

**GUJARAT TECHNOLOGICAL UNIVERSITY**

M.E Sem-II Examination July 2010

Subject code: 720802

Subject Name: Computer Aided Manufacturing

Date: 06 /07 /2010

Time: 11.00am – 1.30pm

Total Marks: 60

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks

- Q.1** (a) In what way the structure of NC/CNC machine tools is different from conventional machine tool? Give your comments with proper justification. **06**
- (b) Enlist the Hardware and Software components of a FMS. What do you mean by the word Flexibility in the context of FMS and give detailed thought on various types of flexibilities that are relevant in production. **06**

- Q.2** (a) Enlist the conditions that have demanded the necessity of application of CIM in modern manufacturing environment. Also comment on how integration of manufacturing activities benefits the organization. **06**
- (b) In what way PLC, Microcomputer and Microcontroller are different than each other? Suggest their specific applications in manufacturing. **06**

**OR**

- (b) Give your thoughts on the role Expert system and Artificial Intelligence in CIM system. **06**
- Q.3** (a) Component shown in the fig. no.1 is to be machined on a CNC machining centre equipped with FANUC controller. Prepare a part program to completely machine this component from an aluminum stock of 70 x75 x12 mm. use appropriate values for cutting parameters and cutter sizes. **06**
- (b) Discuss various types of compensations to be considered while working with a machining centre. Give your comments on the effects, if these compensations are not considered. **06**

**OR**

- Q.3** (a) Component shown in the fig. no.2 is to be machined on a CNC turning centre equipped with FANUC controller. Prepare a part program to completely machine this component from rolled stock of mild steel with  $\Phi 130$  mm and length =175 mm. use appropriate values for cutting parameters. **06**
- (b) State and Justify the need of advanced machining capabilities which a modern day CNC machine demands. **06**

- Q.4** (a) Determine the number of pallets required in a FMS for the data given below. Parts required per shift = 20, Avg. pallet cycle time = 120 mins., Planned production per shift = 480, No. of parts per pallet = 1 **06**
- (b) Discuss the importance of proper presentation of work parts to the robots while operating in an FMS. Also discuss about machine vision system for robot operation. **06**

**OR**

- Q.4 (a)** Five machines in a FMS to be observed by an AGV. A linear single-row is recommended because of AGV. The data on the frequency of AGV trips, material-handling cost per unit distance, and clearance between the machines are given in the following tables. Suggest a suitable layout. **06**

<b>Frequency of trips between pairs of machines:</b>						<b>Cost Matrix:</b>					
	1	2	3	4	5		1	2	3	4	5
1	0	20	70	50	30	1	0	2	7	5	3
2	20	0	10	40	15	2	2	0	1	4	2
3	70	10	0	18	21	3	7	1	0	1	2
4	50	40	18	0	35	4	5	4	1	0	3
5	30	15	21	35	0	5	3	2	2	3	0

<b>The machine dimensions:</b>						<b>Clearance Matrix:</b>					
<i>Machines</i>	M1	M2	M3	M4	M5		1	2	3	4	5
Machine sizes	10*10	15*15	20*30	20*20	25*15	1	0	2	1	1	1
						2	2	0	1	2	2
						3	1	1	0	1	2
						4	1	2	1	0	1
						5	1	2	2	1	0

- (b)** Discuss about working and types of a Coordinate measuring machine (CMM). Also state its role in modern CAD/CAM environment. **06**

- Q.5 (a)** Give your thoughts on requirements and functioning of Tool Management system in FMS. **06**

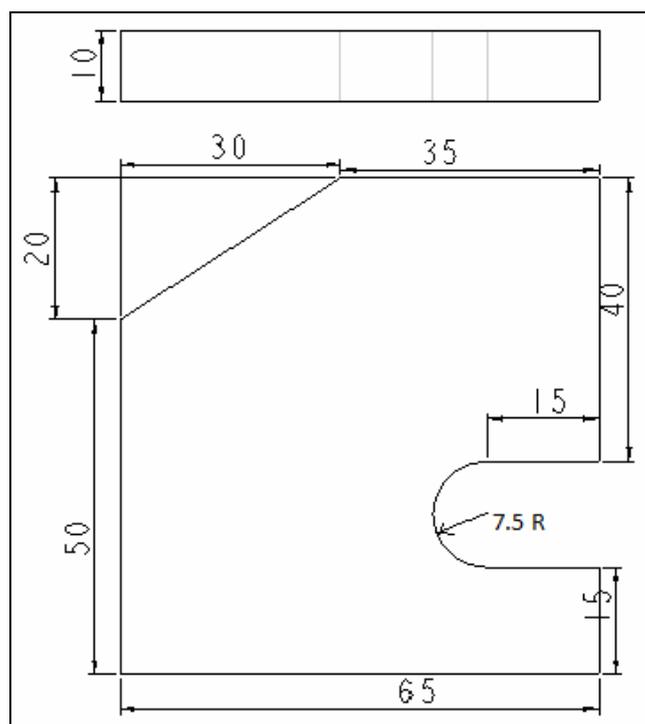
- (b)** Discuss Integrated Product Development (IPD) and Product Life cycle management (PLM) in the context of Concurrent Engineering. **06**

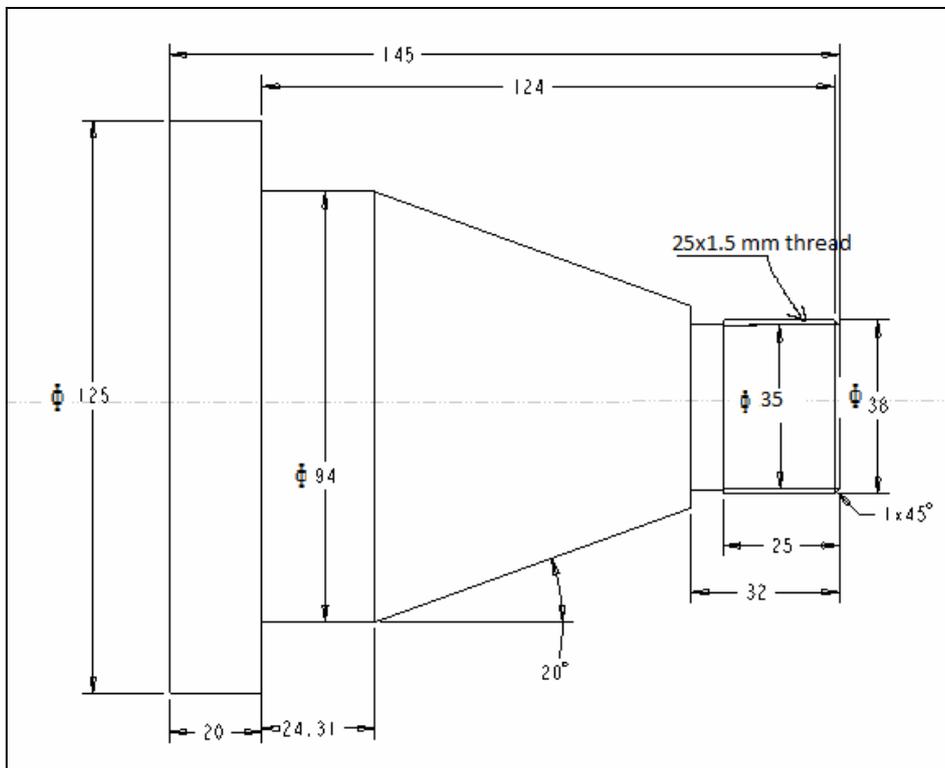
**OR**

- Q.5 (a)** Differentiate between serial and parallel port communication systems. Which data communication system is generally used in CNC machines and why? **06**

- (b)** Give detailed idea about various principles used for Tool condition Monitoring. How do these principles help to increase productivity of an FMS? **06**

**Fig. No.-1**





**Fig. no.-2**

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