Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- VIIth SEMESTER–EXAMINATION – MAY/JUNE- 2012

Subject code: 171906 **Date: 29/05/2012**

Subject Name: Quality and Reliability Engineering

Time: 02:30 pm – 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.**

Q.1	**(a)**	Give two definitions of Quality. Explain the statement – "TQM encompasses quality control, quality assurance as well as quality management."	**07**
	(b)	Briefly explain 7 QC Tools.	**07**
Q.2	**(a)**	Explain the concept of Quality Circles. List the prerequisites of forming a Quality Circle. List advantages and drawbacks of Quality Circles.	**07**
	(b)	Explain PDCA cycle in details with suitable example.	**07**
		OR	
	(b)	Explain 4 basic cost elements covered under "Cost of Quality" system giving at least two examples of each cost element.	**07**
Q.3	**(a)**	Define FMEA. Explain how it helps in ensuring quality of a product. Draw a typical format of FMEA and explain its elements in brief.	**07**
	(b)	Explain each phase of 5S technique. List the advantages offered by 5S technique.	**07**
		OR	
Q.3	**(a)**	Explain the basic concept of ISO 9000 certification. What are the advantages and implementation barriers of the same?	**07**
	(b)	Explain the basic concept, scope and applicability of QS 9000 certification.	**07**
Q.4	**(a)**	What do you understand by the word – Robust Design? How Taguchi Techniques helps achieving robust design of a product?	**07**
	(b)	What is TPM? Explain the objectives and benefits of implementing TPM in an industry.	**07**
		OR	
Q.4	**(a)**	Briefly explain the concepts of Lean and Agile Manufacturing. Discuss the advantages offered by these systems to the industries.	**07**
	(b)	Explain the working of a typical KANBAN system with the help of a neat diagram clearly indicating the flow lines.	**07**
Q.5	**(a)**	(i) Define MTBF and MTTR and explain their significance in reliability calculations of any system.	**04**
		(ii) A system has MTBF of 1000 hrs. and MTTR of 40 hours. Find out the availability of that system.	**03**
	(b)	Define Probability. Explain fundamental laws of probability with suitable examples.	**07**

OR

Q.5 **(a)** Following table indicates part of the failure data of 1000 components. Find out the question mark items in the table. **07**

Time Interval	No. of Failure	Cumulative Failure	No. of Survivors	Failure Density	Failure Rate	Reliability
0		0	1000			
	130			?	?	
1		130	870			?
	83			?	?	
2		213	787			
	75			?	?	
3		288	712			
	68					

(b) Define Reliability. Draw a typical Bath-Tub Curve and explain its phases. **07**

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