

Digital Systems Study Guide

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You will not be required to write complete VHDL programs, just VHDL partial programs and statements. A VHDL Language Reference will be supplied. You should study problems from the textbook chapters that cover the listed material. Lab material and quizzes may also be of value.

VHDL (Chapter 5)

- State the functions of a VHDL entity declaration and architecture body.
- Write VHDL statements defining an entity and architecture, including ports, complete with mode and type.
- Define and use BIT, STD_LOGIC, and INTEGER types.
- Encode Boolean expressions in VHDL, using concurrent signal assignment statements.
- Write statements defining tristate outputs in VHDL.
- Encode truth tables in VHDL, using selected signal assignment statements.
- Write statements defining SIGNALs in VHDL.

Decoders (Chapter 6, Section 6.1)

- Draw the logic diagram of a binary decoder, with or without an enable input.
- Write a selected signal assignment statement in VHDL to describe a binary or seven-segment decoder.

Multiplexers (Chapter 6, Section 6.3)

- 4-to-1 MUX symbol, truth table, circuit, and VHDL
- Quad 4-to-1 MUX symbol, truth table, VHDL
- MUX pattern generator (counter on select inputs, fixed data on data inputs)

Digital Arithmetic and Arithmetic Circuits (Chapter 7.1 to 7.3, part of 7.6; no VHDL)

- Two's complement arithmetic
- Range of signed and unsigned numbers
- Overflow concept
- Half and Full Adder Circuits (**7.6 to page 369**)