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Third Semester M.Tech. Degree Examination, December 2010 Automation in Manufacturing

Time: 3 hrs. Max. Marks:100

Note:1. Answer any FIVE full questions.
2. Draw neat sketches, wherever required.

- 1 a. List and explain automation strategies practiced in automated manufacturing industries.
 (10 Marks)
 - b. Explain with necessary equations the following parameters of production models.
 - i) Manufacturing lead time ii) Capacity iii) Work in process.
- 1) Manufacturing lead time 11) Capacity 111) Work in process. (10 Marks)

 2 a. What are the different types of automations used in practice? Explain the same with respect
 - to volume V/s varities of production graph.

 (10 Marks)

 b. Three products are to be processed through a certain type of work center. Pertinent data are given in the following table:

 (10 Marks)

	Product	Weekly Demand	Production rate (units / h)				
	1	600	10				
	2	1000	20				
i	3	2200	40				

Determine the number of work centers required to satisfy this demand, given that the plant works 10 shifts per week and there are 6.5 hrs available for production on each work center for each shift. It is observed that only one operation is to be performed on one product.

- a. List the different types of material handling systems, used with automated manufacturing systems. Explain any one with the necessary sketch. (10 Marks)
 - b. List and explain the difference between power and gravity assisted feed tracks, used with automated flow line. (10 Marks)
- 4 a. List and explain the necessary requirements of sensors and transducers, used with automated manufacturing shop floors. (10 Marks)
 - b. What do you mean by image data acquisition? Explain the vision system, used with automated manufacturing systems. (10 Marks)
- 5 a. With a flow diagram, explain the retrieval / CAPP system. (10 Marks)
 - b. Write a note on the following: i) Lean production concept ii) Agile manufacturing.
 (10 Marks)
- 6 a. List the six basic components required in a hydraulic fluid power system and state their essential functions. (10 Marks)
 - b. Explain clearly the terms, "cracking pressure", "full flow pressure" and "pressure over ride". (06 Marks)
 - c. State disadvantages of using air, instead of hydraulic oil, in a fluid power system. (04 Marks)
- 7 a. With the aid of a suitable circuit, explain briefly the: meter in and meter out circuit.

(10 Marks)

- b. Using the two way, two position direction control valves, show how the following logic functions can be achieved in pneumatics.

 (10 Marks)
- i) AND ii) OR iii) NOR iv) NAND.

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- 8 a. With the necessary sketch, explain the PLC used with hydraulic systems. (10 Marks)
 - b. List and explain the advantages of using PLC in hydraulic / pneumatic systems. (05 Marks)
 - c. Explain the following low level PLC instructions for a PLC: i) STR ii) TMR
 iii) CTR iv) OUT v) IN. (05 Marks)