QUESTION: What is the number of zeroes at the end of the product $1002 \times 1004 \times 1006 \times 1008 \times \ldots\ldots\ldots \times 1300$?

OPTIONS:

a) 37
b) 38
c) 165
d) None of these

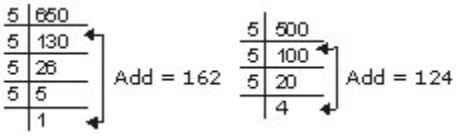
SOLUTION: It can be written as

$2(501 \times 502 \times 503 \times 504 \times \ldots\ldots\ldots \times 650)$

or $\frac{2 \times 650!}{500!}$

Now, to determine the number of zeroes, we have to determine the power of 10.

$\Rightarrow \frac{2 \times 650!}{500! \times 10^M}$



Since power of 5 will always be less than that of power of 2, therefore we will be concerning with the power of 5 only. Now expressing $\frac{2 \times 650!}{500! \times 5^M}$ in terms of power of 5, we get $\frac{N \quad 5^{162}}{5^{124} \times 5^M}$

This gives M = 38

So, total number of zeroes at the end of the product $1002 \times 1004 \times \ldots\ldots\ldots \times 1300$ is 38.