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   **07**
quality control, quality assurance as well as quality management."
   (b) Briefly explain 7 QC Tools.   **07**

Q.2 **(a)** Explain the concept of Quality Circles. List the prerequisites of forming a   **07**
Quality Circle. List advantages and drawbacks of Quality Circles.
   (b) Explain PDCA cycle in details with suitable example.   **07**
                                  OR
   (b) Explain 4 basic cost elements covered under "Cost of Quality" system giving   **07**
at least two examples of each cost element.

Q.3 **(a)** Define FMEA. Explain how it helps in ensuring quality of a product. Draw a   **07**
typical format of FMEA and explain its elements in brief.
   (b) Explain each phase of 5S technique. List the advantages offered by 5S   **07**
technique.
                                  OR

Q.3 **(a)** Explain the basic concept of ISO 9000 certification. What are the advantages   **07**
and implementation barriers of the same?
   (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   **07**
Techniques helps achieving robust design of a product?
   (b) What is TPM? Explain the objectives and benefits of implementing TPM in   **07**
an industry.
                                  OR

Q.4 **(a)** Briefly explain the concepts of Lean and Agile Manufacturing. Discuss the   **07**
advantages offered by these systems to the industries.
   (b) Explain the working of a typical KANBAN system with the help of a neat   **07**
diagram clearly indicating the flow lines.

Q.5 **(a)** (i) Define MTBF and MTTR and explain their significance in reliability   **04**
calculations of any system.

(ii) A system has MTBF of 1000 hrs. and MTTR of 40 hours. Find out the   **03**
availability of that system.

   (b) Define Probability. Explain fundamental laws of probability with suitable   **07**
examples.

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

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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