



## CTQ - 2023

### CTQ : Concept Through Questions

**Year : 2023**

#### Topic : Permutation & Combination II

1. If  $n^{-1}C_r = (k^2 - 3) n C_{r+1}$ , then  $k$  belongs to  
 (a)  $(-\infty, -2]$       (b)  $[2, \infty)$       (c)  $[-\sqrt{3}, 3]$       (d)  $(\sqrt{3}, 2]$  [Video Solution](#)
2. The sum  $\sum_{i=0}^m {}^{10}C_i \times {}^{20}C_{m-i}$  (Where  ${}^pC_q = 0$  if  $p < q$ ) is maximum, when  $m$  is  
 (a) 5      (b) 10      (c) 15      (d) 20 [Video Solution](#)
3. The number  $24!$  Divisible by  
 (a)  $6^{24}$       (b)  $24^6$       (c)  $12^{12}$       (d)  $48^5$  [Video Solution](#)
4. If  $a$  and  $b$  are the greatest values of  ${}^{2n}C_r$  and  ${}^{2n-1}C_r$  respectively. Then,  
 (a)  $a = 2b$       (b)  $b = 2a$       (c)  $a = b$       (d) None of these [Video Solution](#)
5. The number of ways in which  $n$  distinct objects can be put into two different boxes, is  
 (a)  $n^2$       (b)  $2^n$       (c)  $2n$       (d) None of these [Video Solution](#)
6. The number of ways in which  $n$  distinct objects can be put into two identical boxes so that no box remains empty, is .  
 (a)  $2^n - 2$       (b)  $2^n - 1$       (c)  $2^{n-1} - 1$       (d)  $n^2 - 2$  [Video Solution](#)
7. The number of ways in which 8 distinct toys can be distributed among 5 children, is .  
 (a)  $5^8$       (b)  $8^5$       (c)  ${}^8P_5$       (d) 40 [Video Solution](#)
8. The number of different matrices that can be formed with elements 0,1,2,or 3 , each matrix having 4 elements, is  
 (a)  $3 \times 2^4$       (b)  $2 \times 4^4$       (c)  $3 \times 4^4$       (d) None of these [Video Solution](#)
9. The number of distinct rational numbers  $x$  such that  $0 < x < 1$  and  $x = \frac{m}{n}$ , where  $m, n \in \{1,2,3,4,5,6\}$ ,  
 (a) 15      (b) 13      (c) 12      (d) 11 [Video Solution](#)
10. How many different 9 digit numbers can be formed from the number 223355888 by rearranging its digits so that the odd digits occupy even positions ?  
 (a) 16      (b) 36      (c) 60      (d) 180 [Video Solution](#)
11. The number of ways in which a mixed double game can be arranged from amongst 9 married couples if no husband and wife play in the same game, is .  
 (a) 756      (b) 1512      (c) 3024      (d) None of these [Video Solution](#)
12. The number of words of four letters containing equal number of vowels and consonants , repetition being allowed , is  
 (a)  $105^2$       (b)  $210 \times 243$   
 (c)  $105 \times 243$       (d) None of these [Video Solution](#)
13. The number of ways of dividing 20 persons into 10 couple, is  
 (a)  $\frac{20!}{2^{10}}$       (b)  ${}^{20}C_{10}$   
 (c)  $\frac{20!}{(2!)^9}$       (d) None of these [Video Solution](#)



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14. The number of integral solutions of  $x+y+z = 0$ , with  $x \geq -5, y \geq -5, z \geq -5$ , is  
(a) 135      (b) 136      (c) 455      (d) 105      [Video Solution](#)
15. The number of non-negative integral solutions of  $x + y + z \leq n$ , where  $n \in \mathbb{N}$ , is .  
(a)  ${}^{n+3}C_3$       (b)  ${}^{n+4}C_4$       (c)  ${}^{n+5}C_5$       (d) None of these      [Video Solution](#)
16. The number of ways is which an examiner can assign 30 marks to 8 questions, giving not less than 2 marks to any questions.  
(a)  ${}^{21}C_7$       (b)  ${}^{21}C_8$       (c)  ${}^{21}C_9$       (d) None of these      [Video Solution](#)
17. If a, b, c are three natural numbers in A.P such that  $a + b + c = 21$ , then the possible number of ordered triplet (a,b,c), is  
(a) 15      (b) 14      (c) 13      (d) None of these      [Video Solution](#)
18. There are 4 mangoes , 3 apples, 2 oranges and 1 each of 3 other varieties of fruits. The number of ways of selecting at least one fruit of each kind, is  
(a)  $10!$       (b)  $9!$       (c)  $4!$       (d) None of these      [Video Solution](#)
19. There are 5 mangoes , 3 oranges and 4 bananas. The number of ways of selecting at least one fruit of each kind , is  
(a)  $\frac{5!}{2!}$       (b)  $5!$       (c)  $5! - 4!$       (d)  $3!$       [Video Solution](#)
20. The number of divisors of 4200, is  
(a) 42      (b) 48      (c) 54      (d) None of these      [Video Solution](#)
21. The number of proper divisors of 2520, is  
(a) 46      (b) 52      (c) 64      (d) None of these      [Video Solution](#)
22. The number of proper divisors of 1800 which are also divisible by 10, is  
(a) 18      (b) 34      (c) 27      (d) None of these      [Video Solution](#)
23. The number of divisors of  $2^4 \times 3^3 \times 5^2$  having two prime factors, is  
(a) 3      (b) 24      (c) 26      (d) 60      [Video Solution](#)
24. The sum of the divisors of  $2^5 \times 3^4 \times 5^2$ , is  
(a)  $3^2 \cdot 7^1 \cdot 11^2$       (b)  $3^2 \cdot 7^1 \cdot 11^2 \cdot 31$   
(c) 3.7.11.31      (d) None of these      [Video Solution](#)
25. The total number of positive integral solutions for  $(x, y, z)$  such that  $xyz = 24$  , is  
(a) 36      (b) 90      (c) 120      (d) None of these      [Video Solution](#)
26. The total number of positive integral solutions of  $abc = 30$ , is  
(a) 30      (b) 27      (c) 8      (d) None of these      [Video Solution](#)
27. The total number of integral solutions of  $abc = 24$ , is  
(a) 36      (b) 90      (c) 120      (d) 30      [Video Solution](#)
28. The permutations of  $\{a,b,c,d,e,f,g\}$  are listed in lexicographic order. Which of the following permutations are just before and just after the permutation bacdefg?  
(a) agfedbc and bacdfge      (b) agfedbc and badcefg  
(c) agfebcd and bacedgf      (d) agfedcb and bacdegf      [Video Solution](#)
29. There are 4 books on fairy tales, 5 novels and 3 plays. In how many ways can they be arranged in the order, books on fairy tales, novels and then plays so that the books of same category are put together?

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## Video Solution

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30. Let  $S = \{1, 2, \dots, n\}$ . The number of possible pairs of the form  $(A, B)$  with  $A \subseteq B$  for subsets  $A, B$  of  $S$  is

- (a)  $2^n$       (b)  $3^n$       (c)  $n!$       (d)  $\sum_{k=0}^n \binom{n}{k} \binom{n}{n-k}$  [Video Solution](#)

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## Answer Key

Ques.	1	2	3	4	5	6	7	8	9	10
Ans.	D	C	B	A	B	C	A	C	D	C
Ques.	11	12	13	14	15	16	17	18	19	20
Ans.	B	B	D	B	A	A	C	C	A	B
Ques.	21	22	23	24	25	26	27	28	29	30
Ans.	A	D	C	B	D	B	C	D	B	B