Enrolment No./Seat No_____

# 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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Enrolment No./Seat No_____

# GUJARAT TECHNOLOGICAL UNIVERSITY

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

**Subject Code:3161013** **Date:20-05-2024**

**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 and Explain any two Engineering standards. | 03 |
| | (b) | Explain Fundaments of Systems Engineering. | 04 |
| | (c) | Explain Systems Engineering: History and Examples in detail. | 07 |
| Q.2 | (a) | Explain system risk management. | 03 |
| | (b) | Explain how System Engineering as Profession built? | 04 |
| | (c) | Explain system interfaces and interaction in detail. | 07 |
| | | **OR** | |
| | (c) | Explain System Engineering Management(SEM) in detail. | 07 |
| Q.3 | (a) | Explain Hypothesis testing in detail. | 03 |
| | (b) | What is Lifecycle Integration? Explain it in detail. | 04 |
| | (c) | Define work breakdown structure. Also describe benefits and need of work breakdown structure. | 07 |
| | | **OR** | |
| Q.3 | (a) | Briefly demonstrate real life systems by the Indian Army. | 03 |
| | (b) | Compare System Engineering and traditional engineering. | 04 |
| | (c) | How probability data analysis carried out? | 07 |
| Q.4 | (a) | Explain Model Based Systems Engg (MBSE) for Decision making in detail. | 03 |
| | (b) | Explain power of system engineering. | 04 |
| | (c) | Explain importance of system engineering with one example. | 07 |
| | | **OR** | |
| Q.4 | (a) | Explain complex system hierarchy. | 03 |
| | (b) | Describe major three activities of SE Management. | 04 |
| | (c) | Explain system environment and system boundaries in detail. | 07 |
| Q.5 | (a) | Give any one example of complex system where system engineering is needed and explain it. | 03 |
| | (b) | Define redundancy in engineering design stage. | 04 |
| | (c) | Explain the Concepts of maintainability, availability, predictability. | 07 |
| | | **OR** | |
| Q.5 | (a) | Explain Test planning and preparation in detail. | 03 |
| | (b) | Describe functional analysis - Top down process. | 04 |
| | (c) | Describe Integration, testing and evaluation of Total system in detail. | 07 |

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Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

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

**Subject Code:3161013 Date:10-07-2023**

**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)** | Define system engineering. Give examples of systems requiring system engineering. | **03** |
| | **(b)** | Describe the difference between traditional Engineering and SE. | **04** |
| | **(c)** | Explain in brief Systems Engineering Management. | **07** |
| **Q.2** | **(a)** | Define critical path method (CPM) in project management. | **03** |
| | **(b)** | Explain complex system hierarchy in brief. | **04** |
| | **(c)** | Explain principal stages in a system life cycle. | **07** |
| | | **OR** | |
| | **(c)** | Explain Work breakdown structure (WBS) in detail. | **07** |
| **Q.3** | **(a)** | Define the term “functional allocation”. | **03** |
| | **(b)** | Differentiate the terms "concept selection" and "concept validation". | **04** |
| | **(c)** | Write a short note on Model Based Systems Engineering (MBSE). | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain system risk management in brief. | **03** |
| | **(b)** | Explain functional analysis in brief. | **04** |
| | **(c)** | Explain concept exploration phase in the system life cycle. | **07** |
| **Q.4** | **(a)** | Explain trade studies. | **03** |
| | **(b)** | Explain Product Implementation process in brief. | **04** |
| | **(c)** | Explain the concept of User Interface Design (UID). | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Define the term Preliminary Design Review ( PDR). | **03** |
| | **(b)** | Explain the concept of risk reduction. | **04** |
| | **(c)** | Explain importance of system engineering with one example. | **07** |
| **Q.5** | **(a)** | Explain Design synthesis in brief. | **03** |
| | **(b)** | Discuss hypothesis testing in engineering. | **04** |
| | **(c)** | Explain Product Verification process in detail. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Discuss transition from development to production. | **03** |
| | **(b)** | Explain the Concepts of reliability and redundancy for a system. | **04** |
| | **(c)** | Explain the concept of system integration. | **07** |

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Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

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

**Subject Code:3161013 Date:06/06/2022**

**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)** | Define various system Engineering definitions. | **03** |
| | **(b)** | Explain power of system engineering. | **04** |
| | **(c)** | Discuss SE as a profession. | **07** |
| **Q.2** | **(a)** | Give any one example of complex system where system engineering is needed and explain it. | **03** |
| | **(b)** | Compare System Engineering and traditional engineering. | **04** |
| | **(c)** | Explain system interfaces and interaction in detail. | **07** |
| | | **OR** | |
| | **(c)** | Explain system environment and system boundaries in detail. | **07** |
| **Q.3** | **(a)** | Describe system life cycle with block diagram. | **03** |
| | **(b)** | List major system development characteristics. | **04** |
| | **(c)** | Define work breakdown structure. Also describe benefits and need of work breakdown structure. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain system risk management. | **03** |
| | **(b)** | Describe Requirement analysis schematic in detail. | **04** |
| | **(c)** | Explain system requirement types in detail. | **07** |
| **Q.4** | **(a)** | Brief two development stages and one application stage in system life cycle stages. | **03** |
| | **(b)** | Describe concept stage in detail. | **04** |
| | **(c)** | Explain importance of system engineering with one example. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Define redundancy in engineering design stage. | **03** |
| | **(b)** | Describe major three activities of SE Management. | **04** |
| | **(c)** | Explain Engineering development phase with example. | **07** |
| **Q.5** | **(a)** | Discuss transition from development to production. | **03** |
| | **(b)** | Describe functional analysis - Top down process. | **04** |
| | **(c)** | Describe Integration, testing and evaluation of Total system in detail. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain complex system hierarchy. | **03** |
| | **(b)** | Briefly demonstrate real life systems by the Indian Army. | **04** |
| | **(c)** | Explain engineering design stage in detail. | **07** |

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