Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-VII Examination-Nov/Dec.-2011

Subject code: 171906 **Date: 29/11/2011**

Subject Name: Quality and Reliability Engineering

Time: 10.30 am-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.**

Q.1	**(a)**	(i). Give any two definitions of TQM.	**02**
		(ii). Discuss the principles of TQM.	**05**
	(b)	Enlist the various phases of quality revolution and discuss inspection, quality control and quality assurance.	**07**
Q.2	**(a)**	(i). Define Prevention, Appraisal, Internal failure and External failure terms with respect to the cost of quality.	**04**
		(ii). Discuss the uses of quality cost information.	**03**
	(b)	(i). Define QFD.	**02**
		(ii). Discuss house of quality-product planning matrix.	**05**
		OR	
	(b)	Write short note on KAIZEN.	**07**
Q.3	**(a)**	(i). Define factors, levels and response with reference to Design of Experiment giving suitable example.	**03**
		(ii). Explain Taguchi Quality Loss Function.	**04**
	(b)	Discuss the clause "Management responsibility" with respect to ISO 9001:2000.	**07**
		OR	
Q.3	**(a)**	(i). Define Environment Management System.	**02**
		(ii). Discuss the five major elements of environment management system (ISO 14001).	**05**
	(b)	Write brief note on TPM covering its objectives and implementation steps.	**07**
Q.4	**(a)**	(i). Discuss failure characteristics of product depicting its three major life regions.	**04**
		(ii). Discuss system reliability for the assembly in which components are connected in series.	**03**
	(b)	(i). With reference to BPR, discuss three criteria for identification of the process to be reengineered.	**03**
		(ii). Discuss the principles of Re-engineering.	**04**
		OR	
Q.4	**(a)**	(i). Define benchmarking along with its three major types.	**03**
		(ii). Discuss the benchmarking process cycle in detail.	**04**
	(b)	(i). Discuss four-phase approach for eliminating the cause of defects with respect to six sigma.	**04**
		(ii). Define process capability index giving significance of its value.	**03**

Q.5 **(a)** Write short note on JIT production system. **07**

(b) (i). Define failure rate, mean time between failure (MTBF) and mean time to repair (MTTR). **03**

(ii). Based on data given in the following table (for product A and B) answer the following; **04**

(1). Which product has higher reliability?

(2). Which product has greater maintainability?

Product	MTBF (hrs.)	MTTR (hrs.)
A	100	6
B	140	4

OR

Q.5 **(a)** (i). Discuss two card KANBAN system. **04**

(ii). The process of making component X for product Y involves six workstations. The cycle time is 4 minutes per item for each workstation. What will be the impact of reducing lot size from 12 units to 4 units on process flow through time and work in process inventory level **03**

(b) (i). Define multiplication law (theorem) of probability. **02**

(ii). A lot of 25 articles contain 3 defective. A sample of 5 is selected at random from the lot for inspection. What are the respective probabilities of 0 and 1 defective occurring in the sample of 5? **05**

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