KUMARAGURU
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Register Number:……

M.E. DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Second Semester

EMBEDDED SYSTEMS TECHNOLOGIES

P18EST2002: Embedded Processors

COURSE OUTCOMES

CO1: Describe the functional requirements of the hardware and software components of ARM processor Families.

CO2: Apply instruction set to program ARM processor.

CO3: Dramatize DSP Application using ARM processor

CO4: Outline the Black fin processor in all aspects.

CO5: Implement practical DSP applications using Blackfin processor

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Which one does not belongs to the RISC design philosophy? CO1 [K2]

   a) Instructions b) Pipelines

   c) Load-store architecture d) Conditional execution

2. Which one belongs to ARM design philosophy? CO1 [K2]

   a) Load-store architecture b) Inline barrel shifter

   c) Registers d) Processors

3. Which interrupt handler handles and services individual interrupts sequentially? CO2 [K2]

   a) prioritized standard interrupt handler b) nonnested interrupt handler

   c) nested interrupt handler d) reentrant interrupt handler

4. Matching type item with multiple choice code CO2 [K2]

List I	List II
A.Saturation	(i).the result causes an unsigned carry
B.Overflow	(ii).bit 31 of the result is a binary 1
C.Carry	(iii). the result causes a signed overflow
D.Negative	(iv). the result causes an overflow and/or saturation

a) A-(i),B-(ii),C-(iii),D-(iv) b) A-(iv),B-(iii),C-(i),D-(ii)

c) A-(i),B-(iii),C-(ii),D-(iv) d) A-(ii),B-(i),C-(iv),D-(iii)

5. What is the x(t) precision bit for high quality audio? CO3 [K2]

a) 8 b) 16

c) 32 d) 64

6. A digital filter that depends linearly on a finite number of input samples and a finite number of previous filter outputs is CO3 [K2]

a) IIR filter b) FIR filter

c) Band pass Filter d) Band Reject Filter

7. Assertion (A) : The DMA access bus (DAB) provides a means for DMA channels to be accessed by the peripherals. CO4 [K2]

Reason (R) : The DMA external bus (DEB) provides a means for DMA channels to gain access to off-chip memory.

a) Both A and R are true b) A is true but R is false

c) R is true but A is not related with R d) Both A and R are true and R is not correct explanation of A

8. The FIR filter is the simplest type of _____ CO4 [K2]

1) Analog filter 2) Digital filter 3) Both analog and digital filter 4) IIR filter

a) 1 b) 2

c) 1, 4 d) 3

9. When building code for both ARM and Thumb states, which tool decides for each function call whether to use a BL or BLX instruction? CO5 [K2]

a) The linker b) The archiver

c) The compiler d) The assembler

10. The ARM processor registers R13, R14, and R15 are architecturally used for special purposes. Which is the correct respective sequence of special purpose registers? CO5 [K2]

a) LR, PC, SP b) PC, LR, SP

c) SP, LR, PC d) LR, SP, PC

PART B (10 x 2 = 20 Marks)

11. Mention the design Philosophy of ARM Embedded Systems. CO1 [K2]

12. How ARM processor is different from DSP processor? CO1 [K2]

13. What is firmware? CO2 [K2]

14. Define pipeline. CO2 [K2]

15.	State the advantages of FIR filter.	CO3	[K2]
16.	Differentiate physical and virtual memory address.	CO3	[K2]
17.	What is blackfin processor?	CO4	[K2]
18.	What is meant by “Locking by line”?	CO4	[K2]
19.	What are Inline functions?	CO5	[K2]
20.	Define Scratchpad memory.	CO5	[K2]

PART C (6 x 5 = 30 Marks)

21.	Explain different types of interrupt handling schemes in brief.	CO2	[K3]
22.	Write note on DFT used in ARM-DSP.	CO3	[K2]
23.	Discuss about ARM memory optimization.	CO1	[K2]
24.	Explain Thumb instruction set in detail.	CO2	[K2]
25.	Briefly explain the functional block diagram of DMA operations.	CO4	[K2]
26.	Write short notes on digital image processing using DSP.	CO5	[K2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27.	Discuss various ARM processor families in detail.	CO1	[K2]
28.	Explain the design of IIR filter-based graphic equalizer using Blackfin Simulator.	CO5	[K3]
29.	With a neat sketch explain the architecture of micro signal.	CO4	[K2]
30.	Explain Memory Management unit in detail with appropriate diagrams.	CO3	[K2]
31.	Identify the different stage of pipeline used in ARM controller and explain each stage.	CO2	[K2]

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