Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI EXAMINATION – WINTER 2025

Subject Code:3161013 Date:19-11-2025

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)**	What is Systems Engineering? State two contrast between systems engineering and traditional engineering.	**03**
	(b)	Explain any one example of complex system where system engineering is needed in brief.	**04**
	(c)	Explain all phases of System Life Cycle in detail with a block diagram.	**07**
Q.2	**(a)**	Explain complex system hierarchy in brief.	**03**
	(b)	Explain Interfaces and Interactions in reference to complex systems.	**04**
	(c)	List the activities included under all four stages of needs and requirement analysis.	**07**
		OR	
	(c)	Write a short note on Model Based Systems Engineering (MBSE).	**07**
Q.3	**(a)**	Explain system environment and system boundaries in brief.	**03**
	(b)	Explain types of system requirement in detail..	**04**
	(c)	Explain Systems Engineering Management Plan. (SEMP)	**07**
		OR	
Q.3	**(a)**	Explain following terms in brief; also state its importance in life cycle system engineering. (i) PERT (program Evaluation and Review Technique) (ii) PDR (Preliminary Design Review) (iii) CDR (Critical Design Review)	**03**
	(b)	Briefly discuss concept exploration phase in the system life cycle.	**04**
	(c)	Explain Work breakdown structure (WBS). List the benefits and need of WBS.	**07**
Q.4	**(a)**	Justify the need of prototype development for risk mitigation.	**03**
	(b)	Discuss role of hypothesis testing in Systems Engineering.	**04**
	(c)	Explain the model for engineering development phase.	**07**

OR

Q.4	**(a)**	Write a note on Trade-off Analysis.	**03**
	(b)	Write a short note on Systems Modeling Languages.	**04**
	(c)	Explain design synthesis processes in detail.	**07**
Q.5	**(a)**	Explain concept of redundancy in design engineering design.	**03**
	(b)	Discuss transition from development to production.	**04**
	(c)	Explain the concept of system integration in detail.	**07**

OR

Q.5	**(a)**	Explain concept of predictability in design engineering design.	**03**
	(b)	Explain System Maintenance Process in brief.	**04**
	(c)	Explain Verification and Validation of a system in detail.	**07**

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