Performance requirements

ELEC 1202

How do integrated circuits perform?
Ideal inverter

- +V positive voltage supply
- Switch connecting output high
- Input
- Output
- Switch connecting output low
- -V negative voltage supply
Ideal combinational logic gate
Transfer characteristics

(a) ideal inverter transfer characteristic

(b) real inverter transfer characteristic
Noise in transmission channels
Noise margins

$N_{MH}$ is a measure of how much noise can be added to a signal which will still be interpreted as a valid ‘1’

$N_{ML}$ concerns noise that increases an output level and is equal to the difference between a valid output ‘0’ and a valid input ‘0’
Propagation delays

$T_{PLH}$ measures the time between a change in inputs and the subsequent change in output from ‘0’ to ‘1’.

$T_{PHL}$ is a measure of the time taken for the outputs to change from HIGH to LOW, ‘1’ to ‘0’
Other performance measures

The maximum number of gate inputs which can be connected to the output of a single gate is usually expressed as the fan-out of that gate.

Speed/power product is the worst case propagation delay (the longest time taken by a device to respond) divided by the power consumed on average by the device.