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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