C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 99407

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

Elective

Electronics and Communication Engineering

19UEC907 REAL TIME SYSTEM DESIGN

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1.	Define Events and its types in detail.	CO1-U
2.	Explain the common misconceptions on real time system design.	CO1-U
3.	Mention addressing modes of processor architecture.	CO1-U
4.	Compare memory organization and mapping of real time system.	CO1-U
5.	Apply the value of n is greater than 3ti find the possibility of an “n-address” machine.	CO2-App
6.	Analyze the type of microcoded computers tend to be superior to 1-, 2-, or 3- address computers withrespect to overall performance. Justify.	CO3-Ana
7.	Compare EDF scheduling over RM scheduling.	CO2-U
8.	Define the following terms: (a) A synchronous exception (b) An asynchronous exception	CO2-U
9.	List the Challenges in Analyzing Real-Time Systems	CO2-U
10.	Derive the look-up table for the tangent function in increments of 1 degree.	CO2-U

PART – B (5 x 16= 80 Marks)

11.	(a)	i) Elaborate the issues undergone while designing real time system. ii) Summarize the common misconceptions of designing real time system.	CO1-U	(10) (06)
		Or		
	(b)	i) Briefly explain the history of real time systems. ii) List the landmarks in real-time systems history in the United States.	CO1-U	(10) (06)

12.	(a)	(i) Describe the core instructions involved in the architecture of processor.(10) (ii) Explain the addressing modes of processor architecture. (6)	CO2-U	(16)
		Or		
	(b)	(i) Explain in detail about the internal organization of CPU.(10) (ii) Draw the block diagram of microcontroller used in RTS.(6)	CO2-U	(16)
13.	(a)	Identify some of the limitations of existing commercial real-time kernels for the development of different mission- and safety-critical applications.	CO3-App	(16)
		Or		
	(b)	Construct a cyclic executive with four procedures, A,B,C,D. Procedure A runs two times as frequently as B and C, and procedure A runs four times as frequently as D.	CO3-App	(16)
14.	(a)	Design an object oriented system using Unified Modeling Language (UML).	CO4-App	(16)
		Or		
	(b)	Apply the software requirements specification for four-way traffic intersection traffic light controller system.	CO4-App	(16)
15.	(a)	A polled loop system polls a discrete signal every 50 microseconds. Testing the signal and vectoring to the interrupt-processing routine take 40 microseconds. If it takes 6.2 milliseconds to process the interrupt, Analyze the minimum response time for this interrupt and maximum response time?	CO5-Ana	(16)
		Or		
	(b)	Analyze the consumer process can read the data in 32-bit words but only at a rate of one word every 2 microseconds. Calculate the minimum-size buffer required to avoid spill over, assuming there is enough time between bursts to empty the buffer.	CO5-Ana	(16)