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BEC/BTE/BVL601

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Embedded System Design

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.	Define Embedded Systems. Explain the purposes of embedded systems with an examples for each.	10	L2	CO1
	b.	What are the different types of memories used in embedded system design? Explain the role of each.	10	L2	CO1
		OR			
Q.2	a.	With the diagram of elements of embedded system, mention all the cores around which an embedded system is built. Discuss any two in detail	10	L2	CO1
	b.	Write a brief note on the following : i) 7 segment display ii) Brown out protection iii) UART iv) I2C	10	L2	CO1
		Module – 2			
Q.3	a.	Illustrate the domain specific aspect of embedded systems with automotive domain as an example.	10	L2	CO2
	b.	Design drives/passenger 'Seat Belt Warning' in an automotive using the FSM model. The system requirements are captured as i) When the vehicle ignition is turned ON and the seat belt is not fastened within 10 seconds of ignition ON the system generates an alarm signal for 5 seconds. ii) The Alarm is turned OFF when the alarm time (5 seconds) expires or if the driver/passenger, fastens the belt or if the ignition switch is turned off, whichever happens first.	10	L3	CO2
		OR			
Q.4	a.	Illustrate the application specific aspect of embedded systems with washing machine as an example.	10	L2	CO2
	b.	Design an automatic tea/coffee vending machine based on FSM model for the following requirement : i) The tea/coffee vending is initiated by user inserting a 5 rupee coin ii) After inserting the coin, the user can either select 'Coffee' or 'Tea' or press 'Cancel' to cancel the order and take back the coin.	10	L3	CO2

		Module – 3			
Q.5	**a.**	Briefly explain the function of operating system with diagram.	**10**	**L2**	**CO3**
	b.	Explain preemptive SJF scheduling and illustrate with an example.	**10**	**L3**	**CO3**
		OR			
Q.6	**a.**	Write a note on racing and deadlock in task synchronization.	**10**	**L2**	**CO3**
	b.	With a diagram, mention function of the components in an embedded system development environment.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	With a block diagram, explain typical ARM based embedded system.	**10**	**L2**	**CO4**
	b.	What is pipeline in ARM? Explain the different pipeline stages of ARM processor.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	With a block diagram, explain ARM core dataflow model.	**10**	**L2**	**CO4**
	b.	Write a detailed note on : i) Vector table ii) Exception iii) Interrupts.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	Explain the different branch instructions of ARM processors.	**10**	**L2**	**CO5**
	b.	Write an ALP with comments to add an array of 16 bit numbers and store the 32 bit result in internal RAM.	**10**	**L3**	**CO5**
		OR			
Q.10	**a.**	Explain the different data processing instructions in ARM.	**10**	**L2**	**CO5**
	b.	Write an ALP with comments to sort the array of 32 bit numbers in ascending order using bubble sort method.	**10**	**L3**	**CO5**

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