U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January 2024 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**
Course Code: 19EC7PCESD **Max Marks: 100**
Course: Embedded System Design

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Discuss features of Embedded Systems and Distinguish between General purpose systems and Embedded Systems.	*CO2*	*PO2*	**10**
	b)	Justify the need for Real Time Clock and Watch Dog Timer in an Embedded system.	*CO 2*	*PO 2*	**10**
		UNIT - II			
2	a)	Compare the memory mapped I/O and Standard I/O.	*CO 2*	*PO 2*	**6**
	b)	Illustrate the workflow of a DMA controller when an input device sends a DMA request. For faster and bulk data transfer, DMA is preferred than interrupt- justify.	*CO 2*	*PO 2*	***10***
	c)	Compare any two on board communication interfaces for Embedded systems.	*CO 2*	*PO 2*	**4**
		OR			
3	a)	Compare and Discuss arbitration in Priority and Daisy chain arbiters with neat illustrations.	*CO 2*	*PO 2*	**10**
	b)	Discuss in detail the serial communication through I2C Protocol with one master and many slave devices.	*CO 2*	*PO 2*	**10**
		UNIT - III			
4	a)	Briefly describe the Super-loop and RTOS based firmware design approaches. Discuss on their applicability.	*CO 2*	*PO 2*	**10**
	b)	Develop an embedded C program to interface a UART0 with LPC 1768 controller. The program should be able to send the string “Embedded System Design”.	*CO 3*	*PO 3*	**10**
		OR			

	5	a)	Discuss in detail the Embedded Firmware OS based design approach. Differentiate between Compilers and Cross Compilers.	***CO 2***	***PO 2***	**10**
		b)	Write an embedded C program to interface a DC Motor with LPC 1768 controller. The program should be able to control the direction of rotation of DC motor.	***CO 3***	***PO 3***	**10**
			UNIT - IV			
	6	a)	Analyze and Discuss the Process States & State Transitions with neat illustrations.	***CO 2***	***PO 2***	**10**
		b)	Three processes with process IDs P1, P2, P3 with estimated completion time 10, 5, 7 milliseconds and priorities 0, 3, 2 (0-highest priority, 3 lowest priority) 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 (Assuming there is no I/O waiting for the processes) in Non-preemptive priority based scheduling algorithm.	***CO 1***	***PO 1***	**10**
			UNIT - V			
	7	a)	Discuss the various embedded application development tools and analyse their features.	***CO 1***	***PO 1***	**10**
		b)	Discuss the various types of Embedded firmware debugging.	***CO 1***	***PO 1***	**10**

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