Reg. No. : | | | | | | | | | | | | |

Question Paper Code:U9373

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Open elective

21UEE973 - PRINCIPLES OF EMBEDDED COMPUTING SYSTEM

(Common to All Engineering branches)

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer All Questions

PART – A (5 x 20= 100 Marks)

1.	(a)	Explain the role of microprocessors in complex embedded systems with suitable examples.	CO1 - U	(20)
		Or		
	(b)	Discuss the phases of the embedded system design process and their importance in ensuring system reliability	CO1 - U	(20)
2.	(a)	Draw and explain the block diagrams of ARM9 and ARM Cortex-M3 microcontrollers, bringing out key differences.	CO1 - U	(20)
		Or		
	(b)	Describe the basic ARM instruction set with examples of data transfer and arithmetic instructions.	CO1 - U	(20)
3.	(a)	Explain the major components of embedded programs such as code, data, stack, and heap. Discuss how each component supports program execution in microcontrollers. Describe the different models of embedded programs (sequential, state machine, and concurrent). Explain how these models help in structuring program execution.	CO1 - U	(20)
		Or		
	(b)	Describe the different models of embedded programs (sequential, state machine, and concurrent). Explain how these models help in structuring program execution.	CO1 - U	(20)

4.	(a)	Explain the structure of a real-time system with neat diagram. Describe how hardware, software, and tasks interact to achieve predictable execution.	CO1 - U	(20)
		Or		
	(b)	Define program run-time estimation in real-time systems. Why is accurate run-time estimation important for meeting deadlines?	CO1 - U	(20)
5.	(a)	Inter-process communication is critical for multitasking. Apply IPC mechanisms such as message passing in an RTOS to design a reliable communication system.	CO1- U	(20)
		Or		
	(b)	Real-time audio players require responsiveness. Develop a priority-based scheduling algorithm to ensure smooth playback and low latency.	CO1- U	(20)