Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER– VII EXAMINATION – SUMMER 2026

Subject Code:3171929 Date:20-05-2026

Subject Name: Quality and Reliability 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)**	Define Quality as per view of Dr. Juran and Dr. Philip Crosby.	**03**
	(b)	Explain concept of Reliability with suitable example	**04**
	(c)	Describe Agile manufacturing process.	**07**
Q.2	**(a)**	Define, Cumulative function and reliability function.	**03**
	(b)	Elaborate design Reliability and Inherent Reliability	**04**
	(c)	Write short note on Reliability repairable system.	**07**
		OR	
	(c)	Explain in details about six sigma process.	**07**
Q.3	**(a)**	Explain just in time manufacturing.	**03**
	(b)	Describe about Lean manufacturing.	**04**
	(c)	Describe Failure Mechanism and failure severity.	**07**
		OR	
Q.3	**(a)**	Explain TPM along with advantages and application.	**03**
	(b)	Describe ISO 14000 and QS 9000 with example.	**04**
	(c)	Write short notes on ISO 9000.	**07**
Q.4	**(a)**	Explain concept of Robust design in context to DOE	**03**
	(b)	Describe experimental design with a suitable example.	**04**
	(c)	Elaborate Full factorial and Fractional factorial design.	**07**
		OR	
Q.4	**(a)**	Elaborate Fault tree analysis- FTA	**03**
	(b)	Explain 5's Principle in context to your institute workshop.	**04**
	(c)	Explain 7 Quality control tools with its advantages.	**07**
Q.5	**(a)**	Explain Quality Circle with its advantages.	**03**
	(b)	Describe Quality function Deployment with a neat sketch.	**04**
	(c)	Write short notes on Total quality control	**07**
		OR	
Q.5	**(a)**	Describe about world class manufacturing.	**03**
	(b)	Explain Kaizen and poka - yoke.	**04**
	(c)	Elaborate FMEA with suitable examples.	**07**

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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3171929 Date:08-05-2025

Subject Name:Quality and Reliability 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.**

Q.1	**(a)**	Define following: (1) Parameter Design (2)System Design (3) Tolerance Design	**03**
	(b)	Discuss Just in Time Concept.	**04**
	(c)	What is the role of ISO 14000 in managing good environmental practices.	**07**
Q.2	**(a)**	Explain the concept of 5S.	**03**
	(b)	Give various definitions of quality.	**04**
	(c)	Define DOE and enlist the components of DOE. Discuss Taguchi Quality Loss Function.	**07**
		OR	
	(c)	Enlist the various phases of Quality Revolution and discuss inspection, quality control and quality assurance.	**07**
Q.3	**(a)**	What is Kaizen? Explain in brief.	**03**
	(b)	Explain the robust design in terms of Design of Experiments.	**04**
	(c)	Define QFD and Discuss house of quality-product planning matrix.	**07**
		OR	
Q.3	**(a)**	Define following: (1) FMEA (2) TQM (3) Poka yoke.	**03**
	(b)	Explain Total Productive Maintenance.	**04**
	(c)	Discuss TQM and its barriers in implementation.	**07**
Q.4	**(a)**	Write difference between reliability and quality.	**03**
	(b)	Explain characteristics of Quality in Service and manufacturing sector.	**04**
	(c)	Draw and explain Bath tub Curve.	**07**
		OR	
Q.4	**(a)**	State objectives of quality control.	**03**
	(b)	Discuss the Risk Assessment procedures in design.	**04**
	(c)	Define Maintainability and availability and compare it with reliability.	**07**
Q.5	**(a)**	Explain briefly Bench Marking.	**03**
	(b)	What are the Reliability Parameters?	**04**
	(c)	What are the types of System reliability models? Discuss with examples.	**07**
		OR	
Q.5	**(a)**	What is the obstacles to implementing a TQM.	**03**
	(b)	Define Zero defects. Discuss various steps in implementing Zero defects.	**04**
	(c)	Explain Quality Production through KANBAN.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3171929 Date: 21/06/2023

Subject Name: Quality and Reliability 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)**	Explain any three dimensions of Quality.	**03**
	(b)	List out name of any five Quality Gurus and Explain contribution of any two Gurus.	**04**
	(c)	Differentiate between Inspection and Quality Control in detail.	**07**
Q.2	**(a)**	Define and explain Quality Circle.	**03**
	(b)	Explain the concept of 5s.	**04**
	(c)	Discuss about the basic 7 Quality Control Tools.	**07**
		OR	
	(c)	List out 7 new management tools and explain any five in detail.	**07**
Q.3	**(a)**	Explain Poka-Yoke with two examples.	**03**
	(b)	Explain PDCA cycle.	**04**
	(c)	Define QFD and Discuss House of Quality Product Planning Matrix.	**07**
		OR	
Q.3	**(a)**	Define factors, levels and response with reference to Design of Experiment giving suitable example.	**03**
	(b)	Discuss Taguchi Quality Loss Function.	**04**
	(c)	What is FMEA? Explain how FMEA helps in ensuring quality of a product.	**07**
Q.4	**(a)**	Discuss various steps in Taguchi method.	**03**
	(b)	Explain JIT with real field application.	**04**
	(c)	Discuss: Pillars of TPM.	**07**
		OR	
Q.4	**(a)**	Define and discuss Benchmarking.	**03**
	(b)	Short Note: KANBAN.	**04**
	(c)	Explain Quality Management Standards-ISO: 9000.	**07**
Q.5	**(a)**	What is Muda? Explain the various types of Muda.	**03**
	(b)	Describe concept of Concurrent Engineering.	**04**
	(c)	Briefly explain Six Sigma.	**07**
		OR	
Q.5	**(a)**	What is Reliability? Explain the relationship between Reliability, Safety and Quality.	**03**

(b) Define: Skewness and Kurtosis of life dispersion. **04**

(c) Discuss evolution of reliability over product life cycle. **07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3171929 Date: 21/06/2023

Subject Name: Quality and Reliability 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)**	Explain any three dimensions of Quality.	**03**
	(b)	List out name of any five Quality Gurus and Explain contribution of any two Gurus.	**04**
	(c)	Differentiate between Inspection and Quality Control in detail.	**07**
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	(b)	Explain the concept of 5s.	**04**
	(c)	Discuss about the basic 7 Quality Control Tools.	**07**
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	(c)	List out 7 new management tools and explain any five in detail.	**07**
Q.3	**(a)**	Explain Poka-Yoke with two examples.	**03**
	(b)	Explain PDCA cycle.	**04**
	(c)	Define QFD and Discuss House of Quality Product Planning Matrix.	**07**
		OR	
Q.3	**(a)**	Define factors, levels and response with reference to Design of Experiment giving suitable example.	**03**
	(b)	Discuss Taguchi Quality Loss Function.	**04**
	(c)	What is FMEA? Explain how FMEA helps in ensuring quality of a product.	**07**
Q.4	**(a)**	Discuss various steps in Taguchi method.	**03**
	(b)	Explain JIT with real field application.	**04**
	(c)	Discuss: Pillars of TPM.	**07**
		OR	
Q.4	**(a)**	Define and discuss Benchmarking.	**03**
	(b)	Short Note: KANBAN.	**04**
	(c)	Explain Quality Management Standards-ISO: 9000.	**07**
Q.5	**(a)**	What is Muda? Explain the various types of Muda.	**03**
	(b)	Describe concept of Concurrent Engineering.	**04**
	(c)	Briefly explain Six Sigma.	**07**
		OR	
Q.5	**(a)**	What is Reliability? Explain the relationship between Reliability, Safety and Quality.	**03**

(b) Define: Skewness and Kurtosis of life dispersion. **04**

(c) Discuss evolution of reliability over product life cycle. **07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022

Subject Code:3171929 Date:14/06/2022

Subject Name:Quality and Reliability 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)**	Justify "Quality as a winning strategy"	**03**
	(b)	Differentiate between Quality Control and Quality Assurance.	**04**
	(c)	Describe the concept of 5S in detail and also elaborate how you can implement 5S in your daily life.	**07**
Q.2	**(a)**	Explain Poke-Yoke with two real life examples.	**03**
	(b)	What are the major barriers in implementation of ISO 14000?	**04**
	(c)	Describe preparation of Quality Function Deployment (QFD) house of quality matrix by giving suitable example.	**07**
		OR	
	(c)	Define FMEA. Draw a structure of FMEA and explain each element in brief and also explain the influence of RPN in FMEA.	**07**
Q.3	**(a)**	Define following terms in context of DOE. (i) ANOVA (ii) Response (iii) Factorial Design	**03**
	(b)	Explain the steps in experimental design in DOE.	**04**
	(c)	Briefly explain the elements of Just in Time.	**07**
		OR	
Q.3	**(a)**	Enlist the steps of Taguchi methodology in achieving robustness.	**03**
	(b)	What is difference between run and replication in DOE? What is the purpose of replication in the context of DOE?	**04**
	(c)	What is Kanban? Explain briefly its steps and benefits.	**07**
Q.4	**(a)**	What is the meaning of JIDOKA? Explain in brief.	**03**
	(b)	Define six sigma. Why companies are gradually moving towards achieving six sigma?	**04**
	(c)	Explain 8 pillars of Total Productive Maintenance (TPM).	**07**
		OR	
Q.4	**(a)**	What is Paretos 80/20 principle explain it with an example?	**03**
	(b)	Differentiate between Lean manufacturing and Agile manufacturing.	**04**
	(c)	Explain World Class manufacturing system in brief.	**07**
Q.5	**(a)**	Define the terms in context of reliability 1) Mean time to failure (MTTF) 2) Mean time between failures (MTBF) 3) Mean time to repair (MTTR)	**03**

(b) Explain Prevention costs and Appraisal costs in context of Cost of Quality. **04**

(c) A pump motor exhibiting a constant hazard rate has a reliability of 90 per cent from operating time of 1000 hrs. **07**

(i) What is the average failure rate of the pump motor?

(ii) What is MTBF?

(iii) What is the reliability of the item for an operating time of 2000 hours? and for 4000 hours?

(iv) Corresponding to a reliability of 0.5, what is the operating time?

OR

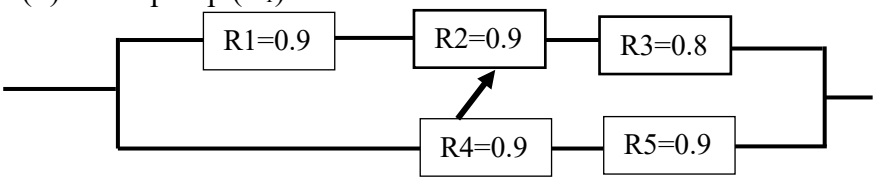
Q.5 **(a)** What is Overall Equipment Effectiveness (OEE)? What are the standard benchmarks of OEE? **03**

(b) Draw and explain the reliability bathtub curve. **04**

(c) What would be the reliability of a thermal power plant represented as block diagram for various components if **07**

(i) boiler pump (R_1) works

(ii) boiler pump (R_1) fails



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