Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 172002 **Date: 02/05/2017**

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 figure1. Take Raw material of size Φ145 x 210 mm. Limit maximum spindle speed to 3000 RPM. **07**

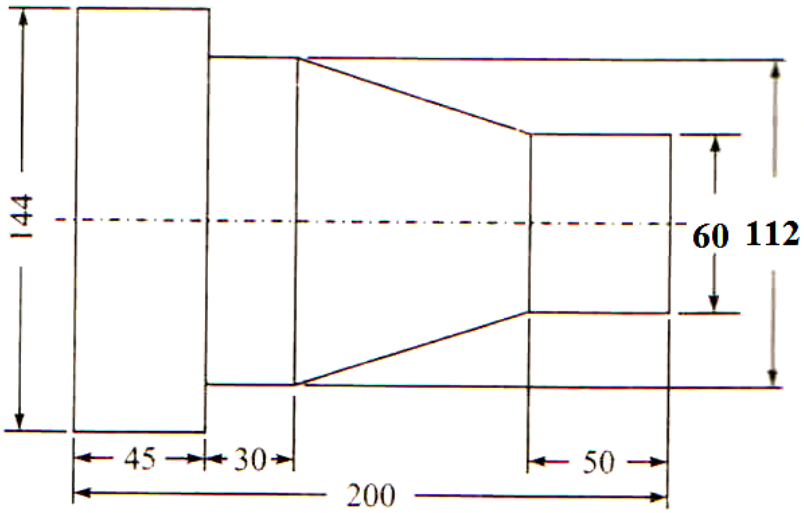

Figure 1. (All Dimension are in mm)

(b) Write a part program to machine the profile as shown in figure.2. Raw material size: 8×4×2 inch. **07**

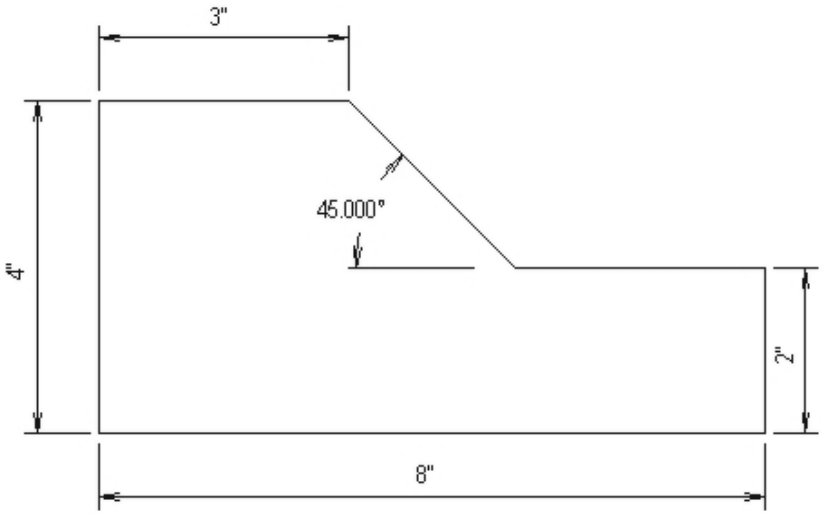

Figure 2. (All Dimension are in inch)

Q.2 **(a)** Applications of CNC Technology in Manufacturing. **07**

(b) What is the USA Principle? List and explain the ten stratorgies for automation and process improvement. **07**

OR

(b) The work table of a NC machine is driven by a closed loop positioning system. Lead screw pitch is 5mm and is coupled directly to the motor shaft with gear ratio of 5:1. The optical encoder generates 125 pulses per revolution of its output shaft. The table has been programmed to move a distance of 200mm at a feed rate of 450mm/min. **07**

1. How many pulses are received by the control system to verify that the table has moved exactly 200mm?
2. What are the pulse rate and the motor speed that corresponds to the specified feed rate?

Q.3 **(a)** DNC Systems. Differentiate between Direct and Distributed. **07**

(b) Differentiate Automatic Tool Changer(ATC) and Automatic Pallet Changer(APC) in CNC machine. **07**

OR

Q.3 **(a)** What are the differences between NC and CNC machines? Discuss the factors due to which CNC machines have completely taken over from NC machine tools. **07**

(b) Explain the difference between the following cycles with respect to the spindle rotation and tool movements. **07**

(i) G74 and G84

(ii) Boring and back boring cycles

Q.4 **(a)** Describe traffic control patterns used in AGV's traffic management. **07**

(b) With neat sketch explain different types of coordinate masuring machine (CMM) configuration. **07**

OR

Q.4 **(a)** Describe briefly various guidance methods available for automated guided vehicle (AGV). **07**

(b) The length of the storage aisle in an AS/RS = 250 ft and its height = 70 ft. suppose horizontal and vertical speeds of the S/R machine are 410 ft/min and 70 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. **07**

Q.5 **(a)** Explain method and working of Laminated Object Manufacturing (LOM). **07**

(b) What is the AS/RS system and carousel system? Explain basic component of automated storage/retrieval system. **07**

OR

Q.5 **(a)** With neat sketch explain the four basic steps of rapid prototype techniques. **07**

(b) Explain any one multipass canned cycle in CNC turning. **07**

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