

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2018

Subject Code: 2172002/2172010

Date: 19/11/2018

Subject Name: Automated Manufacturing - I

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.

- Q.1** (a) What are the advantages of ballscrews over leadscrews? **03**
 (b) Explain three phase of a typical automation migration strategy. **04**
 (c) 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 fig.1. Take Raw material of size $\phi 152 \times 255$ mm. Limit Maximum spindle Speed to 2500 RPM. **07**

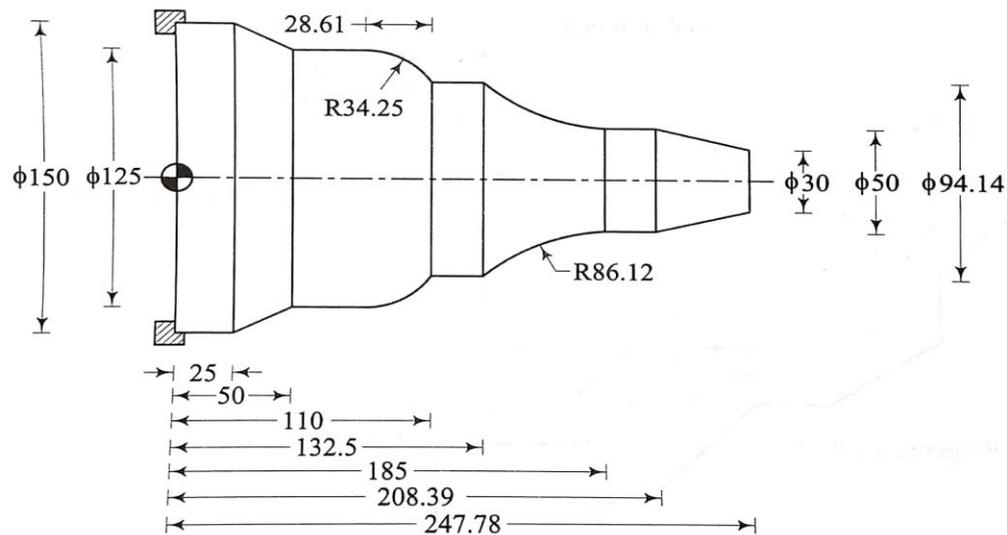
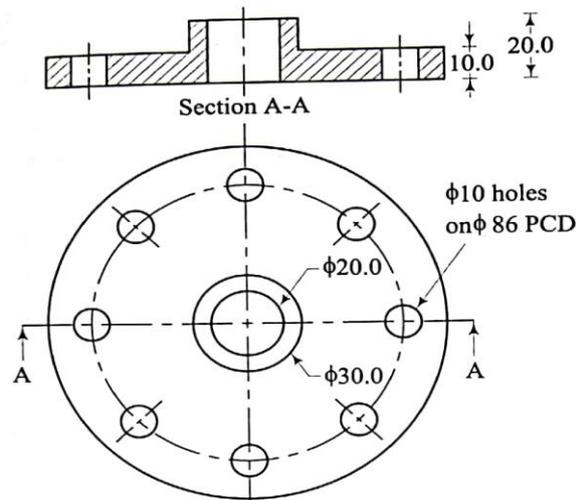


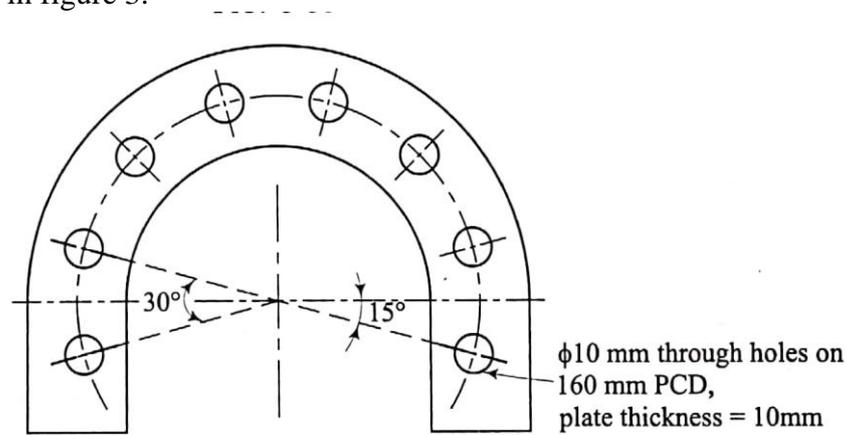
Fig 1. (All Dimension are in mm)

- Q.2** (a) Explain three types of automation. **03**
 (b) What is difference punched cards and punched tape? **04**
 (c) Write down part program using (i) Cartesian and (ii) polar coordinate system for machining the holes on the pitch circle diameter in the part shown in figure 2. **07**



OR

- (c) Write down part program for machining the holes on the pitch circle diameter in the part shown in figure 3. 07



- Q.3** (a) Explain the difference between modal and non-modal codes. 03
 (b) What are the advantage of LM guideways? 04
 (c) Differentiate between machine zero, part zero and programmers zero. 07

OR

- Q.3** (a) What is canned cycle ? 03
 (b) Differentiate between Direct and Distributed. 04
 (c) 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.
 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.4** (a) What is an automated guided vehicle system (AGVS) ? 03
 (b) Name the three categories of automated guided vehicle. 04
 (c) What is process planning ? Briefly describe the two basic approaches in computer aided process planning. 07

OR

- Q.4** (a) What is the advantage of subprograming? What is the format for a subprogram call? 03
 (b) Identify the three application areas of automated storage/ retrieval systems. 04
 (c) The length of the storage aisle in an AS/RS = 280 ft and its height = 46 ft. suppose horizontal and vertical speeds of the S/R machine are 200 ft/min and 75 ft/min, respectively. The S/R machine requires 20 sec to accomplish a pick up –and –deposit operation. Find : (a) single command and dual command cycle times per aisle (b) 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) Application of rapid prototyping techniques 03
 (b) What is the AS/RS system and carousel system? 04
 (c) With neat sketch explain six different types of coordinate measuring machine (CMM) configuration. 07

OR

- Q.5** (a) Describe in brief one of the RP process laminated object manufacturing. 03
 (b) Explain Contact and non contact type inspection techniques in CMM. 04
 (c) 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
