Register Number:……..

KUMARAGURU
college of technology
character is life

B.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Sixth Semester

MECHATRONICS ENGINEERING

U18MCI6203: Microcontroller and Embedded Systems

COURSE OUTCOMES

CO1: Compare various cores of embedded systems

CO2: Brief the architecture, instruction set and interrupts of microcontroller

CO3: Describe the features of ARM Cortex-M4 controller

CO4: Interface the peripherals of ARM Cortex-M4 controller

CO5: Develop embedded systems through hardware and software integration

CO6: Explain the concepts of real time operating systems

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

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

1.	Which features does ARM have in common with many other RISC architectures?	CO1	[K_2]
2.	How do you select a register bank in 8051 microcontrollers?	CO2	[K_2]
3.	Write an ALP for addition of two 8-bit numbers using 8051 microcontroller.	CO2	[K_3]
4.	Define watch dog timer.	CO3	[K_1]
5.	List the importance of pull up/down registers in ARM cortex M4 processor.	CO3	[K_2]
6.	Identify the peripheral which tracks the position, direction of rotation and speed.	CO4	[K_3]
7.	Compare timers and counters.	CO4	[K_2]
8.	Recall the advantages of software Integration.	CO5	[K_2]
9.	What are the ways to eliminate shared data problem?	CO6	[K_2]
10.	Differentiate between OS and RTOS.	CO6	[K_2]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Illustrate the architectural block diagram of ARM and explain the data flow referring each unit.	8	CO1	[K_2]
	b)	Interpret the input and output port structure of 8051 microcontroller with signals.	8	CO2	[K_2]
12.	a)	Explain functions of all 8 pins of port 3 in 8051.	8	CO2	[K_2]
	b)	Summarize the various logical instruction that are used in programming of 8051 microcontroller.	8	CO2	[K_2]
13.	a)	Illustrate the functional block diagram of Tiva ARM cortex M4 processor with its salient features.	10	CO3	[K_2]
	b)	Demonstrate the interrupt servicing process with the help of an interrupt vector table ARM cortex M4 processor.	6	CO3	[K_2]
14.	a)	Show the data transfer mechanism in detail using DMA in an ARM cortex processor.	8	CO4	[K_2]
	b)	Classify the importance of various timers used in Tiva ARM cortex processor.	8	CO4	[K_2]
15.	a)	Make use of embedded C program to interface an LED with ARM processor.	8	CO5	[K_3]
	b)	Develop a program to rotate a DC motor in a solar panel in anti-clockwise direction using embedded C.	8	CO5	[K_3]
16.	a)	Explain in detail about semaphores and its applications.	8	CO6	[K_2]
	b)	Outline the services of real time operating system in handling multiple tasks and data.	8	CO6	[K_2]

****