## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VII EXAMINATION - SUMMER 2016** 

Subject Code:172002 Date:07/05/2016

Subject Name: Automated Manufacturing - I

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.
- Q.1 (a) The following component is to be made using a CNC turning centre equipped with a FANUC OT controller. Write a complete manual part program for machining of the component shown in figure 1. Take Raw material of size Φ100 x 130 mm. Limit maximum spindle speed to 3000 RPM.

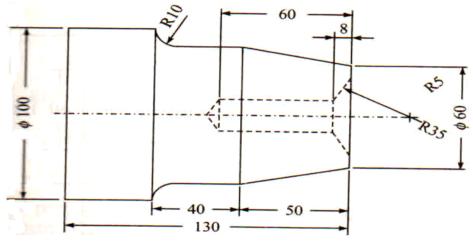


Figure 1. (All Dimension are in mm)

(b) Write a part program to machine the profile as shown in figure.2. Raw material size: 160×125×5mm.

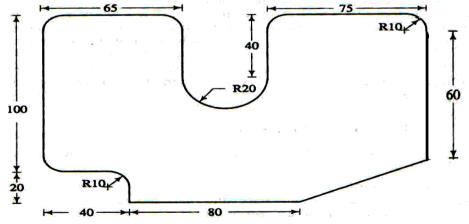


Figure 2. (All Dimension are in mm)

- **Q.2** (a) What is the stick-slip phenomenon in friction guideways? Why the friction **07** guideways are not used in CNC machine tools?
  - (b) With the help of neat sketch, explain the methods of eliminating the backlash 07 in recirculating ballscrews.

OR

**(b)** With the help of neat sketch, Explain the methods and purpose of preloading of recirculating ballscrews.

**07** 

- Q.3 (a) Explain the two types roller screws method with construction detail and 07 compare the roller screws over ballscrews.
  - (b) The following component is to be made using a CNC turning centre equipped with a FANUC OT controller. Write a complete manual part program for machining of the component shown in figure 3. Take Raw material of size Φ90 x 125 mm. Limit maximum spindle speed to 2000 RPM.

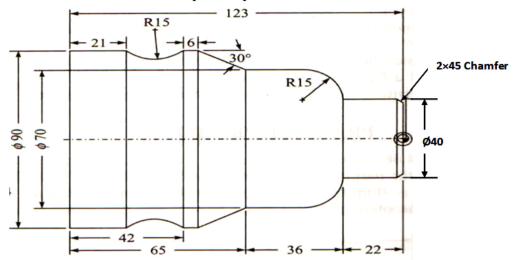
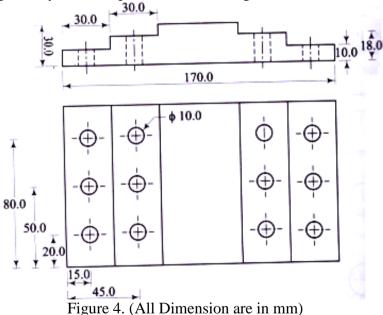


Figure 3.(All Dimension are in mm)

OR

- Q.3 (a) What is the need for cutter radius compensation? How do you decide the use of G41 (left hand cutter radius) and G42(Right hand cutter radius)?
  - (b) Prepare the process plan and write the manual part program for machining the 07 holes using G81 cycle in the plate as shown in figure 3.



- Q.4 (a) What is the advantage of subprograming? What is the format for a subprogram 07 call?
  - **(b)** Explain the principle of CMM. Describe the methods of operating and **07** controlling a CMM.

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- Q.4 (a) Explain three different type of technologies that are used in AGVs for vehicle 07 guidance.
  - (b) The height of storage aisle in an AS/RS= 46 ft and length of the L= 280 ft. **07** suppose horizontal and vertical speeds of the S/R machine are 250 ft/min and 75 ft/min, respectively. The S/R machine requires 20 sec to accomplish a pick

up—and—deposit operation. Find: (a) throughput for the aisle under assumptions that storage system utilization = 90% and a ratio of single-command to dual-command cycles of 3:1 (b) the single command and dual command cycle times per aisle.

Q.5	(a)	Describe in brief one of the RP process laminated object manufacturing.	07
	<b>(b)</b>	Explains in briefly the types of AS/RS.	07
		OR	
Q.5	(a)	What is the difference between point-to-point and continuous path control systems?	07
	<b>(b)</b>	What does the term reverse engineering mean in the context of coordinate measuring machines?	07

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