

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 directive by European Union.

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?

Off. Channel length, gate oxide thickness, Threshold 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 store houses of data, which hosts a lot of computers for data computation

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?

To enforce lead free computing and use of alternative resources for power.

20) Any suggestions:

~~Good~~ I would like to know an eg. device which was the SAC alloy.