Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3161013 Date:28-11-2024

Subject Name: Systems Engineering

Time:02:30 PM TO 05:00 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)**	State three definitions of Systems Engineering.	**03**
	(b)	List the essential characteristics of a successful Systems Engineer professional.	**04**
	(c)	Justify the importance of requirement and need analysis in complex system engineering. List all activities done under this phase.	**07**
Q.2	**(a)**	Justify the role of Critical Path Method in project scheduling.	**03**
	(b)	Explain types of interface elements in complex systems with necessary examples.	**04**
	(c)	Describe System Life Cycle with a block diagram. Discuss major activities done under each of the phases in brief.	**07**
		OR	
	(c)	Explain the concept of hierarchy in complex systems using a detailed example of any signal and data System.	**07**
Q.3	**(a)**	Define ‘MOE’ and ‘MOP’.	**03**
	(b)	Write a short note on design synthesis processes.	**04**
	(c)	Explain Work breakdown structure (WBS). List the benefits and needs of WBS.	**07**
		OR	
Q.3	**(a)**	Define Preliminary Design Review (PDR) and Critical Design Review (CDR).	**03**
	(b)	Briefly discuss activities under each substage of the concept development stage.	**04**
	(c)	Explain Systems Engineering Management Plan. (SEMP).	**07**
Q.4	**(a)**	Write a short note on Trade-off Analysis.	**03**
	(b)	List four pros and cons (two of each) of incorporating some of the latest technology into the development of a new complex system.	**04**
	(c)	Write a detailed note on Model Based Systems Engineering (MBSE) approaches.	**07**
		OR	
Q.4	**(a)**	What is rapid prototyping? Discuss prototype development as a risk mitigation technique.	**03**
	(b)	List differences between Unified Modelling Language (UML) and SysML (Systems Modelling Language).	**04**
	(c)	Explain (i) risk assessment (ii) risk likelihood and (iii) risk criticality with reference to risk management in systems engineering.	**07**

Q.5	**(a)**	Write a short note on User Interface Design (UID)	**03**
	(b)	Explain System Maintenance Process in brief.	**04**
	(c)	Discuss the concept of integration testing and its importance in complex systems. List the activities done under integration testing.	**07**

OR

Q.5	**(a)**	Explain Verification and Validation of a system in brief.	**03**
	(b)	Discuss transition from development to production phase.	**04**
	(c)	Explain the concept of availability, redundancy, and predictability in the engineering design stage.	**07**

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