

TECH APTITUDE TEST SAMPLE QUESTIONS

The Technology Leaders Program requires a strong background in mathematics, logical reasoning, and programming skills.

The tech aptitude test will evaluate these competencies in an AI-proctored environment. This two-hour test has questions on:

- Cognitive Abilities (28 MCQs): Probability, Linear Algebra, Logical Reasoning; and
- Programming Abilities (2 questions in the coding environment): Any high level language can be used to answer two programming questions

Test Result: Those who qualify will receive an intimation, within two to four working days, for the personal interview round.

This document has a set of sample questions. Please note that the questions in the test will be of a similar nature but not necessarily in the same areas or themes.

1. A letter is known to have come either from TATANAGAR or KOLKATA. On the envelope, only the two consecutive letters TA are visible. What is the probability that the letter has come from KOLKATA?
 - $3/5$
 - $5/9$
 - $2/5$
 - $4/9$
2. A bag contains 3 green and 7 white balls. Two balls are drawn one by one at random without replacement. If the second ball drawn is green, what is the probability that the first ball drawn is also green?
 - $5/8$
 - $3/8$
 - $7/9$
 - $2/9$
3. If $2x^2 - 7xy + 3y^2 = 0$, then what is the value of $x:y$?
 - $3 : 2$
 - $5 : 6$
 - $2 : 3$
 - $3 : 1$ and $1 : 2$
4. What is the value of the following expression: $1\log_p qx + 1\log_q rx + 1\log_r px$
 - 0
 - 1
 - 2
 - 3

5. If $a/.25 - 2a/.75 = .5$, what is the value of a ?

- $3/8$
- $1/2$
- $3/4$
- None of these

6. If $2 \begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$, find x and y

- $x = 12 ; y = -8$
- $x = 3 ; y = -7$
- $x = 2 ; y = -8$
- $x = 12 ; y = -4$

7. If $2 \begin{bmatrix} x & 5 \\ 7 & y - 3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}$, then find the value of $(x + y)$.

- 11
- 12
- 13
- 14

8. If $a + \frac{1}{b} = 1$ and $b + \frac{1}{c} = 1$, then what is the value of $c + \frac{1}{a}$?

- 0
- $1/2$
- 1
- 2

9.

$$\text{If } 2 \begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}, \text{ find } x \text{ and } y$$

- $x = 12 ; y = -8$
- $x = 3 ; y = -7$
- $x = 2 ; y = -8$
- $x = 12 ; y = -4$

10.

$$\text{If } 2 \begin{bmatrix} x & 5 \\ 7 & y - 3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}, \text{ then find the value of } (x + y).$$

- 11
- 12
- 13
- 14

11. Simplify the following: $11.007 + 5.345 + 10.215 + 41.205$

- 76.8075
- 67.8175
- 66.8075
- 77.8175

12. A candidate interviews for the post of Management Trainee at 3 companies.

For the first company, there are 12 candidates, for the second there are 15 candidates and for the third, there are 10 candidates. What is the probability that he is selected in at least one of the companies?

- $46/100$
- $77/100$

- $23/100$
- $54/100$

13. The letters of the word 'MUMMY' are placed at random in a row. What is the chance that letters at the extreme are both M?

- $7/10$
- $7/15$
- $3/10$
- $8/15$

14. A speaks truth in 55 percent cases and B speaks truth in 75 percent cases.

Define the percentage of cases in which they are likely to contradict each other in stating the same fact.

- 47.5%
- 52.5%
- 35.5%
- 64.5%

15. A die is thrown twice and the sum of the numbers appearing is observed to be

6. What is the conditional probability that the number 4 has appeared at least once?

- $3/5$
- $2/5$
- $7/12$
- $5/12$

16. Ten cards numbered 1 to 10 are placed in a box, mixed up thoroughly and then one card is drawn randomly. If it is known that the number on the drawn card is more than 3, what is the probability that it is an even number?

- $5/7$
- $3/7$
- $2/7$
- $4/7$

17. A box contains four white, three green, and five red balls. Determine the number of ways to draw three balls from the box such that the selected balls contain one green ball.

- 66
- 84
- 57
- 136

18. What is the value of $\int_{-2}^1 |x - 1| dx$?

- 2
- 2.5
- 4
- 4.5

19. What is the value of $\int_0^1 \frac{1}{\sqrt{4-x^2}} dx$?

- $\pi/12$
- $\pi/6$
- $\pi/3$
- $\pi/2$

20. If $\int \frac{dx}{f(x)} = \log(f(x))^2 + c$, then $f(x)$ is

- $2x + c$
- $\frac{x}{2} + c$
- $x + c$
- $x^2 + c$

21. Which of the following is the differential equation for $y = 2e^{3x}$

- $(y')^2 = y''$
- $y(y')^2 = y''$
- $yy'' = (y')^2$
- $yy'' = y'$

Problem statement for Programming - 1

You are given a number N . You have to check if the binary representation of N contains a pattern of 10 and 01 only.

Input format

- First line: T denoting the number of test cases
- Each test case contains a single integer N

Output format

- For each test cases print YES or NO in a new line

Constraints

$$1 \leq T \leq 2 * 10^6$$

$$2 \leq N \leq 10^{15}$$

Note:

- Use fast I/O methods.

Problem statement for Programming - 2

Consider the following information:

- If the number of integers that divide a number N is even, then $P(N) = 0$.
- If the number of integers that divide a number N is odd, then $P(N) = 1$.

Task

Now, you are given a number X .

Your task is to determine the smallest number Y such that $Y > X$ and $P(Y) \neq P(X)$

.Input format

- The first line contains T denoting the number of test cases.
- The first line of each test case contains X .

Output format

For each test case, print the smallest number Y such that $Y > X$ and $P(Y) \neq P(X)$ in a new line.

Constraints

$$1 \leq T \leq 10^5$$

$$1 \leq X \leq 10^8$$

Problem statement for Programming - 3

Sum of GP

A geometric progression is a sequence of numbers where each term after the first is found by multiplying the previous one by a fixed, non-zero number called the common ratio. For example, 1, 3, 9, 27, 81 is a GP with the common ratio as 3.

Given the second and third terms of a GP, return the sum till the n th term of the GP.

The output returned should be a double value representing the sum till the n th term of the GP, rounded off to 3 decimal places.

Input Specification:

input1: Second Term of GP (Double)

input2: Third Term of GP (Double)

input3: Value of n

Output Specification:

Return a double value representing the sum till the nth term, rounded off to 3 decimal places.

Example 1:

input1: 1

input2: 2

input3: 4

Output: 7.5

Explanation:

The sum of the elements of the GP i.e $(0.5+1+2+4)=7.5$

Example 2:

input1: 1

input2: 2

input3: 5

Output: 15.5

Explanation:

The sum of the elements of the GP i.e $(0.5+1+2+4+8)=15.5$

Problem statement for Programming - 4

Next Greater Number

Given a number 'N' (containing at most 10,000 digits), find the next greater number having the same digits. It is guaranteed that there exists a next greater number having the same digits as N.

Input Specification:

input1: the length of the String 'N'

input2: the number 'N' in the form of a string.

Output Specification:

Return the next greater number having the same digits as 'N' in the form of a string.

Example 1:

input1: 3

input2: 182

Output: 218

Explanation:

Using the same digit the number of permutation are:

1. 128
2. 218
3. 281
4. 812
5. 821

The next greatest number for 182 is 218.

Example 2:

input1: 19

input1: 1234567849876554321

Output: 1234567851234456789

Explanation:

The next Greatest number for 1234567849876554321 is 1234567851234456789