

EEL 5344: Digital CMOS VLSI Design

Lecture:- Environment Friendly Engineering: An Ethical Responsibility of an Engineer

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Questionnaire

- 1) What are the ethical responsibilities of an engineer?
  - a. towards employers and clients.
  - b. towards public and profession.
  - c. All the above
- 2) What is the most important ethical responsibility of an engineer?
  - a. towards employers and clients.
  - b. towards public and profession.
  - c. towards the environment.
- 3) Which of the following chemicals are present in E-waste? (check all possible answers)
  - a. lead
  - b. cadmium
  - c. silver
  - d. tin
  - e. hexavalent chromium
- 4) Which of the following parts of the human body does the chemicals in E-Waste affect?
  - a. brain
  - b. kidney
  - c. heart
  - d. lungs
  - e. all of the above
- 5) What part of the human body does Lead affect? (check all possible answers)
  - a. nervous system
  - b. kidneys
  - c. bones
  - d. skin
  - e. brain
- 6) Which alloy is used for Lead-free soldering?
  - a. SAC
  - b. Tin-Lead
  - c. Gold-Tin
- 7) What is primary concern in Lead-free PCB design?
  - a. high melting point of the Lead-free alloy.
  - b. chemical interaction of the Lead-free alloy with other PCB components.
  - c. availability of the Lead-free alloy.

8) What is the design challenge for Lead-free PCB design? (check all possible answers)

- a. design of physical footprint.
- b. design of clock tree.
- c. choice of SMDs.

9) What is the directive that has been passed for controlling E-waste?

RoHS & WEEE directives

10) Which of the following toxic materials does the directive restrict in electronic devices? (check all possible answers)

- a. lead
- b. aluminum
- c. cadmium
- d. mercury
- e. copper

11) What are the possible design parameters for low power CMOS design?

The design parameters are  
Switching activity, Clock frequency,  
Supply voltage

12) Does increasing threshold voltage reduce static power dissipation?

- a. Yes
- b. No

13) Does increasing supply voltage reduce dynamic power dissipation?

- a. Yes
- b. No

14) What are data centers?

Data centers are the storage devices that consume very large power.

15) What is the typical power consumption from a data center

- a. 10 KW
- b. 40MW
- c. 500 KW
- d. 90 MW

16) Which of the following can be implemented to obtain energy efficiency in data centers?

- a. reduction of hardware
- b. area minimization
- c. streamlining power supplies
- d. all of the above

17) Do you think this exposure was helpful to understand some of the ethical issues as a VLSI Designer?

- a. Very Helpful
- b. Somewhat helpful
- c. I already knew most of it
- d. No use at all

18) In future do you like more emphasis of which of the following area

- a. Design issues of Lead-free computing
- b. Just enough energy computing
- c. Knowing more about laws
- d. Low power design issues
- e. Cooling techniques

19) What is the most important take-home message of this environment-friendly green computing knowledge module?

Proper disposal of the electronic waste. ~~As~~ My contribution to E-waste might be small but shouldn't be negligible as small things pick up to create a disaster. So as a engineer should be aware of this.

20) Any suggestions:

- More information on Low power design.
- Video on a recycle plant (if one exists in any country???)
- Can be more interactive.