

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3164101

Date: 08/06/2026

Subject Name: Automation System Design

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) Define automation and List the types of automation. **03**
 - (b) Compare fixed and programmable automation. **04**
 - (c) Explain the concept and design of automated flow lines. **07**
- Q.2**
- (a) What do you mean by product design for automation? **03**
 - (b) Compare manual vs automatic insertion methods. **04**
 - (c) Develop a modular product design suited for automation. **07**
- OR
- Q.2**
- (c) Evaluate the impact of mechatronic systems in manufacturing. **07**
- Q.3**
- (a) What are the elements of a mechatronic system? **03**
 - (b) Discuss product design guidelines for automatic assembly. **04**
 - (c) Compare condition monitoring techniques used in automated systems. **07**
- OR
- Q.3**
- (a) State the advantages of mechatronic design. **03**
 - (b) Explain general design rules for automation. **04**
 - (c) Discuss the impact of programmable automation on modern manufacturing. **07**
- Q.4**
- (a) What is condition monitoring? **03**
 - (b) Compare conventional and CNC machines. **04**
 - (c) Discuss integration of AS/RS and RFID in an automated assembly system. **07**
- OR
- Q.4**
- (a) What is the function of drive motors in CNC? **03**
 - (b) Analyze drive systems used in CNC. **04**
 - (c) Evaluate the advantages of automated assembly systems. **07**
- Q.5**
- (a) Explain the design of pick and place robot. **03**
 - (b) State and explain applications of CIM. **04**
 - (c) List and explain actuators used in mechatronic systems. **07**
- OR
- Q.5**
- (a) Differentiate between open loop and closed loop systems. **03**

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| (b) Describe features of modern CNC controllers. | 04 |
| (c) Explain the impact of mechatronic systems in manufacturing. | 07 |
