

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**
