Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S4 (R,S) Examination April 2025 (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		Differentiate between a microprocessor and a microcontroller.	3
2		Compare an immediate addressing mode with an indexed addressing mode in 8051 with suitable examples.	3
3		Discuss about Interrupt Enable(IE) and Interrupt Priority(IP) register in 8051 microcontroller.	3
4		What is embedded C programming? How is it different from assembly level programming?	3
5		What is SoC? Give example.	3
6		Differentiate between an assembler and an interpreter.	3
7		Write a sketch to blink an LED using Arduino.	3
8		How can we configure Arduino Uno pins as input and output. Give examples.	3
9		What is abstraction?	3
10		Define the term POSIX.	3

PART B

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

Module -1

11	a)	Describe the unique features of an 8051 microcontroller with a neat diagram showing its architecture and related hardware.	10
	b)	Consider the instruction MOV DPTR, A. Is this a valid one? Comment with reason.	4
12	a)	Write an ALP to add two 8 bit numbers which are stored in the memory locations 4550H and 4551H whose result should be stored in the locations 4552H and	6

4553H respectively.

b) Explain in detail the internal memory organization of 8051 microcontroller. 8

Module -2

13 a) Describe the 8015 serial communication procedure its registers in detail. 6

b) Explain the interfacing of a seven segment display with 8051 as microcontroller. 8

14 a) What is a TMOD register? Explain the different modes of timer used in 8051. 8

b) Write an ALP to turn on and turn off an LED with 8051 microcontroller. 6

Module -3

15 a) Explain in detail the embedded system design process. 10

b) Define an Operating System. Give examples. 4

16 a) Define an embedded system and list any four features of an embedded system. Explain the applications of embedded system in consumer electronics and robotics. 10

b) Discuss the waterfall model of embedded product development lifecycle. 4

Module -4

17 Explain the components of Arduino Uno board with the help of block level schematic diagram. 14

18 Write an embedded C program to monitor the temperature of a system using LM35 and seven segment display with the aid of Arduino Uno board. 14

Module -5

19 a) Explain the term SPI protocol. 4

b) Define the term kernel. What are its functions? Discuss the two types of kernels with suitable examples. 10

20 a) Describe a task with the help of a state transition diagram. List the various types of tasks. 10

b) Compare a preemptible task and a non-preemptible task. 4

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