

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3161013

Date: 26/05/2026

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.**

- Q.1**
- (a) State three definitions of Systems Engineering. **03**
 - (b) Discuss Systems Engineering as a profession. **04**
 - (c) Give two examples of complex system where system engineering is needed and discuss it in detail. **07**
- Q.2**
- (a) Explain complex system hierarchy in brief. **03**
 - (b) Describe functional analysis as a top down process. **04**
 - (c) Illustrate System Life Cycle with a block diagram. Discuss major activities done under each of the phases in brief. **07**
- OR**
- Q.2**
- (c) Discuss need analysis phase in detail. **07**
- Q.3**
- (a) List the main components of systems architecture. **03**
 - (b) Compare and contrast between PDR (Preliminary Design Review) and CDR (Critical Design Review). **04**
 - (c) Describe major three activities of SE Management Plan **07**
- OR**
- Q.3**
- (a) Differentiate the terms "concept selection" and "concept validation". **03**
 - (b) Justify the role of Critical Path Method in project scheduling. **04**
 - (c) Explain design synthesis processes in detail. **07**
- Q.4**
- (a) Write a note on Trade-off Analysis. **03**
 - (b) List differences between Unified Modelling Language (UML) and SysML (Systems Modelling Language). **04**
 - (c) Explain following the terms with reference to risk management in systems engineering **07**
:
 - (i) risk assessment
 - (ii) risk likelihood
 - (iii) risk criticality
- OR**
- Q.4**
- (a) Explain system environment and system boundaries in detail. **03**
 - (b) Explain prototype development as a risk mitigation technique. **04**

	(c) Explain the concept of availability, redundancy, and predictability in the engineering design stage.	07
Q.5	(a) Discuss transition from development to production.	03
	(b) Discuss the terms "MOE" and "MOP".	04
	(c) Explain Verification and Validation of a system in detail.	07
	OR	
Q.5	(a) Explain System Maintenance Process in brief.	03
	(b) Describe the concept of system upgrades and modernization.	04
	(c) Describe Integration, testing and evaluation of Total system in detail.	07
