

## Holiday Homework

**Class: XI**

**Subject: Mathematics**

1. Find the values of  $x$  and  $y$  for which the following hold:

$$(1+i)y^2 + (6+i) = (2+i)x$$

2. If  $z_1, z_2$  are  $1 - i, -2 + 4i$ , respectively, find  $\operatorname{Im} \left( \frac{z_1 z_2}{\bar{z}_1} \right)$

3. Find the value of  $x^3 + 7x^2 - x + 6$  when  $x = 1 + 2i$ .

4. If  $a + ib = \frac{c+i}{c-i}$ , where  $c$  is real, prove that  $a^2 + b^2 = 1$  and  $\frac{b}{a} = \frac{2c}{c^2 - 1}$

5. If  $z = x + iy$  and  $w = \frac{1-iz}{z-i}$  show that  $|\omega| = 1 \Rightarrow z$  is purely real.

6. How many words can be formed the letters of the word 'ORIENTAL' so that A and E always occupy odd places?

7. How many numbers between 20,000 and 30,000 can be formed using the digits 2, 3, 5, 6, 7, if each digit may be repeated any number of times in any number?

8. How many different numbers each of six digits can be formed by using the digits 1, 2, 1, 2, 0, 2?

9. How many different words can be formed out of the letters of the word "MALENKOV" so that

(i) no two vowels are together.

(ii) the relative position of the vowels and consonants remains unaltered.

(iii) vowels never occur together.

10. How many different numbers between 100 and 1000 can be formed from the digits 0, 1, 2, 3, 4, 5 and 6 assuming that, in a number, the digits cannot be repeated? How many of these will be divisible by 5?

11. Find the number of all five digits numbers which have at least one digit repeated.

12. If all the permutations of the word "AGAIN" are arranged in a dictionary order, what is the fiftieth word?

13. How many numbers greater than 56000 can be formed by using the digits 4, 5, 6, 7, 8 ; no digit being repeated in any number.

14. There are 8 students appearing in an examination of which 3 have to appear in a mathematics paper and the remaining 5 in different subjects. In how many ways can they be made to sit in a row, if the candidates in mathematics cannot sit next to each other?