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RAMAIAH Institute of Technology

(Autonomous Institute, Affiliated to VTU)
(Approved by AICTE, New Delhi & Govt. of Karnataka)
Accredited by NBA & NAAC with 'A+' Grade

SEMESTER END EXAMINATIONS – AUGUST 2024

Program	:	**B.E :- Computer Science and Engineering**	**Semester**	:	**IV**
Course Name	:	**Microcontrollers and IoT**	**Max. Marks**	:	**100**
Course Code	:	**CS42**	**Duration**	:	**3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT - I

1.	a)	Differentiate between Main stack pointer and Process stack pointer.	CO1	(05)
	b)	Explain with a diagram the first-in, last-out buffer supported by Cortex M0 Processor.	CO1	(05)
	c)	Discuss the key System and Implementation features of Cortex M0 microcontroller.	CO1	(05)
	d)	With a neat diagram, explain the different ways of structuring the flow of Application processing.	CO1	(05)
2.	a)	Elucidate about the Special registers available in Cortex M0.	CO1	(05)
	b)	Write a startup sequence of cortex M0 processor with a neat diagram.	CO1	(05)
	c)	List the significance of different Files supported in CMSIS.	CO1	(05)
	d)	Illustrate system exception types in the Cortex M0 Processor.	CO1	(05)

UNIT - II

3.	a)	Find the sum of Data in an array called **Data_In** which has 10 elements. Use variable **SUM** to save the result.	CO2	(06)
	b)	Write an assembly language program to realize the switch statement to allow a program to branch to multiple possible address locations based on the input. Also write the comments for the instructions used.	CO2	(08)
	c)	Discuss how late arrival method speeds up processing of higher priority exceptions in Cortex-M0.	CO2	(06)
4.	a)	Give the differences between the three memory barrier instructions offered by the Cortex-M0 processor.	CO2	(06)
	b)	Describe the memory access attributes for different memory regions of Cortex-M0 processor.	CO2	(06)
	c)	Write an Assembly Language program to create a function which executes 2x+4y+2 using stack.	CO2	(08)

UNIT - III

5.	a)	Explain the key components and their interactions within an IoT reference model.	CO3	(08)
	b)	Write the workflow of sensor in a typical system. And also discuss the different classifications of sensor.	CO3	(06)
	c)	Write a short note on: i) I2C ii) SPI.	CO3	(06)
6.	a)	Define IoT. Discuss the characteristics, challenges and applications of it.	CO3	(08)
	b)	Compare and contrast the successive approximation A/D converter method with simultaneous A/D converter. Discuss the advantages and disadvantages of each approach	CO3	(06)
	c)	Illustrate with example the working of hydraulic and pneumatic actuators.	CO3	(06)

UNIT- IV

7.	a)	List the sequence of events that trigger when a HTTP protocol is invoked?	CO4	(08)
	b)	Discuss LoraWAN classes of service and their application.	CO4	(06)
	c)	Discuss AMQP protocols deployed in IOT systems.	CO4	(06)
8.	a)	illustrate STOMP and AMQP.	CO4	(08)
	b)	What is Lora modulation /chirp modulation? explain advantages.	CO4	(06)
	c)	Bring out the differences between MQTT and HTTP protocols used in IOT systems.	CO4	(06)

UNIT - V

9.	a)	Outline the concept of Raspberry Pi interfaces.	CO5	(07)
	b)	Explain IoT Strategy for Smarter Cities uses cases.	CO5	(06)
	c)	Discuss the different ways in with Raspberry Pi can be configured.	CO5	(07)
10.	a)	Describe Smart City Security Architecture.	CO5	(07)
	b)	List the general commands for RaspberryPi.	CO5	(06)
	c)	Explain the steps to be followed while connecting Raspberry Pi to sensors like LED and write python program to interact with the user (2 LEDs).	CO5	(07)

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