## Truncation and Error due to Truncation of Numbers.

Leaving out the extra digits that are not required in a number without rounding off, is called truncation or chopping off.
The difference between a numerical value $X$ and its truncated value $X_{1}$ is called truncation error and is given by $E=X-X_{1}$.

The maximum error due to truncation of a number cannot exceed the place value of the last retained digit in the number.

Remark 1: In truncation the numerical value of a positive number is decreased and that of a negative number is increased.

Remark 2: If we round off a large number of positive numbers to the same number of decimal places, then the average error due to rounding off is zero.

Remark 3:In case of truncation of a large number of positive numbers to the same number of decimal places the average truncation error is one half of the place value of the last retained digit.
Remark 4:If the number is rounded off and truncated to the same number of decimal places, then truncation error is greater than the round off error.

Remark 5:Round of error may be positive or negative but truncation error is always positive in case of positive numbers and negative in case of negative numbers.

| Number | Approximated number obtained by |  |
| :--- | :--- | :--- |
|  | Chopping off | Rounding off |
| $0.335217 \ldots$ | 0.3352 | 0.3352 |
| $0.666666 \ldots$ | 0.6666 | 0.6667 |
| $0.123451 \ldots$ | 0.1234 | 0.1235 |
| $0.213450 \ldots$ | 0.2134 | 0.2134 |
| $0.213950 \ldots$ | 0.2139 | 0.2140 |
| $0.335750 \ldots$ | 0.3357 | 0.3358 |
| $0.999999 \ldots$ | 0.9999 | 1.0000 |


| $0.555555 \ldots$ | 0.5555 | 0.5556 |
| :--- | :--- | :--- |

