Answer Script

Question No. 01
Choose a prime number from the range of 50 to 100. We will call it P.
Answer No. 01
P = 53

Question No. 02
Find the binary representation of P. You must show the process.
Answer No. 02

$(53)_{10} = (110101)_2$

Process:

53 ÷ 2 = 26 remainder = 1 (LSB)
26 ÷ 2 = 13 remainder = 0
13 ÷ 2 = 6   remainder = 1
6 ÷ 2 = 3   remainder = 0
3 ÷ 2 = 1   remainder = 1
1 ÷ 2 = 0   remainder = 1 (MSB)

Question No. 03
You and your friends in class might be choosing different values for P. Can anybody choose a P that is an odd number? Explain your answer.
Answer No. 03
Yes! Everybody will choose a P that is an odd number. Except for the number 2, all prime numbers are odd. So from the range (50 - 100) all the prime numbers will be odd.

Question No. 04
Ternary numbers are formed with a number system with base 3. Given the ternary number 10212, find its decimal value.
Answer No. 04
$(10212)_3 = (?)_{10}$ $(1*3^4) + (0*3^3) + (2*3^2) + (1*3^1) + (2*3^0) = 81 + 0 + 18 + 3 + 2 = \mathbf{(104)_{10}}$

Question No. 05
Build a sieve of Eratosthenes to determine if 19 is a prime number. Show the state of the table at each step.
Answer No. 05

Sieve of Eratosthenes Table:

2	3	4	5	6	7
8	9	10	11	12	13
14	15	16	17	18	19

State - 1: 2
State - 2: 3
State - 3: 5, 7, 11, 13, 17, 19
So, we can say that 19 is a prime number.

Question No. 06
Take two natural numbers X and Y. If X * Y = Z, is Z even or odd when X and Y - (Case 1) both are even: even / odd (Case 2) both are odd: even / odd (Case 3) One of them is odd, the other one is even: even / odd
Answer No. 06
Case - 1: even **Case - 2:** odd **Case - 3:** even

Question No. 07
Find out all the divisors of 72 and 132 separately. What are the numbers that appear in both of the divisor lists?.
Answer No. 07
Divisors of 72   = 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72 **Divisors of 132 =** 1, 2, 3, 4, 6, 11, 12, 22, 33, 44, 66, 132 **Common divisor list =** 1, 2, 3, 4, 6, 12