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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree Supplementary Examination June 2023 (2019 Scheme)

Course Code: ECT206

Course Name: COMPUTER ARCHITECTURE AND MICROCONTROLLERS

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks) Marks

1		Write short note about accumulator and program counter.	3
2		Write short note on instruction sequencing and execution.	3
3		Explain briefly about 8051 timers.	3
4		Explain the stack pointer (SP) using PUSH and POP instructions.	3
5		Write 8051 assembly language program to perform multiplication of two 8bit numbers using repeated addition method.	3
6		Write a 8051 C program code to toggle the bits of P0 continuously using a delay function.	3
7		Write a short note about serial transmission and reception baud rate in 8051.	3
8		Write a short note on ARM registers.	3
9		Briefly explain a static RAM cell.	3
10		Explain the basic structure of a Cache	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Explain Von Neumann and Harvard computer architecture with necessary diagrams. List the advantages and disadvantages.	9
	b)	With an example explain the multiplication operation of two 8-bit binary numbers using shift and add method.	5
12	a)	Explain the steps of opcode fetch cycle using a timing diagram.	10
	b)	Write a short note about program counter and stack pointer.	4

Module -2

13	a)	Write a short note about program status word (PSW) in 8051.	4
	b)	Explain in detail about various addressing modes of 8051 microcontroller.	10
14	a)	With examples briefly explain the instructions used in 8051 microcontrollers for Boolean operation and Rotate operation.	5

	b)	Explain in detail about 8051 interrupts using interrupt vector table. Explain the significance of Interrupt Enable (IE) register and Interrupt priority (IP) register.	9

Module -3

15	a)	Write 8051 assembly language program to toggle all the bits of Port 0 every 1ms using a subroutine. The crystal frequency used is 11MHz. Assume the machine cycle values as 1 or 2.	4
	b)	Draw a neat diagram to represent the interfacing of 8051 with LCD device. Write embedded C code to display 'H', 'E', 'L', 'L', 'O' continuously using delays.	10
16	a)	Write 8051 C program to convert ASCII digits of '5' and '8' to packed BCD and sent the value to port 2.	4
	b)	Explain the 8051 interfacing with ADC using a block diagram. Write embedded C code to convert the analog input to the digital value and store the result in R5.	10

Module -4

17	a)	Write a short note on Mode 2 programming of 8051 timer.	4
	b)	Explain the SBUF and SCON register of 8051. Write an embedded C program to check the status of pin P1.0 and if the pin is HIGH transfer the message " WELCOME" serially at 9600 baud, 8-bit,1 stop bit. If the pin is low exit the program.	10
18	a)	Explain the steps to create an executable file from an assembly language program.	4
	b)	Write the programming steps to transfer character bytes serially. Write 8051 assembly language program to read data through ports 0,1,2 one after the other and transfer the data serially, continuously. Assume 9600 baud, 8-bit,1 stop bit.	10

Module -5

19	a)	Explain the Set-Associative mapping of Cache memory with an example.	8
	b)	Write the importance on Translation Lookaside Buffer (TLB). How physical address is generated using associative-mapped TLB.	6
20	a)	Write a short note on virtual memory organisation.	5
	b)	Illustrate programmed I/O using a block diagram. Explain the steps to input a sequence of data bytes to be stored in memory.	9

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