Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2016

Subject Code:172501 **Date:16/05/2016**

Subject Name:Computer Aided Manufacturing

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)**	Differentiate between conventional and CNC machine tools.	**07**
	(b)	What is Production Flow Analysis in GT? Explain with suitable example.	**07**
Q.2	**(a)**	Explain drive systems used in robot.	**07**
	(b)	Discuss the Open loop & Closed loop control system of NC/CNC machines.	**07**
		OR	
	(b)	Explain axis identification for Lathe, Milling & Drilling machines with neat sketches.	**07**
Q.3	**(a)**	Explain how robot is programmed? Explain different programming methods.	**07**
	(b)	Discuss different elements of CIM with neat sketch.	**07**
		OR	
Q.3	**(a)**	Write short note on Generative process planning.	**07**
	(b)	Explain components of AS/RS used in FMS	**07**
Q.4	**(a)**	Define Mechatronics? Explain benefits & applications of Mechatronics in Manufacturing.	**07**
	(b)	Write the manual part programme for profile milling of the part shown in figure-1. Assume plate thickness to be 10mm. Refer Table -1 for 'G' codes & 'M' codes	**07**
		OR	
Q.4	**(a)**	Write the manual part programme for the part shown in figure-2. Assume suitable raw material size. Refer Table -1 for 'G' codes & 'M' codes	**07**
	(b)	List types of Rapid Prototyping Processes & explain "Selective Laser Sintering" with neat sketch.	**07**
Q.5	**(a)**	Discuss the salient features of Absolute & Incremental programming system with suitable example.	**07**
	(b)	Explain with neat sketch re-circulating ball screw mechanism.	**07**
		OR	
Q.5	**(a)**	What is the difference between Do loop & subroutine? Discuss with suitable example.	**07**
	(b)	What are the four types of statements in APT language? Explain how each of these is useful in APT programming?	**07**

CNC G codes

G00 - Positioning at rapid speed; Mill and Lathe
G01 - Linear interpolation (machining a straight line); Mill and Lathe
G02 - Circular interpolation clockwise (machining arcs); Mill and Lathe
G03 - Circular interpolation, counter clockwise; Mill and Lathe
G04 - Mill and Lathe, Dwell
G20 - Inch units; Mill and Lathe
G21 - Metric units; Mill and Lathe
G40 - Cancel diameter offset; Mill. Cancel tool nose offset; Lathe
G41 - Cutter compensation left; Mill.
G42 - Cutter compensation right; Mill.
G43 - Tool length compensation; Mill
G44 - Tool length compensation cancel; Mill (sometimes G49)
G90 - Absolute programming
G91 - Incremental programming
G92 - Reposition origin point; Mill
G92 - Thread cutting cycle; Lathe
G94 - Per minute feed; Mill
G95 - Per revolution feed; Mill

CNC M Codes

M00 - Program stop; Mill and Lathe
M01 - Optional program stop; Lathe and Mill
M02 - Program end; Lathe and Mill
M03 - Spindle on clockwise; Lathe and Mill
M04 - Spindle on counterclockwise; Lathe and Mill
M05 - Spindle off; Lathe and Mill
M08 - Coolant on; Lathe and Mill
M09 - Coolant off; Lathe and Mill
M30 - Program end, return to start; Lathe and Mill
M97 - Local sub-routine call; Lathe and Mill
M98 - Sub-program call; Lathe and Mill
M99 - End of sub program; Lathe and Mill

Table-1 (G codes & M codes for CNC part Programme)

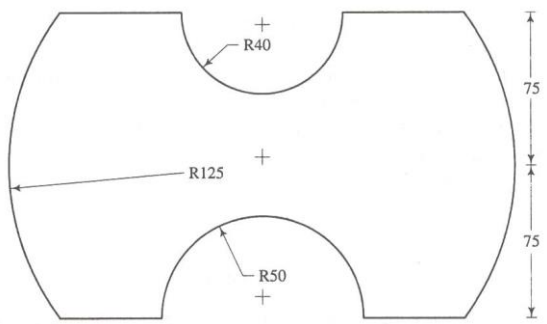

Figure-1, Q. 4 (b)

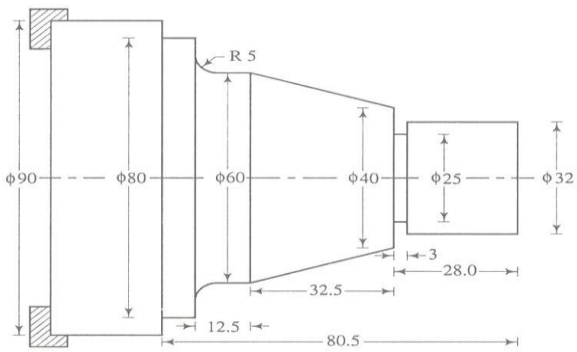

Figure-2, Q. 4 (a) OR

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