GUJARAT TECHNOLOGICAL UNIVERSITY MCA - SEMESTER-V • EXAMINATION – WINTER 2013

Subject Code: 650012

Date: 30-11-2013

Subject Name: Software Development for Embedded Systems Time: 02.30 pm - 05.00 pm Total Marks: 70

Instructions:

- **1.** Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) 1. What is a single-purpose processor? What are the benefits of 03 choosing a single-purpose processor over a general-purpose processor?
 - What is the difference between synchronous and asynchronous circuit? Determine whether the following are synchronous or asynchronous:
 - (a) multiplexer (b) register
 - (b) Explain Embedded software development process with proper 07 diagram.

Q.2 (a) For a particular product, you determine the NRE cost and unit cost to 07 be the following for the three listed IC technologies: FPGA: (\$10,000, \$50); ASIC: (\$50,000, \$10); VLSI: (\$200,000, \$5). Determine precise volumes for which each technology yields the lowest total cost.

(b) Design 3x8 decoder. Start from a truth table, use K-maps to minimize 07 logic and draw the final circuit.

OR

(b)	1. Briefly define EEPROM, SRAM, DRAM	03
	2. Compose 1Kx 8 ROM into an 8Kx 8ROM	04

- Q.3 (a) Add one instruction to the instruction set to the following instruction 07 set that would reduce the size of our summing assembly program by 1 instruction:.
 - MOV Rn,direct MOV direct,Rn MOV @Rn,Rm MOV Rn,#immed ADD Rn,Rm SUB Rn,Rm JZ Rn,relative
 - (b) Explain the role of Cross-Compiler, Cross-Assembler and 07 Linker/Locator for embedded software.

OR

Q.3 (a) Design a circuit that does the matrix multiplication of matrices A and B. Matrix A is 2x2 and matrix B is 2x2. The multiplication works as follows:

$$\begin{bmatrix} A \\ a & b \\ c & d \end{bmatrix} \bullet \begin{bmatrix} B \\ g & h \\ j & k \end{bmatrix} = \begin{bmatrix} c \\ a * g + b * j \\ c * g + d * j \end{bmatrix}$$

- (b) Explain test system for Embedded System with diagram.
- Q.4 (a) Explain all the five methods for transferring file into target system. 07
 - (b) Four lights are connected to a decoder. Build a circuit that will blink the lights in the following order: 1, 2, 1, 3, 0, 2,... Start from a state diagram, draw the state table, minimize the logic, and draw the final circuit.



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Q.4	(a)	1.Discuss the advantages and disadvantages using Memory-mapped I/O versus Standard I/O.	04
		2. Explain the benefits that Interrupt address table has over fixed and vectored interrupt method.	03
Q.4	(b)	Design an Extended Parallel I/O Peripherals.Provide (i) a State- machine description and (ii) a Structural Description	07
Q.5	(a)	Write a Note on Instruction Set Simulator.	07
	(b)	Convert 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6,1.7,1.8 and 1.9 to fixed-point representation using (i) two-bits for the fractional part (ii) three-bits for the fractional part	07
		OR	
Q.5	(a)	Write a short note on Logic Analyzers.	07
	(b)	Write two C routines that, each, takes as input two 32-bit fixed point numbers and perform addition and multiplication using 4-bits for the fractional part and the remaining bits for the whole part.	07

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