

# Questions

THE ZENITH  
For CRT - 01  
BY O.P. GUPTA

Max. Marks : 40

Time : 60 Minutes

Topics : Sets Theory

INDIRA AWARD WINNER

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■ Advanced MATH Classes, 1<sup>st</sup> Floor (Above Master Of Burgers), Opp. HP Petrol Pump, Thana Road, Najafgarh

- Q01. (a) Write  $(-5, 9]$  in set-builder form. (b) Write  $\{x : x \in \mathbb{R}, -3 \leq x \leq 7\}$  as interval.
- Q02. Write the followings in the set-builder form :  
(a)  $\{2, 5, 10, 26, 37, \dots\}$  (b)  $\{b, f, j, p, v\}$ .
- Q03. Write the followings in the roster form (tabular form) :  
(a)  $\{x \mid x^2 = x, x \in \mathbb{R}\}$  (b)  $\{x : x \in \mathbb{Z}^+, x^2 + 3x + 2 = 0\}$ .
- Q04. (a) If  $A = \{1, 3, 5\}$ , how many elements has  $P(A)$ ?  
(b) If  $\mathbb{N}$  is the set of natural numbers and  $\mathbb{W}$  is the set of whole numbers, then what is  $\mathbb{W} - \mathbb{N}$ ?  
(c) Let  $A = \{x : x \in \mathbb{N} \text{ and } x^2 \leq 9\}$ ,  $B = \{x : x \in \mathbb{R} \text{ and } x^2 - 4x + 3 = 0\}$ . State whether or not,  $A = B$ .  
(d) If  $A \subset B$ , then find the value of  $A \cap B$  and  $A \cup B$ .
- Q05. If  $A = \{4, 5, 7, 8\}$ ,  $B = \{3, 5, 9, 10\}$ , then find (i)  $A - (B \cap A)$  and (ii)  $(A - B) \cup (B - A)$ .
- Q06. If  $A = \{1, 2, 4, 5\}$ ,  $B = \{x : x \in \mathbb{N}, x \leq 5\}$ , find  $A \cap B$  and  $A \cup B$ . Show it in Venn diagram.
- Q07. (a) Given that  $N = \{1, 2, 3, \dots, 100\}$ . Then write  
(i) the subset of  $N$  whose elements are even numbers.  
(ii) the subset of  $N$  whose element are perfect square numbers.  
(b) Write all the subsets of  $\{\phi, \{1, 2\}\}$ . Also write its proper subsets.
- Q08. (a) Write the set of 'all real numbers which can not be written as the quotient of two integers' in the set-builder form.  
(b) Which of the followings is a set? Justify your answer in each case.  
(i) The collection of fat boys in your area.  
(ii) The collection of five beautiful actresses in Hollywood.  
(iii) The collection of Maths teachers in your school.
- Q09. Write the elements of (a)  $\{x \mid x \text{ is a positive factor of a prime number } p\}$  (b)  $\{w : \frac{w-2}{w+3} = 3, w \in \mathbb{Z}\}$
- Q10. Let  $T = \left\{x \mid \frac{x+5}{x-7} - 5 = \frac{4x-40}{13-x}\right\}$ . Is  $T$  an empty set? Justify your answer. [4×10 = 40]

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INDIRA Award Winner **O.P. Gupta** is author of several popular books on Mathematics for Classes XII and XI. These books can be bought at : [www.iMathematicia.com](http://www.iMathematicia.com).

# Hints & Answers Of CRT-01

- Q01.** (a)  $\{x : x \in \mathbb{R}, -5 < x \leq 9\}$  (b)  $[-3, 7]$ .
- Q02.** (a)  $\{x | x = n^2 + 1, n \in \mathbb{N}, n \neq 4\}$   
(b)  $\{x : x \text{ is a letter of English alphabet just next to the vowel}\}$ .
- Q03.** (a)  $\{0, 1\}$  (b)  $\{\}$  or  $\phi$ .
- Q04.** (a)  $\because n(A) = 3 \therefore n[P(A)] = 2^3 = 8$   
(b)  $\{0\}$   
(c) Here  $A = \{1, 2, 3\}$ ,  $B = \{1, 3\} \therefore n(A) = 3 \neq n(B) = 2 \therefore A \neq B$   
(d)  $A \cap B = A$  and  $A \cup B = B$
- Q05.** We have  $B \cap A = \{5\}$   
 $\therefore A - (B \cap A) = \{4, 5, 7, 8\} - \{5\} = \{4, 7, 8\}$   
Also  $A - B = \{4, 7, 8\}$ ,  $B - A = \{3, 9, 10\}$   
 $\therefore (A - B) \cup (B - A) = \{3, 4, 7, 8, 9, 10\}$
- Q06.** Here  $A = \{1, 2, 4, 5\}$ ,  $B = \{1, 2, 3, 4, 5\}$   
 $\therefore A \cap B = \{1, 2, 4, 5\} = A$ ,  $A \cup B = \{1, 2, 3, 4, 5\} = B$ . Draw the Venn diagram yourself.
- Q07.** (a) (i)  $\{2, 4, 6, 8, \dots, 96, 98\}$   
(ii)  $\{1, 4, 9, 16, 25, 36, 49, 64, 81, 100\}$   
(b) Subsets of  $\{\phi, \{1, 2\}\}$  are  $\phi, \{\phi\}, \{\{1, 2\}\}, \{\phi, \{1, 2\}\}$   
And proper subsets of  $\{\phi, \{1, 2\}\}$  are  $\phi, \{\phi\}, \{\{1, 2\}\}$ .
- Q08.** (a)  $\{x : x \in \mathbb{T}\}$  or  $\{x : x \text{ is real and irrational number}\}$   
(b) (i) It is not a set as definition of fatness can't be fixed.  
(ii) It's not a set as definition of beauty varies from person to person.  
(iii) It is a set as it is easy to count the number of Maths teachers in a school.
- Q09.** (a)  $\{1, p\}$  (b)  $\{\} = \phi$
- Q10.** As  $T = \{10\}$  so, T is not an empty set.

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❖ Dear Student/Teacher,

I would urge you for a little favour. Please notify me about any error (s) which you notice in this (or other Maths) work. It would be beneficial for all the future learners of Maths like us. Any constructive criticism will be well acknowledged.

Please find below my contact info when you decide to offer your valuable suggestions. I am looking forward for a response.

Moreover, I would wish **if you inform your friends/students** about my efforts for Maths so that they may also be benefited.

**Let's learn Maths with smile :-)**

☞ For any clarification(s), please contact :

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