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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth Semester B.Tech Degree (R,S) Examination May 2024 (2019 Scheme)

Course Code: RAT206

Course Name: RAT206 MICROCONTROLLERS AND EMBEDDED SYSTEMS

Max. Marks: 100 Duration: 3 Hours

PART A

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

1		List the main features of 8051 Microcontroller.	3
2		Describe the different types of buses used in 8051 Microcontroller.	3
3		Explain the function of the instructions in 8051 microcontroller: MUL AB & DIV AB.	3
4		Differentiate ALP & embedded C programming.	3
5		Define an Embedded system.	3
6		Explain the need of Tool chains in embedded system.	3
7		Describe the memory allocations in Arduino Uno.	3
8		Justify the recommendation for Arduino Uno board over other boards for beginners.	3
9		Explain the different functional layers of a computer system?	3
10		List the advantage and disadvantages of Monolithic Kernel.	3

PART B

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

Module -1

11	a)	Explain the architecture of 8051 Microcontroller with neat block diagram.	10
	b)	Write an assembly language code to push R5, R6 and A onto the stack and then pop them back into R2, R3 and B, where register B=register A, R2=R6 and R3=R5.	4
12	a)	Explain in detail about the memory organization of 8051 Microcontroller.	10
	b)	Write an ALP program to transfer a block of data from internal memory location to external memory location.	4

Module -2

13	a)	Explain the various interrupts in 8051 microcontrollers with their priority.	7

	b)	Explain the structure of TMOD register	7
14	a)	Explain about the Interfacing of LCD peripherals to 8051 Microcontroller. Write an ALP to display the message 'HELLO' in LCD Display.	7
	b)	Explain about the serial communication registers in 8051 Microcontroller.	7

Module -3

15		Explain in detail the steps involved in embedded system design process with neat diagram.	14
16		Explain in detail any two embedded product life cycle models with necessary diagrams.	14

Module -4

17	a)	Explain the different pins of Arduino Uno Board.	7
	b)	Write an Arduino sketch to control speed and direction of spin of a dc motor.	7
18		Write a program to monitor the room temperature by interfacing LM35 and seven segment display with Arduino Uno board.	14

Module -5

19	a)	Explain the functional block diagram of an OS.	7
	b)	Compare General Purpose OS and Real Time OS.	7
20	a)	Explain SPI communication protocol.	7
	b)	Explain how RS232 helps in communication.	7

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