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

Question Paper Code: 99407

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2023

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 real time system and its types.	CO1-U
2.	List the utilizations of CPU in real time systems.	CO1-U
3.	Mention addressing modes of processor architecture.	CO1-U
4.	Compare memory organization and mapping of real time system.	CO1-U
5.	List the types of requirements and specifications for real time systems.	CO1-U
6	Define the following terms: (a) A synchronous exception (b) An asynchronous exception (c) An application-detected error (d) An environment-detected error	CO1-U
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) Discuss the issues that impact on real-time systems engineering.(10) (ii) List out some typical real-time domains and applications. (6)	CO1-U	(16)
		Or		
	(b)	(i) Discuss in details about the types of events with example. (10) (ii) Compare the performance mechanisms of events and determinism. (6)	CO1-U	(16)
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)	Analyze different laws and theorems to find better optimization tool for designing of real time system design.	CO5-Ana	(16)
		Or		
	(b)	Analyze the Sporadic and Aperiodic Interrupt Systems for the below conditions (i) Interrupt Latency (ii) Instruction Completion Times (iii) Deterministic Performance	CO5-Ana	(16)