 2$

6. If $\frac{|x-2|}{x-2} \geq 0$, then

(a) $x \in [2, \infty)$ (b) $x \in (2, \infty)$

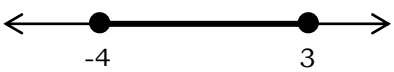
(c) $x \in (-\infty, 2)$ (d) none of these

7. The length of a rectangle is three times the breadth. If the minimum perimeter of the rectangle is 160 cm, then

(a) breadth > 20 cm (b) length < 20 cm

(c) breadth ≥ 20 cm (d) length ≤ 20 cm

8. Solution of the inequalities comprising a system in variable x are represented on number lines as given below, then



(a) $x \in (-\infty, -4] \cup [3, \infty)$ (b) $x \in [-3, 1]$

(c) $x \in (-\infty, -4] \cup [-3, \infty)$ (d) $x \in [-4, 3]$

9. If $|x + 3| \geq 10$, then

(a) $x \in (-13, 7]$ (b) $x \in (-13, 7)$

(c) $x \in (\infty, -13] \cup [7, \infty)$ (d) $x \in (-\infty, -13] \cup [7, \infty)$

10. If $x < 5$, then

(a) $-x < -5$ (b) $-x \leq -5$

(c) $-x > -5$ (d) $-x \geq -5$

11. Given that x, y and b are real numbers and $x < y$, $b < 0$, then

(a) $\frac{x}{b} < \frac{y}{b}$ (b) $\frac{x}{b} \leq \frac{y}{b}$

(c) $\frac{x}{b} > \frac{y}{b}$ (d) $\frac{x}{b} \geq \frac{y}{b}$

12. If $-3x + 17 < -13$, then

(a) $x \in (10, \infty)$ (b) $x \in [10, \infty)$

(c) $x \in (-\infty, 10]$ (d) $x \in [-10, 10)$

13. If $xy > 0$, then $x > 0$ and $y < 0$

(a) True (b) False

(c) Can't say (d) none of these

14. If $(x - 2)^2 > 0$, then

(a) $x \in R$ (b) $x \geq 2$

(c) $x > 2$ (d) $x < 2$

15. Is $x^2 < 0$

(a) True (b) False

(c) Can't say (d) none of these

[Section – B]

16. Using the principle of mathematical induction prove that: **[4]**

$$1^3 + 2^3 + 3^3 + \ldots\ldots\ldots + n^3 = \left\{\frac{n(n+1)}{2}\right\}^2 \text{ for } n \in N.$$

17. Solve the following system of inequalities: **[6]**

$$\frac{x}{2x+1} \geq \frac{1}{4}, \frac{6x}{4x-1} < \frac{1}{2}$$

OR

A solution of 9% acid is to be diluted by adding 3% acid solution to it. The resulting mixture is to be more than 5% but less than 7% acid. If there is 460 liters of the 9% solution, how many liters of 3% solution will have to be added?

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Hints/Solutions to Chapter End Test

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[Section – A]

1. (d) **2.** (c)
3. (b) **4.** (c)
5. (a) **6.** (b)
7. (c) **8.** (d)
9. (d) **10.** (c)
11. (c) **12.** (a)
13. (b) **14.** (a)
15. (c)

[Section – B]

17. x has no solution

OR

More than 230 liters but less than 920 liters

(230 liter < x < 920 liters)

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