

## EE231 STUDY GUIDE - Exam 1

CMOS gates:

They are formed by switching on/off transistors in the PDN and the PUN (transistors act as switches in SERIES and/or PARALLEL. NOT, AND, OR, NAND, NOR, ...

Truth tables:

Basic operations can be defined in the form of a table.

Logic gates and networks:

ANDs, ORs, NOTs, XORs, NANDs, NORs.

Timing diagrams:

Show waveforms at the output when the inputs change through time.

Functionally equivalent networks:

A logic function can be implemented with different networks (possibly different costs).

Boolean algebra:

Axioms, theorems, two and three-variable properties: commutative, distributive, absorption, combining, and DeMorgan's.

Venn diagrams:

Simple visual way that is used to verify theorems, properties, and functions.

Sum-Of-Products (SOP) and Product-Of-Sums (POS):

Can use minterms and maxterms to synthesize circuits.

Multiplexer circuits

Used to select different input to a circuit.

Karnaugh Maps:

2-variable, 3-variable, and 4-variable maps (5-variable maps will not be included in the test because by nature they are lengthy procedures to be included in a 1-hour test).

Cost of implementation:

A Karnaugh map can produce more than one implementation, but with different costs. We want to select the less expensive implementation.

Minimization of POS forms:

Use minterms to find a minimum implementation.

Minimization of SOP forms:

Use maxterms to find a minimum implementation.

Incompletely specified functions:

Functions that contain DON'T CARE conditions can be used to our advantage to minimize a function.

Conversion between decimal & binary systems:

Conversion from decimal to binary is found by dividing successively by 2.

Conversion from binary to decimal is found by multiplying by 2 to some power, each binary value.

Important number representations in analysis of computer systems:

Binary, octal, and Hex (short for hexadecimal).

Half Adder (HA) and Full Adder (FA):

HAs are used to add/subtract one bit.

FAs are used to add/subtract three bits.

Number representations:

Sign and magnitude, 1's complement, and 2's complement.

Addition and subtraction:

1's complement addition, 2's complement addition.

Arithmetic overflow:

Used to indicate that a summation/subtraction can't be expressed using a specific number of bits.