

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 7 – EXAMINATION – SUMMER 2026

Subject Code: 3172013

Date: 20/05/2026

Subject Name: Quality Assurance and Reliability

Time: 02:30 PM TO 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.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a) Define Quality and explain its importance in manufacturing. **03**
 - (b) Differentiate between internal and external failure costs. **04**
 - (c) Explain the Cost of Quality and its various components with examples **07**
- Q.2**
- (a) What is the purpose of an R-chart? **03**
 - (b) Write short notes on “Assignable and Chance causes of variation”. **04**
 - (c) Explain process capability study and how it is calculated. **07**
- OR
- Q.2**
- (c) Describe practical methods for improving reliability in manufacturing systems. **07**
- Q.3**
- (a) What is the purpose of system improvement? **03**
 - (b) Discuss the advantages of parallel redundancy. **04**
 - (c) Discuss the role and advantages of Statistical Quality Control in manufacturing. **07**
- OR
- Q.3**
- (a) What are the basic steps in problem-solving? **03**
 - (b) Explain how Pareto analysis helps in decision-making. **04**
 - (c) Explain Taguchi methods for design of experiments and robust design. **07**
- Q.4**
- (a) Write short notes on “Vendor Development”. **03**
 - (b) Discuss Quality Planning and Quality Program. **04**
 - (c) Write a detailed note on PDCA cycle and its significance in QA. **07**
- OR
- Q.4**
- (a) What is Failure Density Function? **03**
 - (b) Explain the relationship between Reliability and Failure Rate. **04**
 - (c) Discuss the role of reliability in product design and quality control. **07**
- Q.5**
- (a) What are the advantages of implementing TQM? **03**
 - (b) Compare Inspection, Quality Control, and Quality Assurance. **04**
 - (c) Explain the role of management commitment in achieving Total Quality. **07**
- OR
- Q.5**
- (a) State the benefits of Statistical Quality Control (SQC). **03**

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| (b) Explain the concept of variation in quality control. | 04 |
| (c) Discuss Six Sigma process improvement methodology (DMAIC). | 07 |
