GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code: 3161013 **Date: 26-05-2025**
Subject Name: Systems Engineering
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)**	List key milestones in the history of systems engineering.	**03**
	(b)	Explain the concept of system lifecycle in systems engineering in brief.	**04**
	(c)	Compare System Engineering and traditional engineering.	**07**
Q.2	**(a)**	List the main evolutionary characteristics of complex systems in brief.	**03**
	(b)	Explain complex system hierarchy in brief.	**04**
	(c)	Explain in brief Systems Engineering Management.	**07**
		OR	
	(c)	Explain the project life cycle in detail.	**07**
Q.3	**(a)**	Explain the purpose of a Work Breakdown Structure (WBS) in project management.	**03**
	(b)	Describe how a Systems Engineering Management Plan (SEMP) supports the development of a system.	**04**
	(c)	Explain system interfaces and interaction in detail.	**07**
		OR	
Q.3	**(a)**	List the key components of systems risk management	**03**
	(b)	Describe the difference between need analysis and need validation.	**04**
	(c)	Explain system environment and system boundaries in detail.	**07**
Q.4	**(a)**	List the main components of systems architecture.	**03**
	(b)	Describe the role of systems architecture in organizing and structuring complex systems.	**04**
	(c)	Define Model-Based Systems Engineering (MBSE) and how does it improve systems engineering processes.	**07**
		OR	
Q.4	**(a)**	Explain two development stages and one application stage in system life cycle stages in brief.	**03**
	(b)	Describe functional analysis - Top down process.	**04**
	(c)	Explain Model based Systems Engineering (MBSE).	**07**
Q.5	**(a)**	Define modular maintainability, availability and redundancy.	**03**
	(b)	Describe concept stage in detail.	**04**
	(c)	Explain Product Verification process in detail.	**07**
		OR	
Q.5	**(a)**	Explain System Operation Process in brief.	**03**
	(b)	Describe the techniques to increase reliability.	**04**
	(c)	Explain importance of system engineering with one example.	**07**

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