SAHYADRI
COLLEGE OF ENGINEERING & MANAGEMENT
An Autonomous Institution
MANGALURU

USN | | | | | | | | | | |

21CS42

Fourth Semester B.E. Degree Examination, Apr/May 2023

Embedded System Concepts with ARM

Time: 3 hrs.Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Q. No.		Questions	Marks	BL/CO
		Module I		
1	a.	Define Embedded systems. Is DVD player an embedded system? Give reasons.	8	CL/CO1
	b.	Explain the Super Loop Based Approach.	7	CL/CO1
	c.	Compare Embedded systems with General Computing Systems.	5	CL/CO1
		OR		
2	a.	Write the FSM model for automatic seat belt warning system.	8	CL/CO1
	b.	Explain the operational quality attributes of an embedded system.	7	CL/CO1
	c.	Bring out the Purpose of Embedded systems.	5	CL/CO1
		Module II		
3	a.	Explain the Data flow model of ARM core with neat diagram.	8	CL/CO2
	b.	Illustrate the different processing modes available in ARM with CPSR.	7	CL/CO2
	c.	What are Banked Registers. Explain with a neat diagram.	5	CL/CO2
		OR		
4	a.	Explain the ARM program structure with assembler directives and also write an ALP to find the largest no. in an array.	8	CL/CO2
	b.	Illustrate ARM pipeline Instruction sequence with an example.	7	CL/CO2
	c.	Explain Exceptions, Interrupts, and the Vector Table.	5	CL/CO2
		Module III		
5	a.	Demonstrate the following instruction sets with suitable examples. i)MOV ii) ADD iii)RSB iv) SBC	8	CL/CO3
	b.	Explain different barrel shifter operations.	7	CL/CO3
	c.	Perform the following operations i) PRE r0= 0x00000000 r1=0x00000077 RSB r0, r1, #0 POST r0=? ii)PRE r0=0x00000000 r1=0x00000000 r2=0xf0000002 R3=0x00000002 UMULL r0, r1, r2, r3 POST r0=?,r1=?	5	CL/CO3
		OR		
	a.	Illustrate Pseudo instructions for loading constant with example.	8	CL/CO3

6	b.	Explain Addressing modes for Load- Store Multiple Instructions.	7	CL/CO3
	c.	Explain Addressing methods for Stack operations.	5	CL/CO3

Module IV				
7	a.	Explain the operation of stepper motor operating in Full step, Wave step and Half step with interfacing diagram of stepper motor through driver circuit.	8	CL/CO4
	b.	Explain Matrix Keyboard Interfacing with neat diagram.	7	CL/CO4
	c.	Write short notes on the following i)Zigbee ii) sensors iii)Actuators iv)Wi-Fi	5	/CO4
OR				
8	a.	Discuss the following i)I2C bus ii)SPI bus iii)UART iv) USB	8	CL/CO4
	b.	Explain RS-232 C & RS-485 external communication Interfaces.	7	CL/CO4
	c.	Explain the role of watchdog Timer in Embedded system.	5	CL/CO4
Module V				
9	a.	Write a multithreaded application to print "Hello I am in Sahyadri" from the main thread and "Hello I am in CSE" 5 times each using pthread_create() and pthread_join()	8	CL/CO5
	b.	Explain the sequence of operations for embedding firmware with programmer with neat diagram.	7	CL/CO5
	c.	Explain In system programming with SPI protocol.	5	CL/CO5
OR				
10	a.	Explain multithreaded architecture of a process with a neat thread –process diagram	8	CL/CO5
	b.	With a neat diagram explain JTAG based boundary scanning for hardware testing.	7	CL/CO5
	c.	List out the advantage of Simulator based debugging	5	CL/CO5

Cognitive Levels of Bloom's Taxonomy

No.	CL1	CL2	CL3	CL4	CL5	CL6
Level	Remember	Understand	Apply	Analyze	Evaluate	Create

Course Outcomes

CO1	Describe the characteristics, quality attributes for designing an embedded system.	CL2
CO2	Illustrate the architectural features of ARM controller.	CL3
CO3	Use ISA (Instruction set architecture)of ARM controller to develop programs.	CL3
CO4	Interface the peripheral devices with LPC2148 microcontroller.	CL3
CO5	Demonstratethe real time operating system by using case studies.	CL3