CS43(OO)

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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

SUPPLEMENTARY SEMESTER EXAMINATIONS – JULY 2023

Program	:	**B.E. – Computer Science and Engineering**	**Semester**	:	**IV**
Course Name	:	**Microprocessors and Microcontrollers**	**Max. Marks**	:	**100**
Course Code	:	**CS43(OO)**	**Duration**	:	**3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT – I

1.	a)	Discuss the key System and Implementation features of Cortex M0 microcontroller.	CO1	(06)
	b)	Explain the various control signals for Data operations in MU0 Microprocessor with a diagram showing various registers.	CO1	(08)
	c)	Explain features of Cortex M0 making it suitable for low power applications.	CO1	(06)
2.	a)	Explain the register transfer level design to determine exactly the control signals that are required to cause the datapath to carry out the full set of operations.	CO1	(08)
	b)	Discuss the different Instruction design formats based on memory access.	CO1	(08)
	c)	Discuss the limitations of 8bit/16bit microcontrollers over cortex M0.	CO1	(04)

UNIT – II

3.	a)	Explain the Various programming models employed for embedded system applications examine the critical differences between them.	CO2	(10)
	b)	Discuss the utility of APSR,IPSR, EPSR,Control register and Primask registers.	CO2	(06)
	c)	Discuss the interrupt features available with NVIC support.	CO2	(04)
4.	a)	Differentiate between Main stack pointer and Process stack pointer.	CO2	(06)
	b)	Explain memory-remapping implementation with the boot loader and SRAM for fast program accesses.	CO2	(06)
	c)	Discuss the different ways of structuring the embedded programs.	CO2	(08)

UNIT – III

5	a)	Illustrate the difference between Arithmetic Shift Rotate(ASR) and Other Logical shift rotate instructions like ROR,LSR with the help of examples.	CO3	(06)
	b)	Discuss the utility of memory barrier instructions and sleep mode instructions.	CO3	(06)
	c)	Write a program to illustrate the transfer of the 256 Bytes of data using LDMIA also comment on the instructions used. Also discuss no of iterations the code goes through.	CO3	(08)

6	a)	Write a neat program to discuss nested loop and stack utility for nested functions.	CO3	(08)

	b)	Find the output of following code:-
		i) LDR r2,=0x08000080;
		LSRS r0,r2,#05;
		ii) LDR r2,=0x80000080;
		ASRS r0,r2,#05;
		iii) LDR r2,=0x80000080;
		RORS r0,r2,#05;
			CO3	(06)

	c)	Write a program using Thumb instructions to illustrate the switch case in cortex M0.Also Comment on the instructions used.	CO3	(06)

UNIT – IV

7	a)	Discuss the Utility EXE RETURN register and its utility for interrupts.	CO4	(06)
	b)	With timing diagram explain tail chaining and late arrival features of COTEX M0.	CO4	(08)
	c)	Write a program to enable interrupt request IRQ4 using its control register.	CO4	(06)
8.	a)	Discuss the attributes of various parts of the memory map of CORTEX M0 and its utility.	CO4	(08)
	b)	Compare the working of thermistor and thermocouple and their area of application.	CO4	(08)
	c)	With a neat diagram explain working of relay and the scenarios that necessitate their deployment.	CO4	(04)

UNIT- V

9.	a)	Explain the Boot process of Nodemcu.	CO5	(06)
	b)	Elaborate on Micropython interpreter its, auto intent and auto completion and soft reset.	CO5	(06)
	c)	Analyse the shortcomings of Nodemcu 8266 in terms of RTC, socket and buffer overflow and SSL/TLS limitations.	CO5	(08)
10.	a)	List the general features of 8266 Nodemcu microcontroller.	CO5	(08)
	b)	Examine the scarcity of runtime resources of Nodemcu.	CO5	(06)
	c)	Examine the various control pins of LCD 16x2 which are read write and enable data transfer and check if LCD is busy.	CO5	(06)

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