

# Difference Between SOP and POS in Digital Logic

The difference between SOP and POS is essential for the upcoming GATE exam. The table given below shows a comparison of SOP vs POS in Digital Logic based on expression, including a method of representation, etc.

## Key Differences Between SOP and POS in Digital Logic

SOP	POS
SOP is useful for representing Boolean expressions as a sum of product terms.	POS is useful for representing Boolean expressions as a product of sum terms.
SOP employs minterms.	POS employs max terms.
Minterm can be thought of as a Boolean variable product (in normal form or complemented form).	Minterm can be thought of as a Boolean variable sum (in normal form or complemented form).
SOP is computed as the sum of the minterms.	POS is computed as the product of the max terms.
Minterms are represented by the letter 'm.'	Max terms are represented by the letter 'M'
It is formed by taking into account all of the minterms whose output is HIGH (1).	It is formed by taking into account all of the max terms whose output is HIGH (0).
When minterms are written for SOP, input with value 0 is treated as the input's complement.	When max terms are written for POS, input with value 0 is treated as the variable itself.

## What is SOP?

The sum-of-products (SOP) form is a method (or form) for simplifying logic gate Boolean expressions. The variables are AND (summed or added) together to form a product term in this SOP form of Boolean function representation.

A sum-of-products form can be created by adding (or summing) two or more product terms using a Boolean addition operation. Various questions can be formulated in the GATE CSE question paper based on the SOP. The product terms are defined using the AND operation, and the sum term is defined using the OR operation.

The sum-of-products form is also known as the Disjunctive Normal Form because the product terms are ORed together, and the Disjunction operation is logical OR. The sum-of-products form is also known as Standard SOP.

## What is POS?

The product of sums form is a method (or form) of simplifying logic gate Boolean expressions. It carries a good marks weightage in the GATE CSE syllabus. All variables in this POS form are ORed, i.e. written as sums to form sum terms.

The product-of-sum form is obtained by ANDing (multiplying) all of the sum terms together. This form is the polar opposite of the SOP form. As a result, this is also known as the "Dual of SOP form." SOP

The sum terms are defined using the OR operation, while the product terms are defined using the AND operation. When two or more sum terms are multiplied by a Boolean OR operation, the resulting output expression is in product-of-sums form, also known as POS form.

