# GUJARAT TECHNOLOGICAL UNIVERSITY
## BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

**Subject Code:3171929**                                    **Date:01-12-2023**
**Subject Name: Quality and Reliability Engineering**
**Time: 10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

| | | | |
|---|---|---|---|
| **Q.1** | **(a)** | How Juran, Deming and Crosby define Quality? | **03** |
| | **(b)** | Enlist the dimensions of Quality and explain any three dimensions of Quality in detail. | **04** |
| | **(c)** | Explain in brief house of quality – Product Planning matrix with suitable example. | **07** |
| | | | |
| **Q.2** | **(a)** | Describe 80/20 rule of Pareto diagram in detail. | **03** |
| | **(b)** | Illustrate the purpose of implementation of ISO 14000 in industries for India. | **04** |
| | **(c)** | Explain how FMEA helps in ensuring quality of a product. Draw a typical format of FMEA and explain the influence of RPN number in FMEA. | **07** |
| | | **OR** | |
| | **(c)** | What is Total Employee involvement? How leader can improve the total employee involvement? | **07** |
| | | | |
| **Q.3** | **(a)** | Enlist the steps of Experimental design process. | **03** |
| | **(b)** | Why Poka-Yoke is known as error-proofing techniques? | **04** |
| | **(c)** | Briefly explain Toyota's seven deadly wastes. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | What is Design of Experiments (DOE)? Enlist the types of Experimental Design. | **03** |
| | **(b)** | What is fishbone diagram? Construct fishbone diagram for poor mileage of two-wheeler. | **04** |
| | **(c)** | Explain briefly seven principles of JIT in detail. | **07** |
| | | | |
| **Q.4** | **(a)** | Briefly explain Autonomous Maintenance? | **03** |
| | **(b)** | Explain the Cost of Quality in detail. | **04** |
| | **(c)** | Explain Lean manufacturing and World class manufacturing in detail. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Discuss the differences between a traditional push system and a JIT demand-pull system. | **03** |
| | **(b)** | Illustrate Agile manufacturing with suitable example. | **04** |
| | **(c)** | Briefly explain the concept of Six sigma with its advantages and limitations. | **07** |
| | | | |
| **Q.5** | **(a)** | Define Maintainability and availability and compare it with reliability. | **03** |
| | **(b)** | Define the terms in context of reliability 1) MTTF 2) Reliability function 3) Failure rate 4) Active redundancy | **04** |
| | **(c)** | What is inspection and repair availability model? Explain a case for it. | **07** |

**Q.5** **(a)** Enlist types of Reliability and explain any three. **03**

**(b)** Derive equation for hazard rate function using reliability, probability density **04**
function and cumulative distribution function.

**(c)** What are the four types of benchmarking? How it is useful in industries? **07**

************