If two different numbers are taken from the set $\{0, 1, 2, 3, ..., 10\}$; then the probability that their sum as well as absolute difference are both multiple of 4, is.

A. $\dfrac{6}{55}$

B. $\dfrac{12}{55}$

C. $\dfrac{14}{45}$

D. $\dfrac{7}{55}$

Correct option is A)

Let us take this case by case. First, take number 0. The second number p has to be chosen such that $p - 0$ and $p + 0$ are divisible by 4. Hence, p can be either 4 or 8.

Now, take number 1. We find that $3 + 1$ is divisible by 4 but $3 - 1$ is not. Similarly, $5 - 1$ is divisible by 4 but $5 + 1$ is not. You can see that for all odd numbers, no such p exists, so only even numbers should be checked.

First Number	Second Number	No. of cases
0	4, 8	2
2	6, 10	2
4	0, 8 (However, case of 0, 4 is already taken)	1
6	2, 10 (However, case of 2, 6 is already taken)	1
8	0, 4 (However, both cases have been taken)	0
10	2, 6 (However, both cases have been taken)	0

Hence, total number of cases possible are $2 + 2 + 1 + 1 = 6$

Total ways to choose 2 numbers from $\{0, 1, 2, ..., 10\}$ are $^{11}C_2 = 55$

Hence, probability $= \dfrac{6}{55}$