THE ZENITH Questions For CRT - 02

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Max. Marks : **40**
Time : **60 Minutes**
Topics : **Sets Theory**

◘ **Advanced MATH Classes**, 1st Floor (Above Master Of Burgers), Opp. HP Petrol Pump, Thana Road, Najafgarh

Q01. If A, B and C are three sets and U is the universal set such that n(U) = 700, n(A) = 200, n(B) = 300 and $n(A \cap B) = 100$. Find the value of (i) $n(A \cup B)$ (ii) $n(A' \cap B')$.

Q02. Check which of the following pair of sets are disjoint? Give reason(s).
(i) $\{1,2,3,4\}$ and $\{x : x \text{ is a natural number and } 4 \le x \le 6\}$.
(ii) $\{x : x \text{ is a vowel in English alphabet}\}$ and $\{x : x \text{ is a consonant in English alphabet}\}$.

Q03. Let the sets A = {1, 2, 3, 5, 6}, B = {2, 3, 4, 6, 7, 8} are associated with the universal set U = {1, 2, 3, ..., 10}. State and verify De-Morgan's Laws for sets A and B.

Q04. A college awarded 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?

Q05. Prove that $n(A \cup B) = n(A) + n(B) - n(A \cap B)$.

Q06. A school auditorium displays badminton and tennis matches for its 100 students of XI class once in a week. If 80 students like to watch either Tennis or Badminton Matches, 55 students like to watch Tennis, 40 like to watch Badminton, find the number of students who like to watch both Tennis and Badminton. Find the number of students who is neither watching Tennis nor Badminton.

Q07. Let U be the set of all boys, and girls in a school, G be the set of all girls in the school, B be the set of all boys in the school and S be the set of all students in the school who take swimming. Some but not all, students in the school take swimming. Depict this information using venn diagram showing one of the possible interrelationship among sets U, G, B and S. $[4 \times 7 = 28$

Q08. Let A, B and C be three given finite sets in such a way that $A \cup B = A \cup C$ and $A \cap B = A \cap C$ then show that B = C.

Q09. A survey provides the following information for TV viewership in an area :
60% watch program A, 50% watch program B, 47% watch program C, 28% watch program A and B, 23% watch program A and C, 18% watch program B and C, 8% watch all the three programs. Draw Venn diagram to illustrate this information and use it to find :
(a) the percentage of people who watch program A and B but not C
(b) the percentage of people who watch exactly two programs
(c) the percentage of people who do not watch any program. $[6 \times 2 = 12$

 # Test held on : 02 July, 2017

Hints & Answers Of CRT-02

Q01. Since $n(A \cup B) = n(A) + n(B) - n(A \cap B) = 200 + 300 - 100 = 400$

So $n(A' \cap B') = n(A \cup B)' = n(U) - n(A \cup B) = 700 - 400 = 300$

Q02. **(i)** Since 4 belongs to both the sets so, these are not a pair of disjoint sets..

(ii) No element belongs to both the sets so these sets are pair of disjoint sets.

Q03. De Morgan's laws are (i) $(A \cup B)' = A' \cap B'$, (ii) $(A \cap B)' = A' \cup B'$. Now verify yourself.

Q04. For solution, refer to Worked Out Examples in Mathematicia Vol. 1 by O.P. Gupta. Ans. 9

Q05. Refer to the Mathematicia Vol. 1 by O.P. Gupta

Q06. 15, 20.

Q07. Refer to Q11 in NCER Exemplar Problems Solutions by O.P. Gupta

Q08. We have $A \cup B = A \cup C \Rightarrow (A \cup B) \cap B = (A \cup C) \cap B$

$\Rightarrow B = (A \cap B) \cup (C \cap B)$...(i)

Again $A \cup B = A \cup C \Rightarrow (A \cup B) \cap C = (A \cup C) \cap C$

$\Rightarrow (A \cap C) \cup (B \cap C) = C \Rightarrow (A \cap B) \cup (B \cap C) = C$...(ii) $[\because A \cap B = A \cap C$

By (i) & (ii), we have : $B = C$.

Q09. **(a)** 20%,

(b) 45%,

(c) 4%

❖ 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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