PES Institute of Technology, Bangalore
(Autonomous Institute under VTU, Belgaum)

11CS253

SEMESTER END EXAMINATION (SEE) B. E. 4TH SEMESTER – May 2013

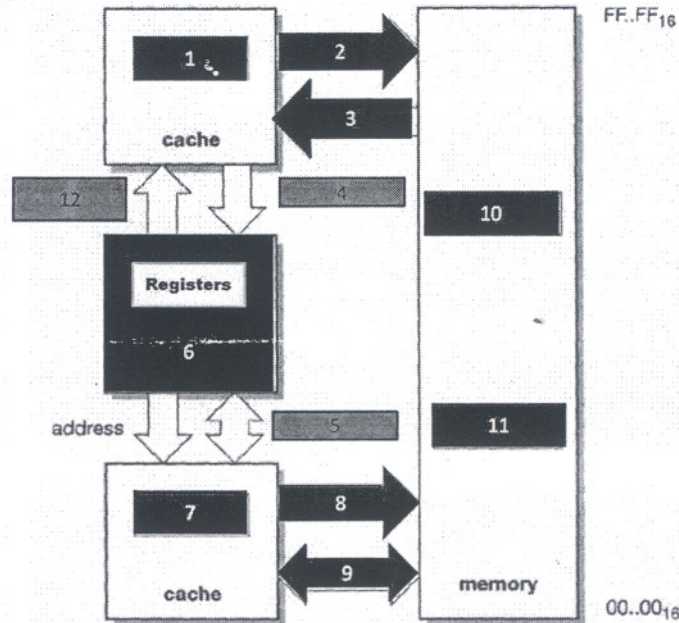### 11CS253 - INTRODUCTION TO MICROPROCESSOR

Time: 3 Hrs	Answer All Questions	Max Marks: 100

1.	a)	Write the few basic components which helps in building a simple form of processor.	3
	b)	Briefly discuss the behaviour of pipeline hazards with suitable example	6
	c)	What is current program status register? Explain the generic structure of program status register as ARM core.	8
	d)	Discuss the Rejected features of Berkeley RISC design by ARM designers.	3

2.	a)	What are the different categories of instruction set and Explain how many bits are used to specify the offset value / immediate value in
		   i) Branch Instructions
		   ii) SWI
		   iii) Data processing Instructions
		   iv) Multiply Instructions and
		   v) Data transfer instructions respectively
		And what are their maximum addressable memory/ length.
			10
			[3+5+2]

	b)	Write the four variations possible in stack addressing? Draw a table to capture the mapping between stack and block copy views of the load and store multiple instructions.	6
	c)	Write a program to find the factorial of a number (0 to 7) using jump tables	4
3.	a)	What are the various processor modes of ARM? What is the order of their privilege?	6

	b)	Rewrite the following high-level program in ARM assembly language. Try to write code that is as optimized as possible.
		<pre>int Function(int x, int y)
		    {
		        if (x >= 0 && y >= 0)
		            return (x+y);
		        else
		            if (x >= 0 && y < 0)
		                return (x-y);
		            else
		                if (x < 0 && y >= 0)
		                    return (y-x);
		                    else
		                        return (x-y);
		    }</pre>
			4

	c)	How can we change the PSR contents through instructions in ARM? Explain different PSR instructions in ARM with their assembler formats.	8 [2+3x2]

	d)	Explain the working of the following instructions:
		   i) CDPEQ P3, 6, C1, C5, C7, 4
		
		   ii) LDMFD r13!, {r0-r3, pc}^
			2

4.	a)	Redraw the block and Identify the shaded blocks in the figure given below. Discuss the functionality of the same.	10 [6+4]
	b)	With a neat figure compare the ARM9TDMI verses ARM10TDMI pipeline	5
	c)	Write the procedure to manually enable and disable IRQ and FIQ interrupts using ARM instructions	5
5.	a)	Explain the bus transfer signals in Advanced Microcontroller bus Architecture	8 [4+4]
	b)	Distinguish the binary encoding required for ARM v5TE multiply instruction along with their width? And explain 5 types of multiply instruction formats?	12 [7+5]