# MATHS

## BOOKS - RD SHARMA MATHS (ENGLISH)

## SETS

Others

**1.** in a survey of 500 TV views , it was found that 285 watch cricket , 195 watch football and 115 watch tannis . also , 45 watch both cricket and football, 70 watch both cricket and tennis and 50 watch football and tennis . if 50 do not watch any game on tv . then the no. of views watch all three games is ?

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**2.** Of the members of three athletic teams in a certain school, 21 are in the basketball team, 26 in hockey team and 29 in the football team. 14 play hockey and basket ball, 15 play hockey and football, 12 play football and basketball and 8 play all the three games bow many members are there in all?

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**3.** Prove that : $A \subseteq B, B \subseteq CandC \subseteq AA = C.$

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**4.** Using properties of sets, show that for any two sets $A\ and\ B, (A \cup B) \cap \left(A \cup B'\right) = A.$

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**5.** For any two sets $AandB$ , prove that $(A \cup B) - B = A - B$ (ii) $A = (A \cap B) = A - B$ (iii) $A - (A - B) = A \cap B$ (iv) $A \cup (B - A) = A \cup B\,(A - B) \cup (A \cap B) = A$

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**6.** FOR ANY TWO SETS $AandB$ , show that the following statements are equivalent: $A \subset B$ (ii) $A - B = \varphi$ (iii) $A \cup B = B$ (iv) $A \cap B = A$.

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**7.** If $U = \{2, 3, 5, 7, 9\}$ is the universal set and $A = \{3, 7\}, B = \{2, 5, 7, 9\},$ then find: $(A \cup B)'$

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**8.** If $U = \{2, 3, 5, 7, 9\}$ is the universal set and $A = \{2, 7\}, B = \{2, 5, 7\},$ then find: $A'$,$B'$

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**9.** Let $AandB$ be two sets. Using properties of sets prove that: (i) $A \cap B' = \Phi = A \subset B$ (ii) $A' \cup B = U = A \subset B$

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**10.** If A, B and C are three sets such that $A \cap B = A \cap C$ and $A \cup B = A \cup C$, then (1) $A = B$ (2) $A = C$ (3) $B = C$ (4) $A \cap B = \varphi$

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**11.** In a group of 800 people, 550 can speak Hindi and 450 can speak English. How many can speak both Hindi and English?

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**12.** Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}, A = \{2, 4, 6, 8\} and B = \{2, 3, 5, 7\}$.

Find: $(A \cup B)'$

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**13.** Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}, A = \{2, 4, 6, 8\} and B = \{2, 3, 5, 7\}$.

Find: $(A \cap B)'$

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**14.** The collection of vowels in English alphabets. This set contains five elements. Namely, $a,\ e,\ i,\ o,\ u$.

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**15.** The collection of first five prime natural numbers is asset containing the elements 2, 3, 5, 7, 11.

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**16.** The collection of all States in the Indian Union is a set.

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**17.** The collection of post presidents of the Indian union is a set.

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**18.** The collection of cricketers in the world who were out for 99 runs in a test match is a set.

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**19.** What is the difference between a collection and a set? Give reasons to support your answer?

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**20.** Which of the following collections are sets? Justify your answer: A collection of all natural numbers less than 50.

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**21.** Which of the following collections are sets? Justify your answer: The collection of good hockey players in India.

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**22.** Which of the following collections are sets? Justify your answer: The collection of all girls in your class.

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**23.** Which of the following collections are sets? Justify your answer: The collection most talented writers of India.

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**24.** Which of the following collections are sets? Justify your answer: The collection of difficult topics in Mathematics.

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**25.** The collection of all months of a year beginning with the letter J.

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**26.** Is the collection of novels written by Munshi a set?

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**27.** Which of the following collections are sets? Justify your answer: A collection of most dangerous animals of the world.

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**28.** Which of the following collections are sets? Justify your answer: The collection of prime integers.

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**29.** If $A = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ , then insert the appropriate symbol $\in$ or $\notin$ in each of the following blank spaces: 4...A ii. 12...A -4...A iv. 9...A 0...A vi. -2...A

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**30.** Describe the following wets in Roster form: The set off all letters in the word $'MATHEMATICS'$

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**31.** Describe the following wets in Roster form: The set off all letters in the word $'ALGEBRA'$

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**32.** Describe the following sets in Roster form: The set of all vowels in the word $'EQUATION'$

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**33.** Describe the following sets in Roster form: The set of squares of integers.

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**34.** Describe the following sets in Roster form: The set of all natural numbers less than 7 ?

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**35.** Write the set $\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \frac{6}{7}, \frac{7}{8}, \frac{8}{9}, \frac{9}{10}\right\}$ in the set builder form.

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**36.** Describe the following sets in Roster form: $\{x : x$ is a letter before $e$ in the English alphabet$\}$ .

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**37.** Describe the following sets in Roster form: $\{x \in n : x^2 < 25\}$

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**38.** Describe the following sets in Roster form:{x in N : x is a prime number,$10 < x < 20$}

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**39.** Describe the following sets in Roster form: $\{x \in N : x = 2n, n \in N\}$

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**40.** Describe the following sets in Roster form: $\{x \in R : x > x\}$.

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**41.** Describe the following sets in Roster form: $\{x : x$ is a prime number which is a divisor of $60\}$.

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**42.** Describe the following sets in Roster form: $\{x : x$ is a two digit number such that the sum of digits is $8\}$ .

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**43.** Describe the following sets in Roster form: The set of all letters in the word 'Better'.

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**44.** Describe the following set in set builder form: $A = \{1, 2, 3, 4, 5, 6\}$

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**45.** Describe the following set in set builder form: $B = \{1,1/2,1/3,1/4,1/4,..\}$

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**46.** Describe the following set in set builder form: $C = \{0, 3, 6, 9, 12\}$

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**47.** Describe the following set in set builder form: $D = \{10, 11, 12, 13, 14, 15\}$

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**48.** Describe the following set in set builder form: $E = \{0\}$

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**49.** Describe the following set in set builder form: $\{1, 4, 9, 16, \ldots\ldots, 100\}$

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**50.** Describe the following set in set builder form: $\{2, 4, 6, 8, \ldots\ldots\}$

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**51.** Describe the following set in set builder form: $\{5, 25, 125, 625\}$

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**52.** Find the pairs of equal sets from the following sets, if any, giving reasons:

$A = \{0\},\ B = \{x : x > 15\ and\ x < 5\},\ C = \{x : x - 5 = 0\},\ D = \{x : x^2$

$E = \{x : x$ is an integral positive root of the equation $x^2 - 2x - 15 = 0\}$.

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**53.** Which of the following are examples of empty set? Set of all even natural numbers divisible by 5.

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**54.** Which of the following are examples of empty set? Set of all even prime numbers.

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**55.** Which of the following are examples of empty set? $\{x : x^2 - 2 = 0 \, and \, x$ is rational$\}$

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**56.** Which of the following are examples of empty set? $\{x : x$ is a natural number, $x < 8$ and simultaneously $x > 12\}$

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**57.** Which of the following are examples of empty set? $\{x : x$ is a point common to any two parallel lines$\}$ .

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**58.** Are the following sets equal? $A = \{x : x$ is a letter in the word reap$\}$ , $B = \{x : x$ is as letter in the word paper$\}$ $C = \{x : x$ is a letter in the word rope$\}$ .

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**59.** Are the following pairs of sets equal? Give reason. $A = \{1, 2, 3\},\ B\{x; x \text{ is a solution of } x^2 + 5x + 6 = 0\}$

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**60.** Are the following pairs of sets equal? Give reason. $A = \{x : x$ is a letter of the word WOLF$\}$ $B = \{x : x$ is a letter of the word $\text{FOLLOW}\}$

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**61.** Which o the following sets are equal?

$A = \{x : x \in N,\ x < 3\},\ B = \{1, 2\},\ C = \{3, 11\}$

$D = \{x : x \in N,\ \xi s\ odd,\ x < 5\},\ E = \{1, 2, 1, 1\},\ F = \{1, 1, 3\}$

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**62.** Show that the set of letters needed to spell “CATARACT” and the set of letters needed spell “TRACT” are equal.

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**63.** When we study two dimensional coordinate geometry, then the set of all points in xy-plane is the universal set.

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**64.** If A={1,2,3} B={2,4,5,6} a n d C ={1,3,5,7}, t h e n U={1,2,3,4,5,6,7}` can be taken as the universal set.

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**65.** When we are using sets containing natural numbers, then N is the universal set.

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**66.** Let $A = \{1, 2, 3\}$. Then the subsets of A are: $\varphi$, $\{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3, \}, \{2, 3\} and \{1, 2, 3\}$. Find Power set of A.

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**67.** If $A$ is the void set $\varphi$ then $P(A)$= .

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**68.** An investigator interviewed 100 students to determine the performance of three drinks: that 10 students take all three drinks milk, milk, coffee and tea. The investigator reported coffee and tea; 20 students take milk and coffee: 25 students take milk and tea; 20 students take coffee and tea; 12 students take milk only; 5 students take coffee only and 8 students take tea only. then the number of students who did not take any of three drinks is

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**69.** Show that $n\{P\{P(P(\varphi))\}\} = 4$.

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**70.** Let $A = \{a,\ \{b\}\}, find P(A)$.

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**71.** Consider the following sets $\varphi,\ A = \{1, 2\}, B = \{1, 4, 8\}, C = \{1, 2, 4, 6, 8\}$ . Insert the correct symbol $\subset and$ between each of the following pair of sets: $\varphi \ldots B$

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**72.** Consider the following sets $\varphi,\ A=\{1,2\}, B=\{1,4,8\}, C=\{1,2,4,6,8\}$ . Insert the correct symbol $\subset and$ between each of the following pair of sets: $A...B$

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**73.** Consider the following sets $\varphi,\ A=\{1,2\}, B=\{1,4,8\}, C=\{1,2,4,6,8\}$ . Insert the correct symbol $\subset and$ between each of the following pair of sets: $A...C$

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**74.** Consider the following sets A={1,2}, B={1,4,8}, C={1,2,4,6,8} . Insert the correct symbol of subset between each of the following pair of sets: $B...C$

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**75.** Let $A = \{a, b, c, d\},\ B = \{a, b, c\} and\ C = \{b, d\}$ . Find all sets $X$ such that: $X \subset B\ and\ X \subset C$.

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**76.** Let $A = \{a, b, c, d\},\ B = \{a, b, c\} and\ C = \{b, d\}$ . Find all sets $X$ such that: $X \subset A\ and\ X \subset B$.

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**77.** In each of the following determine whether the statement is true or false. If it is true prove it . if it is false, give an example: If $x \in A\ and\ A \in B,\ then\ x \in B$.

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**78.** In each of the following determine whether the statement is true or false. If it is true prove it . if it is false, give an example: If

$A \subset B \text{ and } B \subset C, \text{ then } A \subset C.$

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**79.** In each of the following determine whether the statement is true or false. If it is true prove it . if it is false, give an example: If x∈A and A∈B, then x∈B

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**80.** In each of the following determine whether the statement is true or false. If it is true prove it . if it is false, give an example: If $A \subset B \text{ and } B \in C, \text{ then } A \in C.$

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**81.** In each of the following determine whether the statement is true or false. If it is true prove it . if it is false, give an example: If

$A \not\subset B \text{ and } B \not\subset C, \text{ then } A \not\subset C.$

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**82.** In each of the following determine whether the statement is true or false. If it is true prove it . if it is false, give an example: If $A \subset B \text{ and } x \notin B, \text{ then } x \notin A.$

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**83.** Write the following subsets of $R$ as interval:{x : x in R: x is less than and equal to 6 and also greater than -4

A.

B. null

C. null

D. null

**Answer: null**

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**84.** Write the following subsets of $R$ as interval:{x : x in R -12

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**85.** Write the following subsets of $R$ as interval: $\{x : x \in R,\ 0 \leq x < 7\}$

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**86.** Write the following subsets of $R$ as interval: $\{x : x \in R,\ 3 \leq x \leq 4\}$

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**87.** Write the following interval in the set builder form: $(-7, 0)$

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**88.** Write the following interval in the set builder form: $[6, 12]$

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**89.** Write the following interval in the set builder form: $(6, 12]$

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**90.** Write the following interval in the set builder form: $[-20, 3)$

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**91.** Which of the following statements are true? Give reason to support your answer. For any two sets A and B either $A \subseteq B$ or $B \subseteq A$.

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**92.** Is the following statement true? Give reason to support your answer. Every subset of an infinite set in infinite.

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**93.** Which of the following statements are true? Give reason to support your answer. Every subset of a finite set is finite.

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**94.** Which of the following statements are true? Give reason to support your answer. Every set has a proper subset.

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**95.** Which of the following statements are true? Give reason to support your answer. $\{a, b, a, b, a, b.\}$ is an infinite set.

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**96.** Which of the following statements are true? Give reason to support your answer. $\{a, b, c\}$ and $\{1, 2, 3\}$ are equivalent sets.

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**97.** Which of the following statements are true? Give reason to support your answer. A set can have infinitely many subsets.

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**98.** State whether the following statements are true or false: $1 \in \{1, 2, 3\}$, $a \subset \{b, c, a\}$, $\{a\} \in \{a, b, c\}$, $\{a, b\} = \{a, a, b, b, a\}$, The set $\{x : x + 8 = 8\}$ is the null set.

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**99.** Decide among the following sets, which are subsets of which: $A = \{x : x$ satisfies $x^2 - 8x + 12 = 0\}$, $B = \{2, 4, 6\}$, $C = \{2, 4, 6, 8\}$, $D = \{6\}$.

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**100.** Write which of the following statements are true? Justify your answer: The set of all crows in contained in the set of all birds.

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**101.** Write which of the following statements are true? Justify your answer: The set of all rectangles is contained in the set of all squares.

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**102.** Write which of the following statements are true? Justify your answer: The set of all rectangles is contained in the set of all squares.

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**103.** Write which of the following statements are true? Justify your answer: The set of all real numbers is contained in the set of all complex numbers.

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**104.** Write which of the following statements are true? Justify your answer: The sets $P = \{a\} and\ B = \{\{a\}\}$ are equal.

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**105.** Write which of the following statements are true? Justify your answer: The sets $A = \{x : x$ is a letter of the word LITTLE$\}$ and $B = \{x : x$ is a letter of the word TITLE$\}$ are equal.

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**106.** Which of the following statements are correct? Write a correct form of each of the incorrect statements. (i) $a \subset \{a, b, c\}$ (ii) $\{a\} \in \{a, b, c\}$ (iii) $a \in \{\{a\}, b\}$

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**107.** Which of the following statements are correct? Write a correct form of each of the incorrect statements. (i) $\{a\} \subset \{\{a\}, b\}$ (ii) $\{b, c\} \subset \{a, \{b, c\}\}$ (iii) $\{a, b\} \subset \{b, c\}$

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**108.** Which of the following statements are correct? Write a correct form of each of the incorrect statements. (i) $\varphi \in \{a, b\}$ (ii) $\varphi \subset \{a, b, c\}$ (iii) $\{x : x + 3 = 3\} = \varphi$

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**109.** Let $A = \{a, b, \{c, d\}, e\}$ . Which of the following statements are false and why? (i) $\{c, d\} \subset A$ (ii) $\{c, d\} \in A$ (iii) $\{\{c, d\}\} \subset A$

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**110.** Let $A = \{a, b, \{c, d\}, e\}$ . Which of the following statements are false and why? (i) $a \in A$ (ii) $a \subset A$ (iii) $\{a, b, e\} \subset A$

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**111.** Let $A = \{a, b, \{c, d\}, e\}$ . Which of the following statements are false and why? (i) $\{a, b, e\} \in A$ (ii) $\{a, b, c\} \subset A$ (iii) $\varphi \in A$ (iv) $\{\varphi\} \subset A$

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**112.** Let $A = \{\{1, 2, 3\}, \{4, 5\}, \{6, 7, 8\}\}$. Determine which of the following is true or false: (i)$1 \in A$ (ii) $\{1, 2, 3\} \subset A$ (iii) $\{6, 7, 8\} \in A$

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**113.** Let $A = \{\{1, 2, 3\}, \{4, 5\}, \{6, 7, 8\}\}$. Determine which of the following is true or false: (i) $\{\{4, 5\}\} \subset A$ (ii)$\varphi \in A$ (iii) $\varphi \subset A$

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**114.** Let $A = \{\varphi, \{\varphi\}, 1, \{1, \varphi\}, 2\}$. Which of the following are true? i. $\varphi \in A$ ii. $2 \subset A$ iii. $\{2, \{1\}\} \subset A$

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**115.** Let $A = \{\varphi\{\varphi\}, 1, \{1, \varphi\}, 2\}$. Which of the following are true? (i) $\{\{2\}, \{1\}\}A$ (ii) $\{\varphi, \{\varphi\}, \{1, \varphi\}\} \subset A$

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**116.** Let $A = \{\varphi, \{\varphi\}, 1, \{1, \varphi\}, 2\}$. Which of the following are true? i. $\{1\} \subset A$ ii. $\{\{\varphi\}\} \subset A$ iii. $\{2, \varphi\} \subset A$

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**117.** Write down all possible subset of each of the following set: $\{0, 1\}$

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**118.** Write down all possible subset of each of the following set: $\{1, \{1\}\}$

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**119.** Write down all possible subset of each of the following set: $\{\varphi\}$

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**120.** Write down all possible subset of each of the following set: $\{a, b, c\}$

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**121.** Write down all possible proper subsets each of the following set: $\{1, 2\}$

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**122.** Write down all possible proper subsets each of the following set: $\{1, 2, 3\}$

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**123.** Write down all possible proper subsets each of the following set: $\{1\}$

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**124.** How many elements has $(A)$, if $A = \varphi$?

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**125.** If $A = \{1, 2, 3\} and\ B = \{1, 3, 5, 7\},\ then\ A \cup B = \{1, 2, 3, 5, 7\}$.

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**126.** If $A = \{x : x = 2n + 1,\ n \in Z\}\ and\ B = \{x : x = 2n,\ n \in Z\}$, then $A \cup B = \{x : x$ is an odd integer$\} \cup \{x : x$ is an even integer $\} = \{x : x$ is an integer$\} = Z$.

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**127.** Let $A = \{1, 2, 3\},\ B = \{5, 6\},\ C = \{4, 7, 8\}$. Then $A \cup B \cup C = \{1, 2, 3, 4, 5, 6, 7, 8\}$

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**128.** If $A = \{1, 2, 3, 4, 5\} and\ B = \{1, 3, 9, 12\}$ then $A \cap B = \{1, 3\}$.

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**129.** If

$A = \{1, 2, 3, 4, 5, 6, 7, 8\}\ and\ B = \{1, 3, 5, 6, 7, 8, 9\},\ then\ A - B = \{2, 4$

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**130.** If

$A = \{1, 2, 3, 4, 5\},\ B = \{4, 5, 6, 7, 8\},\ C = \{7, 8, 9, 10, 11\} and\ D = \{10, 1$

. Find: $A \cup C$

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**131.** If

$A = \{1, 2, 3, 4, 5\},\ B = \{4, 5, 6, 7, 8\},\ C = \{7, 8, 9, 10, 11\} and\ D = \{10, 1$

. Find: $B \cup C$

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**132.** If

$A = \{1, 2, 3, 4, 5\},\ B = \{4, 5, 6, 7, 8\},\ C = \{7, 8, 9, 10, 11\} and\ D = \{10,$

. Find: $B \cup D$

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**133.** If

$A = \{1, 2, 3, 4, 5\},\ B = \{4, 5, 6, 7, 8\},\ C = \{7, 8, 9, 10, 11\} and\ D = \{10,$

. Find: $B \cup C \cup D$

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**134.** If

$A = \{1, 2, 3, 4, 5\},\ B = \{4, 5, 6, 7, 8\},\ C = \{7, 8, 9, 10, 11\} and\ D = \{10,$

. Find: $A \cup B \cup C$

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**135.** If

$A = \{1, 2, 3, 4, 5\},\ B = \{4, 5, 6, 7, 8\},\ C = \{7, 8, 9, 10, 11\} and\ D = \{10,$

. Find: $A \cup B \cup D$

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**136.** If

$A = \{1, 2, 3, 4, 5\},\ B = \{4, 5, 6, 7, 8\},\ C = \{7, 8, 9, 10, 11\} and\ D = \{10,$

. Find: $A \cap (B \cup C)$

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**137.** If

$A = \{1, 2, 3, 4, 5\},\ B = \{4, 5, 6, 7, 8\},\ C = \{7, 8, 9, 10, 11\} and\ D = \{10,$

. Find: $(A \cap B) \cap \{B \cap C\}$

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**138.** Let

$A = \{x : x \in N\},\ B = \{x; x = 2n,\ n \in N\},\ C = \{x : x = 2n - 1, n \in N$

is a prime natural number$\}$ . Find: $A \cap B$

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**139.** Let

$A = \{x : x \in N\},\ B = \{x; x2n,\ n \in N\},\ C = \{x : x = 2n - 1, n \in N\}an$

is a prime natural number$\}$ . Find: $A \cap C$

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**140.** Let $A = \{x : x \in N\},\ B = \{x; x = 2n,\ n \in N\},\ and, D = \{x : x$ is

a prime natural number$\}$ . Find: $A \cap D$.

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**141.** Let

$A = \{x : x \in N\},\ B = \{x; x = 2n,\ n \in N\},\ C = \{x : x = 2n - 1, n \in N$

is a prime natural number$\}$ . Find: $B \cap C$

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**142.** Let

$A = \{x : x \in N\},\ B = \{x; x = 2n,\ n \in N\},\ C = \{x : x = 2n - 1, n \in N$

is a prime natural number$\}$ . Find: $B \cap D$

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**143.** Let

$A = \{x : x \in N\},\ B = \{x; x = 2n,\ n \in N\},\ C = \{x : x = 2n - 1, n \in N$

is a prime natural number$\}$ . Find: $C \cap D$

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**144.** Let

$A = \{3, 6, 12, 15, 18, 21\},\ B = \{4, 8, 12, 16, 20\},\ C = \{2, 4, 6, 8, 10, 12, 14$

. Find: $A - B$

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**145.** Let

$A = \{3, 6, 12, 15, 18, 21\},\ B = \{4, 8, 12, 16, 20\},\ C = \{2, 4, 6, 8, 10, 12, 14$

. Find: $A - C$

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**146.** Let

$A = \{3, 6, 12, 15, 18, 21\},\ B = \{4, 8, 12, 16, 20\},\ C = \{2, 4, 6, 8, 10, 12, 14$

. Find:$A - D$

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**147.** Let

$A = \{3, 6, 12, 15, 18, 21\}$, $B = \{4, 8, 12, 16, 20\}$, $C = \{2, 4, 6, 8, 10, 12, 14$

. Find: $B - A$

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**148.** Let

$A = \{3, 6, 12, 15, 18, 21\}$, $B = \{4, 8, 12, 16, 20\}$, $C = \{2, 4, 6, 8, 10, 12, 14$

. Find: $B - C$

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**149.** Let

$A = \{3, 6, 12, 15, 18, 21\}$, $B = \{4, 8, 12, 16, 20\}$, $C = \{2, 4, 6, 8, 10, 12, 14$

. Find: $B - D$

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**150.** Let

$A = \{3, 6, 12, 15, 18, 21\},\ B = \{4, 8, 12, 16, 20\},\ C = \{2, 4, 6, 8, 10, 12, 14$

. Find: $C - A$

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**151.** Let

$A = \{3, 6, 12, 15, 18, 21\},\ B = \{4, 8, 12, 16, 20\},\ C = \{2, 4, 6, 8, 10, 12, 14$

. Find: $D - A$

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**152.** A class has 175 students. The following data shows the number of students obtaining one or more subjects. Mathematics 100, Physics 70, Chemistry 40, Mathematics and Physics 30, Mathematics and Chemistry 28, Physics and Chemistry 23, Mathematics, Physics and Chemistry 18. How many students have offered Mathematics alone (a) 35 (c) 60 (b) 48 (d) 22

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**153.** Two finite sets A and B have m and n element respectively. If the total number of subsets of A is 112more than the total number of subsets of B, then the value of m is

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**154.** For any two sets A and B, $A \cap (A \cup B')$ is equal to a. $A$ b. $B$ c. $\varphi$ d. $A \cap B$

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**155.** The set $(A \cup B')' \cup (B \cap C)$ is equal to

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**156.** If $a \in N$ such that $aN = \{ax : x \in N\}$. Describe the set $3N \cap 7N$.

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**157.** For any natural number a,we define aN={ax:x in N}. If b,c,d in N such that bN uu cN=dN, then prove that d = bc

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**158.** Find the smallest set $A$ such that $A \cup \{1, 2\} = \{1, 2, 3, 5, 9\}$.

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**159.** Let $A = \{1, 2, 4, 5\}\ B = \{2, 3, 5, 6\} C = \{4, 5, 6, 7\}$ . Verify the following identities: $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

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**160.** Let $A = \{1, 2, 4, 5\}\ B = \{2, 3, 5, 6\} C = \{4, 5, 6, 7\}$ . Verify the following identities: $A \cap (B - C) = (A \cap B) - (A \cap C)$

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**161.** Let $A = \{1, 2, 4, 5\}\ B = \{2, 3, 5, 6\} C = \{4, 5, 6, 7\}$ . Verify the following identities: $A - (B \cap C) = (A - B) \cup (A - C)$

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**162.** Let $A = \{1, 2, 4, 5\}\ B = \{2, 3, 5, 6\} C = \{4, 5, 6, 7\}$ . Verify the following identities: $A - (B \cup C) = (A - B) \cap (A - C)$

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**163.** Let $A = \{1, 2, 4, 5\}\ B = \{2, 3, 5, 6\} C = \{4, 5, 6, 7\}$ . Verify the following identities: $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

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**164.** For any two sets $A \; and \; B,$ prove that $B \subset A \cup B$

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**165.** For any two sets $A \; and \; B,$ prove that $A \cap B \subset A$

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**166.** For any two sets $A \; and \; B,$ prove that $A \subset B \Rightarrow A \cap B = A$

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**167.** Show that $A \cap B = A \cap C$ need not imply $B = C$

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**168.** Show that if $A \subset B$, then $C - B \subset C - A$.

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**169.** Prove that $A \cup (A \cap B) = A$

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**170.** For any two sets, prove that: $A \cap (A \cup B) = A$

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**171.** Find sets A, B and C such that $A \cap B$, $B \cap C$ and $A \cap C$ are nonempty sets and $A \cap B \cap C = \varphi$.

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**172.** For any two sets $A \text{ and } B$, prove that $A \cap B = \varphi \Rightarrow A \subseteq B'$.

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**173.** For any two sets of A and B, prove that: $A' \cup B = U \Rightarrow A \subset B$

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**174.** For any two sets of A and B, prove that: $B' \cup A' \Rightarrow A \subset B$

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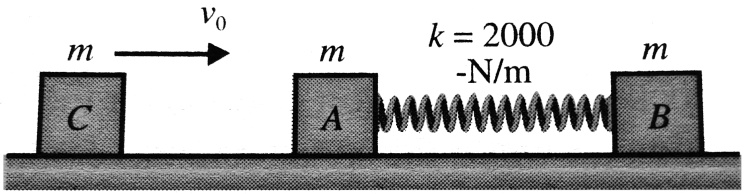


**175.**

Two identical blocks A and B, each of mass $m = 3kg$, are connected with the help of an ideal spring and placed on a smooth horizontal surface as shown in Fig. Another identical blocks C moving velocity $v_0 = 0.6\frac{m}{s}$ collides with A and sticks to it, as a result, the motion of system takes place in some way

Based on this information answer the following questions:

Q. After the collision of C and A, the combined body and block B would

Option1

oscillate about centre of mass of system and centre of mass is at rest.

Option2

oscillate about centre of mass of system and centre of mass is moving.

Option3

oscillate but about different location other than the centre of mass.

Option4

not oscillate.

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**176.** If A and B are any two sets, then prove that $(A \cap B) \cup (A - B) = A$

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**177.** Show that for any sets $A$ and $B$; $A = (A \cap B) \cup (A - B)$ and $A \cup (B - A) = (A \cup B)$

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**178.** For any two sets A and B prove the following: $A \cap (A' \cup B) = A \cap B$

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**179.** For any two sets A and B prove the following: $A-(A-B)=A \cap B$

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**180.** For any two sets A and B prove the following: $A \cap (A \cup B)' = \varphi$

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**181.** For any two sets A and B prove the following: $A-B=A \Delta (A \cap B)$.

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**182.** In a class of 35 students, 24 like to play cricket and 16 like to play football. Also, each student likes to play at least one of the two games. How many students like to play both cricket and football?

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**183.** In a group of 50 people, 35 speak Hindi, 25 speak both English and Hindi and all the people speak at least one of the two languages. How many people speak only English and not Hindi? How many people speak English?

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**184.** Out of 500 car owners investigated, 400 owned car A and 200 owned car B, 50 owned both A and B cars. Is this data correct?

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**185.** A market research group conducted a survey of 2000 consumers and reported that 1720 consumers liked product $P_1$ and 1450 consumers like product $P_2$. What is the least number that must have liked both the products?

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**186.** A survey shows that 63% of the Americans like cheese 4 whereas 76% like apples. If x% of the Americans likes both cheese and apples, find the value of x.$(39 \leq x \leq 63)$

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**187.** A college warded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got medals in all the three sports, how many received medals in exactly two of the three sports?

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**188.** If A and B are two sets such that $n(A \cup B) = 50,\ n(A) = 20\ and\ n(B) = 32,\ find\ n(A \cap B)$.

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**189.** If X and Y are two sets such that X has 40 elements, $X \cup Y$ has 60 elements and $X \cap Y$ has 10 elements, how many elements does Y have?

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**190.** In a school there are 20 teachers who teach mathematics or physics. Of these, 12 teach mathematics and 4 teach both physics and mathematics. How many teach physics?

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**191.** In a group of 70 people, 37 like coffee, 52 like tea and each person likes at least one of the two drinks. How many people like both coffee and tea?

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**192.** Let A and B be two sets such tat $: n(A) = 20,\ n(A \cup B) = 42\ and\ n(A \cap B) = 4.$ Find $n(B)$

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**193.** Let A and B be two sets such tat $: n(A) = 20,\ n(A \cup B) = 42\ and\ n(A \cap B) = 4.$ Find $n(A - B)$

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**194.** Let A and B be two sets such tat $: n(A) = 20,\ n(A \cup B) = 42\ and\ n(A \cap B) = 4.$ Find $n(B - A)$

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**195.** A survey shows that 76% of the Indians like oranges, whereas 62%like bananas. What percentage of the Indians like both oranges and bananas?

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**196.** In a group of 950 persons, 750 can speak Hindi and 460 can speak English. Find: How many can speak both Hindi and English. How many can speak English only. How many can speak Hindi only

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**197.** In a group of 1000 people all of whom speak atleast one of Bengali or Hindi language, there are 750 who can speak Hindi and 400 who can speak Bengali. If number of people who can speak Bengali only is B and the people who can speak both Hindi and Bengali is C, then.

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**198.** In a survey of 100 persons it was sound that 28 read magazine A, 30 readmagazine B, 42 read magazine C, 8 read magazines A & B, 10 read

magazine A & C and 5 read magazine B&C and 3 read all the three. Find how many read none of three magazines?

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**199.** In a group of 50 persons, 14 drink tea but not coffee and 30 drink tea. Find: How many persons drink tea and coffee both How many persons drink coffee but not tea.

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**200.** In a survey of 100 students, how many of students studying the various languages were found to study: English only 18, English but not Hindi 23, English and Sanskrit 8, English 26, Sanskrit 48, Sanskrit and Hindi 8, no language 24 Find:(i) how many students were studying Hindi (ii) how many students were studying English and Hindi

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**201.** Write the number of elements in the power set of null set.

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**202.** Let $A = \{x; x \in N,\ x$ is a multiple of 3$\}$ and $B = \{x : x \in N$ and $x$ is a multiple of 5$\}$. Write $A \cap B$

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**203.** If A and B two sets containing 3 and 6 elements respectively and if minimum no. elements and max no. of elements in $A \cup B$ is p, q respectively then p+q is

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**204.** If $A = \{x \in C : x^2 = 1\}$ and $B = \{x \in C : x^4 = 1\}$, then write $A - B$ and $B - A$.

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**205.** Let A and B be two sets having 4 and 7 elements respectively. Then write the maximum number f elements that $A \cup B$ can have:

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**206.** If $A = \left\{(x,\ y) : y = \frac{1}{x},\ 0 \neq x \in R\right\} and\ B = \{(x, y) : y = -x,\ x \in R\}$, then write $A \cap B$.

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**207.** If $A = \{(x,\ y) : y = e^x,\ x \in R\} and\ B = \left\{(x, y) : y = e^{-x},\ x \in R\right\}$, then write $A \cap B$.

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**208.** If A and B are two sets such that $n(A) = 20,\ n(B) = 24\ and\ n(A \cup B) = 40,$ then write $n(A \cap B)$.

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**209.** If A and B are two sets such that $n(A) = 115,\ n(B) = 326,\ n(A - B) = 47$, then write $n(A \cup B)$.

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**210.** For any set $A$, $(A')'$ is equal to a.$A'$ b. $A$ c. $\varphi$ d. none of these

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**211.** Let A and B be two sets in the same universal set. Then, $A - B = A \cap B$ b. $A' \cap B$ c. $A \cap B'$ d. none of these

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**212.** The number of all possible subsets of a set containing $n$ elements ?

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**213.** For any two sets A and B $A \cap (A \cup B) =$ a.$B$ b. $A$ c. $\varphi$ d. none of these

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**214.** If $A = \{1, 3, 5, B\} and\ B = \{2, 4\}$ , then $4 \in A$ b. $\{4\} \subset A$ c. $B \subset A$ d. none of these

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**215.** The symmetric difference of A and B is equal to

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**216.** The symmetric difference of $A = \{1, 2, 3\} and\ B = \{3, 4, 5\}$ is a. $\{1, 2\}$ b. $\{1, 2, 4, 5\}$ c. $\{4, 3\}$ d. $\{2, 5, 1, 4, 3\}$

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**217.** For any two sets A and B, $(A - B) \cup (B - A) = ?$ a.$(A - B) \cup A$ b. $(B - A) \cup B$ c. $(A \cup B) - (A \cap B)$ d. $(A \cup B) \cap (A \cap B)$

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**218.** Which of the following statement is false: $A - B = A \cap B$ b. $A - B = A - (A \cap B)$ c. $A - B = (A \cup B) - B$ d.$A - B = A - B'$

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**219.** For any three sets A, B, and C $A \cap (B - C) = (A \cap B) - (A \cap C)$

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**220.** Choose the correct answer: 1. If A, B and C are three sets and U is the universal 6 set such that n(U) = 700, n(A) = 200, n(B) = 300 and n(A n B) = 100. Find n(A' n B')

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**221.** Let $A = \{x : x \in R,\ x > 4\}$ and $B = \{x \in R : x < 5\}$ . Then $A \cap B =$ (a) $(4, 5]$ (b) $(4, 5)$ (c) $[4, 5)$ (d) $[4, 5]$

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**222.** Let A and B be two sets such that $n(A) = 16,\ n(B) = 14, n(A \cup B) = 25.$ Then $n(A \cap B)$ is equal to 30 b. $50$ c. $5$ d. none of these

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**223.** In set builder method the null set is represented by

A. A. $\{\}$

B. B. $\varphi$

C. C. $\{x : x \neq x\}$

D. D. $\{x : x = x\}$

**Answer: null**

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**224.** If A and B are two disjoint sets, then $n(AuB)$ is equal to a. $n(A) + n(B)$ b. $n(A) + n(B) - n(AnB)$ c. $n(A) + n(B) + n(AnB)$ d. $n(A)n(B)$

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**225.** For two sets $A$ and $B$; $A \cup B$ is equal to:

A. (A) $B \subseteq A$

B. (B) $A \subseteq B$

C. (C) $A \neq B$

D. (D) $A = B$

**Answer: null**

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**226.** If $A$ and $B$ are two sets such that $n(A) = 70,\ n(B) = 60,\ n(A \cup B) = 110,\ then\ n(A \cap B)$ is equal to

A. (A) $240$

B. (B) $50$

C. (C) $40$

D. (D) $20$

**Answer: null**

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**227.** If $A$ = {x : x is a multiple of 3} and, $B$ ={x : x is a multiple of 5}, then $A - B$ is

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**228.** If $A \cap B = B,$ then a.$A \subseteq B$ b. $B \subseteq A$ c. $A = \varphi$ d. $B = \varphi$

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