

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination: Semester I
Date: 02 August 2007
Subject: 240- 534 Advanced Computer Engineering
Design and Systems

Academic Year: 2007
Time: 09:00 – 12:00
Room: A203

Instructions:

1. Answer all 12 questions. (70 marks in totals)
2. Write your answer in the answer book

Objectives: Understand the FPGA design

1. Explain the basic structure of Field Programmable Gate Array (FPGA) {5 marks}
2. What is Look-Up Table (LUT) cells in Xilinx FPGA? {5 marks}
3. Explain and draw a structure of LUT to form the function $f = abd + bcd' + a'b'c'$ {5 marks}
4. Explain the difference between Fine granularity cell and Coarse granularity cell in FPGA {5 marks}
5. how to implement the function $f = (x_3 + y_3)(ma' + na) + (x_3 + y_3)'(gb + kb')$ using mux-based cells {5 marks}
6. Explain the figures of merit: Power-Delay-Product (PDP) and Energy-Delay-Product (EDP) {5 marks}
7. Why FPGA technology is not the best solution for portable applications (using battery)? {5 marks}

Objective: Intellectual Property (IP) based VLSI Design

8. Describe the structure of IP based in FPGA structure {5 marks}
9. What is the difference between original FPGA and embedded IP cores FPGA (MicroBlaze or PowerPC)? {5 marks}
10. What is the meaning of 'soft core' and 'hard core'? {5 marks}

Objective: Systems on a chip design

11. What is the meaning of systems on a chip, give me some example of SoC applications. {5 marks}
12. Explain the meaning of the following SoC platforms:
 - a. Communication Centric platform {5 marks}
 - b. Highly programmable platform {5 marks}
 - c. Processor-centric platform {5 marks}