Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code:3161011 Date:26-05-2025

Subject Name:Cyber Physical systems

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	How CPS used in Medical field?	**03**
	(b)	What is RTOS? Explain it in detail.	**04**
	(c)	How CPS used in Building Automation. Explain in detail.	**07**
Q.2	**(a)**	How Human and CPS are connected each other. Explain it in detail.	**03**
	(b)	What is IIOT implications? Explain it in detail.	**04**
	(c)	Explain any one CPS Attack model.	**07**
		OR	
	(c)	Explain Sense and actuation faults on control performance	**07**
Q.3	**(a)**	Explain Industry 4.0 in detail.	**03**
	(b)	How Privacy maintained in CPS.	**04**
	(c)	Explain CPS Performance Analysis in detail.	**07**
		OR	
Q.3	**(a)**	Explain CAN bus protocol in detail.	**03**
	(b)	How network congestion done in CPS engineering.	**04**
	(c)	How threats to CPS affect Medical domain.	**07**
Q.4	**(a)**	Explain High level Control model of CPS.	**03**
	(b)	How CPS SW be verified using Frama-C	**04**
	(c)	Explain Advanced Automata based modeling and analysis using an example.	**07**
		OR	
Q.4	**(a)**	List and explain any 2 Sensors used in CPS H/W.	**03**
	(b)	What are the effects of scheduling.	**04**
	(c)	How Flowpipe construction using SpaceX and Phaver tools carried out.	**07**
Q.5	**(a)**	What is Basic principles of design and validation of CPS	**03**
	(b)	Explain CPS application in Real world.	**04**
	(c)	Explain in detail : -Advanced Automata based modeling and analysis	**07**
		OR	
Q.5	**(a)**	Explain Wireless Hart in detail	**03**
	(b)	Explain Scheduling Real Time control tasks in detail.	**04**
	(c)	Explain different Threats to CPS in detail.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3161011 Date:20-05-2024

Subject Name:Cyber Physical systems

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	What are basic principles of design and validation of CPS.	**03**
	(b)	Write about the industrial internet of things (IIOT) implications?	**04**
	(c)	How Cyber Physical System used in Industry 4.0?	**07**
Q.2	**(a)**	How are the Human and CPS related to each other?	**03**
	(b)	What is RTOS? Explain it in detail.	**04**
	(c)	Explain the Basic principles of CPS involved in medical application.	**07**
		OR	
	(c)	How is CPS impacted by network congestion?	**07**
Q.3	**(a)**	Describe CAN bus protocol in detail.	**03**
	(b)	Explain Low level Control model of CPS.	**04**
	(c)	Discuss advanced Automata based modeling using an example.	**07**
		OR	
Q.3	**(a)**	Define the bus latency.	**03**
	(b)	Discuss Wireless HART in detail.	**04**
	(c)	How Privacy maintained in CPS.	**07**
Q.4	**(a)**	List out the application of CPS in real world.	**03**
	(b)	Describe the sense and actuation errors in the CPS.	**04**
	(c)	Explain Automotive Ethernet in detail.	**07**
		OR	
Q.4	**(a)**	What are the effects of scheduling	**03**
	(b)	Describe Human Computer Interface (HCI) in detail	**04**
	(c)	How Scheduling used in RTOS for Real Time control tasks.	**07**
Q.5	**(a)**	Describe the CPS High Level Control model.	**03**
	(b)	Write about the weakest preconditions in CPS software.	**04**
	(c)	Explain any one CPS Attack model.	**07**
		OR	
Q.5	**(a)**	Why mapping of software components to ECUs is important in CPS engineering?	**03**
	(b)	How industrial domain is impacted by threats to CPS.	**04**
	(c)	How Cyber Physical System can be verified using Frama-C software.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3161011 Date:10-07-2023

Subject Name:Cyber Physical systems

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Differentiate Hard real time and soft real time in an embedded system	**03**
	(b)	Define CPS and contradictions in CPS.	**04**
	(c)	With the help of a block diagram, explain Cyber Physical System architecture.	**07**
Q.2	**(a)**	Explain the various ways of memory allocation in RTOS	**03**
	(b)	Differentiate I/O mapped I/O and Memory Mapped I/O	**04**
	(c)	Explain various terminologies in reference to sensor selection for embedded application.	**07**
		OR	
	(c)	How threats to CPS affect industrial automation	**07**
Q.3	**(a)**	Explain various modes of communication protocol in Automotive domain.	**03**
	(b)	What are the effects of bus latency in scheduling?	**04**
	(c)	Write a note on Network congestion w.r.t. CPS	**07**
		OR	
Q.3	**(a)**	Write a note on scheduling in real time environment	**03**
	(b)	What is Basic principles of design and validation of CPS	**04**
	(c)	Explain Advanced Automata based modeling and analysis using an example	**07**
Q.4	**(a)**	Explain Human Computer Interface (HCI) in detail	**03**
	(b)	Differentiate tasks, threads and process	**04**
	(c)	List down the various hardware and software components of CPS and explain in detail	**07**
		OR	
Q.4	**(a)**	Write a note on authentication in CPS	**03**
	(b)	What is RTOS? Explain it in detail.	**04**
	(c)	What is IIOT implications? Explain it in detail.	**07**
Q.5	**(a)**	Explain low level Control model of CPS	**03**
	(b)	Write a note on two state process model	**04**
	(c)	What is AutoSAR? Explain it in detail	**07**
		OR	

Q.5	**(a)**	Write a note on Wireless HART	**03**
	(b)	List various industrial revolution and their features	**04**
	(c)	Write a note on Frama - C	**07**

Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3161011 Date:06/06/2022

Subject Name:Cyber Physical systems

Time:10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	What is bus latency? Explain it.	**03**
	(b)	Explain Sense and actuation faults of CPS system.	**04**
	(c)	How threats to CPS affect Automotive domain.	**07**
Q.2	**(a)**	Explain CAN bus protocol indetail.	**03**
	(b)	What are the effects of scheduling.	**04**
	(c)	Explain Advanced Automata based modeling and analysis using an example.	**07**
		OR	
	(c)	How network congestion affects CPS?	**07**
Q.3	**(a)**	Explain Wireless Hart in detail.	**03**
	(b)	Explain Low level Control model of CPS.	**04**
	(c)	How Scheduling used in RTOS for Real Time control tasks	**07**
		OR	
Q.3	**(a)**	How CPS used in Medical field?	**03**
	(b)	What is AutoSAR? Explain it in detail.	**04**
	(c)	How Flowpipe construction using SpaceX and Phaver tools carried out.	**07**
Q.4	**(a)**	What is Basic principles of design and validation of CPS	**03**
	(b)	Explain Human Computer Interface (HCI) in detail.	**04**
	(c)	How CPS SW be verified using Frama-C	**07**
		OR	
Q.4	**(a)**	How Human and CPS are connected each other. Explain it in detail.	**03**
	(b)	Explain High level Control model of CPS.	**04**
	(c)	How Privacy maintained in CPS.	**07**
Q.5	**(a)**	Explain CPS application in Real world.	**03**
	(b)	What is RTOS? Explain it in detail.	**04**
	(c)	How threats to CPS affect Medical domain.	**07**
		OR	
Q.5	**(a)**	What is, Industry 4.0? Explain it.	**03**
	(b)	What is IIOT implications? Explain it in detail.	**04**
	(c)	Explain any one CPS Attack model.	**07**

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