Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (R,S) (FT/WP) / (S2 PT) Examination April 2025 (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	With examples represent fixed point and floating-point numbers.	3
2	Represent -245.375 in IEEE 754 format	3

3	Show the status of carry flag, auxiliary carry flag and parity flag after the following instructions. Draw the program status word (PSW) and mark the bits.
	MOV A, #88H
	ADD A, #94H
		3

4	Differentiate microprocessors and microcontrollers.	3
5	Write 8051 assembly language program to generate a time delay subroutine of 10 ms using crystal frequency of 10MHz. Assume machine cycles taken for execution of instructions as 1 or 2.	3
6	Write 8051 C program to toggle the bits of P0 and P1 by giving a delay in between.	3
7	Explain the ARM Current Program Status Register (CPSR) format.	3
8	Explain the various steps to convert an assembly language source file to an executable program.	3
9	Illustrate the memory hierarchy in a computer system.	3
10	Write a short note on a ROM cell	3

PART B

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

Module -1

11	a)	Compare CISC and RISC architecture.	4
	b)	Explain the steps of memory read cycle using a timing diagram.	10
12	a)	Illustrate a division algorithm with an example using binary numbers.	5
	b)	Explain the general processor architecture in detail.	9

Module -2

13	a)	Explain in detail about the input/output ports of 8051.Sketch the PORT0 circuit and explain READ & WRITE operation.	9
	b)	With examples explain the conditional and unconditional branching instructions.	5
14	a)	Using a neat block diagram list the 8051components.	5
	b)	Explain the memory organisation of 8051. How different register banks are selected using program status word.	9

Module -3

15	a)	Write 8051 assembly language program to check the status of pin P1.0. If the bit is set, sort the ten numbers in ascending order that is stored from location 0x30 onwards. If the bit is not set, sort the numbers in descending order.	10
	b)	Write an embedded C program for 8051 to convert packed BCD (x34) to ASCII and move the bytes to P1 and P2.	4
16	a)	Explain in detail about 8051 interfacing with stepper motor. How the step angle is controlled. Write an embedded C program to rotate the stepper motor in clock wise direction continuously.	10
	b)	Write an embedded C program for 8051 to convert the hexadecimal number " 5CH " to decimal number and output the numbers at the ports P0,P1,P2. Store the sum of the decimal numbers in R5.	4

Module - 4

17	a)	Explain the 8051 timer registers, TMOD and TCON registers. Generate a 50%	10

duty cycle square wave on pin P1.0 using assembly language program. Use Timer 0 to generate the time delay.

b) Write a short note on features of ARM 7. 4

18 a) Explain briefly about SCON (serial control) register of 8051. 10

Write an 8051 embedded C program to check the status (SW) of pin 2.1 and transmit the data to serial port as follows.

SW= '0' send "INVALID"

SW= '1' send "VALID"

Assume XTAL = 11.0592 MHz, 9600 baud, 8-bit data, and 1 stop bit.

b) Write a short note on Mode 1 programming of 8051 timer. 4

Module -5

19 a) Explain the direct mapping of Cache memory with an example. 7

b) Briefly explain the interrupt initiated I/O. Explain how the priority is established in daisy chaining method. 7

20 a) Using a diagram explain the virtual memory address translation method 7

b) Explain the Direct Memory Access (DMA) method of data transfer using a block diagram. 7

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