CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐

Second Semester B.E./B.Tech. Degree Examination, Dec.2023/Jan.2024
Introduction to Embedded Systems

Time: 3 hrs.   Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With block diagram, explain the typical elements of an Embedded System.	8	L2	CO1
	b.	Explain the role of Brown-out Protection circuit in Embedded system with a neat diagram.	8	L2	CO1
	c.	Compare RISC and CISC architecture.	4	L2	CO1
		OR			
Q.2	a.	With diagram, list the sequence of operation for communicating with a 1-wire slave device.	8	L2	CO1
	b.	Explain the following devices used in embedded system : i) Opto-coupler ii) Relay	8	L2	CO1
	c.	Classify embedded system based on complexity and performance.	4	L2	CO1
		Module – 2			
Q.3	a.	With diagram, list the parts and explain the working of washing machine.	8	L2	CO1
	b.	Briefly explain any four non-operational quality attributes of an embedded system.	8	L2	CO
	c.	The availability of an embedded product is 90% , the Mean Time Between Failure (MTBF) of the product is 30 days. What is the Mean Time To Repair (MTTR) in days/hours for the product?	4	L1	CO1
		OR			
Q.4	a.	With Product Life Cycle (PLC) curve, explain the different phases of an embedded product.	8	L2	CO1
	b.	Briefly explain any four characteristics of an embedded system.	8	L2	CO1
	c.	Mention different types of communication buses deployed in automotive embedded applications.	4	L1	CO1
		Module – 3			
Q.5	a.	Explain DFG and CDFG models in embedded system.	8	L2	CO3
	b.	With flow diagram, explain various steps involved in HDL based VLSI design process.	8	L2	CO4
	c.	Draw the logic circuit and truth table of SR flip-flop.	4	L1	CO3

		OR			
Q.6	a.	With FSM model, explain the design and operation of an automatic tea/coffee vending machine.	8	L2	CO3
	b.	With diagram, explain open collector output configuration. Mention its advantages.	8	L2	CO3
	c.	Write VHDL description of D Flip-flop.	4	L1	CO4
		Module – 4			
Q.7	a.	With diagram, explain the steps involved in conversion of a program written in assembly language to machine language.	10	L2	CO4
	b.	Describe embedded OS based approach for embedded firmware design.	5	L2	CO4
	c.	Mention the advantages and limitations of simulator based debugging.	5	L1	CO2
		OR			
Q.8	a.	With diagram, explain different subsystem and Interfaces of an in Circuit Emulator (ICE) device.	10	L2	CO2
	b.	Describe the advantages and limitations of High Level Languages.	5	L2	CO4
	c.	Mention the details stored in an object file.	5	L1	CO4
		Module – 5			
Q.9	a.	Explain the functions of Real Time OS Kernel.	8	L2	CO5
	b.	Explain the concept of Monolithic Kernel and Micro-Kernel.	8	L2	CO5
	c.	Differentiate between process and threads.	4	L1	CO5
		OR			
Q.10	a.	With diagram, explain various states and transitions associated with a process.	8	L2	CO5
	b.	Three processes with process IDs P1, P2, P3 with estimated completion time 10,5,7 milliseconds respectively enters the ready queue together. Calculate the waiting time and Turn Around Time (TAT) for each process and the average waiting time and Turn Around Time in non preemptive SJF algorithm.	8	L2	CO5
	c.	Define multitasking. List the types of multitasking.	4	L1	CO5

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