

**First Semester M.Tech. Degree Examination, Dec.2014/Jan.2015**  
**Automation in Manufacturing Systems**

Time: 3 hrs.

Max. Marks: 100

**Note: Answer any FIVE full questions.**

- 1 a. Explain with sketch, the various functions of a manufacturing support system. (10 Marks)  
 b. What are the strategies for automation? Explain (10 Marks)
- 2 a. Explain the following manufacturing technologies with the relevant equations :  
 i) Production capacity (Pc)  
 ii) Manufacturing Lead Time (MLT)  
 iii) Work in Process (WIP). (10 Marks)  
 b. In a factory, an average of 20 new orders are processed every month and 50 parts are processed for every order. The processing is carried out by 10 machines. The average operation time is 15 min, average setup time is 4 hours and the average non – operation time per order is 8 hours per machine. There are 25 machines in the plant, 80% of which are operational at any time and the other 20% are under repair and maintenance. The plant operates an average of 160 production hours per month. However, the plant manger complains that a total of 100 overtime machine hours must be authorized each month in order to keep up with the production schedule. Determine :  
 i) Manufacturing Lead Time (MLT) for an average order  
 ii) Plant Capacity (PC)  
 iii) If overtime should be authorized  
 iv) Plant Utilization (U)  
 v) Work In Process (WIP). (10 Marks)
- 3 a. Explain the various levels of automation, with sketch. (10 Marks)  
 b. What are the different advanced automation functions? Explain (10 Marks)
- 4 a. What is the meaning of 'Process Planning'? Explain retrieval computer Aided Process Planning (CAPP) with sketch. (10 Marks)  
 b. Explain the requirements of a sensor/transducer. (10 Marks)
- 5 a. Explain the working of a double pump hydraulic circuit with a neat sketch. (10 Marks)  
 b. With a neat sketch, explain the working of meter –out circuit. (10 Marks)
- 6 a. Explain with a block diagram, the working of an Electro hydraulic servo system. (10 Marks)  
 b. With necessary sketches, explain NOT, NAND and NOR functions. (10 Marks)
- 7 a. What is a Programmable Logic Controller (PLC)? Explain with a block diagram, the various components of a PLC. (10 Marks)  
 b. Explain with sketch, the AND and OR Moving Part Logic (MPL) control system. (10 Marks)
- 8 a. With a block diagram, explain the various components of an Analog to Digital Converter (ADC). (10 Marks)  
 b. Explain with sketch, the Ladder Logic Circuit. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.