

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013**

**Subject code: 712803N****Date: 03-01-2014****Subject Name: Product Automation & CNC Technology****Time: 10.30 am – 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.

- Q.1** (a) What are the applications of CNC technology in manufacturing? Why CNC machine tools are widely accepted by modern industries? **07**
- (b) Sketch and designate the axes of universal column and knee type milling machine. **07**
- Q.2** (a) Using neat sketch, explain the working principle of incremental and absolute optical encoders. **07**
- (b) Give the difference between an Open loop and a Closed loop control system. **07**
- OR**
- (b) With the help of neat sketch, explain the methods of eliminating the backlash in recirculating ball screws. **07**
- Q.3** (a) Explain the following terms: **07**
- (i) Modal and Non Modal codes
- (ii) Absolute and Incremental Positioning
- (iii) Tool nose radius compensation
- (b) Briefly explain sequence number, preparatory codes and miscellaneous codes. **07**
- OR**
- Q.3** (a) What is cutter radius compensation? Discuss when it is used and how it is included in the part programme? **07**
- (b) What do you understand by machine zero and work zero? Explain. **07**
- Q.4** (a) What are the different statements used to write a part programme using APT? Discuss any two statements with the help of suitable examples. **07**
- (b) How are CNC machines designed and equipped incorporating automation? **07**
- OR**
- Q.4** (a) Give some examples of automation with specific reference to manufacturing of discrete components and parts. **07**
- (b) Explain ACC and ACO briefly. **07**
- Q.5** (a) Write a note giving examples of repetitive programming in APT. **07**
- (b) Develop a program using appropriate G and M codes to turn a MS bar of size and shape as shown in Fig.1. Use various canned cycles for roughing, grooving and threading operation. Assume suitable data for speed, feed and depth of cut. The raw material size is  $\phi 30 \times 60$  bar. **07**

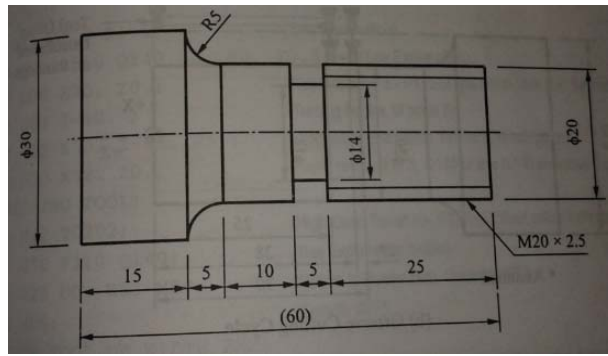


Fig.1

OR

- Q.5** (a) What are the different strategies adopted in automation. **07**  
 (b) Write a part program using appropriate G and M codes to turn component as shown in Fig.2. Assume suitable data for speed, feed and depth of cut. The raw material size is  $\phi 32 \times 50$  bar. **07**

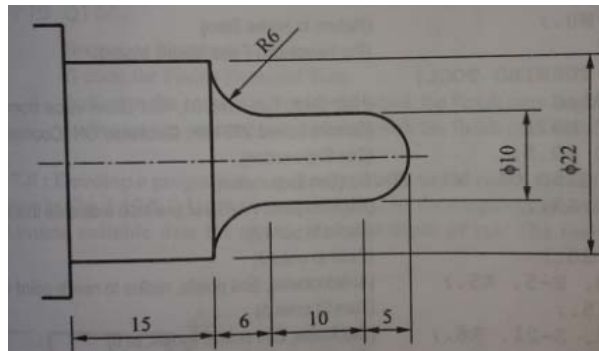


Fig.2

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