Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013

Subject code: 1725002 **Date: 27-12-2013**

Subject Name: Computer-Integrated Manufacturing

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.**
4. **Abbreviations have usual meaning.**

Q.1 **(a)** Enlist 10 discretely manufactured products that affect your life most. Which of the three types of facilities—mass-, batch-, or job shop-production—is used to manufacture the products you listed? Give two examples for continuous-flow class of manufacturing. **07**

(b) What is CIM? Explain the *CIM wheel* to elucidate the meaning of CIM, as suggested by CASA/SME. **07**

Q.2 **(a)** Explain, in detail, the steps in NC manufacturing right from *process planning* to actual machining. **07**

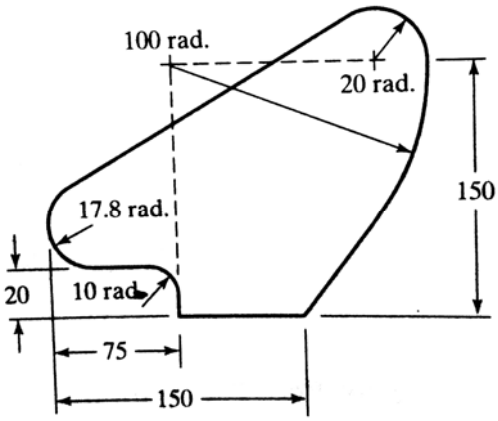
(b) Discuss the essential functions of DNC in addition to what NC/CNC machine tools provide.(any seven) **07**

OR

(b) Explain the major benefits that can be expected from successful FMS applications. **07**

Q.3 **(a)** Explain, using syntax, the following with reference to manual part programming: G92, G42, G02, G10, G01. What are EIA and ISO regarding punched tapes used on an NC machine? **06**

(b) The outline of the cam in figure below is to be machined in an end milling operation, using a 12.5-mm diameter end mill with two teeth. The part is 7.5 mm thick. Write the complete APT program for this job, using a feed rate = 80 mm/min and a spindle speed = 500 rev/min. Postprocessor call statement is MACHIN/MILL, 03. Assume the rough outline for the part has been obtained in a band saw operation. Ignore clamping issues in the problem. **08**



OR

Q.3 **(a)** Discuss the various features of an advanced CNC machine. **07**

(b) What is computer-assisted part programming? Why is it needed? Enlist different languages developed for it and, in particular, explain the procedure used in the APT language. **07**

Q.4	**(a)**	Through light on the functions performed by the FMS computer control system category wise.	**07**
	(b)	Write down various criteria a manufacturing system should satisfy to qualify as being flexible. Explain FMS operational issues.	**07**

OR

Q.4	**(a)**	'An AGVS provides a versatile material handling system to complement the flexibility of the FMS', justify the statement. Discuss *self-guided vehicles* (SGVs) in brief stating their main advantage.	**07**
	(b)	Write about any five types of AS/RS. Why, you think, has it found application for WIP recently?	**07**
Q.5	**(a)**	Suppose a company has designed a new product line and is planning to build a new plant to manufacture this product line. The new line consists of 100 different product types, and for each product type the company wants to produce 10,000 units annually. The products average 1000 components each, and the average number of processing steps required for each component is 10. All parts will be made in the factory. Each processing step takes an average of 1 min. Determine: (a) how many products, (b) how many parts, (c) how many production operations will be required each year, and (d) how many workers will be needed for the plant, if it operates one shift for 250 days/year?	**07**
	(b)	Explain the following terminology relating to manufacturing data communication: *data, information, signals, signaling, and transmission*. 'The diversity in the communications needs of CIM prevents implementation of full-blown CIM to achieve totally automated factory', justify the statement.	**07**

OR

Q.5	**(a)**	Brief, using figures, about the hierarchical-, network-, and relational-data models employed for manufacturing.	**07**
	(b)	Explain various layout configurations found in FMSs using figures. State the type of material handling system used in each layout.	**07**

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