GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) – EXAMINATION – SUMMER 2019

Subject Code:2161102   **Date:16/05/2019**

Subject Name:Advanced Microprocessor

Time:10:30 AM TO 01:00 PM   **Total Marks: 70**

Instructions:
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

			MARKS
Q.1	**(a)**	What is the difference between RISC and CISC philosophy? Explain features of RISC system.	**03**
	(b)	Explain embedded system design challenges. Explain embedded system design parameters where improving one design parameter worsening other design parameter with suitable example. How ARM processor is useful in meeting this design challenge.	**04**
	(c)	Explain concept of pipeline used in ARM processor. Explain three stage pipeline used in ARM7TDMI processor.	**07**
Q.2	**(a)**	Why FIQ response is fast in ARM processor compared to IRQ?	**03**
	(b)	What are the exceptions in ARM processor? Explain process of exception entry and exception return.	**04**
	(c)	Discuss ARM core extensions and architecture revisions. List at least two applications for Cortex A, Cortex M and Cortex R processors.	**07**
		OR	
	(c)	Explain looping and branch instructions of ARM processor with suitable examples.	**07**
Q.3	**(a)**	Which features of RISC design philosophy are rejected in ARM architecture?	**03**
	(b)	Explain difference between (1) Little Endian & Big Endian (2) Harvard & Von-Neumann Architecture	**04**
	(c)	Explain following instructions of ARM7TDMI processor. (1) LDMIA r0!,{r2-r6} (2) MVN R1,R3 (3) MOV R1,R2,LSL #3 (4) LDR R1,[R2] [5] RSC r0,r1,r2 [6] ADDEQ r0,r1,r2 [7] LDR R1,[R2],#8	**07**
		OR	
Q.3	**(a)**	Explain barrel shifter instructions LSL, LSR and ASR with example.	**03**
	(b)	Write C program to turn ON all eight Electrical devices which are controlled by Port pins P0.0 to P0.7 one by one at the interval of 1 second. Assume that there is relay driver used to control electrical devices and logic 1 on the port pin turns on the electrical device.	**04**
	(c)	What is conditional execution? What are the mnemonics extension codes used for conditional execution? Explain any two examples of conditional execution.	**07**
Q.4	**(a)**	What are the advantages and disadvantages of assembly language programming compared to C programming?	**03**
	(b)	Write subroutines IOSET() to set port pins and IOCLR() to clear port pins where port pin number can be specified in argument of these subroutines. Write main program to set port pin P1.4 and clear port pin P1.5 using these subroutines.	**04**

(c) Explain I2C and SPI protocols. Explain interfacing of any one device **07**
with ARM microprocessor using SPI protocol.

OR

Q.4 **(a)** Discuss any three ARM optimization techniques **03**

(b) Write ARM assembly language program for HEX number to ASCII **04**
conversion. Assume HEX number is stored in register R1.

(c) Draw interfacing diagram to interface LCD with ARM Processor. **07**
Connect LCD data lines with P1.16 to P1.23, RS with P0.0 and EN with
P0.1. Connect RW pin with ground. Write C program to display
message on the LCD "GTU IS BEST" on first line and "EXAM
REFORMS" on second line of LCD.

Q.5 **(a)** What is cache performance? On which factor it depends? **03**

(b) Explain concept of translation look aside buffer **04**

(c) Explain techniques used for memory optimization in embedded **07**
systems.

OR

Q.5 **(a)** Write features of advanced microprocessor bus architecture (AMBA) **03**

(b) Explain interfacing of DAC with ARM processor. Write program to generate **04**
ramp waveform.

(c) Explain concept of virtual memory for advance microprocessor based **07**
system design.

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