

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2024

Subject Code:3172010

Date:04-12-2024

Subject Name: Automated Manufacturing

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) Write a short note on Automated System. 03
- (b) Explain advantages of NC/CNC machine tool over conventional machine tool. 04
- (c) Write a CNC program for the given part drawing in figure-1 using suitable G-Codes and M-Codes. 07

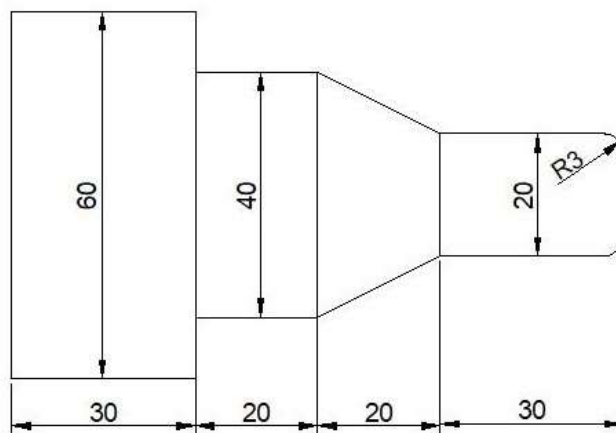


Figure-1

- Q.2 (a) Define Accuracy, Precision and Resolution for a machine tool. 03
- (b) Differentiate between Fixed Automation and Programmable Automation. 04
- (c) What is layout in manufacturing industries? Explain process layout and cellular layout with one application each in detail. 07
- OR**
- (c) Explain machine origin, part origin and program origin with sketches. 07
- Q.3 (a) Define Robot as per RIA and mention its industrial applications. 03
- (b) Define basic categories of codes used in CNC machine tool. 04
- (c) Explain Ten Strategies for Automation and Process Improvement. 07
- OR**
- Q.3 (a) Briefly explain the USA Principle for automation. 03
- (b) Write a short note on part family. 04
- (c) Explain Rank Order Clustering Technique in detail. 07
- Q.4 (a) What are the three laws of Robotics proposed by Asimov? 03
- (b) Write a short note on forward kinematics of Robot. 04
- (c) What is Robot configuration? With neat sketch explain any two basic Robot configurations in detail. 07

**OR**

- Q.4** (a) Mention various input methods for programming the NC and CNC machine tools? **03**
- (b) What are the advantages of linear motion guideways. **04**
- (c) Explain different types of joints used in Robotics. **07**
- Q.5** (a) Explain significance of Automatic Tool Changer (ATC). **03**
- (b) What are the different types of grippers used in robotics? **04**
- (c) What is Flexible Manufacturing System (FMS)? Discuss the following in terms of FMS: (1) Production Flexibility (2) Mix Flexibility (3) Product Flexibility (4) Routing Flexibility (5) Volume Flexibility (6) Expansion Flexibility **07**

**OR**

- Q.5** (a) What are the benefits of Group Technology? **03**
- (b) Explain working of optical encoder with sketch. **04**
- (c) Compare NC, CNC and DNC systems in detail. **07**

\*\*\*\*\*